# A Symphony Uncovered- The Endocrine Dance

By Cobi Slater

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Introduction

The North American culture is currently experiencing alarmingly high rates of hormonal imbalances. These imbalances are setting the stage for a cultural shift towards disorders of the endocrine system to become seemingly “normal”. By the time the average North American woman has completed her morning routine, she has exposed her face, body and hair to over 126 chemicals from 12 different products. Theo Colborn, co-author of Our Stolen Future, states the findings of a gathering of international experts back in 1991. It was then that they first warned us about chemicals that have the potential to disrupt the hormone systems of humans and animals. These experts estimated with profound confidence that “unless the environmental load of synthetic hormone disruptors is abated and controlled, large scale dysfunction at the population level is possible”.

Exposing the many underlying causes of disparity within the hormonal systems of North American females is the first step towards healing. The incidence of hormonal dysfunction is specific to North American females as the rate of endocrine imbalances far supersedes that of any other culture on our planet. An obvious conclusion is that many women in North America are exposed to far more endocrine disruptors, experience endless stress and have poor dietary habits resulting in liver toxicity. People who are native to other cultures live simplistic lifestyles

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1 Slow Death By Rubber Duck pg. V111 Rick Smith and Bruce Lourie
relying entirely on nature to feed and house them. These people eat indigenously within their land and are not exposed to as many pollutants in the form of electromagnetic radiation, noise pollution, air pollution, pesticides, herbicides, preservatives and chemicals. Terms such as “hot flashes”, “PMS”, and “menopause” simply do not exist in their language. They are relatively free from hormonal irregularities and imbalances. Hormonal stages in a woman’s life such as menstruation, childbirth and the cessation of the menstrual cycle are celebrated through cultural rituals. Interviews of rural Mayan Indian women further illustrates that menopause, as an example, is far from a uniform experience. Researchers found that the women reported no incidences of hot flashes or any other significant menopausal symptoms. Mayan women tend to look forward to menopause because with it comes a progressive change in status within their communities and, in turn, a feeling of freedom. When women from indigenous cultures cross into menopause, they often become known as "wise women" or spiritual leaders and hold a place of power in their communities². In stark contrast, in North America, these stages have been medicalized and deemed pathological in nature. Menopause as an example is treated very much as a medical condition rather than as a natural phenomenon of a woman’s life.

There are many proven holistic treatments that are able to bring balance back into the endocrine systems of women. Conditions such as depression, anxiety, peri-menopause, menopause, pre-menstrual syndrome, fibroids, ovarian cysts, polycystic ovarian syndrome, endometriosis, adrenal fatigue, thyroid disorders and obesity are some of the main disorders that can result from hormonal imbalances. Rather than compartmentalize each organ of the body, a holistic approach is one that considers all aspects involved including dietary habits, stress, genetics, thought processes, exposure to toxins, liver toxicity and lifestyle habits.

Uncovering the underlying cause of any hormone imbalance is the most effective way to bring complete resolution and restoration of health.
Endocrine Overview- The Symphony

Every biological process within the body relies upon the hormones that are produced within the body’s endocrine glands. Hormones are sophisticated chemical messengers. They form the body’s major communication network system, allowing for different parts of the body to interconnect in a symphony.

There are several hormones secreted by the endocrine system. Each hormone affects only those body cells that have a genetic program that allows the cells to react only to those hormones that are related to them. The endocrine system functions like a lock and key mechanism. Therefore each hormone (aka “key”) can only fit into its genetic receptor (aka “lock”). Although each key has its own lock, there are circumstances when other keys can fit into other locks. An example of the lock and key function or dysfunction is the ability of environmental xenoestrogens (estrogen mimickers) which can fit into human estrogen receptor sites and may then cause severe hormonal disturbances.

The endocrine system is regulated by feedback in much the same way that a thermostat regulates the temperature in a room. For the hormones that are regulated by the pituitary gland, a signal is sent from the hypothalamus to the pituitary gland in the form of a "releasing hormone". This stimulates the pituitary to secrete a "stimulating hormone" into the circulation.
The stimulating hormone then signals the target gland to secrete its hormone. As the level of this hormone rises in the circulation, the hypothalamus and the pituitary gland shut down secretion of the releasing hormone and the stimulating hormone. In response, the secretion by the target gland is slowed down. This system results in stable blood concentrations of the hormones that are regulated by the pituitary gland.

The term “endocrine” implies that in response to specific stimuli, the products of those glands are released into the bloodstream. The hormones are then carried via the blood to their target cells. Some hormones have only a few specific target cells, whereas other hormones affect numerous cell types throughout the body. The target cells for each hormone are characterized by the presence of certain docking molecules (i.e., receptors) for the hormones that are located either on the cell surface or inside the cells. The interaction between the hormone and its receptor triggers a cascade of biochemical reactions in the target cell that eventually modifies the cell’s functions or activities.³

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³ The Endocrine System- An Overview Susanne Hiller-Sturmhöfel, Ph.D., and Andrzej Bartke, Ph.D.
The endocrine system is comprised of 8 major glands, namely:

1. Hypothalamus
2. Pituitary gland
3. Parathyroid gland
4. Thyroid gland
5. Adrenal glands
6. Pancreas
7. Ovaries (in the female body)
8. Testes (in the male body)
The following illustration portrays the glands of the Endocrine System:

The endocrine system is the body’s regulating mechanism. All of the body’s functions can be influenced by the endocrine system. This includes metabolism, growth, water and electrolyte balance, sexual function, reproduction and behavior. The function of the endocrine glands are numerous and specific to each individual gland.

• **Hypothalamus:** The hypothalamus is the main link between the endocrine system and the nervous system. It is a collection of specialized cells which are located in the lower central part of the brain. The nerve cells of the hypothalamus control the pituitary gland by stimulating or suppressing the hormone secretions.

• **Pituitary Gland:** The pituitary gland is the most important part in the endocrine system. It is often termed the “Master Gland” and is located at the base of the brain just below the hypothalamus. The pituitary gland secretes hormones on the basis of the emotional and seasonal changes. The hypothalamus sends information that is sensed by the brain to the pituitary triggering production hormones. Endorphins are also secreted by the pituitary gland that act on the nervous system and lower the feelings of pain. The pituitary gland is also involved in the production of hormones that signal the reproductive organs to secrete sex hormones and control the menstrual cycle in women.

The pituitary gland is divided into two parts- the anterior lobe and the posterior lobe. The anterior lobe of the pituitary gland regulates the activities of the thyroid, adrenals, and the reproductive glands. The anterior lobe also produces hormones such as:

• **Growth Hormone:** To stimulate the growth of the bones and tissues. It also plays a role in the body's absorption of nutrients and minerals

• **Prolactin:** To activate the production of milk in lactating mothers
• **Thyrotropin (TSH):** To stimulate the thyroid gland to produce thyroid hormones

• **Corticotropin:** To stimulate the adrenal glands to produce certain hormones

The posterior lobe of the pituitary gland produces antidiuretic hormones that help to control the water balance in the body. In addition oxytocin is produced by the posterior lobe and it triggers contractions of the uterus in a woman who is in labor.

• **Thyroid Gland:** The thyroid gland is located in the lower front part of the neck and is shaped like a bowtie or a butterfly. It produces the thyroid hormones thyroxine and triiodothyronine which regulate the metabolism of the body. Triiodothyronine (T3) and thyroxine (T4) look quite similar except for the number of iodine atoms they contain. Triiodothyronine has three iodine atoms and thyroxine has four iodine atoms. Very different quantities of these two hormones are produced in the thyroid gland. Approximately 93 percent of its thyroid hormone production is in the form of T4 and the remainder is in the form of T3.\(^5\)

Despite its higher level of production within the thyroid gland, T4 is considered an inactive form of the thyroid hormone. Only T3 or T4 that has been converted into T3 inside the cells can be used to produce energy in our cells. When the body’s energy requirements increase, the hypothalamus secretes thyrotropin-releasing hormone (TRH). TRH signals the pituitary gland to secrete thyroid-stimulating hormone (TSH). In turn, TSH stimulates the thyroid gland to produce

T4. T4 is secreted by the thyroid gland into the bloodstream and travels to distant cells. After it enters a cell, T4 must be converted into T3 which is the active form of thyroid hormone so that it can be used to fuel metabolic reactions.\(^6\)

The thyroid gland also plays a role in bone growth and development of the brain and nervous system in children. Thyroid hormones also help to maintain normal blood pressure, heart rate, digestion, muscle tone, and reproductive functions.

- **Parathyroid Glands**: These are four tiny glands that are attached to the thyroid gland. They release the parathyroid hormones that help in regulating the level of calcium in the blood along with calcitonin which is produced in the thyroid gland.

- **Adrenal Glands** The adrenal glands are triangular-shaped glands located on top of each kidney. The adrenal glands are made up of two parts. The outer part is called the adrenal cortex and the inner part is called the adrenal medulla. The outer part produces hormones called corticosteroids which regulate the body's metabolism, the balance of salt and water in the body, the immune system, and sexual function. The inner part, or adrenal medulla, produces hormones called catecholamine’s such as adrenaline. These hormones help the body cope with physical and emotional stress by increasing the heart rate and blood pressure.\(^7\)

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• **Reproductive Glands or Gonads:** The reproductive glands are the main source of sex hormones. In males, the testes, located in the scrotum, secrete hormones called androgens—the most important of which is testosterone. These hormones affect many male characteristics such as sexual development, growth of facial and pubic hair as well as sperm production. In females, the ovaries are located on both sides of the uterus. They produce estrogen and progesterone as well as eggs during ovulation. These hormones control the development of female characteristics such as breast development and they are also involved in reproductive functions such as menstruation and pregnancy.

• **Pancreas:** The pancreas is an elongated organ located toward the back of the abdomen behind the stomach. The pancreas has digestive and hormonal functions. One part of the pancreas, the exocrine pancreas, secretes digestive enzymes. The other part of the pancreas, the endocrine pancreas, secretes hormones called insulin and glucagon. These hormones regulate the level of glucose (sugar) in the blood.

• **Pineal:** The pineal gland is located in the center of the brain. Melatonin is secreted by this gland which regulates the circadian rhythm or the sleep-wake cycle of a person.
The following picture illustrates the main endocrine glands and the hormones they secrete:

Hormones are molecules that are produced by endocrine glands, including the hypothalamus, pituitary gland, adrenal glands, gonads, (i.e., testes and ovaries), thyroid gland, parathyroid glands, and pancreas. Each hormone has a very specific function in the body in order to maintain homeostasis.

**Oxytocin**

Oxytocin is a hormone secreted by the pituitary gland.

It is one of a group of hormones that control sexual development and processes.

The roles of oxytocin are slightly different in males than in females.

The functions of oxytocin hormones in males include:

- Inducing pair bonding in both males and females
- Playing some role in orgasms in both males and females
- Facilitating sperm transport in ejaculation
The functions of oxytocin hormones in females include:

- Inducing pair bonding in both males and females
- Playing some role in orgasms in both males and females
- Causing contraction of the uterus during labor
- Stimulating milk flow from the breasts by causing the contraction of muscle fibers in the milk ducts
- Inducing maternal behavior

**Anti-Diuretic Hormone (ADH)**

- Anti-Diuretic Hormone (ADH), also known as antidiuretic hormone and as vasopressin, is a hormone secreted by the posterior pituitary gland
- Anti-Diuretic Hormone increases reabsorption of water by the kidneys which prevents the body from losing excessive amounts of water

**Prolactin (PRL)**

Prolactin (also known as lactogenic hormone, luteotrophic hormone, and luteotrophin) is a hormone secreted by the anterior pituitary gland.

The actions of prolactin in females include:

- Stimulating the production of progesterone in the ovaries
- Stimulating milk production after childbirth

**Human Growth Hormone (HGH)**

Human Growth Hormone (HGH), also known as somatotrophin, is a hormone that is synthesized, stored and secreted by the anterior pituitary gland.
Human Growth Hormone (HGH) promotes growth, especially growth of the long bones in the limbs (i.e. the femur, tibia, and fibula in the legs and the humerus, ulna, and radius in the arms). It also increases the synthesis of proteins.

The release of human growth hormone into the bloodstream is controlled by the balancing or opposing effects of the growth-hormone releasing hormone and somatostatin.

**Thyroid Stimulating Hormone (TSH)**

Thyroid Stimulating Hormone (TSH), also known as thyrotrophin is a hormone that is synthesized and secreted by the anterior pituitary gland.

Thyroid Stimulating Hormone is synthesized and stored in the thyrotroph cells in the anterior lobe of the pituitary gland (which is called the "adenohypophysis").

Its main function is to stimulate the thyroid gland to release two of its own hormones into the bloodstream. These two hormones are triiodothyronine (T3) and thyroxine (T4).

Synthesis of thyroid stimulating hormone is controlled by thyrotrophin-releasing hormone. The other factor that regulates the amount of thyroid stimulating hormone present in the body is the negative feedback mechanism involving the influence of the thyroid hormones themselves.

**Adrenocorticotrophic Hormone (ACTH)**

Adrenocorticotropic Hormone (ACTH), also known as adrenocorticotropin, and corticotrophin, is a hormone that is synthesized, stored, and released by the anterior pituitary gland.

Adrenocorticotropic Hormone is released in response to stress and controls the secretion of corticosteroid hormones from the adrenal glands.
These include Corticosteroids such as:

- mineral corticoids
- glucocorticoids
- cortisol (natural anti-inflammatory)
- androgens.

Luteinizing Hormone (LH)

Luteinizing Hormone (LH) is a glycoprotein gonadotropin hormone secreted by the anterior pituitary gland. It is released by the anterior pituitary in hourly pulses called "circhoral oscillations".

Luteinizing hormone (and also follicle stimulating hormone) binds to receptors in the testes (in males) and the ovaries (in females). LH also regulates gonadal function by promoting sex steroid production and "gametogenesis" i.e. the processes by which spermatozoa and ova are formed.

The roles of luteinizing stimulating hormone are slightly different in males than in females.

The actions of luteinizing stimulating hormone in men include:

- Stimulating testosterone production from the interstitial cells of the testes (Leydig cells)
- Luteinizing hormone (and also follicle stimulating hormone) is essential for the maturation of spermatozoa i.e. mature male sex cells.

The actions of luteinizing stimulating hormone in females include:

- Stimulating estrogen and progesterone production from the ovary

A surge of luteinizing hormone midway through the menstrual cycle leads to ovulation. Continued secretion of luteinizing hormone stimulates the corpus luteum to produce progesterone.
In conjunction with follicle stimulating hormone, LH controls the secretion of estrogen from ovarian follicles.

**Follicle Stimulating Hormone (FSH)**

Follicle Stimulating Hormone (FSH) is a glycoprotein gonadotropin hormone secreted by the anterior pituitary gland.

Follicle stimulating hormone (and also luteinizing hormone) binds to receptors in the testes (in males) and the ovaries (in females). FSH also regulates gonadal function by promoting sex steroid production and "gametogenesis" i.e. the processes by which spermatoza and ova are formed.

The role of follicle stimulating hormone is slightly different in males than in females.

**The actions of follicle stimulating hormone in males include:**

- Stimulating testicular growth and enhancing the production of a protein that causes high local concentrations of testosterone near the sperm. This is an essential factor in the development of normal spermatogenesis.
- Follicle stimulating hormone (and also luteinizing hormone) is essential for the maturation of spermatoza (mature male sex cells).

**The actions of follicle stimulating hormone in females include:**

- Controlling the development of ovarian follicles (vessels inside the ovaries within which ova develop).
- In conjunction with the luteinizing hormone, FSH controls the secretion of estrogen from ovarian follicles.
**Gonadotrophin**

The term "Gonadotrophin" (or "Gonadotropic hormone") may refer to any of several hormones synthesized and released by the anterior pituitary gland. Their function is to promote the production of sex hormones and either sperm or ova by the gonads (testes in males; ovaries in females).

The main gonadotrophins are Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH).

The production of gonadotrophins by the body is controlled by the gonadotrophin-releasing hormone (GnRH). This is a peptide hormone produced in the hypothalamus and then transported to the pituitary gland via the bloodstream.

**Melatonin**

Melatonin is a hormone secreted by the pineal gland.

The hormone melatonin is important for setting and maintaining the body's biological clock or regulating the day/night rhythm based on periods of light/darkness.

- It is produced by the pineal gland in darkness but not in bright light
- Melatonin receptors in the brain react to this hormone and synchronize the body to the 24 hour day/night rhythm and thus informs the brain when it is day and when it is night.
- Melatonin is derived from serotonin which works together to regulate the sleep cycle.

Melatonin levels are higher in children than in adults and declines with the ageing process.

**Thyroxin**

Thyroxin (sometimes written "thyroxine") is a hormone secreted by the thyroid gland.
Functions

- Thyroxin is important for the regulation of the body's Basal Metabolic Rate (BMR), which is the amount of energy the body uses.
- There are consequences of both excessive quantities of thyroxin in the body (hyper-thyroidism), and insufficient thyroxin in the body (hypo-thyroidism).

Calcitonin

Calcitonin (also known as "thyrocalcitonin") is a hormone produced by and secreted by the thyroid gland.

- Calcitonin helps to regulate the levels of calcium and phosphate in the blood.
- Calcitonin decreases the amount of calcium in the blood by inhibiting the action of osteoclasts (cells that break down the bone matrix). Hence, calcitonin promotes the movement of calcium ions Ca (2+) into the bone matrix, simultaneously decreasing the quantity of calcium ions Ca (2+) in the blood.

Parathormone

Parathormone is a hormone secreted by the parathyroid gland.

Parathormone is:

- Associated with the growth of muscle and bone
- Responsible for the distribution of calcium and phosphate in the body
Insulin

Insulin is a protein hormone secreted by the Beta Cells of the Islets of the Langerhans within the pancreas.

Insulin is extremely important for the regulation of the amount of sugar (glucose) in the blood.

The secretion of insulin by the Beta Cells of the pancreas is stimulated by (high) concentration of blood sugar. The insulin secreted prevents the amount of sugar in the blood from rising to a dangerous level by acting in many ways, including:

- Easing and increasing the rate of diffusion of glucose from the blood into most of the body cells - especially the skeletal muscle fibers
- Accelerating the conversion of glucose into glycogen and fatty acids
- Promoting the uptake of amino acids into body cells and increasing the production of proteins within cells
- Reducing the rate of conversion of liver glycogen into glucose
- Reducing the rate of formation of glucose by liver cells

Glucagon

Glucagon is a hormone secreted by the Alpha Cells of the Islets of the Langerhans within the pancreas.

The presence in the blood of hormone glucagon causes an increase in the quantity of sugar in the blood (blood sugar level). That is, glucagon in the bloodstream has the opposite effect to that of insulin which regulates the amount of sugar in the blood.

Glucagon increases blood sugar (or "blood glucose") levels when they fall below the typically "normal" level i.e. in the range 4-10 m.mol/liter, in the following ways:
• Accelerating the conversion of glycogen in the liver into glucose
• Promoting the conversion in the liver of amino acids and lactic acid into glucose
• Stimulating the release of glucose from the liver into the blood

**Adrenalin**

Adrenalin (also known as epinephrine) is a hormone secreted by the Adrenal Medulla.

The effects of the hormone adrenalin (or epinephrine) are similar to the effects of noradrenalin which is the other hormone secreted by the adrenal medulla.

Adrenalin prepares the body for "fight or flight" responses and has many effects, including:

• Increasing the action of the heart
• Increasing the rate and depth of breathing
• Increasing the metabolic rate
• Improving the force of muscular contractions
• Delaying the onset of muscular fatigue

**Noradrenalin**

Noradrenalin (also known as norepinephrine) is a hormone secreted by the Adrenal Medulla.

The effects of the hormone "noradrenalin" are similar to the effects of adrenalin which is the other hormone secreted by the adrenal medulla.

**The actions of noradrenalin include:**

• Constriction of small blood vessels leading to increases in blood pressure
• Increases the blood flow through the coronary arteries and slowing of the heart rate
- Increases the rate and depth of breathing
- Relaxes the smooth muscle in the intestinal walls

Increased amounts of both adrenalin and noradrenalin are secreted when the body is under stress.

**Corticosteroids**

Corticosteroids are hormones secreted by the Adrenal Cortex.

There are two main groups of corticosteroids:

1. **Glucocorticoids** (e.g. cortisol, cortisone, corticosterone) which functions include:
   - Utilization of carbohydrates, fats and proteins by the body
   - Normalizing responses to stress
   - Anti-inflammatory effects

2. **Mineralocorticoids** (e.g. aldosterone), which functions include:
   - Regulation of salt and water balance
   - Hyper secretion of Aldosterone decreases the potassium in the body affecting nerve impulse transmission and can lead to muscular paralysis

**Estrogen**

Estrogen is a hormone secreted primarily by the ovaries.

Estrogen is one of a group of steroid hormones that controls female sexual development. Estrogen promotes the development and function of the female sex organs and female secondary sexual characteristics including breast development.
Although estrogens are synthesized mainly by the ovaries, some small quantities of estrogen are also produced by the adrenal cortex, the testes, and the placenta. Estrogen is present in males but excessive production of estrogen in men can lead to feminization.

**The actions of the hormone estrogen include:**

- Control of female sexual development
- Promotion of the growth of female secondary sexual characteristics at puberty
- Stimulation of egg (ovum) production
- Preparation of the lining of the uterus for pregnancy
- In conjunction with progesterone, regulation of the growth and functioning of sex organs for sexual reproduction

**Progesterone**

Progesterone is a steroid hormone secreted primarily by the ovaries. It is one of a group of steroid hormones that controls female sexual development and processes. Although progesterone is synthesized mainly by the corpus luteum of the ovaries, some small quantities of progesterone are also produced by the adrenal cortex, the testes, and the placenta.

**The actions of the hormone progesterone in women include:**

- Preparing the inner lining (endometrium) of the uterus for pregnancy
- Maintaining the uterus after fertilization and then throughout the pregnancy
- Preventing further release of eggs from the ovaries during pregnancy
Testosterone

Testosterone is the principal androgen or male sex hormone and is secreted primarily by the testes.

Testosterone is important for:

- Development and function of male sex organs
- Secondary sexual characteristics. e.g. body hair, muscle development, voice changes

SUMMARY- FUNCTIONS OF THE ENDOCRINE SYSTEM

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<th>Gland and Hormones</th>
<th>General Function</th>
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<td>HYPOTHALAMUS</td>
<td>Controls the secretion of the pituitary gland, body temperature, hunger, thirst and sexual drive</td>
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<tr>
<td>CRF, GnRH, TRH, PIF, GRF, Somatostatin</td>
<td>Stimulates the pineal gland to secrete melatonin, which orchestrates body rhythms</td>
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<tr>
<td>PINEAL GLAND</td>
<td>Regulates circadian and ultradian rhythms</td>
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<td>Melatonin</td>
<td>Often called the body’s biological clock</td>
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<tr>
<td>PITUITARY GLAND</td>
<td>Controls bone growth and regulates the other glands</td>
</tr>
<tr>
<td>ACTH, TSH, Prolactin, Growth hormone, FSH, LH,, Vasopressin, Oxytoxin</td>
<td>Often called the Master gland</td>
</tr>
<tr>
<td>THYROID GLAND</td>
<td>Maintains an optimal metabolic rate in tissues, controlling the rate of fuel use in the body, its sensitivity to heat and cold</td>
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<tr>
<td>T4, T3, Calcitonin</td>
<td>Supports immune function</td>
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<td></td>
<td>Protects us from bone loss during pregnancy</td>
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8 Complete Natural Medicine Guide to Women's Health Sat Dharam Kaur, ND Pg. 83-84
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<th>Helps to regulate the amount of calcium in the blood</th>
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<td>PTH</td>
<td>Stimulates bone building</td>
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<th>THYMUS</th>
<th>Coordinates white blood cells (especially T cells) and the immune system</th>
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<tr>
<td>Thymosin</td>
<td>Destroys viruses, fungi, some bacteria, and cancer cells</td>
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<td>Shrinks with age</td>
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<th>LIVER</th>
<th>Regulates growth and blood sugar metabolism</th>
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<td>IGF-1</td>
<td>Detoxifies body systems</td>
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<th>PANCREAS</th>
<th>Controls blood sugar levels</th>
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<td>Insulin, Glucagon</td>
<td>Helps to digest food (non-hormonal function)</td>
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<th>OVARIIES</th>
<th>Controls sexual development, maturation and release of eggs, fertility</th>
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<td>Estrogen, Progesterone</td>
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**Estrogen:**
- Causes multiplication of breast cells
- Thickens uterus and uterine lining
- Maintains vaginal thickness and lubrication
- Encourages formation of collagen in skin
- Inhibits breakdown of bone, increasing density

**Progesterone:**
- Prepares uterus for implantation
- Maintains development of the placenta
- Develops milk-secreting cells during pregnancy
- Causes maturation of breast cells during pregnancy
- Helps prevent breast cysts and cancer
- Increases libido
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<th><strong>ADRENAL GLANDS</strong></th>
<th>Control salt and water balance in the body</th>
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<tr>
<td>Cortisol, Aldosterone, DHEA, Testosterone, Adrenaline, Noradrenaline</td>
<td>Helps us to adapt to stress</td>
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<td>Generates fight or light reaction in response to life-threatening situations or unexpected emotional stress</td>
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<td>Decreases allergies</td>
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<td>Regulates sleep and mood</td>
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<td>Increase resistance to viruses, bacteria, fungi, allergies, cancer</td>
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<td>Stimulates bone formation</td>
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<td>Prevent osteoporosis, arthritis, Lupus, autoimmune disease</td>
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<tr>
<td></td>
<td>Helps to maintain normal sex hormone levels</td>
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<td>Increase libido, sexual arousal</td>
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Epidemics Uncovered- Endocrine Disruptors

Our bodies were created to function in perfect homeostasis. Since the advent of industrialization within the last one hundred years, our once perfect environment became inundated with horrific chemicals that threaten this very homeostasis. Our bodies are now subjected to unprecedented insults from environmental estrogen-like hormones. Our food has changed more in the past fifty years than in the previous one thousand years. We have managed to turn our diets from whole unprocessed foods to a borage of fast and chemically laden processed foods. Consider cattle that were once raised on grass and natural organic feed and chickens that were allowed to run free and how commercialization has now caged them. To add insult to injury, feeds are now laced with pesticides and hormones. These pesticides and hormones have estrogen-like effects and are passed on to humans as they are consumed. This explains the alarmingly high rate of endocrine disorders in our modern day population.

It has been shown that chronic low dose exposure to pesticides in humans can negatively affect the nervous system and cause immune deficiencies leading to allergies and autoimmune conditions.

Exogenous chemicals in the body settle into the organs of high metabolism first. Both the uterus and the ovaries have high metabolic rates. In non-industrialized cultures, women whose diets are indigenous and therefore based on non-processed, whole foods, seldom suffer hormonal imbalances such as those seen in industrialized cultures.

Causes of Hormone Imbalance

The delicate symphony of hormones that occur within the endocrine system can be easily disrupted in many different ways. The sheer act of ageing can result in the endocrine system being upset.

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9 Environmental Illness; COULD CHEMICAL OVERLOAD BE THE CAUSE OF YOUR ILLNESS? Interview with William J. Rea, M.D.
As reproductive functions play out over time, hormone levels naturally decline. If the hormones decline too quickly, this can trigger the onset of early menopause and can cause other hormone imbalances associated with the change of life. Lifestyle habits play a major role in the pace of hormonal decline and premature aging.

Hormone balance is deeply connected to many different factors including nutrition, exercise, detoxification capabilities, obesity and stress levels. At midlife, the already overstressed adrenal glands must take over much of the hormone production previously handled by the ovaries. Chronic stress which exceeds the body’s capabilities causes excess cortisol to consequently flood the system and disrupt the total hormone production. The body sacrifices its own progesterone in order to make even more cortisol in response to the chronic stress. This depletes the key balancing hormone progesterone with obvious implications for estrogen dominance. Prolonged stress deteriorates our bones, atrophies our muscles, decreases strength and energy, lowers libido and overwhelms our immune system. This puts women at serious risk for severe menopausal symptoms as well as chronic illnesses and autoimmune diseases. Many women’s ailments are linked to specific hormonal imbalances which can be triggered by any one or a combination of the following:10

- Stress and overexertion
- Not enough time for relaxation and play
- Improper breathing
- Improper diet- excess saturated or hydrogenated fat, sugar, refined carbohydrates, meats, dairy, toxins in fish
- Nutritional deficiencies- such as vitamins B5, B6, C, zinc, selenium, magnesium, tyrosine, tryptophan, essential fatty acids

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10 Complete Natural Medicine Guide to Women’s Health Sat Dharam Kaur, ND pg. 85
• Food sensitivities
• Environmental allergies
• Infectious organisms and/or imbalances in intestinal flora
• Intestinal toxins, such as yeast toxins
• Impaired liver function or liver stagnation
• Elevated blood sugar
• Excess alcohol
• Smoking
• Exposure to electromagnetic chemicals, including PCB’s, dioxin, pesticides, phthalates, Bisphenol A, PVC, fire retardants, parabens in cosmetics
• Exposure to hormone-disrupting chemicals or hormonal excess in utero
• Pharmaceutical drugs, birth control pills, hormone replacement therapy
• Heavy metals, particularly cadmium, mercury and lead
• Lack of exercise or excessive exercise
• Light at night
• Lack of exposure to sunlight
• Shift work
• Insomnia
• Obesity or being underweight
• History of emotional trauma or abuse
• Negative thought patterns and emotions
Xenoestrogens

Xenoestrogens are foreign estrogens as “xeno” literally means foreign. Not found in nature, man-made toxins are estrogen imposters that mimic the effects of the real hormone but over stimulate cellular activity to an uncontrollable extent. In 1991, the field of xenoestrogens was first introduced to the world.\textsuperscript{11} The xenoestrogens adversely affect the internal balancing mechanisms of the body, raising the estrogen burden and with it, potential risks for the development of endocrine disorders. Xenoestrogens accumulate in the fat tissues of our bodies and have the capability of locking into our own estrogen’s receptor sites. This deems them to be highly toxic and detrimental to our hormonal environment.

Xenoestrogens are making their way into our bodies on the pretense of being biological estrogen. These xenoestrogens are present in our soil, water, air, food supply as well as in personal care and household products.

The following is a list of the most common Xenoestrogens:\textsuperscript{12}

- Organochlorines are one of the largest sources. They are used in pesticides, dry cleaning, bleaching of feminine-hygiene products and the manufacture of plastics.

- Bisphenol-A, a breakdown of polycarbonate, is used in many plastic bottles. It’s found in the lining of many food cans and juice containers.

- Avoid heating plastics, plastic lined items and Styrofoam as the polycarbonates escape during the heating process.

- Use glass, ceramics or steel to store/consume foods and liquids.

\textsuperscript{11} Read more at Suite101: List of Xenoestrogens - Chemical Estrogens: How to Avoid Xenoestrogens http://www.suite101.com/content/list-of-xenoestrogens---chemical-estrogens-a205523#ixzz1recjmqZ

\textsuperscript{12} http://www.suite101.com/content/xenoestrogens-and-your-health-a205476
• Choose organic produce. Always go organic with thin skinned fruits and vegetables.

• Buy hormone-free animal products (eggs, poultry, meats and dairy) to avoid xenoestrogen injections and bovine growth hormones that are added to non-organic animal products.

• Avoid butylated hydroxyanisole (BHS) which is a common food preservative found in processed food.

• Avoid non-organic coffee and tea.

• Use reverse-osmosis filtered water or purchase your own filter for drinking and bathing.

• Many creams and cosmetics contain parabens and stearal konium chloride. Choose natural brands with preservatives made from minerals or grapefruit seed extract.

• Most skin lotions, creams, soaps, shampoo and cosmetics use parabens and phenoxyethanol as a preservative which are substances that are 100% absorbed into the body.

• Phthalates are commonly found in baby lotions and powders.

• Sunscreen can contain benzophenone-3, homosalate, 4-methyl-benzylidene camphor, octal-methoxycinnamate, octal-dimethyl-PABA.

• Many perfumes, deodorizers, air fresheners have artificial scents and contain phthalates.

• Most perfumes are petrochemically based.

• Nail polish and removers contain harsh chemicals.

• The birth control pill contains high concentration of synthetic estrogen. Choose a condom or diaphragm gels without surfactants. Use a condom without spermicidal.
• Hormone replacement therapy contains synthetic estrogen as opposed to paraben-free progesterone cream.

• Dryer sheets, fabric softeners and detergents contain petrochemicals that can be absorbed by the skin. Use laundry detergent with fewer chemicals or use white vinegar and baking soda.

• Be aware of noxious gas that comes from copiers and printers, carpets, fiberboards and new carpets.

• Do not inhale and protect your skin from electrical oils, lubricants, adhesive paints, lacquers, solvents, oils, paints, fuel, industrial wastes, packing materials, harsh cleaning products and fertilizers.

• Avoid pesticides, herbicides, fungicides, parathion, plant and fungal estrogens, industrial chemicals (cadmium, lead, mercury), Primpro, DES, Premarin-cemeteries, Tagamet, Marijuana, insecticides (Dieldrin, DDT, Endosulfan, Heptachlor, Lindane/hexachlorocychohexan, methoxychlor), Erythrosine, FD&C Red No 3, Nonylphenol, Polychlorinated biphenyls, Phenosulfothizine, Phthalates and DEHP.

Listed below are the main causes of exposure to endocrine disruptors in North American Women:

1. **Exposure to In Utero Xenoestrogens:** When symptoms of anovulation or progesterone deficiency are noted in puberty, exposure to xenoestrogens in utero can be a factor. 500 000 to 800 000 follicles are created in the embryo, each enclosing an immature ovum when a female embryo develops in the womb. Outward changes or symptoms to the pregnant mother may not be obvious when exposed to toxic estrogen-like chemicals. However the fragile ovarian follicles are extremely sensitive to the environmental pollutants which can be toxic. The fetus is therefore increasingly affected by the toxins that may damage its ovarian follicles.
2. **Exposure to Petrochemical Compounds**: Petrochemical compounds found in general consumer products such as creams, lotions, soaps, shampoos, perfumes, hair sprays and room deodorizers. These compounds have estrogen-like chemical structures and may have estrogen mimicking effects. Other sources of xenoestrogens include car exhaust, petrochemically derived pesticides, herbicides, and fungicides; solvents and adhesives such as those found in nail polish, paint removers, and glues; dry-cleaning chemicals; practically all plastics, industrial waste such as PCBs and dioxins. Synthetic estrogens from urine of women taking HRT and birth control pills are flushed down the toilet and eventually find their way into the food chain and back into the body. They are fat soluble and non-biodegradable.\(^{13}\)

3. **Exposure to Industrial solvents**: Solvents are a family of chemicals that are often overlooked as a common source of xenoestrogens. These chemicals enter the body through the skin, and accumulate quickly in the lipid-rich tissues such as myelin (nerve sheath) and adipose (fat). Some common organic solvents include alcohol like methanol, aldehydes like acetaldehyde, glycol like ethylene glycol, and ketones like acetone. They are commonly found in cosmetics, fingernail polish and fingernail polish remover, glues, paints, varnishes, and other types of finishes, cleaning products, carpets, fiberboards, and other processed woods. Pesticides and herbicides such as lawn and garden sprays and indoor insect sprays are also sources of minute amounts of xenoestrogens. While the amount may be small in each, the additive effect from years of chronic exposure can lead to estrogen dominance.\(^{14}\)

4. **Exposure to Hormone Replacement Therapy (HRT)**: The hormones used in HRT are chemically different in structure to that of the hormones naturally found in humans. This differing structure is processed in a lab in order to patent the medication and therefore make an economic profit. One of the most popular HRT drugs is called Premarin and has been the mainstay choice of

\(^{13}\) [http://www.drlam.com/articles/Estrogen_Dominance.asp]

\(^{14}\) [http://www.drlam.com/articles/Estrogen_Dominance.asp]
Doctors in prescribing HRT. Premarin contains 48% estrone and only a very small amount of progesterone which is insignificant to have enough of an opposing effect. The excessive estrogen from HRT can lead to an increased chance of DNA damage and can result in endometrial and breast cancer.

5. **Exposure to Xenoestrogens in Commercially Raised Cattle and Poultry**: 25 million pounds per year, or half the antibiotics used in the United States each year are used in livestock. These antibiotics enter our food supply and result in hormone disruption as we consume them as meat. In poultry farms, it now only takes 6 weeks to grow a chicken to full size compared to 4 months in 1940. Feed containing a cocktail of hormone disrupting toxins including pesticides, antibiotics and drugs are used to combat disease and are necessary due to the overcrowded conditions of animal warehouses.

6. **Exposure to Commercially Grown Fruits and Vegetables Containing Pesticides**: Over the past 100 hundred years, several billion pounds of pesticides have been released into the environment. These pesticides are similar in structure to estrogen and therefore can disrupt our hormonal system. Pesticides that have been previously banned make their way back to our food supply illegally. Approximately 5 billion pounds of chemicals have been added to the world each year in the form of pesticides, herbicides, fungicides and other biocides. It is estimated that the average person eats 75 pounds of illegal pesticides per year just by following the guidelines of eating 5 servings of fruits and vegetables a day if purchasing them from non-organic sources.\(^\text{15}\)
The following is information and published studies taken from *Our Stolen Future* by Theo Colborn, Pete Myers and Dianne Dumanoski which discuss the widespread influence of toxic chemicals on animal and human life.

**DDT (dichlorodiphenyltrichloroethane)**

A study published in the Proceedings of the Society of Experimental Biology and Medicine in 1950 by two Syracuse University Zoologists Lindeman and Burlington described how doses of DDT prevented young roosters from developing normally. They injected DDT into roosters by injecting the pesticide into forty young roosters for a period of 2 to 3 months. The daily doses of DDT did not kill the roosters or even made them sick. It made them look weird; they looked like hens. The bird’s testicles were only 18% of normal size. Their combs and wattles remained stunted and pale. The roosters were chemically castrated.

Michael Fry, a wild life toxicologist, at the University of California at Davis injected eggs from western and California gull colonies with DDT and a breakdown product of DDT, DDE, and methoxychlor (another synthetic pesticide known to bind to estrogen receptors). He found the feminization of the male’s reproductive tracts. Typical female cells were found in the testicles, and in cases of higher doses, the presence of an oviduct, the egg-laying canal normally found only in females. Despite all this internal disruption, the chick looked completely normal.

DDT was found to bind to the estrogen receptor sites. It is now considered one of the classic xenoestrogens.

DDT was banned in the United States. However, worldwide production of DDT has never been higher. In fact, DDT is manufactured in the United States and shipped to third world countries. DDT is metabolized to DDE (Dichlorodiphenyldichloroethylene) in the human body within a few months. DDE then may last
in the human body for several decades. However, some medical doctors occasionally find DDT in the serum routinely following intensive sauna. So where is this new exposure to DDT coming from? The United States ships DDT to third world countries that spray it on vegetables and fruits. This agricultural produce is shipped to United States supermarkets where Americans consume it. In 1991, the United States exported 96 tons of DDT.

Another source may come from your living area. If your house is near or built upon old agricultural land, DDT will persist in the soil for several centuries.

**Plastics, Spermicide, Detergent, and Personal Care Products**

At Tufts Medical School in Boston in 1987, Soto and Sonnenschein serendipitously discovered that plastic test tubes thought to be inert contained a chemical that stimulated breast cancer cells to grow and proliferate wildly. They were experimenting with malignant breast cancer cells that were sensitive to estrogen. When exposed to estrogen the cells would grow and multiply, and when isolated from estrogen, the cells would stop multiplying.

During the course of their experiments, they found that the test tube manufacturer changed the formulation of the plastic test tubes that they were using. The manufacturer had used p-nonylphenol, one of the family of synthetic chemicals called alkylphenols to make these plastics more stable and less breakable. Manufacturers routinely add nonylphenols to polystyrene and polyvinyl chloride (PVC). These new plastic test tubes caused their estrogen sensitive breast cancer cells to proliferate, multiply and grow. Thus, they concluded that p-nonylphenol acted like an estrogen.

One study showed that the food processing industry and packaging industry used PVC's that contained nonlyphenols. Another reported contamination of water that had passed through PVC tubing. Even a compound found in contraceptive creams nonoxynol-9 breaks down inside the animal's body to produce
nonylphenol. Breakdown of chemicals such as those found in industrial detergents, pesticides, and personal care products give rise to nonylphenol. Global production of alkylphenols polyethoxylate was 600 million pounds in 1990. Although the products purchased by the consumer are not themselves estrogenic; studies have found that bacteria in the animal's bodies, in the environment, or in sewage treatment plants degrade these alkylphenol polyethoxylates, creating nonylphenol and other xenoestrogens.

**Plastic Drinking Bottles and Plastics used with food**

In 1993, at Stanford University School of Medicine, Dave Feldman, professor of medicine was experimenting with a yeast estrogen protein that binds to estrogen. They found that the polycarbonate bottles used to hold drinking water contained Bisphenol-A. They used the polycarbonate lab flasks to sterilize the water used in their experiments. Bisphenol-A nicely bound to the estrogen protein found in the yeast. This polycarbonate plastic is routinely used for the giant jugs used in shipping water.

The manufacturer was aware that the bottles would leach particularly if exposed to high temperatures and caustic cleaners and so developed a washing regimen that they thought would solve the problem. However, the researchers discovered that the manufacturer could not detect samples sent from their lab, samples that were causing proliferation of estrogen responsive breast cancer cells. This proved to be a detection limit in the manufacturer's lab equipment. The Stanford team found that 2-5 parts per billion of Bisphenol-A was enough to cause the breast cancer cells to proliferate.

Professor Feldman noted that though Bisphenol-A is 2000X less potent than estrogen, "it still has activity in the parts per billion range."
One Dartmouth University Study showed that plastic wrap heated in a microwave oven with vegetable oil had 500,000 times the minimum amount of xenoestrogens needed to stimulate breast cancer cells to grow in the test tube.

**Detergent Breakdown Products**

John Sumpter a biologist from Brunel University in Uxbridge began to study sexually confused fish reported from anglers fishing in English rivers. Many fish caught in the lagoons and pools just below the discharge from sewage plants looked quite bizarre. Even experienced fisherman could not tell if a fish was male or female. The fish showed male and female characteristics at the same time. They were perfect examples of intersex where an individual is stranded between both sexes.

Sumpter used a marker that helped identify female fish. Normally in females a special egg protein is made called vitellogenin, in response to estrogen from the ovaries. On the estrogen signal from the ovaries, the liver produces vitellogenin and the protein is incorporated into the eggs. Since the response is dependent on estrogen, vitellogenin levels found in male fish would be a good indication of estrogen exposure.

Caged fish raised in captivity and then kept in the contaminated pools made 1000X to 100,000X more vitellogenin than control trout kept in clean water.

15 sites were sampled with soaring vitellogenin levels. It was a national problem. Alkylphenol levels from detergent breakdown products are high on the suspect list. However, Sumpter suspects that it is the synergistic qualities of several xenoestrogens acting together.

**Canned Foods**

Two Spanish Scientists at the University of Granada decided to investigate the plastic coatings that manufacturers use to line the metal cans. The coating is added to avoid the metallic taste of metal in the
food from the cans. These linings are present in about 85% of the cans. Fatima Olea and Nicolas Olea, an M.D., specializing in endocrine cancers worked with Soto and Sonnenschein. In a study analyzing twenty brands of canned foods purchased in the United States and in Spain, they discovered Bisphenol-A, the same chemical that the Stanford researchers discovered, in about half of the canned food up to levels of 80 parts per billion. This is 27 times greater concentration of Bisphenol-A needed to cause the breast cancer cells to proliferate in the Stanford Study.

**Commercially raised Beef, Chicken and Pork**

Commercially raised livestock are routinely given xenoestrogens to fatten them up, grow quickly, and cause them to retain water. This results in greater profits for the farmer. It is an effective, cheap, quick way to fatten them up. In the 1970's and 1980's there was an epidemic in Puerto Rico of early puberty in girls as young as a year old and even young boys who developed breasts caused by meat and dairy products containing high levels of estrogen. In the United States, the use of estrogen compounds is now slightly better regulated, but it is still very much used and abused.

DES (diethylstilbestrol), a type of synthetic estrogen, was the first hormone to be used by the meat industry to fatten up livestock until it was discovered that it causes cancer even in extremely minute amounts.

**Birth Control Pills**

Birth Control Pills contain a synthetic estrogen and a synthetic progestin to force the body to cycle in a normal manner even though conception may have occurred and different hormones levels are supposed to occur. Is it really nice to fool Mother Nature? Many times what we see clinically is that it takes one year or more for a woman's period to become normal after stopping birth control pills. This is because
the synthetic estrogens and progestins in the birth control pills are oil soluble and difficult for the body to get rid of.

Why not use a simpler method of birth control such as condoms? Use one that does not use a spermicide such as nonoxynol-9. Researchers found that once nonoxynol-9 gets into a rats body it breaks down into nonylphenol - a known xenoestrogen.

**Preservative Methyl Paraben in Skin Lotions and Gels**

For many years, parabens were considered among those preservatives with low systemic toxicity, primarily causing allergic reactions. However, as we have become aware that some synthetic chemicals mimic the female hormone estrogen, our understanding of the toxic effects of both synthetic and natural substances has changed. Now, John Sumpter from the Department of Biology & Biochemistry, Brunel University, Uxbridge, Middlesex, have found that alkyl hydroxy benzoate preservatives (namely methyl-, ethyl-, propyl-, and butylparaben) are weakly estrogenic. In an estrogen receptor-binding assay, butylparaben was able to compete with the female hormone estradiol for binding to estrogen receptors with an affinity approximately 5 orders of magnitude lower than that of diethylstilbestrol (a highly carcinogenic synthetic estrogen), and between 1 and 2 orders of magnitude less than nonylphenol (an estrogenic synthetic industrial chemical).

Although it is reassuring to note that when administered orally, the parabens were inactive, subcutaneous administration of butylparaben produced a positive estrogenic response on uterine tissues. Although approximately 100,000 times less potent than 17 beta-estradiol, greater exposure to the parabens may compensate for their lower potency. The researchers conclude that, "Given their use in a wide range of commercially available topical preparations, it is suggested that the safety in use of these chemicals should be reassessed . . ."
The European Union has asked the European Cosmetics and Toiletry industry about these new findings and the implication for breast cancer. These preservatives are found in the vast majority of skin and body lotions, even in natural progesterone creams. Generally, for the sterol hormones, taken orally the hormones are 90% first pass metabolized by the liver. Thus, taken orally only 10% reaches the body. In contrast, anything absorbed by the skin is directly absorbed. In other words, anything absorbed through the skin may be as high as 10 times the concentration of an oral dose.

Unfortunately, some natural progesterone creams were found to contain methyl and propyl parabens as a preservative.

**Shampoos that Purposely Contain Very High Amounts of Estrogen**

African Americans favored shampoos with clinically active high doses of estrogen. They also used them on their children. In 1998 Tiwary, now retired, published a study of four girls - including a 14-month-old - who developed breasts or pubic hair months after beginning to use such products. The symptoms started to disappear when they stopped using them. The year before, he published a study showing that some of the products used by his patients contained up to one milligram (1 mg) of estradiol per one ounce of shampoo. By comparison a normal adult topical skin dose for estradiol is 0.02-0.05 mg/day. This means that one ounce of shampoo contains 50 times the daily ADULT dose of estradiol. A small handful of this shampoo on your child every day may give her OR HIM breasts!

**Herbicide**

Tyrone B. Hayes of the University of California at Berkeley found that atrazine, the most commonly used weed killer in North America, affected frogs at doses as small as 0.1 parts per billion. As the amount of atrazine increased, as many as 20 percent of frogs exposed during their early development produced multiple sex organs or had both male and female organs. Many had small, feminized larynxes.
Plastic IV Bags

The United States FDA warns that prolonged fluid exposure in IV bags may affect testicle development in young boys. The chemical, called DEHP can leach from the plastic into certain liquids, especially fat-containing ones like blood. Studies of young animals show the chemical can affect testicle development and production of normal sperm. Some companies already label that their products contain phthalates (DHEP), and the FDA soon will issue a recommendation — not a requirement — that more companies do so.

"FDA's public health notification falls far short of what is needed to protect patients," said Charlotte Brody of Health Care Without Harm, a group working to reduce the amount of phthalates — the family of chemicals that includes DEHP — in a variety of products, from plastic toys to cosmetics.

5 Out of 6 Chemicals Used to block UV in Sunscreen are Estrogenic

Margaret Schlumpf and her colleagues (Institute of Pharmacology and Toxicology, University of Zurich, Switzerland) have found that many widely-used sunscreen chemicals mimic the effects of estrogen and trigger developmental abnormalities in rats. (Schlumpf, Margaret; Beata Cotton, Marianne Conscience, Vreni Haller, Beate Steinmann, Walter Lichtensteiger. In vitro and in vivo estrogenicity of UV screens. Environmental Health Perspectives Vol. 109 (March 2001) pp 239-244) her group tested six common chemicals that are used in sunscreens, lipsticks and facial cosmetics. Five of the six tested chemicals (benzophenone-3, homosalate, 4-methyl-benzylidene camphor (4-MBC), octyl-methoxycinnamate and octyl-dimethyl-PABA) behaved like strong estrogen in lab tests and caused cancer cells to grow more rapidly. Only one chemical - a UVA protector called butyl-methoxydibenzoylmethane (B-DM) - showed no activity. Uterine growth and endometriosis: One very common sunscreen chemical, 4-MBC, was mixed with olive oil and applied to rat skin. This caused a doubling of the rate of uterine growth well before puberty. "That was scary, because we used concentrations that are in the range allowed in
“sunscreens,” said Schlumpf. Three of the six caused developmental abnormalities in animals. The major cause of sterility in women in the USA is endometriosis, a condition afflicting 5.5% of American women. Exposure to excessive estrogen that may have come from such sunscreens is felt to be the primary cause of endometriosis. Perhaps a sunscreen using zinc oxide is a better choice.

**Common Chemical in Personal Care Products, Fragrances, Paints, Plastics and Cosmetics May cause Testicular Defects in Boys**

For the first time, scientists have shown that pregnant mothers exposed to high but common levels of a widely used ingredient in cosmetics, fragrances, plastics and paints can have baby boys with smaller genitals and incomplete testicular descent. Previous work had shown that prenatal phthalate exposure in rodents can critically affect male hormones, resulting in impaired testicular descent and smaller genital size. The Swan study is the first to look at effects in humans. While none of the boys showed clear malformation or disease, in the 25% of mothers with the highest levels of phthalate exposure, the odds were 10 times higher that their sons would have a shorter than expected distance between the anus and the base of the penis. This so-called AGD measurement is a sensitive indicator of impacts on their reproductive system.

The human body is inundated with these harmful chemicals on a daily basis. This creates an overburdened liver, a weakened immune system and thus the delicate hormonal balance is disrupted.
Liver Toxicity

The liver is a complex and unique organ, serving many functions crucial to sustaining life. From circulation to digestion, it is constantly processing blood for use by the rest of the body.

The liver is the largest internal organ in the human body, weighing three to four pounds. The rich supply of blood flowing through it gives it its dark red color and glossy appearance. Sometimes called “The Great Chemical Factory” the liver neutralizes harmful toxins and wastes, stores glycogen (a blood-sugar regulator), amino acids, protein, and fat.

Environmental toxins and over-processed foods which are infused with many unnatural chemicals leave the liver at great risk for contamination. If the liver is not functioning well, a hazardous buildup of toxins may occur.

From its sheltered position in the abdominal cavity, the liver filters blood and performs many functions vital to health including:

1. **Circulation:** The liver stores and regulates the blood in the body and is responsible for nourishing every cell. The liver transfers blood from portal vein to the systemic circulation.

2. **Excretion:** The liver is responsible for the formation and secretion of bile for digestion and cleansing of blood. Removing ammonia from the blood and excretion of substances filtered from the blood by the liver such as heavy metals or dyes is also a function of the liver.

3. **Metabolism:** Manufacturing and storage of many nutrients such as glucose and vitamins occur in the liver. The metabolism of carbohydrates, proteins, lipids (fat), minerals and vitamins is also a part of the liver’s contribution to metabolism.
4. **Protection and detoxification:** The essential process of removal of foreign bodies from the blood (phagocytosis); detoxification by conjugation, methylation, oxidation and reduction are also some of the liver’s main functions.

5. **Production:** The formation of urea, serum albumin, glycogen and blood coagulating proteins such as prothrombin, fibrinogen and heparin are all produced in the liver. The destruction of erythrocyte (red blood cells) also occurs in the liver. The liver regulates blood sugar levels and stores the balanced amount of sugar as glycogen for future energy usage.

6. **Regulation of hormones:** The process of rendering hormones inactive and causing them to be eliminated through the bile or urine occurs via the liver. Since estrogens and androgens are both growth hormones which stimulate cell division, elevation of their levels in the blood due to the liver's failure to remove them efficiently can cause their accumulation in tissue. This in turn may lead to abnormal growths such as uterine fibroids, ovarian cysts, endometriosis, breast cysts and breast cancer, prostate enlargement or prostate cancer.

7. **Regulates cholesterol levels:** Rids the body of excess cholesterol subsequently lowering the levels of low density lipoproteins (LDL) cholesterol and triglycerides.

The body functions which are affected by emotional and mental activities are regulated by the liver. When the liver's blood storage and regulatory functions are affected and bleeding or clots result, the liver is usually in a diseased condition. The joints can become stiff and muscles can become spasmodic and numb when the liver blood is deficient as nourishment to the tendons and blood vessels is decreased. Conditions such as stroke, dizziness, headaches, tinnitus, deafness, fainting or convulsion can result due to severe liver blood deficiency. When the liver blood is so deficient that it cannot nourish the eyes, night blindness or blurring may result. Stress and negative or unhappy feelings can greatly affect the liver and cause a noticeable decline in liver vitality which can result in hiccups, hernia and pain.
surrounding the liver. The bowels may then also become constipated and sleep may become disturbed as nightmares or insomnia can occur.

**Symptoms of a poorly functioning liver may include:**

- Low energy
- Indigestion, bloating, constipation, gas or diarrhea
- Foggy thinking
- Weight gain
- Stiff, aching, weak muscles—especially low back and shoulders
- Altered cholesterol levels
- Blood sugar abnormalities
- Sleep disturbances
- Easy bruising
- Brittle bones
- Fluid retention
- Kidney problems
- Slow wound healing

The liver plays a major role in the detoxification of numerous substances in the body, whether they come from the environment, food, or from within the body (from hormones and other substances). In order to metabolize and eliminate these potentially harmful toxins, the liver has developed an intricate, two-step detoxification system. Together, these two phases convert toxins into water-soluble molecules that can be excreted from the body in the stool and urine.
The Phase I System:

The Phase I detoxification system, composed mainly of the cytochrome P450 supergene family of enzymes, is generally the first enzymatic defense against foreign compounds. Most pharmaceuticals are metabolized through Phase I biotransformation. In a typical Phase I reaction, a cytochrome P450 enzyme (CypP450) uses oxygen and, as a cofactor, NADH, to add a reactive group, such as a hydroxyl radical. As a consequence of this step in detoxification, reactive molecules, which may be more toxic than the parent molecule, are produced. If these reactive molecules are not further metabolized by Phase II conjugation, they may cause damage to proteins, RNA, and DNA within the cells. Several studies have shown evidence of associations between induced Phase I and/or decreased Phase II activities and an increased risk of disease, such as cancer, systemic lupus erythematosus, and Parkinson's disease. Compromised Phase I and/or Phase II activity has also been implicated in adverse drug responses. This process is often referred to as Bio activation. In order to prevent Bio activation from occurring there must be an orchestrated balance between Phase I and Phase II detoxification. Enhancements of both phases can be achieved through natural medicinal agents. Prior to this process simple testing can be done in order to reveal the state of detoxification phases. For example a quantity of caffeine is ingested and saliva samples are taken twice at specified intervals. The efficiency of caffeine clearance is directly related to the efficiency of Phase I detoxification. Rapid clearance shows enzyme induction either from xenobiotic exposure or toxins within the body. Slower rates indicate that CypP450 activity in the liver is abnormal. Patients with slower caffeine clearance will have more difficulty eliminating xenobiotics and other toxins. The primary nutrients required during phase I detoxification include B vitamins, vitamin C, folic acid, copper, magnesium, and zinc; antioxidants including glutathione, N-acetylcysteine, and lipoic acid; and the branched-chain amino acids leucine, isoleucine,

and valine. Phase I detoxification is further enhanced by indole-3-carbinol which found in cruciferous vegetables such as broccoli, Brussels sprouts, cabbage, and cauliflower. It is also enhanced by flavonoids, including Silymarin from milk thistle, curcumin from the spice turmeric, and polyphenol antioxidants from grape seeds and green tea. Nutrients required to support phase II detoxification include vitamins B5, B6, B12, and C, folic acid, selenium, zinc, molybdenum, glutathione, and the amino acids glycine, cysteine, methionine, taurine, and glutamine.

**Phase II System:**

One of the consequences of Phase I activation is that the product, called the reactive intermediate, is quite often more reactive—and potentially more toxic—than the parent molecule. Therefore, it is important that this molecule be converted to a non-toxic, water-soluble molecule as soon as possible. Conjugation of the reactive intermediate to a water-soluble molecule is accomplished by the Phase II conjugation reactions which include glucuronidation, sulfation, glutathione conjugation, amino acid conjugation, methylation, and acetylation. These reactions not only require the water-soluble molecule that will be attached to the toxicant—such as sulfate in the case of sulfation or glucuronic acid in the case of glucuronidation—but also use a large amount of energy in the form of adenosine triphosphate (ATP). In addition to energy repletion, Phase II reactions require an adequate, continually replenished amount of cofactors since these cofactors are attached to the toxins and then excreted. Several nutrients and phytonutrients support Phase II reactions\(^{17}\) including antioxidants, vitamins, amino acids, and other substances the liver needs to have in ample supply to detoxify efficiently.

The following illustration clearly outlines the process of detoxification through the liver.\(^{18}\)
DETOXIFICATION

Step 1: (Unhealthy Function)
Toxins enter the body.

Toxins and other poisons formed internally leak through the unhealthy intestine and flow to the liver.

Step 2: (Unhealthy Function)
In Phase I toxins are not completely detoxified in the unhealthy liver.

Step 3: (Unhealthy Function)
In Phase II toxins are not completely detoxified in the unhealthy liver.

Step 5: (Unhealthy Function)
Stored toxins recirculate in the blood and may contribute to long term poor health.

Step 4: (Unhealthy Function)
Unbalanced toxins leave the liver and store in tissues such as fat, the brain and nervous system.

Step 2-A: (Healthy Function)
Harmful free radicals (Ox) are formed as a result of Phase I activity, but are transformed to harmless water (H₂O₂) by antioxidant nutrients.

Step 3: (Healthy Function)
The intermediate substance is transformed in Phase III to a more water-soluble substance and released to the kidney.

Step 4: (Healthy Function)
The water-soluble substance is excreted via the urine.

Healthy Intestine

Unhealthy Intestine

Healthy Liver

Unhealthy Liver

Kidney

Brain

Fat
Liver Detoxifiers

Foods to Detoxify the Liver

<table>
<thead>
<tr>
<th>FOODS TO INCLUDE</th>
<th>FOODS TO AVOID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FRUIT TO INCLUDE</strong></td>
<td><strong>FRUIT TO AVOID</strong></td>
</tr>
</tbody>
</table>
| strawberries, citrus (except grapefruit), pineapple, apples, apricot, avocado, banana, blueberries, cherries, grapes, kiwi, mango, melons, nectarine, papaya, pear, peach, plums, prunes, raspberries, etc.  
Organically grown is always preferred  | grapefruit (grapefruit can alter detoxification enzyme function for up to 72 hours), sweetened fruits (either in cans or frozen) and sweetened fruit juice  |
| **VEGETABLES TO INCLUDE**  | **VEGETABLES TO AVOID**  |
| arugula, asparagus, artichokes, bean sprouts, bell peppers, bok Choy, broccoli, Brussels sprouts, cauliflower, celery, cucumber, cabbage, eggplant, endive, escarole, all types of greens and lettuce, green beans, jicama, mushrooms, okra, green peas, radishes, spinach, squash (summer and winter), sweet potatoes, taro, turnips, yams, zucchini, etc.  
all fresh raw, steamed, grilled, sautéed, roasted, or juiced  
Organically grown is always preferred  | corn, tomato, tomato sauce, and any creamed vegetables  |
<p>| <strong>GRAINS TO INCLUDE</strong>  | <strong>GRAINS TO AVOID</strong>  |
| rice (white, brown, sushi, wild), potatoes, oats (gluten-free), quinoa, millet, tapioca, amaranth, buckwheat  | corn, plus all gluten-containing products including wheat, spelt, kamut, barley, rye  |
| <strong>LEGUMES TO INCLUDE</strong>  | <strong>LEGUMES TO AVOID</strong>  |
| all legumes including peas and lentils (except soybeans  | soybeans, tofu, tempeh, soy milk, soy sauce, or any product containing soy proteins  |
| <strong>NUTS/SEEDS TO INCLUDE</strong>  | <strong>NUTS/SEEDS TO AVOID</strong>  |
| all nuts except peanuts – almonds, cashews,  |  |</p>
<table>
<thead>
<tr>
<th>macadamia, walnuts, pumpkin seeds, brazil nuts, sunflower seeds, etc., — whole or as a nut butter</th>
<th>peanuts, peanut butter, and peanut oil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MEAT AND FISH TO INCLUDE</strong>&lt;br&gt;all fresh or frozen wild fish (except shellfish) such as salmon, halibut, sole, mahi mahi, cod, snapper, etc.&lt;br&gt;Organic, hormone-free chicken, turkey, lamb and wild game (venison, buffalo, elk, etc.),</td>
<td><strong>MEAT AND FISH TO AVOID</strong>&lt;br&gt;tuna and swordfish, shellfish, beef, pork, cold cuts, hot dogs, sausage, and canned meats</td>
</tr>
<tr>
<td><strong>DAIRY AND EGGS TO INCLUDE</strong>&lt;br&gt;milk substitutes such as rice milk, oat milk, hemp milk, almond or other nut milk, and egg substitutes (use ground flax or chia for replacing eggs in baking- avoid processed egg replacers)</td>
<td><strong>DAIRY AND EGGS TO AVOID</strong>&lt;br&gt;milk, cheese, cottage cheese, cream, butter, yogurt, ice cream, non-dairy creamers, soy milk, and eggs</td>
</tr>
<tr>
<td><strong>FATS TO INCLUDE</strong>&lt;br&gt;cold pressed oils such as olive oil, flaxseed, canola (non-GMO), safflower, sunflower, sesame, walnut, hazelnut or pumpkin seed, coconut oil</td>
<td><strong>FATS TO AVOID</strong>&lt;br&gt;margarine, butter, shortening, any processed or hydrogenated oils, peanut oil, mayonnaise, fried foods</td>
</tr>
<tr>
<td><strong>BEVERAGES TO INCLUDE</strong>&lt;br&gt;filtered or distilled water, green tea, herbal tea, pure fruit juices, mineral water, roasted grain coffee substitutes</td>
<td><strong>BEVERAGES TO AVOID</strong>&lt;br&gt;sodas and soft drinks (including sugar-free), alcoholic beverages, coffee, tea, or any other caffeinated beverages, sweetened fruit juice</td>
</tr>
<tr>
<td><strong>SWEETENERS TO INCLUDE</strong>&lt;br&gt;brown rice syrup (gluten-free), chicory syrup, stevia, blackstrap molasses, fruit sweeteners such as LoHan fruit, pure maple syrup, agave nectar, yacon syrup, organic raw honey</td>
<td><strong>SWEETENERS TO AVOID</strong>&lt;br&gt;white or brown sugar, high fructose corn syrup, processed honey, corn syrup, sucrose, dextrose, turbinado, nutritive corn sweetener and any artificial sweeteners, colors or flavors</td>
</tr>
<tr>
<td><strong>HERBS/SPICES/CONDIMENTS TO INCLUDE</strong>&lt;br&gt;vinegars (except grain source), wasabi, mustard, horseradish, pesto (cheese free) and all spices</td>
<td><strong>HERBS/SPICES/CONDIMENTS TO AVOID</strong>&lt;br&gt;High salt intake, chocolate, ketchup, relish, soy sauce, BBQ sauce, chutney, MSG, BHA, BHT, nitrates, nitrites and any other chemical additive or preservatives</td>
</tr>
</tbody>
</table>
Herbs to Detoxify the Liver

**Milk thistle (Carduus marianus)**

Silymarin, a flavanolignan is the main active compound that gives Milk Thistle its well-researched liver protecting effects. Silymarin protects the liver by inhibiting damaging substances in the liver that cause liver damage. Silymarin has the added ability to increase glutathione, one of the most critical nutrients for liver detoxification in the liver, intestine and stomach.¹⁹ There are over one hundred studies that involve the ability of Milk thistle to protect and regenerate the liver. Milk thistle is proved to be useful in all liver conditions such as hepatitis, cirrhosis, liver damage, cholestasis and fatty liver. Silymarins ability to promote the regeneration of damaged hepatocytes renders it as one of the most potent liver detoxifiers.

**Turmeric (Curcuma longa)**

Curcumin, one of the active compounds in Turmeric, is a potent liver detoxifier and anti-inflammatory agent. Curcumin is of exponential use in Phase 2 detoxification pathways in the liver as it increases the levels of the enzymes needed to facilitate the action of Phase 2 detoxification. Curcumin also increases the production of bile from the liver which helps to expel toxins and reduce liver inflammation.

**Burdock Root (Arctium lappa)**

Burdock Root is one of the foremost cleansing herbs, providing nourishing support for the blood, the liver, and the natural defense system. It is rich in Vitamins B-1, B-6, B-12, and E, plus manganese, copper, iron, zinc and sulfur. Burdock root contains Inulin along with bitter compounds and mucilage which allows its ability to control liver damage and protection from further burdens to the liver. Burdock

¹⁹ Medicinal Herbs Quick Reference Guide Julieta Criollo, DNM, CHT pg. 109
root also promotes the flow and release of bile, which not only helps in cleansing the liver, but also aids in the digestive process.

**Dandelion Root (Taraxacum officinalis)**

The Australian Journal of Medicinal Herbalism has cited two studies that showed the liver-regenerating properties of dandelion in cases of jaundice, liver swelling, hepatitis and indigestion.\(^{20}\)

The root of the Dandelion plant is effective as a detoxifying agent acting especially on the liver and gallbladder and it helps to remove toxins and waste products. It stimulates and tonifies the digestive system. Its cholagogue or bile secreting effect creates a mild laxative effect which allows for expulsion of toxins. Dandelion root is therefore useful in the treatment of liver conditions such as jaundice, metabolic toxicity, hepatitis, cholelithiasis (gallstones), as well as chronic conditions of the digestive system, conditions of the skin such as acne and eczema and joint problems such as arthritis.

**Globe Artichoke (Cynara scolymus)**

Globe Artichoke contains a powerful compound called cynaropicrin which is a sesquiterpene lactone that stimulates the flow of bile from the liver and makes it a useful liver detoxifier and protector. Due to its ability to promote detoxification and improve bile flow, Globe Artichoke is useful in all cases of insufficient liver production and digestive insufficiencies.

**Blue Flag (Iris versicolor)**

Blue Flag has the ability to detoxify almost all channels of elimination. It stimulates the flow and release of bile from the liver, purges the intestines, promotes secretions from the pancreas. Blue flag also cleanses the blood of impurities and stimulates the lymphatic system which enhances whole body cleansing effects.

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\(^{20}\) The 4-Week Ultimate Body Detox Plan Michelle Schoffro Cook, DNM, DAc, CNC pg. 237
Yellow Dock (*Rumex crispus*)

The major plant chemicals in yellow dock are tannins, oxalates, anthraquinone glycosides (about 3-4%) and include nepodin, as well as others based on chrysophanol, physcion and emodin. These constituents produce alterative, gentle purgative, mild laxative, and mild astringent tonic effects. The iron content of yellow dock makes it useful in treating anemia symptoms. Chrysarobin in yellow dock is found to relieve a congested liver.

The Anthraquinone glycosides contained in Yellow dock have a laxative effect on the bowels making it beneficial in all detoxification strategies. The release of toxins from the tissues can create an increasingly symptomatic effect on the body if the channels of elimination are not working efficiently. Yellow dock has the ability to expel toxins from the bowels as well as from the liver and blood.

Barberry (*Berberis vulgaris*)

Barberry is known for containing Berberine, the powerful agent which has numerous actions including its potent anti-microbial effects, hepato-protectant, bile secreting and liver detoxifying benefits. Apart from berberine in the chemical composition of the plant, there are numerous active substances. The bark contains a large number of alkaloids (berberine, berbamine, oxyacantha) and tannins. Barberry is also effective in reducing nausea and vomiting. It also tones and strengthens the body and stimulates bowel action.
Nutrients to Detoxify the Liver

Alpha-Lipoic Acid (ALA)

ALA is the remarkable “universal antioxidant” as it is both water and fat soluble proving to have antioxidant effects on the inside and outside of the cells. ALA helps to neutralize the effects of all free radicals and enhances the antioxidant functions of vitamins C and E and glutathione.

Research shows ALA is effective in neutralizing toxins from over-the-counter and prescription drugs before they can cause liver damage.

Glutathione

Glutathione is one of the molecules used in Phase 2 detoxification and is produced in the body by the liver. Levels of glutathione naturally decrease with the aging process. Glutathione is made up of cysteine, glutamic acid and glycine. The amount of cysteine in the body will determine how much glutathione is produced. Glutathione has tremendous liver protecting effects which blocks the effects of environmental pollution, medications, radiation, mercury and other heavy metals. As well, glutathione aids in detoxification by removing fungicides, herbicides, carbamate, organophosphates, pesticides, nitrates, notrosamines, flavorings, plastics, steroids, phenolic compounds and certain medications.

Vitamin C

Vitamin C is a water-soluble antioxidant vitamin which is not produced within the body and therefore must be replenished through dietary means on a daily basis. Deficiencies in Vitamin C have been shown to decrease the metabolism of xenobiotics by lowering the level of cytochrome P-450. Vitamin C aids in detoxification by combating all free radicals. Vitamin C also prevents damage from exposure to

21 Natural Detoxification A Practical Encyclopedia Jaqueline Krohn MD, Frances Taylor, MA pg. 276
numerous hepato-toxic agents including pollutants, carbon monoxide, heavy metals, sulfur dioxide, carcinogens, stored lipophilic chemicals, medications, anesthetics, radiation, bacterial toxins and poisons.

**N-Acetyl Cysteine (NAC)**

NAC is thought to be an intermediate compound in cysteine metabolism, which makes it a derivative of cysteine. NAC has the ability to boost glutathione levels which is critical to Phase 2 detoxification. NAC protects the liver from toxic compounds, has tremendous chemo-protectant effects and also protects the body from radiation. NAC is a potent liver vasodilator which increases the blood flow to the liver thereby enhances its detoxification abilities.

**Methionine**

Due to methionine’s sulfur content, it is a powerful antioxidant that has the ability to inactivate free radicals, support liver detoxification, protect cell membranes against lipid peroxidation and protect precious glutathione levels in the body. Methionine, when in non-deficient levels has the added effect of preventing the accumulation of fat in the liver.

**Coenzyme Q**

COQ₁₀ is the most powerful antioxidant in the body. COQ₁₀, also called Ubiquinone is a potent free radical scavenger which protects the cellular membranes, protecting against damage caused by toxins and is a crucial co-factor for energy production within the body.

**Vitamin B₅**

Vitamin B₅, also known as pantothenic acid, is part of the B-complex family of vitamins. B₅ is the main vitamin that is used in times of stress as it stimulates adrenal hormone production and supports adrenal
function preventing adrenal exhaustion during prolonged stress. B5 is a critical nutrient involved in
Phase 1 detoxification. It aids the body in its detoxification efforts by protecting the body against
harmful radiation. It also counters the effects and toxicity of antibiotics, aids in the production of
hydrochloric acid in the stomach and stimulates the synthesis of cholesterol.

**Vitamin B6**

Pyrodoxine or Vitamin B6 is involved in more bodily processes than any other single nutrient and has an
effect on both physical and mental health. B6 is needed for the metabolism of methionine, aids in the
transport of amino acids across the cellular membrane and supports liver detoxification. B6 is also
needed for the proper metabolism and use of protein, fats, carbohydrates and hormones.

**Folic acid**

Folic acid plays a role in both the Phase 1 and Phase 2 detoxification pathways. It is needed for the
utilization of amino acids and is involved in protein metabolism and the production of RNA and DNA.
Folic acid is required for the formation of both red and white blood cell formation.

**Selenium**

Selenium is an essential trace mineral that is found in glutathione peroxidase, which is necessary for the
recycling of glutathione. Considered to be one of the beneficial antioxidants, selenium protects the
cellular membranes and prevents the breakdown of DNA. It also neutralizes free radicals and enhances
the functions of Vitamin C and E.
Zinc

Zinc is a trace mineral that is found in over 90 essential enzymes in the body.\textsuperscript{22} Zinc is directly involved with Phase 1 detoxification as it is also found in alcohol dehydrogenase, an enzyme that detoxifies aldehydes. In addition, zinc supports liver detoxification and protects the liver from the toxic effects of chemicals. It is a component of superoxide dismutase and it reduces lipid peroxidation.

\textsuperscript{22} Natural Detoxification A Practical Encyclopedia Jaqueline Krohn MD, Frances Taylor, MA pg. 284
The Stress Effect

Stress can be defined as any perceived physical or psychological change that disrupts an organism’s metabolic balance.\textsuperscript{23} In modern day society, people are faced with constant exposure to stress. Stress automatically activates a chain of events which occur in order for individuals to respond to the stress. Signals are sent throughout the body through the communication efforts of the neuroendocrine system resulting in “fight or flight” responses. Some of these signals cause positive changes in order for the body to respond to the immediate or acute stress. Long term or chronic stress poses too many challenges which overload the circuits and cause the systems of the body to eventually shut down.

Surveys and research reports conducted over the past 2 decades reveal that 43% of all adults suffer adverse effects due to stress. In fact, 75% to 90% of all visits to primary care physicians are in some way related to the adverse impact of psychosocial stress. Furthermore, an estimated 1 million workers are absent on an average workday because of stress-related complaints. The market for stress management programs, products, and services has skyrocketed in the past decade and is estimated to currently exceed $11 billion annually.\textsuperscript{24} While all age groups are affected by stress, the aging population faces compounded susceptibility to stress-induced disorders because of the accumulation of problems mediated by chronic, long term stress.\textsuperscript{25}

\textsuperscript{23} ANSR–APPLIED NUTRITIONAL SCIENCE REPORTS Nutritional Management of Stress-Induced Dysfunction
Physiological Response to Stress

The autonomic nervous system (ANS) which is a branch of the nervous system is automatically activated when the stress response is initiated. The autonomic nervous system activities are involuntary and take place completely beyond our conscious control. The automatic functions of the ANS include digestion, heart rate, blood pressure, and body temperature.

The two branches of the ANS that regulate the fight-or-flight response are the sympathetic and the parasympathetic nervous systems. The sympathetic nervous system is the part of the ANS that is responsible for initiating the fight-or-flight response. With each perceived thought of danger or pain, the sympathetic nervous system automatically initiates the fight-or-flight response so that the body can handle any potential danger or pain.

The parasympathetic nervous system returns the body back to balance. During parasympathetic activity, blood concentrates in the central organs for such processes as digestion and storage of energy reserves. Breathing, heart rate, blood pressure, muscle tension and body temperature are all decreased back to normal.
The hypothalamus or “master gland” controls the autonomic nervous system. The hypothalamus receives the message of danger from the higher-order thinking component of the mind which sends a message to the hypothalamus in the face of danger. The message is delivered through the nervous system that connects, like a hard-wired neuron system, to every other system of the body. Hormones are secreted as the hypothalamus stimulates the endocrine system to initiate the secretion of hormones. The adrenalin and cortisol hormones are then secreted into the bloodstream and travel throughout the body to deliver information to cells and systems.

Epinephrine (adrenalin) and norepinephrine (noradrenalin) are released into the bloodstream from the adrenal medulla. The adrenal medulla is the part of the adrenal glands positioned on top of the kidneys.

http://www.google.ca/imgres?imgurl=http://malynne.net/media/Physiology%2520of%2520stress.png&imgrefurl=
Cortisol is the other key hormone released from a portion of the adrenal glands called the adrenal cortex. Together, these hormones flood every cell in the body with the specific message to prepare for fight-or-flight.

**Autonomic Nervous System Responses**

Some immediate physiological changes that result from autonomic nervous system activation include:

- Increased central nervous system (CNS) activity
- Increased mental activity
- Increased secretion of adrenaline (epinephrine), noradrenalin (norepinephrine) and cortisol
- Increased heart rate
- Increased cardiac output
- Increased breathing rate
- Increased metabolism
- Increased oxygen consumption
- Increased oxygen to the brain
- Blood is shunted away from the digestive tract and directed into the muscles and limbs
- Increased muscle contraction which leads to increased strength
- Increased blood coagulation (blood clotting ability)
- Increased circulation of free fatty acids
- Increased output of blood cholesterol
- Increased blood sugar released by the liver to nourish the muscles
- Release of endorphins from the pituitary gland
• Pupils of the eyes dilate
• Hair stands on end
• Blood thins
• Increased brainwave activity
• Sweat glands increase secretion
• Increased secretion from Apocrine glands resulting in foul body odor
• Capillaries under the surface of the skin constrict which consequently increases blood pressure

There are also several processes in the body that tend to decrease in function when the fight-or-flight response is activated:

• Immune system is suppressed
• Constriction of blood vessels, except to running and fighting muscles
• Reproductive and sexual systems stop functioning normally
• Digestive system stops metabolizing food normally
• Excretory system turns off
• Decrease in saliva production
• Decreased perception of pain
• Kidneys decrease output
• Bowel and bladder sphincter close

The General Adaptation Syndrome

According to Dr. Hans Selye and his research on the physiological effects of chronic stress on rats, the General Adaptation Syndrome (GAS) was founded. The general adaptation syndrome provides a
summary of the physiological changes that follow stress. Dr. Selye observed three sets of responses whenever he injected rats with a toxin:

1. Adrenal gland enlargement
2. Lymph node decrease
3. Severe bleeding ulcer development in the stomach and the intestines

Over several years, Dr. Selye theorized that the same physiological changes took place in the body in reaction to any kind of stress. These patterns had a tendency to result in disease conditions such as ulcers, arthritis, hypertension, arteriosclerosis and diabetes. Dr. Selye called the pattern the general adaptation syndrome. For decades researchers have studied the syndrome and Dr. Selye’s theories have held up to all levels of scientific scrutiny.

**Three stages of the general adaptation syndrome include:**

1. **Alarm Stage:** In the Alarm stage, bursts of the hormones cortisol and adrenaline are released in response to a stressor, resulting in the traditional “fight or flight” responses.

2. **Resistance Stage:** In the resistance stage, the body uses high cortisol levels to free up stored energy that helps the body physically resist the stressor. It is now known that a prolonged resistance stage may increase the risk of developing stress related diseases. If cortisol levels remain elevated, symptoms may include feeling tired but wired, having difficulty sleeping, weight gain around the waist, high blood pressure, hair loss, muscle mass loss and anxiety. Excess cortisol also interferes with the action of other hormones like progesterone, testosterone and thyroid which further creates more imbalances and increasing symptoms.

3. **Exhaustion Stage:** At this stage, the adrenals are either depleted from producing too much cortisol or are reacting to the detrimental effects of high cortisol. This reduces the cortisol
production significantly. Symptoms of low cortisol include fatigue (especially morning fatigue),
increased susceptibility to infections, decreased recovery from exercise, allergies, low blood
sugar, a burned out feeling, depression and low sex drive.

Chronic stress-induced dysfunction can create a significant loss of vitality and can result in serious long-
term health problems. While stress is an inevitable consequence of modern life, the devastating damage
caused by chronic stress cannot be ignored. A healthy diet, regular exercise, lifestyle changes, relaxation
as well as holistic therapies can help to normalize the parameters of the stress response.

**The Effects of Herbal Adaptogens on Stress**

Adaptogens are a group of herbs which have been used for centuries in traditional medicine. There is
clear empirical and clinical evidence that adaptogens have the ability to support a healthy response to
stress and to normalize HPA activity.\(^{27}\)\(^{28}\) Through their complex chemical compositions, adaptogens are
able to address multiple levels of the stress response, including HPA activation, feedback loops, insulin
and glucose homeostasis, energy levels, cognitive function, gastric mucosal strength, blood lipid levels,
blood pressure, and immunity.\(^{29}\) Due to their complex chemical structure and their broad effects, herbal
adaptogens provide the benefit of balancing and normalizing the physiology of the body and thus can
greatly reduce the effects of stress.

\(^{28}\) Panossian A, Wikman G, Wagner H. Plant adaptogens. III. Earlier and more recent aspects and concepts on their
\(^{29}\) 576 1/02 Rev. 11/03 ANSR–APPLIED NUTRITIONAL SCIENCE REPORTS Nutritional Management of Stress-Induced Dysfunction
Some beneficial herbal adaptogens are:

**Holy Basil (Ocimum sanctum)**

Holy basil is an Indian herb which is found to affect multiple aspects of physiology. Research suggests that it has immunomodulatory activities. Holy basil enhances gastric mucosal strength, normalizes blood glucose levels, increases physical endurance, supports healthy blood lipid levels, and modulates adrenal corticosterone levels in animals. \(^{30}\) Holy Basil works directly on stress levels by reducing the harmful effects of elevated cortisol levels and consequently restores a sense of calm and well-being.

**Ashwagandha (Withania somnifera)**

Also known as Indian Ginseng, although it shares no relation to Ginseng, Ashwagandha traditionally has been used as a tonic for several types of body weaknesses as well as to promote strength and vigor. As an adaptogen, Ashwagandha has the unique ability to have amphoteric actions on cortisol. Whether cortisol levels are low or high, Ashwagandha will restore balance. Known in the Indian system of Ayurveda as a classic rejuvenating herb, ashwagandha has repeatedly proven its adaptogenic potential. While the HPA modifying mechanisms of ashwagandha are not fully understood, research suggests it may interact with pathways in the CNS that affect HPA activation and catecholamine production. These pathways may include cholinergic, GABAergic, and dopaminergic. \(^{31}\)

**Bacopa (Bacopa monnieri)**

Bacopa, a nerve tonic from Ayurvedic medicine, has traditionally been used to improve learning, enhance memory, and relieve anxiety and seizures. It has been shown to have neuro-protective and antioxidant properties. The active constituents for cognitive function appear to be saponins called


Bacopa. Although memory can improve with short-term dosing, it appears chronic (2-3 months). Supplementation with Bacopa may be necessary for maximum cognitive-enhancing benefits to be demonstrated. Bacopa has been studied in adults and in normal children as well as children diagnosed with attention deficit/hyperactivity disorder. Modern Bacopa research confirms its effects on anxiety which might be mediated by an increase in the brain’s level of the inhibitory neurotransmitter GABA (gamma-aminobutyric acid).

**Cordyceps (Cordyceps sinensis)**

Cordyceps is a therapeutic fungus found primarily at high altitudes in China. Research dating back to 1843 states that Cordyceps has properties similar to those of ginseng. Cordyceps like ginseng is used to strengthen and rebuild the body after exhaustion or long-term illness.\(^3\) Research has also demonstrated immunoregulating activities and Cordyceps has been shown to increase adenosine triphosphate (ATP) making it effective in alleviating fatigue and improving physical endurance.\(^3\) In addition, Cordyceps is a powerful antioxidant that can defend against oxidative damage that can occur within in the cells including the mitochondria.

Two of the primary mechanisms of actions for Cordyceps are its ability to increase oxygen capacity and increase ATP (adenosine triphosphate) levels. Studies have shown that Cordyceps can help increase lung capacity and lead to easier breathing and better oxygen capacity.

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Korean Ginseng (*Panax ginseng*)

Panax Ginseng is greatly valued in traditional use as a tonic. It is a substance that acts to normalize the body and aids in creating a state of healthy homeostasis through a variety of pharmacological actions.\(^{34}\) Panax’s main constituent is Ginsenoside which has a corticosteroid-like action and is also hypoglycemic which inhibits the re-uptake of neurotransmitters and causes a calming balance within the body. It is used to enhance stamina and to provide the capacity to cope with fatigue and physical stress. Although the exact mechanisms of ginseng remain a mystery, animal and human research indicates that ginseng may influence HPA activity by modulating glucocorticoid levels. This influences the positive and negative feedback stress hormone receptors and inhibits cortisone-induced adrenal and thymic atrophy.\(^{35}\)

Rhodiola (*Rhodiola rosea*)

Rhodiola rosea has been extensively studied in Russia and Scandinavian countries for over 35 years and is categorized as an adaptogen because of its ability to increase resistance to chemical, biological, and physical stressors. Rhodiola has been found to inhibit stress-induced depletion of catecholamines and to facilitate the transport of neurotransmitters within the brain. The adaptogenic properties of Rhodiola have been attributed primarily to this ability to influence the levels and activity of neurotransmitters and opioid peptides such as beta-endorphins. Because it is an adaptogen, Rhodiola has the potential to normalize neurotransmitters in the central nervous system without causing drowsiness or fatigue.

Licorice (*Glycyrrhiza glabra*)

Licorice root is one of the most highly regarded in terms of treating conditions associated with diminished adrenal function. The adaptogenic activity of licorice is associated with two active

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\(^{34}\) Huang KC. The Pharmacology of Herbs 2nd Ed. New York: CRC Press; 1999

components—glycyrrhizin and glycyrrhitinic acid. These components have been reported to bind to both glucocorticoid and mineralcorticoid receptors, possibly displacing endogenous steroids and thus contributing to an increase in availability of cortisol within the body.\textsuperscript{36} Licorice is known to have multiple pharmacological actions including adrenocorticoid-like activity. In addition, licorice has anti-inflammatory, antitussive, antiviral, antiulcer, and estrogen-balancing properties.

5-Hydroxytryptophan (5-HTP)

5-HTP is extracted from the seeds of the African plant, Griffonia simplicifolia. It is the intermediate metabolite of the essential amino acid L-tryptophan in the biosynthesis of serotonin. Unlike L-tryptophan, 5-HTP cannot be shunted into niacin or protein production. Therapeutic use of 5-HTP bypasses the conversion of L-tryptophan into 5-HTP by the enzyme tryptophan hydroxylase. This is the rate-limiting step in the synthesis of serotonin but is inhibited by numerous factors which include stress, insulin resistance, vitamin B6 deficiency, magnesium deficiency, and increasing age. It easily crosses the blood-brain barrier and effectively increases central nervous system (CNS) synthesis of serotonin. This makes it an effective treatment in a wide variety of conditions, including depression, fibromyalgia, insomnia, binge eating associated with obesity and chronic headaches.

Gamma-aminobutyric acid (GABA)

GABA is a major neurotransmitter which is widely distributed throughout the central nervous system. When too much excitation occurs in the CNS, it can lead to irritability, restlessness, insomnia, seizures, and movement disorders and it must be balanced with inhibition. GABA is the most important inhibitory neurotransmitter in the brain. It provides this inhibition and acts like a “brake” during times of runaway stress. Either low GABA levels or decreased GABA function in the brain is associated with several

psychiatric and neurological disorders such as anxiety, depression, insomnia, and epilepsy. Studies indicate GABA can improve relaxation and enhance sleep.

**L-theanine**

L-theanine is a unique amino acid which is present almost exclusively in the green tea plant (Camellia sinensis) and has been used safely in Japan for decades. L-theanine has demonstrated the potential to positively modify brain waves and key neurotransmitters involved in mood, focus, and memory.

Consumption of L-theanine enhances brain alpha-wave activity as a sign of relaxation. The intensity of brain alpha-wave activity increases within 30-45 minutes of L-theanine supplementation. This results in enhanced relaxation and improved mental focus and acuity. This effect is most pronounced in persons subjectively feeling the highest levels of distress. A small Japanese study of university students showed 200 mg oral L-theanine led to increased brain alpha-waves and a subjective sense of relaxation.

Theanine administration caused a dose-dependent relaxed, yet alert, state of mind without sedation, beginning approximately 40 minutes after oral dosing. L-theanine enhances production of dopamine and serotonin and appears to play a role in the formation of GABA – a neurotransmitter that acts like a “brake” during times of runaway distress. Theanine helps establish balance in the neurotransmitter system, resulting in improvements in the mental/emotional and physical disturbances resulting from chronic stress.
Nutritional Factors

Food production and processing has been greatly affected over the past century. Sporadic eating habits in a fast paced society have adversely compromised the hormonal health of North Americans.

A study in the journal Pediatrics in 2010 of 1,238 girls found that nearly 25% of African American girls, 15% of Latin girls and 10% of Caucasian girls were developing breasts by the age of 7. In the previous decade, only 5% of Caucasian girls were developing breasts that early.

The first genetically engineered product ever brought to market was in 1994 when milk in the United States started coming from cows injected with a genetically engineered growth hormone. At that time the U.S. Food and Drug Administration (FDA) approved rBGH for sale over the objections of consumer and health advocacy groups, such as Consumers Union and Cancer Prevention Coalition. rBGH, also known as recombinant bovine somatropine (rBST) and recombinant bovine growth hormone (rBGH), was not approved for use in both Canada and Europe due to animal welfare and human health concerns.

Although rBGH is manufactured in labs, it actually mimics a naturally occurring hormone that is produced in a cow’s pituitary gland. It’s injected into cows every two weeks to boost the cow’s hormonal activity which is artificially boosted through these injections. This boost allows the cows to produce 10-25% more milk each day which translates into one extra gallon per day. Within four years of its introduction to the market, rBGH was being injected into one third of the US cattle herds.

The label on rBGH’s package states that this product is extremely hazardous to the cows. The sited side effects on the cows include “increases in cystic ovaries and disorders of the uterus,” “decreases in gestation length and birth weight of calves,” and “increased risk of clinical mastitis.” 37

37 http://www.allergykids.com/uncategorized/raging-hormones/
Use of rBGH increases Insulin-like Growth Factor-1 (IGF-1) in the milk of treated cows by as much as 10-fold. Though IGF-1 naturally occurs in both humans and cows, higher than normal levels of this substance in humans has recently been linked to breast and prostate cancers. There is no definitive proof that drinking milk with high IGF-1 levels will translate to high levels in humans, but IGF-1 can be absorbed into the bloodstream from the digestive tract.\(^\text{38}\)

As early as 1998, an article in the Lancet, the prestigious British medical journal, reported that women with even relatively small increases of a hormone known as Insulin-like Growth Factor 1 (IGF-1) were up to seven times more likely to develop premenopausal breast cancer.\(^\text{39}\)

According to a January 1996 report in the International Journal of Health Services, rBGH milk has up to 10 times the IGF-1 levels of natural milk. More recent studies have put the figure even higher at approximately 20-fold.\(^\text{40}\)

Non-organic beef is another controversial issue. Farmers use many hormones other than rBGH to raise their animals faster and more efficiently. More than 90 percent of cows in the U.S. are routinely injected with hormones as the FDA actually permits six hormones to be given to livestock. Estradiol, testosterone and progesterone are three of the hormones that are used that naturally occur in livestock and humans. Trenbolone acetate, melengestrol acetate and zeranol are synthetically produced hormones also used on animals. Two hormones, estradiol, a type of estrogen, and progesterone—are considered probable carcinogens by the National Toxicology Program at the National Institutes of Health. Estrogen has been linked with breast cancer in women and testosterone with prostate cancer in men, while progesterone has been found to increase the growth of ovarian, breast and uterine tumors.

\(^{38}\) http://healthychild.org/blog/comments/hormones_in_our_food/

\(^{39}\) http://www.allergykids.com/uncategorized/raging-hormones/

\(^{40}\) http://www.allergykids.com/uncategorized/raging-hormones/
Alternatively organic dairy products come from cows that are not routinely treated with bovine growth hormone (BGH) to increase milk production or antibiotics and are fed a natural pesticide free diet. If a cow in an organic herd does need to be treated with antibiotics, she is not returned to the herd for a period of 12 months at which time testing confirms there are no traces of antibiotic residue. Certified organic beef and dairy producers must comply with stringent production, animal welfare and processing requirements of an organic standard by a certifying body. Furthermore, organic beef and dairy production require an audit trail and an annual third-party (independent) verification.

According to the Organic Consumers Association, one benefit of organic milk is that it is higher in vitamins and antioxidants. Some of the vitamins and antioxidants found in greater concentration in organic milk include vitamin E, beta carotene, omega-3 fatty acids, lutein and zeaxanthine.

According to a University study in Newcastle conducted by Carlo Leifert and Machteld Huber and published in the "British Journal of Nutrition," organic milk is associated with 36% lower rates of allergies, asthma and eczema in children by age 2.

Factory Farms are concentrated-animal –feeding operations (CAFO’s) where non-organic or non-natural beef is raised. According to "Food, Inc.," the book accompaniment to the documentary film of the same name, tens of thousands of animals are raised in such crowded conditions that normal behavior such as grazing is impossible. Prophylactic antibiotics are routinely administered due the rampant spread of infections in the overcrowded conditions. Increased use of antibiotics on farm animals leads to antibiotic-resistant strains of bacteria that can be passed to humans.

USDA regulations require that all organic livestock must be fed a diet of "agricultural products...that are organically produced and ...organically handled." Therefore organic cattle eat grass or organically grown grains that are pesticide free and not laced with fertilizers or other chemicals. In stark contrast, corn and soybeans is the main staple in the feedlots of conventional cattle. Cattle are designed to eat grass, but
those that eat grains have been found to have more E. Coli bacteria in their intestinal tract and feces. During slaughter, this can contaminate meat with these deadly bacteria. Conventionally raised livestock are also fed plastic pellets, formulas containing urea or manure, or slaughter by-products which are all allowable by the USDA.

**Processed Foods**

Any food that is canned, frozen, dehydrated, texturized, softened or has been chemically laden to increase longevity is a processed food. Research shows that the North American diet consists of 60% processed foods. Researchers have discovered that preservatives are altering our biochemistry and can lead to autoimmune conditions, cancer, obesity, insulin resistance and accelerated aging.

Butylated hydroxyanisole or BHA, for example, has been generally recommended as safe (GRAS) by the FDA but is still considered to be “reasonably anticipated to be a human carcinogen”. BHA is a chemical that helps to prolong the shelf life of food but it also an endocrine disruptor. BHA’s are found in numerous sources such as butter, lard, cereals, baked goods, sweets, beer, vegetable oils, potato chips, snack foods, dehydrated potatoes, flavoring agents, sausage, poultry and meat products, dry mixes for beverages and desserts, glazed fruits, chewing gum, active dry yeast, defoaming agents for beet sugar and yeast and emulsion stabilizers for shortening. BHA is also found in food packaging, lipsticks, lip gloss, mascara, eye shadow and facial creams.  

**Hydrogenated Fats**

When a regular fat is blasted with a hydrogen ion and the liquid is changed to a solid at room temperature, hydrogenated fats are created. Deemed as one of the worst preserving agents, hydrogenated fats increase cholesterol and triglyceride levels dramatically. Just a 2% increase of Trans

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fatty acids increases the chance of heart disease by 23%. A New England Journal of Medicine review of more than 80 studies found that Trans fat is more dangerous to health than any food contaminant even when it is only 1 to 3% of the total calorie intake. Only 20 to 60 calories from artificial Trans fats per day will start damaging health.  

High Fructose Corn Syrup- HFCS

In 1967, the US production of HFCS was 3 000 tons compared to 9 227 000 tons in 2005. There has been a 350% increase in production since 1980 alone and consumption has increased by 20 fold. Studies conducted at the University of Pennsylvania found that HFCS did not suppress the hormone ghrelin which is the hunger suppression hormone in the way that the suppression occurred by glucose. The studies showed that when HFCS was consumed, more calories were subsequently taken in than normal in the 24 hours following. This translated into an overall weight gain in all the studies that were performed. HFCS also causes leptin resistance which is the hormone that is secreted from the brain to tell the body it is full.

Artificial Sweeteners

Consumers of artificial sweeteners have greatly increased over the past few decades. The consumption rate increased from 70 million in 1987 to 160 million in 2000. There is much research to show that artificial sweeteners such as aspartame and saccharin are not only linked to cancer but also have been shown to cause increased cravings and weight gain also leading to insulin resistance. Researchers at the University of Texas San Anontio determined that adults aged 25-64 who drank diet soft drinks drastically increased their risk of gaining weight. The study involved the weight and soda- drinking habits of more

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than 600 normal weight subjects. 8 years later, researchers discovered in subsequent studies that those who consumed 1 diet soda per day were 65% more likely to be overweight than those who drank none.

When aspartame is broken down in the body, methanol is produced. Methanol is a neurotoxic alcohol which is hundreds of times more potent than the alcohol in alcoholic beverages. Aspartame has thus been shown to cause neurological diseases and symptoms including headaches, muscle spasms, dizziness, twitching, memory loss, migraines and even seizures.

**Refined Grains**

When the bran and germ of the grain are removed during the refining of the grains to extend shelf life, almost all of the fiber, vitamins and minerals of the entire grain kernel are also eliminated. In addition, the B vitamins—thiamine, riboflavin, niacin, folic acid and iron—are all stripped away during the processing. Enrichment of these nutrients often occurs to add back synthetic versions of these eliminated nutrients.

Refined grains are easily digestible but cause spikes in blood sugar and insulin which can result in insulin resistance and diabetes. There is a 30% increased risk of developing diabetes in those people who never eat whole grains or non-refined grains in comparison to those who eat 3 servings of whole grains per day. A study in the *Journal of Clinical Nutrition* found that people who eat refined grains have a 40% higher level of C Reactive protein which is an inflammatory marker in the cardiovascular system that can increase the risk of heart attack and stroke.

**Caffeine**

The central nervous system is stimulated when caffeine is consumed even at doses as small as one third of a cup. The body is sent into “fight or flight” mode. Once caffeine enters the bloodstream, the adrenals secrete epinephrine and norepinephrine which sets the stage for a chain of hormonal events that cause weight gain. Specifically, the liver releases blood sugar and the pancreas subsequently
secretes insulin to counteract the sugar and therefore the blood sugar dips due to the actions of insulin. Blood vessels are constricted and sugar cravings then occur which is actually the result of the body reacting to the drop in blood sugar. Cortisol is elevated for up to 14 hours due to the acids in just one cup of coffee. Over consumption of caffeine deteriorates the adrenal glands and inflicts the effects of long term stress on the body. Other effects of caffeine consumption include suppression of the immune system and a decrease in brain oxygenation. Excess cortisol also results in increasing abdominal fat deposits and therefore can lead to insulin resistance.

The phosphoric acid in caffeine containing beverages blocks calcium absorption which can lead to a calcium deficiency. This deficiency promotes the loss of bone and contributes to heightened PMS symptoms which include breast tenderness, irritability and nervousness.

**Alcohol**

Consumption of even small amounts of alcohol will cause a release of estrogen into the bloodstream, raised cortisol levels and decreased leptin levels. The extra estrogen in the bloodstream can cause increased fat storage and decreased muscle growth. The raised cortisol levels will cause night waking and disturbed sleep. Decreased leptin levels will result in food cravings.

**Influencing Hormone Balance through Nutrition**

**Organic Foods**

90% of all hormone disrupting agents are found in everyday food supplies. Consuming organic foods will greatly reduce the toxic exposure accumulated through non-organic foods.

The Environmental Working Group, a non-profit organization dedicated to consumer health and protection has published a list of the 12 most densely sprayed fruits and vegetables (“Dirty Dozen”) and the 15 least sprayed fruits and vegetables (“Clean Fifteen”).
The Dirty Dozen

1. Peaches - 96.7% of samples tested positive for pesticides, 87% for multiple pesticides
2. Apples - 94.1% tested positive, 82.3% for multiple pesticides
3. Sweet Bell Peppers - 81.5% tested positive, 62.2% for multiple pesticides
4. Celery - 94.1% tested positive, 79.8% for multiple pesticides
5. Nectarines - 97.3% tested positive, 85.3% for multiple pesticides
6. Strawberries
7. Cherries
8. Kale - 53.1% for multiple pesticides
9. Lettuce
10. Imported Grapes
11. Carrots - 82.3% tested positive
12. Pears

The Clean Fifteen

1. Onions - no detectable residues on 90% or more of samples, zero samples positive for multiple pesticides
2. Avocado - less than 10% tested positive, less than 1% for multiple pesticides
3. Frozen Sweet Corn- no detectable residues on 90% or more of samples, zero samples positive for multiple pesticides

4. Pineapples- less than 10% tested positive, less than 1% for multiple pesticides

5. Mango- less than 10% tested positive, less than 1% for multiple pesticides

6. Asparagus- no detectable residues on 90% or more of samples

7. Frozen Sweet Peas- 77.1% had no detectable pesticides

8. Kiwi

9. Cabbage- 82.1% had no detectable pesticides

10. Eggplant- 75.4% had no detectable pesticides

11. Papaya

12. Watermelon- 28.1% tested positive, 9.5% for multiple pesticides

13. Broccoli- 65.2% had no detectable pesticides

14. Tomatoes- 53.1% had no detectable pesticides, 13.5% positive for multiple pesticides

15. Sweet Potatoes and Grapefruit tie 90% of all hormone disrupting agents are found in everyday food supplies.

**Low Glycemic Carbohydrates**

The degree to which a carbohydrate raises blood sugar 2 to 3 hours after eating is known as its glycemic index. Glycemic index numbers measure how fast an individual food converts to glucose before entering the bloodstream in comparison to the action of glucose itself. On the Glycemic Index Scale,
pure glucose is measured at 100. Any foods that are measured to be above 100 raises blood sugar faster than pure glucose. Any food that is measured to be below 100 raises blood sugar that much slower. An example of this would be white rice, corn and potatoes which are all high glycemic foods while pearl barley, legumes and bran all have a low glycemic index. Studies have consistently shown that a diet consisting mainly of high glycemic carbohydrates will cause higher blood levels of insulin and insulin-like-growth factor (IGF-1). Consistently high levels of these hormones in the blood will lead to an increase in fat deposition and the promotion of breast and uterine cell growth and is linked to the formation of cysts, fibroids and cancer. Combing fiber, protein or flaxseed oil with the carbohydrates has been shown to lower the glycemic rate.

Consuming a diet consisting of low to medium glycemic foods will restore blood sugar levels and hormonal balance. Complex carbohydrates, such as those found in vegetables and whole grains are preferred over simple carbohydrates for optimizing estrogen metabolism. Excess consumption of simple carbohydrates raises blood glucose and insulin levels, resulting in adverse influences on sex hormone balance. Conversely, complex carbohydrates attenuate glycemic and insulinemic responses.43

**Glycemic Index of Common Foods**44

<table>
<thead>
<tr>
<th>Food List</th>
<th>Rating</th>
<th>Food Glycemic Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bakery Products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Pound cake</td>
<td>Low</td>
<td>54</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food</th>
<th>Type</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danish pastry</td>
<td>Medium</td>
<td>59</td>
</tr>
<tr>
<td>Muffin (unsweetened)</td>
<td>Medium</td>
<td>62</td>
</tr>
<tr>
<td>Cake, tart</td>
<td>Medium</td>
<td>65</td>
</tr>
<tr>
<td>Cake, angel</td>
<td>Medium</td>
<td>67</td>
</tr>
<tr>
<td>Croissant</td>
<td>Medium</td>
<td>67</td>
</tr>
<tr>
<td>Waffles</td>
<td>High</td>
<td>76</td>
</tr>
<tr>
<td>Doughnut</td>
<td>High</td>
<td>76</td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soya milk</td>
<td>Low</td>
<td>30</td>
</tr>
<tr>
<td>Apple juice</td>
<td>Low</td>
<td>41</td>
</tr>
<tr>
<td>Carrot juice</td>
<td>Low</td>
<td>45</td>
</tr>
<tr>
<td>Pineapple juice</td>
<td>Low</td>
<td>46</td>
</tr>
<tr>
<td>Grapefruit juice</td>
<td>Low</td>
<td>48</td>
</tr>
<tr>
<td>Food</td>
<td>Type</td>
<td>Level</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Orange juice</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td><strong>Biscuits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digestives</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Shortbread</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Water biscuits</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Ryvita</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Wafer biscuits</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td><strong>Rice cakes</strong></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td><strong>Breads</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi grain bread</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Whole grain</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Pita bread, white</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Pizza, cheese</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>Food</td>
<td>Type</td>
<td>Value</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Hamburger bun</td>
<td>Medium</td>
<td>61</td>
</tr>
<tr>
<td>Rye-flour bread</td>
<td>Medium</td>
<td>64</td>
</tr>
<tr>
<td>Whole meal bread</td>
<td>Medium</td>
<td>69</td>
</tr>
<tr>
<td>White bread</td>
<td>High</td>
<td>71</td>
</tr>
<tr>
<td>White rolls</td>
<td>High</td>
<td>73</td>
</tr>
<tr>
<td>Baguette</td>
<td>High</td>
<td>95</td>
</tr>
<tr>
<td><strong>Breakfast Cereals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-Bran</td>
<td>Low</td>
<td>42</td>
</tr>
<tr>
<td>Porridge, non-instant</td>
<td>Low</td>
<td>49</td>
</tr>
<tr>
<td>Oat bran</td>
<td>Medium</td>
<td>55</td>
</tr>
<tr>
<td>Muesli</td>
<td>Medium</td>
<td>56</td>
</tr>
<tr>
<td>Mini Wheat’s (whole meal)</td>
<td>Medium</td>
<td>57</td>
</tr>
<tr>
<td>Shredded Wheat</td>
<td>Medium</td>
<td>69</td>
</tr>
<tr>
<td>Cereal Grain</td>
<td>Acidlishness</td>
<td>Value</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------</td>
<td>-------</td>
</tr>
<tr>
<td>Golden Grahams</td>
<td>High</td>
<td>71</td>
</tr>
<tr>
<td>Puffed wheat</td>
<td>High</td>
<td>74</td>
</tr>
<tr>
<td>Weetabix</td>
<td>High</td>
<td>77</td>
</tr>
<tr>
<td>Rice Krispies</td>
<td>High</td>
<td>82</td>
</tr>
<tr>
<td>Cornflakes</td>
<td>High</td>
<td>83</td>
</tr>
<tr>
<td><strong>Cereal Grains</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearl barley</td>
<td>Low</td>
<td>25</td>
</tr>
<tr>
<td>Rye</td>
<td>Low</td>
<td>34</td>
</tr>
<tr>
<td>Wheat kernels</td>
<td>Low</td>
<td>41</td>
</tr>
<tr>
<td>Rice, instant</td>
<td>Low</td>
<td>46</td>
</tr>
<tr>
<td>Rice, parboiled</td>
<td>Low</td>
<td>48</td>
</tr>
<tr>
<td>Barley, cracked</td>
<td>Low</td>
<td>50</td>
</tr>
<tr>
<td>Rice, brown</td>
<td>Medium</td>
<td>55</td>
</tr>
<tr>
<td>Food</td>
<td>Texture</td>
<td>Calorie Count</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td>Rice, wild</td>
<td>Medium</td>
<td>57</td>
</tr>
<tr>
<td>Rice, white</td>
<td>Medium</td>
<td>58</td>
</tr>
<tr>
<td>Barley, flakes</td>
<td>Medium</td>
<td>66</td>
</tr>
<tr>
<td>Taco Shell</td>
<td>Medium</td>
<td>68</td>
</tr>
<tr>
<td>Millet</td>
<td>High</td>
<td>71</td>
</tr>
</tbody>
</table>

**Dairy Foods**

<table>
<thead>
<tr>
<th>Food</th>
<th>Texture</th>
<th>Calorie Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogurt low-fat (sweetened)</td>
<td>Low</td>
<td>14</td>
</tr>
<tr>
<td>Milk, chocolate</td>
<td>Low</td>
<td>24</td>
</tr>
<tr>
<td>Milk, whole</td>
<td>Low</td>
<td>27</td>
</tr>
<tr>
<td>Milk, Fat-free</td>
<td>Low</td>
<td>32</td>
</tr>
<tr>
<td>Milk, skimmed</td>
<td>Low</td>
<td>32</td>
</tr>
<tr>
<td>Milk, semi-skimmed</td>
<td>Low</td>
<td>34</td>
</tr>
<tr>
<td>*Ice-cream (low-fat)</td>
<td>Low</td>
<td>50</td>
</tr>
<tr>
<td>Food</td>
<td>Level</td>
<td>Calories</td>
</tr>
<tr>
<td>--------------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>*Ice-cream</td>
<td>Medium</td>
<td>61</td>
</tr>
<tr>
<td><strong>Fruits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherries</td>
<td>Low</td>
<td>22</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>Low</td>
<td>25</td>
</tr>
<tr>
<td>Apricots (dried)</td>
<td>Low</td>
<td>31</td>
</tr>
<tr>
<td>Apples</td>
<td>Low</td>
<td>38</td>
</tr>
<tr>
<td>Pears</td>
<td>Low</td>
<td>38</td>
</tr>
<tr>
<td>Plums</td>
<td>Low</td>
<td>39</td>
</tr>
<tr>
<td>Peaches</td>
<td>Low</td>
<td>42</td>
</tr>
<tr>
<td>Oranges</td>
<td>Low</td>
<td>44</td>
</tr>
<tr>
<td>Grapes</td>
<td>Low</td>
<td>46</td>
</tr>
<tr>
<td>Kiwi fruit</td>
<td>Low</td>
<td>53</td>
</tr>
<tr>
<td>Bananas</td>
<td>Low</td>
<td>54</td>
</tr>
<tr>
<td>Food</td>
<td>Size</td>
<td>Calories</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Fruit cocktail</td>
<td>Medium</td>
<td>55</td>
</tr>
<tr>
<td>Mangoes</td>
<td>Medium</td>
<td>56</td>
</tr>
<tr>
<td>Apricots</td>
<td>Medium</td>
<td>57</td>
</tr>
<tr>
<td>Apricots (tinned in syrup)</td>
<td>Medium</td>
<td>64</td>
</tr>
<tr>
<td>Raisins</td>
<td>Medium</td>
<td>64</td>
</tr>
<tr>
<td>Pineapple</td>
<td>Medium</td>
<td>66</td>
</tr>
<tr>
<td><strong>Watermelon</strong></td>
<td>High</td>
<td>72</td>
</tr>
<tr>
<td><strong>Pasta</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spaghetti, protein enriched</td>
<td>Low</td>
<td>27</td>
</tr>
<tr>
<td>Fettuccine</td>
<td>Low</td>
<td>32</td>
</tr>
<tr>
<td>Vermicelli</td>
<td>Low</td>
<td>35</td>
</tr>
<tr>
<td>Spaghetti, whole wheat</td>
<td>Low</td>
<td>37</td>
</tr>
<tr>
<td>Ravioli, meat filled</td>
<td>Low</td>
<td>39</td>
</tr>
<tr>
<td>Food</td>
<td>Type</td>
<td>Score</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Spaghetti, white</td>
<td>Low</td>
<td>41</td>
</tr>
<tr>
<td>Macaroni</td>
<td>Low</td>
<td>45</td>
</tr>
<tr>
<td>Spaghetti, durum wheat</td>
<td>Medium</td>
<td>55</td>
</tr>
<tr>
<td>Macaroni cheese</td>
<td>Medium</td>
<td>64</td>
</tr>
<tr>
<td>Rice pasta, brown</td>
<td>High</td>
<td>92</td>
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</table>

**Root Crop**

<table>
<thead>
<tr>
<th>Food</th>
<th>Type</th>
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<tbody>
<tr>
<td>Carrots, cooked</td>
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<td>39</td>
</tr>
<tr>
<td>Yam</td>
<td>Low</td>
<td>51</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>Low</td>
<td>54</td>
</tr>
<tr>
<td>Potato, boiled</td>
<td>Medium</td>
<td>56</td>
</tr>
<tr>
<td>Potato, new</td>
<td>Medium</td>
<td>57</td>
</tr>
<tr>
<td>Potato, tinned</td>
<td>Medium</td>
<td>61</td>
</tr>
<tr>
<td>Beetroot</td>
<td>Medium</td>
<td>64</td>
</tr>
<tr>
<td>Item</td>
<td>Preparation</td>
<td>Calorie</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>Potato, steamed</td>
<td>Medium</td>
<td>65</td>
</tr>
<tr>
<td>Potato, mashed</td>
<td>Medium</td>
<td>70</td>
</tr>
<tr>
<td>Chips</td>
<td>High</td>
<td>75</td>
</tr>
<tr>
<td>Potato, micro waved</td>
<td>High</td>
<td>82</td>
</tr>
<tr>
<td>Potato, instant</td>
<td>High</td>
<td>83</td>
</tr>
<tr>
<td>**Potato, baked</td>
<td>High</td>
<td>85</td>
</tr>
<tr>
<td>Parsnips</td>
<td>High</td>
<td>97</td>
</tr>
<tr>
<td><strong>Snack Food and Sweets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanuts</td>
<td>Low</td>
<td>15</td>
</tr>
<tr>
<td>*M&amp;Ms (peanut)</td>
<td>Low</td>
<td>32</td>
</tr>
<tr>
<td>*Snickers bar</td>
<td>Low</td>
<td>40</td>
</tr>
<tr>
<td>*Chocolate bar; 30g</td>
<td>Low</td>
<td>49</td>
</tr>
<tr>
<td>Jams and marmalades</td>
<td>Low</td>
<td>49</td>
</tr>
<tr>
<td>Snack</td>
<td>Glycemic Index</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>*Crisps</td>
<td>Low</td>
<td>54</td>
</tr>
<tr>
<td>Popcorn</td>
<td>Medium</td>
<td>55</td>
</tr>
<tr>
<td>Mars bar</td>
<td>Medium</td>
<td>64</td>
</tr>
<tr>
<td>*Table sugar (sucrose)</td>
<td>Medium</td>
<td>65</td>
</tr>
<tr>
<td>Corn chips</td>
<td>High</td>
<td>74</td>
</tr>
<tr>
<td>Jelly beans</td>
<td>High</td>
<td>80</td>
</tr>
<tr>
<td>Pretzels</td>
<td>High</td>
<td>81</td>
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<tr>
<td>Dates</td>
<td>High</td>
<td>103</td>
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**Soups**

<table>
<thead>
<tr>
<th>Soup</th>
<th>Glycemic Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato soup, tinned</td>
<td>Low</td>
</tr>
<tr>
<td>Lentil soup, tinned</td>
<td>Low</td>
</tr>
<tr>
<td>Black bean soup, tinned</td>
<td>Medium</td>
</tr>
<tr>
<td>Green pea soup, tinned</td>
<td>Medium</td>
</tr>
<tr>
<td>Vegetables and Beans</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Artichoke</td>
<td>Low</td>
</tr>
<tr>
<td>Asparagus</td>
<td>Low</td>
</tr>
<tr>
<td>Broccoli</td>
<td>Low</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>Low</td>
</tr>
<tr>
<td>Celery</td>
<td>Low</td>
</tr>
<tr>
<td>Cucumber</td>
<td>Low</td>
</tr>
<tr>
<td>Eggplant</td>
<td>Low</td>
</tr>
<tr>
<td>Green beans</td>
<td>Low</td>
</tr>
<tr>
<td>Lettuce, all varieties</td>
<td>Low</td>
</tr>
<tr>
<td>Low-fat yogurt, artificially sweetened</td>
<td>Low</td>
</tr>
<tr>
<td>Peppers, all varieties</td>
<td>Low</td>
</tr>
<tr>
<td>Snow peas</td>
<td>Low</td>
</tr>
<tr>
<td>Vegetable</td>
<td>Diet</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Spinach</td>
<td>Low</td>
</tr>
<tr>
<td>Young summer squash</td>
<td>Low</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Low</td>
</tr>
<tr>
<td>Zucchini</td>
<td>Low</td>
</tr>
<tr>
<td>Soya beans, boiled</td>
<td>Low</td>
</tr>
<tr>
<td>Peas, dried</td>
<td>Low</td>
</tr>
<tr>
<td>Kidney beans, boiled</td>
<td>Low</td>
</tr>
<tr>
<td>Lentils green, boiled</td>
<td>Low</td>
</tr>
<tr>
<td>Chickpeas</td>
<td>Low</td>
</tr>
<tr>
<td>Haricot beans, boiled</td>
<td>Low</td>
</tr>
<tr>
<td>Black-eyed beans</td>
<td>Low</td>
</tr>
<tr>
<td>Chickpeas, tinned</td>
<td>Low</td>
</tr>
<tr>
<td>Baked beans, tinned</td>
<td>Low</td>
</tr>
<tr>
<td>Food Item</td>
<td>Level</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Kidney beans, tinned</td>
<td>Low</td>
</tr>
<tr>
<td>Lentils green, tinned</td>
<td>Low</td>
</tr>
<tr>
<td>Broad beans</td>
<td>High</td>
</tr>
</tbody>
</table>

Notes: *high in empty calories **low-calorie and nutritious foods

**Whole Grains**

95% of grain consumption comes from refined grains in North America. 45 Considering that grains should make up approximately 25% of the daily diet, refined grains are being consumed in excessive amounts. Whole grains are known to be one of the best sources of phytochemicals and antioxidants, even higher than some vegetables. Whole grains contain three specific types of carbohydrates- fiber, resistant starch R1 and oligosaccharides. These 3 carbohydrates are fermented in the stomach giving them prebiotic action which creates short-chain fatty acids such as butyric acid, which feed the healthy cells of the colon. The strengthening of the colon cells enables them to detoxify the body of pharmaceutical and other environmental chemicals, similar to the function of the liver. Grains consumed in their whole form and that have not been processed into a flour are filling as the short-chain fatty acids and fiber stimulate fat cells in the stomach to release leptin, the satiety hormone.

**Dietary Fiber**

Insoluble dietary fibers such as lignin (found in flaxseeds and the bran layer of grains, beans, and seeds) can interrupt the enterohepatic circulation of estrogens in two ways. This interruption enables the

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45 Master Your Metabolism Jillian Michaels pg. 144
harmful estrogen to be detoxified and not reabsorbed into the system. Dietary fiber, especially lignin, can bind unconjugated estrogens in the digestive tract, which are then excreted in the feces. Dietary fiber can beneficially affect the composition of intestinal bacteria and reduce intestinal b-glucuronidase activity, resulting in a lowered deconjugation of estrogen and reduced reabsorption. Dietary fiber intake also increases serum concentrations of SHBG, thus reducing levels of free estradiol.

45 to 60 grams of dietary fiber consumed daily has the additional benefits of slowing down the aging process, decreasing cancer risks, stabilizing blood sugar, lowering cholesterol, decreasing cardiovascular risks and improving insulin sensitivity. A diet high in fiber has also been shown to modify the bowel floral composition which promotes the growth of beneficial bacteria resulting in a strengthened immune system. Fiber also improves mineral absorption and decreases osteoporosis risks. Many digestive conditions are greatly improved through increased dietary fiber consumption which speeds up elimination and decreases toxicity. Valuable fiber sources are found in foods such as beans, raw fruits and vegetables, bran, psyllium, ground flax seeds and whole grains.

**Essential Fatty Acids**

Essential Fatty Acids (EFA’s) are required in cell membrane formation and are a crucial part of the immune system and enable the buffering of excessive acids in the body. EFA’s protect the membrane of the cell from harmful carcinogens and aid in the oxygen transport of air in the lungs to each cell membrane of the body where the oxygen acts as a barrier to pathogenic microbes. Specifically Omega-6 and Omega-3 are EFA’s that the body cannot produce. Sixty years ago the average North American

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diet consisted of a dietary ratio of 1:2 Omega-6 to Omega-3. Currently the ratio is approximated at 25:1 Omega-6 to Omega-1. The optimal ratio has been found to be a 1:1 ratio. Omega-6 fatty acids found in vegetable oils and evening primrose oil consumed in excess without being balanced with at least twice as much Omega-3 fatty acids is carcinogenic. The most common sources of Omega-6 fatty acids include safflower, corn and sunflower oils which are readily used in baked goods and packaged items. Omega-6 fatty acids are now commonly used in replacement of Trans fatty acids in trans-fat free products. Omega-3 fatty acids are found primarily in flax seed oil, purslane, blackcurrant seed oil and cold water fish oils. Omega-3 fatty acids have been shown to decrease inflammation, pain and arthritis; improve mental function and memory; decrease cardiovascular risk, diabetes prevention; reduce PMS and symptoms of endometriosis.

**Legumes**

Legumes contain protective phytoestrogens and are one of the richest sources of dietary fiber. Phytoestrogens are weak estrogens that bind to estrogen receptor sites, displacing the body’s strong estrogens and environmental estrogens. A constant supply is required in order to prevent the accumulation of excess estrogen which can cause diseases. Protective phytoestrogens are found in sprouted beans and soy which is the highest source.

Soy is perhaps the most common food source of isoflavones but others include legumes, alfalfa, clover, licorice root, and kudzu root. Higher intakes of soy products and isoflavones such as consumed in traditional Japanese diets are associated with low rates of hormone-dependent cancers. The average daily isoflavone intake of Japanese women is 20 to 80 mg, while that of American women is 1 to 3 mg. In two human studies, women given isoflavone supplements and soymilk for one month experienced

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longer menstrual cycles and lower serum estradiol levels.\textsuperscript{51,52} Longer menstrual cycles are beneficial because they result in decreased lifetime exposure to estrogen and lowered the risk for breast cancer.

**Protein**

Protein when broken down into its smaller subunits, amino acids, are the essential building blocks of hormones such as serotonin, melatonin, growth hormone, thyroid hormone. Neurotransmitters such as dopamine, enzymes essential for digestion and antibodies form the immune system and all come from protein as well. Although protein is essential for tissue healing and repair, an excessive amount of protein can stress the kidneys, exacerbate osteoporosis and negatively affect digestive function.

Excessive protein consumed without the balancing effects of carbohydrates can elevate cortisol and lead to adrenal fatigue. Deficiencies of dietary protein can trigger mood disorders, memory loss, increased appetite and cravings, decreased metabolism, sleep disruption, muscle loss and weight gain. When consumed in the correct portions, protein stimulates the activity of the fat burning and appetite controlling hormones, leptin and glucagon. In addition, protein releases Peptide YY from the digestive system which causes a suppression of appetite. The average daily intake of protein should consist of 30% of the whole diet. This amount can vary depending on gender, activity level and the amount of lean muscle mass. Optimal protein choices are low in saturated fats and have been shown to increase inflammation in the body and to disrupt hormones. Healthiest sources of vegetarian protein include fermented soy foods (miso, tofu, soy beans, and tempeh), kidney beans, lentils, split peas, chickpeas, almonds, sunflower seeds, pumpkin seeds and sesame seeds. Healthy animal protein sources include


non-farmed fish, organic poultry, organic omega-3 eggs, organic lamb, organic grass fed wild game, organic dairy (plain yogurt, low fat ricotta and cottage cheese).

**Berries**

Berries have extremely high concentrations of anthocyanin particularly flavonoids that are responsible for the bright colors of berries. A Japanese researcher discovered that anthocyanins can stop individual fat cells from increasing in size and can also help to secrete adiponectin which is a hormone that reduces inflammation, lowers blood sugar and reverses leptin and insulin resistance. Other studies have found that anthocyanin are capable of reducing post-prandial blood sugar levels, preventing insulin spikes, blocking the digestive enzyme activity of specific starches and fats and thereby reducing their absorption.

**Cruciferous Vegetables**

Cruciferous vegetables contain a kind of phytochemical known as isothiocyanates which stimulate our bodies to break down potential carcinogens. They work by preventing the transformation of normal healthy cells into cancerous cells. Some examples of cruciferous vegetables are arugula, bok Choy, broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, collard greens, daikon, kale, kohlrabi mustard greens, radishes, rutabaga, turnips and watercress. In particular broccoli contains sulforaphane, which is a natural chemical that stimulate our bodies to produce enzymes and destroy carcinogens. This substance is particularly rich in broccoli sprouts and about 20 to 50 times richer in mature broccoli.

At the Harbor UCLA Medical Center in Torrance, California, a study was conducted to document the effects of eating broccoli among men and women aged 50 to 74. The results showed that those who
consumed more broccoli (3.7 half-cup cooked servings weekly on average) were 50 percent less likely to
develop colorectal cancer than those who never ate broccoli.\textsuperscript{53}

Many cruciferous vegetables also contain a compound called indole-3-carbinol. This compound is said to
reduce the risk of hormone dependent cancers such as prostate, breast and ovarian cancer.

**Phytochemical Sources and Health Values\textsuperscript{54}**

<table>
<thead>
<tr>
<th>PHYTOCHEMICAL</th>
<th>EFFECT</th>
<th>FOOD SOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLYL SULPHIDES</td>
<td>Increases liver enzymes to detoxify carcinogens</td>
<td>Garlic, onions and leeks</td>
</tr>
<tr>
<td>CAPSAICIN</td>
<td>Prevents carcinogens from binding to DNA</td>
<td>Chili peppers</td>
</tr>
<tr>
<td>CAROTENOIDS</td>
<td>Act as antioxidants that neutralize free radicals, enhance immunity. High intake is associated with low cancer rates</td>
<td>Parsley, carrots, spinach, kale, winter squash, apricots, cantaloupe, sweet potatoes</td>
</tr>
<tr>
<td>FLAVANOIDES</td>
<td>Prevent the attachment of cancer causing hormones to cells by blocking receptor site</td>
<td>Most fruits and vegetables, including parsley, carrots, citrus, broccoli, cabbage, cucumber, squash, yams, eggplant, peppers and berries</td>
</tr>
<tr>
<td>CURCUMIN</td>
<td>Decreases inflammation Assists the liver in detoxifying carcinogens and hormones Arresets cell division in cancer cells</td>
<td>Turmeric</td>
</tr>
<tr>
<td>ELLAGIC ACID</td>
<td>Neutralizes carcinogens in the liver Antioxidant Inhibits cancer cell divisions</td>
<td>Red raspberries, walnut skin</td>
</tr>
<tr>
<td>ISOFLAVONES (genestein and diadzen)</td>
<td>Bind to the estrogen receptor so that harmful estrogens can’t bind Block the formation of blood vessels to tumors Inhibit enzymes that might cause cancer Inhibit activation of breast cancer genes</td>
<td>Soy beans, tofu, miso, lentils, dried beans, split peas, garbanzo beans, green beans, green peas, mung bean sprouts, red clover sprouts</td>
</tr>
</tbody>
</table>

\textsuperscript{53} http://www.drlam.com/opinion/cruciferous_vegetables.asp
\textsuperscript{54} Complete Natural Medicine Guide to Women’s Health Sat Dharam Kaur, ND pg. 52-54
| **INDOLES** | Decrease the estrogen that initiates breast cancer | Raw cabbage, broccoli, Brussels sprouts, kale, cauliflower, bok Choy, kohlrabi, mustard and turnips |
| **ISOThIOCYANATES** | Prevents DNA damage Block the production of tumors induced by environmental chemicals Act as antioxidants Assist liver detoxification | Mustard, horse radish, radishes, turnips, cabbage, broccoli, cauliflower, Brussels sprouts, kale, bok Choy, watercress and garden sorrel |
| **LIMONOIDs** | Induce protective enzymes in liver and intestines that fight cancer | Citrus fruit rind, essential oils of lemon, orange, celery and lemongrass |
| **LINOLENIC ACID** | Regulates production of prostaglandins in cells | Flax seeds, flax seed oil |
| **LYCOPENE** | Protects from cell damage | Tomatoes, red grapefruit and guava |
| **LUTEIN** | Protects against cell damage | Spinach, kiwi, tomatoes and grapes |
| **MONOTERPENES** | Antioxidant properties Induce protective enzymes Inhibit cholesterol production in tumors Stimulate the destruction of breast cancer cells Inhibit growth of cancer cells | Cherries, lavender, parsley, yams, carrots, broccoli, cabbage, basil cucumbers, peppers, squash, eggplant, mint, tomatoes and grapefruit |
| **PHENOLIC ACIDS** | Block the effects of free radicals Inhibit the formation of nitrosamine, a carcinogen | Berries, broccoli, grapes, citrus, parsley, peppers, soy, squash, tomatoes, grains |
| **PLANT STEROLS (beta-sitosterol)** | Prevent cells from becoming cancerous and lower cholesterol levels in the body | Broccoli, cabbage, soy, peppers, whole grains |
| **POLYPHENOLS** | Act as antioxidants Reduce damaging effects nitrosamines Kill human cancer cells | Broccoli, carrots, green tea, cucumbers, squash, basil and citrus |
| **PROTEASE INHIBITORS** | Block the activity of enzymes involved in the growth of tumors | Beans and soy products |
| **QUERCETIN** | Slows down cell division in cancer cells Anti-inflammatory | Onions, apples and green cabbage |
| **QUINONES** | Neutralize carcinogens | Rosemary, Pau d’arco tea |
| **SULPHORAPhANE** | Increase the ability of the liver’s detoxifying enzymes to remove carcinogens Antioxidant | Broccoli sprouts, broccoli, cauliflower, Brussels sprouts |
Consumption of the following “Super Foods” on a daily basis will prevent inflammation as well as lower cholesterol and balance hormones.

**Super Food Health Effects**

<table>
<thead>
<tr>
<th>SUPERFOOD</th>
<th>GOOD HEALTH EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FLAXSEED</strong>&lt;br&gt;2 tbsp. freshly ground flaxseeds daily</td>
<td>High fiber for increasing bowel movements and cleansing the colon&lt;br&gt;Contain phytoestrogens to prevent breast cancer and alleviate menopausal hot flashes&lt;br&gt;A complete protein</td>
</tr>
<tr>
<td><strong>FLAXSEED OIL OR UNCONTAMINATED FISH OIL</strong>&lt;br&gt;2 tbsp. per day uncooked</td>
<td>High in Omega-3 EFA’s to help prevent cancer, arthritis, heart disease, depression, skin affections, and Alzheimer’s disease&lt;br&gt;Keeps the cell membranes strong</td>
</tr>
<tr>
<td><strong>TURMERIC</strong>&lt;br&gt;2 tsp. or more daily</td>
<td>One of the best anti-inflammatories to alleviate arthritic symptoms&lt;br&gt;Decreases the risk of most cancers and helps prevent Alzheimer’s disease&lt;br&gt;Assists in liver detoxification</td>
</tr>
<tr>
<td><strong>GARLIC</strong>&lt;br&gt;2 cloves daily</td>
<td>Natural antibiotic and anti-parasitic&lt;br&gt;Lowers cholesterol and blood pressure, preventing heart disease&lt;br&gt;Helps to prevent many types of cancer&lt;br&gt;Assists in liver detoxification</td>
</tr>
<tr>
<td><strong>RAW NUTS AND SEEDS</strong>&lt;br&gt;2-4 tbsp. daily</td>
<td>High in zinc and magnesium which are common mineral deficiencies linked to lowered immune function, anxiety and heart disease&lt;br&gt;Pumpkin seeds are anti-parasitic</td>
</tr>
<tr>
<td><strong>SEAWEEDS</strong>&lt;br&gt;2 tbsp. daily</td>
<td>Good vegetarian sources of calcium and iron&lt;br&gt;Nori, dulse, hiziki, arame, and kombu are highly alkaline, rich in minerals, and high in beta carotene&lt;br&gt;Brown seaweeds, like kelp, help to pull radioactive particles out of the body so they can be excreted</td>
</tr>
<tr>
<td><strong>ORGANIC SOY (NON-GMO)</strong>&lt;br&gt;25 grams daily</td>
<td>Helps to lower cholesterol and blood pressure&lt;br&gt;Helps to prevent breast and uterine cancers&lt;br&gt;Eat with seaweeds as a source of iodine&lt;br&gt;Avoid if allergic</td>
</tr>
<tr>
<td><strong>RAW BRASSICAS</strong>&lt;br&gt;Cabbage, cauliflower, broccoli, kale</td>
<td>Assist the liver</td>
</tr>
</tbody>
</table>

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**Complete Natural Medicine Guide to Women’s Health Sat Dharam Kaur, ND pg. 61-61**
<table>
<thead>
<tr>
<th>Half cup or more daily</th>
<th>In detoxification pathways, improve estrogen metabolism, and help to prevent breast and uterine cancer when eaten raw. Raw cabbage juice health stomach and duodenal ulcers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shitake Mushrooms</td>
<td>Enhance the immune system and help prevent cancer.</td>
</tr>
<tr>
<td>3-4 times daily</td>
<td></td>
</tr>
<tr>
<td>Blueberries, Raspberries, Strawberries</td>
<td>High in antioxidants that help to prevent cancer and improve vision.</td>
</tr>
<tr>
<td>Half cup or more daily</td>
<td></td>
</tr>
<tr>
<td>Cooked Tomatoes</td>
<td>High in lycopene, antioxidant that helps prevent breast, lung, and cervical cancer.</td>
</tr>
<tr>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td>Extra Virgin Olive Oil</td>
<td>Moves the bile through the liver and gallbladder, facilitating a removal of toxins.</td>
</tr>
<tr>
<td>1-2 tbsp. daily</td>
<td></td>
</tr>
<tr>
<td>Legumes</td>
<td>Contain high amounts of potassium and magnesium. Low glycemic index.</td>
</tr>
<tr>
<td>Half cup or more daily</td>
<td>Contain phytic acid which helps to prevent the growth of cancer.</td>
</tr>
<tr>
<td>Rosemary and Coriander</td>
<td>Rosemary facilitates liver detoxification of hormones and chemicals. Coriander helps to remove toxic metals such as mercury, cadmium, and lead.</td>
</tr>
<tr>
<td>Several times per week</td>
<td></td>
</tr>
<tr>
<td>Organic Green Tea</td>
<td>Stimulates metabolism to assist in weight loss and helps to prevent cancer.</td>
</tr>
<tr>
<td>2 or more cups daily</td>
<td></td>
</tr>
</tbody>
</table>

Multiple dietary and nutritional factors have the ability to influence the endocrine system into a state of harmony or dysfunction. Incorporating dietary changes with the use of select nutritional supplements can have profound effects in beneficially influencing hormone balance and thus preventing hormone-related diseases and conditions.
Testing Procedures

The Science of Saliva Testing

Hormone levels are proving to be most reliably measured through the saliva hormone testing procedures. The amount of hormones delivered to receptors in the body is most accurately represented by hormone levels in saliva samples. Comparatively, serum represents the hormone levels that may or may not be delivered to receptors of the body. Clinically, it is far more relevant to test the amount of hormones delivered to the tissue receptors as this is a reflection of the active hormone levels of the body.

The majority of hormones in the blood exist in two forms: free (5%) or protein bound (95%). Only 5% of free hormones are biologically active while 95% of the hormones in the body are protein bound. Saliva free bioavailable hormone levels in the body are measured through saliva while blood serum measures only the protein bound non-bioavailable hormone levels. When assessing functional hormone levels, blood serum is a much less accurate measurement than saliva.

When blood is filtered through the salivary glands, the bound hormone components are too large to pass through the cell membranes of the salivary glands. Only the unbound hormones pass through and into the saliva. What is measured in the saliva is considered the "free", or bioavailable hormone, that which will be delivered to the receptors in the tissues of the body.

In order for steroid hormones to be detected in serum, they must be bound to circulating proteins. In this bound state, they are unable to fit into receptors in the body, and therefore will not be delivered to tissues. They are considered inactive, or non-bioavailable.
The discrepancy between free and protein bound hormones becomes especially important when monitoring topical, or transdermal, hormone therapy. Studies show that this method of delivery results in increased tissue hormone levels (thus measurable in saliva), but no parallel increase in blood serum levels. Therefore, blood serum testing cannot be used to monitor topical hormone therapy.

### Saliva, Serum, and Urine Testing Comparative Analysis

<table>
<thead>
<tr>
<th>Saliva Tests</th>
<th>Serum Tests</th>
<th>Urine Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real Life Hormone Function Evaluation</strong></td>
<td>Serum collection requires clinic visit and creates apprehension due to anticipation of venipuncture.</td>
<td>24-hour urine has metabolites of the hormones and is not time specific and does not reflect time sensitive hormonal and stress responses.</td>
</tr>
<tr>
<td>Multiple Salivary Specimens throughout the day or month.</td>
<td>Hormone values reflect real life physiological conditions and responses.</td>
<td>Only approximates real life conditions.</td>
</tr>
<tr>
<td>Can be collected under real life situations, at work, at home, etc.</td>
<td>Stress causes an artificial increase in cortisol.</td>
<td></td>
</tr>
</tbody>
</table>

### Ease of Collection

| Saliva is easily collected by the patient. | Serum tests require clinic staff and disruption of routine schedule of patient. | 24-hour urine collection is cumbersome and time consuming, especially for women. |

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**Minimal Biohazard**

| Patient collects sample with minimal biohazard to clinic staff. | Serum collection is bio-hazardous to clinic staff especially with AIDS and Hepatitis. | Urine collection is minimally bio-hazardous to clinic staff. |

**Time Specific**

| Multiple saliva samples collected at different times allow evaluation of hormonal stress response and circadian rhythm. | The routine single serum sample does not allow circadian rhythm evaluation, i.e., no real time component. | 24-hour urine is absolutely time non-specific and does not reflect circadian rhythm variation at all. |

**Bioactive hormonal fraction**

| Saliva reflects the unbound bioactive hormone level to which living cells are subjected. This is the hormone level that needs to be evaluated. | Routine serum hormone testing reflects total hormone level not the bioactive fraction. Total levels are crude estimates of unbound bioactive hormone. | Urine hormones reflect production and catabolism and do not reflect tissue level hormone concentrations that living cells are exposed to. Urine hormone interpretation is very misleading. |
**Therapeutic discrimination**

Because saliva testing can subclassify hormonal dysfunction into time related values, the subclasses of dysfunction are discernable. Consequently, therapeutic options are expanded and treatments are very specific.

<table>
<thead>
<tr>
<th>Therapeutic discrimination</th>
<th>Serum testing results are</th>
<th>Urine testing results are</th>
</tr>
</thead>
<tbody>
<tr>
<td>classify hormonal dysfunction</td>
<td>reported as: high, low, or normal.</td>
<td>reported as: high, low, or normal.</td>
</tr>
<tr>
<td>into time related values, the subclasses of dysfunction are discernable. Consequently, therapeutic options are always synchronized and harmonious with the natural circadian cycle of the patient.</td>
<td>Hormone values &amp; treatment options are limited and not always synchronized and harmonious with the natural circadian cycle of the patient.</td>
<td></td>
</tr>
<tr>
<td>expanded and treatments are very specific.</td>
<td></td>
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</tr>
</tbody>
</table>

**Female Hormone Panel**

**Estradiol (E2)**

The correct balance between estrogens and progesterone is one of the critical factors for maintaining hormonal health. Estradiol is needed for the proper function of progesterone receptors. High estradiol levels may compete with T3, a thyroid hormone at T3 responsive gene sites and interfere with the tissue activity of T3 leading to hypothyroidism. High estradiol levels may also increase Thyroid Binding Globulin levels, which bind up free T3 and T4 hormone, resulting in decreased tissue action of T3. Low estradiol levels post-menopause may be a consequence of adrenal dysfunction as post-menopausal production of estradiol comes via conversion from the adrenal hormone DHEA.
**Progesterone**

Progesterone enhances the sensitivity of estrogen receptors. Even with normal E2 levels progesterone deficiency contributes to, or exacerabtes, estrogen deficiency symptoms.

**Estradiol and progesterone** levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age women including endometrial hyperplasia, pre-menstrual syndrome, fibrocystic breasts, and uterine fibroids.\(^{57}\) When estrogen supplements are prescribed without the balancing effects of progesterone, a deficiency in progesterone can also result. Symptoms of estrogen dominance which include weight gain in the hips and thighs, fibrocystic and tender breasts, uterine fibroids, irritability, water retention, and thyroid problems can occur from this imbalance. Estrogen dominance can lead to cancers of the uterus and breasts, and insulin resistance. Low estradiol levels occurring at the onset of menopause can trigger a multitude of symptoms including hot flashes, night sweats, vaginal dryness, sleep disturbances, foggy thinking, more rapid skin aging and bone loss. Maintaining appropriate levels of estradiol adequately balanced with progesterone at any age is essential for optimal hormonal health. Only endogenous levels of progesterone and estradiol are used in the calculation of the progesterone to estradiol ratios. The most commonly observed range in regularly cycling women in the luteal phase is between 8 and 30, with 15 being the median value.

**Testosterone**

Unbalanced testosterone can lead to hormonal disruption whether levels are deficient or excessive. Elevated testosterone often caused by ovarian cysts leads to conditions such as polycystic ovarian syndrome (PCOS), excessive facial and body hair, acne, and oily skin and hair. Testosterone deficiency is

often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

**Sex Hormone Binding Globulin**

Sex Hormone Binding Globulin (SHBG) is a protein produced by the liver when exposed to any type of estrogen. This exposure can include estrogen produced naturally by the body or consumed as a synthetic oral contraceptive estrogen, estrogen therapy, or as foods or herbs (phytoestrogens). SHBG binds tightly to circulating estradiol and testosterone. This prevents their rapid metabolism and clearance and limits their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens. The SHBG level is also used to calculate free (unbound) testosterone levels when blood spot is used instead of saliva to measure sex hormones.

**DHEA sulphate**

DHEA sulphate (DHEA-S) which is produced by the adrenal glands generally reflects adrenal gland function when levels are monitored through saliva hormone testing. DHEA is normally present in greater quantities than all the other steroid hormones as it is the precursor for estrogen and testosterone production. DHEA levels peak in the late teens to early 20’s and then naturally declines with age. Cortisol and DHEA have opposite effects on immune function and insulin regulation. When cortisol levels are increased, more DHEA is required to be released to balance the effects of the elevated cortisol. Thus, chronically elevated cortisol can result in a deficiency of DHEA. Low DHEA can result in decreased libido and general malaise, while high DHEA can have masculinizing effects on women because it metabolizes

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into androgens, including testosterone. The ratio of cortisol to DHEA-S increases with age, mostly due to declining DHEA. Low DHEA-S levels may be associated with hypothyroidism and chronic illnesses such as lupus and rheumatoid arthritis.

**Cortisol**

Cortisol levels portray overall adrenal function and indicate exposure to stressors. Healthy adrenal cortisol production is highest early in the morning, soon after waking and then falls to lower levels at mid-day and continues to decrease into the evening. Low cortisol levels can indicate adrenal fatigue (a reduced ability to respond to stressors), and can leave the body more vulnerable to poor blood sugar regulation and immune system dysfunction. Chronically high cortisol is a consequence of high, constant exposure to stressors, and this has serious implications for long-term health, including an increased risk of cancer, osteoporosis, and possibly Alzheimer’s disease. Elevated cortisol can interfere with the action of progesterone and testosterone at gene regulatory sites. A functional deficiency can result when women with normal progesterone and/or testosterone levels exhibit signs of deficiency when cortisol levels are high. High cortisol can also induce the enzyme aromatase, which speeds the conversion of testosterone to estradiol resulting in elevated estradiol levels and estrogen dominance.

Excess cortisol is also linked to significant bone loss. Elevated cortisol in the evening has been associated with depression and a poorer prognosis in breast cancer survivors. Chronically high cortisol levels may progress to adrenal exhaustion and eventual low cortisol levels as the adrenal glands are no longer able to produce enough cortisol in response to stress.

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Luteinizing Hormone (LH)/Follicular Stimulating Hormone (FSH)

LH and FSH tests are included in the Female Fertility Profiles to give information on the possible presence of ovarian insufficiency (elevated FSH) or PCOS (elevated LH/FSH). These hormones are released from the pituitary gland and stimulate the ovaries and testes. High levels are found in menopause, infertility, amenorrhea and premature ovarian failure. Low levels indicate pituitary gland dysfunction. An excess of LH compared to FSH is a common finding in PCOS.

Thyroid Profile

The Thyroid Profile (free T4, free T3, TSH, and TPO) can indicate the presence of an imbalance in thyroid function. Some of the associated symptoms of low thyroid include cold intolerance, low stamina, fatigue (particularly in the evening), depression, low sex drive, weight gain, dry brittle nails, coarse hair, hair loss, infertility, constipation and high cholesterol.

Thyroid Stimulating Hormone (TSH)

TSH is produced by the pituitary gland and acts on the thyroid gland to stimulate production of T4. High levels of TSH can indicate a low functioning thyroid gland, while low TSH can indicate an over-production of T4 which acts in a negative feedback on the pituitary to reduce TSH production. Low TSH can also be caused by problems in the pituitary gland itself which result in insufficient TSH being produced to stimulate the thyroid (secondary hypothyroidism).

Free T4 – Thyroxine

T4 is an inactive thyroid hormone that is most predominantly produced by the thyroid gland. T4 converts to T3 within cells. Free T4 is the non-protein-bound fraction of the T4 circulating in the blood,
representing about 0.04% of the total circulating T4, which is available to tissues. Low TSH combined
with low T4 levels indicates hypothyroidism, while low TSH and high T4 levels indicate hyperthyroidism.
High TSH and low T4 indicate a thyroid gland disease such as thyroiditis.

**Free T3 – Triiodothyronine**

Free T3 is the active thyroid hormone that regulates the metabolic activity of cells. Free T3 is a non-
protein-bound fraction circulating in the blood. This represents about 0.4% of the total circulating T3,
which is available to tissues. Elevated T3 levels are seen in hyperthyroid patients but levels can be
normal in hypothyroid patients.

**TPO – Thyroid Peroxidase Antibodies**

Thyroid peroxidase is an enzyme used by the thyroid gland in the manufacture of T4. The body produces
antibodies that attack the thyroid gland in patients with autoimmune thyroiditis (predominantly
Hashimoto’s disease). Levels of these antibodies in the blood can diagnose this condition and indicate
the extent of the disease.

**Adrenal Stress Index**

**Cortisol Rhythm**

Utilizing four saliva samples taken upon rising, before lunch, before dinner and finally before bed
reflects accurate salivary cortisol measurement. Results indicate the awake diurnal cortisol rhythm
generated in response to everyday normal stress. The test results facilitate the diagnosis of stress
maladaptation and adrenal fatigue.
DHEA/DHEA-S

Multiple salivary samples are used to measure the average DHEA/DHEA-S* levels for the day. The many facets of stress maladaptation are highlighted by the cortisol to DHEA relationship. The cortisol/DHEA ratio also helps to determine the projected time for recovery, as well as the substances, hormones, supplements, and botanicals that will facilitate the recovery.

17-Hydroxyprogesterone (P17-OH)

The Adrenal Stress Index measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. A small percentage of the population is genetically predisposed to low cortisol production and hence will not benefit from exogenous supplementation of pregnenolone or progesterone.

Insulin

Fasting and non-fasting insulin measurements are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes). These levels are also used to correlate elevated cortisol with insulin and can explain glycemic dysregulation problems. The combined results of insulin and cortisol can help in designing an effective glycemic control treatment plan that may include lifestyle modifications, nutritional support and botanical supplementation.

Secretory IgA (SlgA)

Mucosal immunity is measured by using SlgA as a stress impact biomarker. SlgA values are sensitive to increased cortisol/DHEA ratio and sympathetic tone. Detection of depressed mucosal immune function
allows for a number of therapeutic modalities to be utilized. These can range from botanical supplementation to the control of heart rhythm variability.

**Gliadin Antibodies**

The Adrenal Stress Index provides objective identification of grain-intolerant patients. Measurements of gliadin antibodies detect subclinical grain intolerance even when overt celiac disease is not present. Positive findings indicate restriction of gluten intake which will reduce inflammation and adrenal stress.

**Hormonal Imbalances in Women**

| **ESTROGENS** | **Conditions**: early puberty, uterine fibroids, uterine cancer, ovarian cysts, breast fibro adenoma, breast cancer, PMS, endometriosis, hypothyroidism, autoimmune diseases, increased risk of gallbladder disease  
Elevated estrogen (estrogen dominance)  
Symptoms: blood clots, impaired blood sugar, water retention, depression, anxiety, headaches |
| --- | --- |
| **ESTROGENS** | **Conditions**: infertility, amenorrhea, osteoporosis, menopausal hot flashes, vaginal dryness  
Estrogen deficiency  
Symptoms: decreased sexual arousal, poor memory, depression, elevated cholesterol, high LDL, low HDL, elevated blood pressure, poor sleep, aging skin with wrinkles |
| **ESTROGENS** | **Conditions**: breast cancer, uterine cancer  
Disturbed estrogen quotient |
| **PROGESTERONE** | **Conditions**: infertility, PMS, prolonged or heavy menstrual bleeding, breast tenderness, breast cysts, breast fibroadenomas, breast cancer, uterine fibroids, uterine cancer, ovarian cysts, polycystic ovarian syndrome, lowered libido, hypothyroidism, adrenal fatigue, miscarriage, increase cardiovascular disease  
Progesterone deficiency  
Symptoms: fatigue, insomnia, anxiety, coronary |

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61 Complete Natural Medicine Guide to Women’s Health Sat Dharam Kaur, ND pg. 92-94
<table>
<thead>
<tr>
<th>Hormone</th>
<th>Condition</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTH</td>
<td>Low</td>
<td>Symptoms: low energy and motivation, poor memory</td>
</tr>
<tr>
<td>CORTISOL</td>
<td>High</td>
<td>Conditions: PMS, polycystic ovary syndrome, hypothyroidism</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Conditions: PMS, menopausal hot flashes, nausea in pregnancy, hypothyroidism, lupus, chronic fatigue syndrome, fibromyalgia, low libido, allergies and asthma</td>
</tr>
<tr>
<td>ALDOSTERONE</td>
<td>High</td>
<td>Conditions: PMS (water and salt retention), high blood pressure</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Symptoms: low blood pressure, dizziness, fatigue, frequent urination, excess perspiration, salt craving, muscle twitches, cardiac arrhythmia</td>
</tr>
<tr>
<td>DHEA</td>
<td>High</td>
<td>Conditions: converted to estrogen in breast cancer cells; may increase tumor growth in estrogen driven cancers</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Conditions: heart disease, fibromyalgia, lupus, osteoporosis</td>
</tr>
<tr>
<td>Hormone</td>
<td>Symptons</td>
<td>Conditions</td>
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<tr>
<td>TESTOSTERONE</td>
<td><strong>Symptoms:</strong> fatigue, poor memory, decreased libido, anxiety, nervousness, decreased dreaming, elevated blood pressure, high cholesterol, atherosclerosis, increased infections, poor recovery after stress</td>
<td><strong>Conditions:</strong> PMS, amenorrhea, polycystic ovary syndrome, miscarriage, increased breast cancer risk</td>
</tr>
<tr>
<td>High testosterone</td>
<td><strong>Symptoms:</strong> easily angered; increased facial hair, increased muscle mass</td>
<td></td>
</tr>
<tr>
<td>TESTOSTERONE</td>
<td><strong>Symptoms:</strong> low energy, little drive, poor memory, depression, no sexual orgasms, low libido, elevated blood pressure during or after menopause, loss of muscle mass</td>
<td></td>
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<tr>
<td>Low testosterone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSULIN</td>
<td><strong>Symptoms:</strong> high cholesterol, atherosclerosis, elevated testosterone, elevated estrogen</td>
<td><strong>Conditions:</strong> precocious puberty, amenorrhea, dysmenorrhea, polycystic ovary syndrome, diabetes, hypothyroidism, cardiovascular disease, breast cancer, uterine cancer, ovarian cancer</td>
</tr>
<tr>
<td>Elevated insulin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSULIN</td>
<td><strong>Symptoms:</strong> high blood pressure, high cholesterol, elevated LDL, low HDL</td>
<td><strong>Conditions:</strong> irregular periods, polycystic ovarian syndrome, preeclampsia in pregnancy, cardiovascular disease, adult onset diabetes</td>
</tr>
<tr>
<td>Insulin resistance or insensitivity</td>
<td><em>Insulin resistance or insensitivity (metabolic syndrome)</em></td>
<td></td>
</tr>
<tr>
<td>Low insulin</td>
<td><strong>Symptoms:</strong> low endurance</td>
<td><strong>Condition:</strong> type 1 diabetes</td>
</tr>
<tr>
<td>INSULIN-LIKE GROWTH FACTOR (IGF-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevated IGF-1</td>
<td><strong>Symptoms:</strong> causes increased growth of tissue, promotes growth and invasiveness of malignant cells, decreases production of SHBG which results in more available estrogen, stimulates increased estrogen production in the ovaries</td>
<td><strong>Conditions:</strong> precocious puberty, breast cancer, lung cancer, polycystic ovary syndrome, uterine fibroids, uterine cancer, ovarian cysts, ovarian cancer</td>
</tr>
<tr>
<td>GROWTH HORMONE</td>
<td><strong>Symptoms:</strong> increase estradiol long term, elevated</td>
<td><strong>Conditions:</strong> precocious puberty and early breast development, breast cancer, polycystic ovary syndrome, uterine fibroids, uterine cancer, ovarian cysts, ovarian cancer</td>
</tr>
<tr>
<td>Hormone</td>
<td>Condition</td>
<td>Symptom Description</td>
</tr>
<tr>
<td>------------------</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| GROWTH HORMONE   | Decreased growth hormone           | **Conditions:** amenorrhea, osteoporosis  
Symptoms: exhaustion, poor recovery from exertion, high LDL, low HDL, high blood pressure |
| THYROID HORMONES | Underactive thyroid gland          | **Conditions:** amenorrhea, PMS, heavy periods, menopausal hot flashes, endometriosis, polycystic ovary syndrome, infertility, miscarriage, breast cysts, breast cancer, breast cancer, fibromyalgia, osteoarthritis, cardiovascular disease  
Symptoms: low energy, especially in the morning, poor memory, slow thinking, anxiety and depression, worse in the morning, better when physically active, elevated cholesterol, high or low blood pressure, slow pulse, numbness in hands and feet, carpal tunnel syndrome, dry skin, decreased perspiration, weight gain with puffy face and eyelids, hair falling out, husky voice, intolerance to cold, slow digestion, gas, constipation |
| PTH              | Decreased PTH                      | **Symptoms:** causes low levels of calcium in the blood, muscle spasms  |
| PTH              | Elevated PTH                       | **Symptoms:** causes high levels of calcium in the blood, possibly calcium containing kidney stones  |
| PROLACTIN        | Elevated prolactin                 | **Conditions:** amenorrhea, PMS, polycystic ovary syndrome, infertility, breast cancer, osteoporosis  
Symptoms: increases cell division in breast cells causing increased breast density, can inhibit estrogen, causing amenorrhea or osteoporosis, may cause breast milk secretion in non-breastfeeding women |
| MELATONIN        | Low melatonin                      | **Conditions:** precocious puberty, uterine fibroids, uterine cancer, breast cancer  
Symptoms: low energy in the morning, disturbed |
| body rhythms, insomnia, morning anxiety and agitation, increased effects of estrogen dominance |
BHRT vs HRT

On January 13th, 1964, the Newsweek published an article titled “No More Menopause” which reported on the work of Dr. Robert A. Wilson, a New York gynaecologist who had been studying menopause since 1920. Teaming up with Ayerst, Wilson, along with the financial backing of the pharmaceutical industry, developed the first conjugated estrogen called Premarin. Dr. Wilson then subsequently published his infamous book, *Feminine Forever*. This book informed the readers how estrogen only hormone replacement therapy (ERT) could prevent the “curse” of menopause which was causing women to become shrivelled up, old and decrepit. News of this flooded the media and sales of ERT blossomed into an economic boom for the pharmaceutical industry. At the time, estrogen was actually very poorly researched. Estrogen gained approval in the pharmaceutical realm based on a very small and poorly conducted trial in Puerto Rico. The study was based on an insignificant number of women who took the birth control pill. The pill contained progestin and a synthetic estrogen. During the trial, 3 women died and 20% reported negative side effects that were actually disregarded. The evidence was clear that the “pill” caused blood clots and strokes but it was dismissed and suppressed for the supposedly higher good of controlling the population explosion and consequently, synthetic estrogen was approved as a drug.

Although ERT remained controversial over the decades, it was not until 2002 after a long-term government funded study of Hormone Replacement Therapy called the Women’s Health Initiative (WHI) was abruptly halted that the controversy ended for most people. The study was ended 3 years early as the data had clearly shown that the risks of long-term HRT use clearly outweighed the benefits. The randomized, double-blind study was composed of sixteen thousand healthy menopausal women aged 50-79 years. One group was placed on PremPro (Premarin-equine estrogens, plus Provera-synthetic
progestin). 5 years into the trial, those using PremPro had a 29% higher risk of breast cancer, a 26% higher risk of heart disease and a 41% higher risk of stroke. The National Cancer Institute released a second study on the same day that reported that women who used estrogen-only hormone replacement for longer than ten years doubled their risk for ovarian cancer. In addition, a report from the Harbor-UCLA Research and Education Institute found that the cancers tended to be diagnosed at more advanced stages and resulted in substantial increases in the percentage of women with abnormal mammograms. The report of increased risk was not reported with the first findings. Although the breast tumors were most likely already present, they were not detected because synthetic hormones caused increased breast density. Therefore, women on PremPro who had tumors in their breasts made it much more difficult to detect them. Consequently, when the tumors were detected, the cancer was much more advanced. Studies published in the last several years continue to provide alarming evidence against the use of HRT. In April, 2007 researcher’s reported that breast cancer rates remained low in 2004 after a substantial decline in 2003. Powerful evidence published in the New England Journal of Medicine expressly linked the significant drop in breast cancer to the sharp drop in the synthetic hormones used by menopausal women. In March 2008, the JAMA published a study which found that women who stopped taking PremPro still had a 24% higher risk of developing breast cancer years later.

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62 Writing Group for the Women’s Health Initiative Investigators (2002). Risks and benefits of estrogen plus progestin in healthy postmenopausal women: Principal result from the Women’s Health Initiative randomized controlled trial, JAMA, 228, 327-333
The word “bio identical” is derived from the words “bios,” meaning “life,” and “identical,” meaning “the same as.” Therefore, “bio identical” means “the same as life” or identical to what is in the living body, as opposed to synthetic substances such as conjugated hormones. Although bioidentical hormones are created in a lab (not extracted from humans), they have the exact same molecular structure as hormones made in the human body, making them chemically indistinguishable from one another. Bioidentical hormones generate the same physiologic responses in the body as do hormones already produced by the body because their chemical structure is identical.

In 1939, Russell E. Marker devised a method to convert sarsasapogenin which is a sapogenin found in the sarsaparilla plant into a progesterone-like compound. Shortly after, he devised methods to convert disogenin from the wild yam (Dioscorea villosa) into progesterone. It was quickly discovered that progesterone was a fat-soluble compound and when administered orally it was ineffective due to the first-pass effect of the liver. Efforts to dissolve the progesterone-like compound into vegetable oil and to administer it via injection were quickly aborted due to the difficulty of administration. Progesterone was then given as a suppository in the rectum or vagina to effectively treat conditions such as PMS, ovarian cysts and to prevent miscarriages.

Bio-identical hormones are made from botanical plants such as soy and yams. The human body cannot convert soy or yams directly into natural hormones. Because of this, the natural plants must be pharmaceutically processed to produce natural bio-identical progesterone and estrogen into the form of a transdermal cream. The body responds to the hormones as if it was the naturally produced identical biological structure of the hormones of the body rather than a foreign substance being introduced which occurs with synthetic hormones. This conversion can occur in a laboratory setting and therefore wild yam is sometimes used to synthesize the progesterone found in progesterone creams. This cream may technically be yam-based but its active ingredient is not the wild yam itself but the USP
progesterone that has been added. The USP progesterone used for hormone replacement comes from plant fats and oils which are usually a substance called diosgenin which is extracted from a very specific type of wild yam that grows in Mexico or from soybeans. In the laboratory, diosgenin is chemically synthesized into real human progesterone. The other human steroid hormone including estrogen, testosterone, progesterone and the cortisones are also nearly always synthesized from diosgenin.

“Bioidentical” hormone replacement therapy (BHRT) is a modification of conventional hormone replacement therapy that involves the use of supplemental doses of hormones with 3 important criteria:

1. BHRT has the identical chemical structure to the hormones that exist naturally in the human body.
2. BHRT is used to replenish levels to physiologically normal concentrations, never exceeding physiological levels.
3. BHRT is administered via a mode/route of administration that most mimics the body’s natural production. BHRT is given transdermally to avoid metabolic by-products which are produced by first pass metabolism to the liver which occurs only with oral dosage routes which for example increase the risk of blood clotting.

The term “bioidentical” is used because the administered hormones although chemically synthesised, are identical to the endogenous hormones of the human body. Estradiol, progesterone, estriol (another natural estrogen) and testosterone are the most common hormones.

In contrast, conventional hormone replacement therapy often involves the use of non-bio-identical hormones which have been modified so that their chemical structure is not the same as endogenous human hormones (hormones the body naturally makes). These conventional hormones can also be extracted from animals which have non-human estrogens (i.e. equine from horses’ urine does not occur
in humans naturally). Another example is when a molecule is added to progesterone to make medroxyprogesterone acetate. This process makes this form of synthetic progesterone more bioavailable via oral routes and patentable but it also increases the risk of cancer.

Many studies and media statements discuss hormones in general terms without making a distinction between bioidentical and non-bioidentical forms of hormones. For example, a clinical study involving medroxyprogesterone (a progestin), a non-bioidentical form of progesterone, may inaccurately refer to the hormone as "progesterone." Yet medroxyprogesterone and progesterone differ in their molecular structure, their derivation, and, most importantly, their effects on the body. Therefore, the results from such a study reflect only those of the particular progestin used and does not involve any other types of progestin, or progesterone itself, which might, in fact, produce different results.

In the late 1800’s laws were passed in the United States that allowed medicines to be patented only if they were not natural substances. If a drug company discovered a naturally occurring medicine then anyone was also free to capitalize on the discovery. However, if the drug company could isolate an “active ingredient” within a naturally occurring plant medicine and chemically alter the molecular structure by even one molecule, then it could be patented into a drug which no one else could manufacture. When a drug company manufactures a synthetic hormone, they do not alter it by only one molecule. Instead they add whole chains of molecules so that it will behave similarly enough like natural hormone yet it is different enough to be patentable! The grave changes to the molecular structure are the very reason that there are so many side effects attached to synthetic hormone replacement therapy. Conversely, pharmaceutical companies have no interest in bioidentical hormone replacement therapy because these forms of hormones are not patentable and therefore useless from an economic standpoint.
**Progesterone and Progestin**

Progesterone and Progestin are often confused although they are not related. Progestins are often defined as any compound able to sustain the human secretory endometrium. Progesterone is the only such hormone that is made by the body and has many significant functions that are not provided by synthetic progestins. One clear example of the differences in function between progesterone and progestin is the fact that progesterone is necessary for the survival and development of the embryo and throughout gestation. Conversely Provera, the most commonly prescribed progestin, carries the warning that its use in early pregnancy may increase the risk of early abortion or congenital deformities of the fetus. There is only one type of progesterone and it is produced via the ovaries. There are seven commonly prescribed synthetic progestins. Two of these, namely medroxyprogesterone acetate and megesrol acetate, are synthesized from the 21-carbon nucleus of progesterone. The other five- norgestrel, norethindrone acetate, norethynodrel, lynestrenol and norethisterone -are from the 19-carbon nucleus of nortestosterone. The basic body of the synthetic hormones remain identical to progesterone or nortestosterone and thus the compounds will likely bind with the same receptor sites as the natural hormones. It is the alteration (i.e. acetate or ethyl groups) linked to the C-17 site that will convey a different “message” to the target cell. This undoubtedly explains the alarming array of listed warnings, contraindications, precautions and adverse reactions attached to the synthetic progestins.

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66 Natural Progesterone-The multiple roles of a remarkable hormone John R. Lee MD pg. 17
Potential side effects of medroxyprogesterone acetate (Provera) 67

Warnings:

• Increased risk of birth defects such as heart and limb defects if taken during the first trimester of pregnancy
• Beagle dogs given this drug developed malignant mammary nodules
• Discontinue this drug if there is sudden or partial loss of vision
• This drug passes into breast milk, consequences unknown
• May contribute to thrombophlebitis, pulmonary embolism, and cerebral thrombosis

Contraindications:

• Thrombophlebitis
• Thromboembolic disorders
• Cerebral apoplexy
• Liver dysfunction or disease
• Known or suspected malignancy of genital organs
• Undiagnosed vaginal bleeding
• Known sensitivity to any included ingredient

Precautions:

• May cause fluid retention, epilepsy, migraine, asthma, cardiac or renal dysfunction
• May cause breakthrough bleeding or menstrual irregularities
• May cause or contribute to depression

67 Natural Progesterone-The multiple roles of a remarkable hormone John R. Lee MD pg. 18
- The effects of prolonged use of this drug on pituitary, ovarian, adrenal, hepatic, or uterine function is unknown

- May decrease glucose tolerance; diabetic patients must be carefully monitored

- May increase the thrombotic disorders associated with estrogens

**Adverse Reactions:**

- May cause breast tenderness and galactorrhea

- May cause sensitivity reactions such as urticaria, pruritus, edema, or rash

- May cause acne, alopecia and hirsuitism

- Edema, weight changes (increase or decrease)

- Cervical erosions and changes in cervical secretions

- Cholestatic jaundice

- Mental depression, pyrexia, nausea, insomnia or somnolence

- Anaphylactoid reactions and anaphylaxis (severe, acute allergic reactions)

- Thrombophlebitis and pulmonary embolism

- Breakthrough bleeding, spotting, amenorrhea, or changes in menses

**When taken with estrogens, the following have been observed:**

- Rise in blood pressure, headache, dizziness, nervousness, fatigue

- Changes in libido, hirsuitism and loss of scalp hair, decrease in T-3 uptake values

- Premenstrual-like syndrome, changes in appetite

- Cystitis-like syndrome

- Erythema multiforme, erythema nodosum, haemorrhagic eruption, itching
The Official Black Box Warning for Premarin

Important Safety Information

What is the most important information you should know about PREMARIN (estrogens), PREMPRO (a combination of estrogens and a progestin), or PREMARIN Vaginal Cream (a cream of estrogens)?

- Estrogens increase the chances of getting cancer of the uterus. Report any unusual vaginal bleeding right away while you are using these products. Vaginal bleeding after menopause may be a warning sign of cancer of the uterus (womb). Your health care provider should check any unusual vaginal bleeding to find out the cause.

- Do not use estrogens with or without progestins to prevent heart disease, heart attacks, strokes or dementia.

- Using estrogens with or without progestins may increase your chances of getting heart attacks, strokes, breast cancer and blood clots. Using estrogens, with or without progestins, may increase your risk of dementia, based on a study of women 65 years or older. You and your health care provider should talk regularly about whether you still need treatment with estrogens.
Anxiety

The most common psychiatric disorder in North America is anxiety disorders. 65% of North Americans take prescription medications daily, 43% take mood altering prescriptions regularly. Paxil and Zoloft (two of the more popular anti-anxiety medications) ranked 7th and 8th in the top ten prescribed medications in North America. These two medications totaled almost $5 Billion in sales in 2002. While anxiety is a symptom that everyone experiences at some point in their life, in some individuals it can be more than just occasional nervousness or stress. People with anxiety disorders often have symptoms that go beyond a simple response to stressful situations. The manifestations of an anxiety disorder are extremely debilitating and can prevent the individual from engaging in a fully functional life. The consequences of anxiety encompass all areas of life including emotional, occupation and social.

Common anxiety symptoms include:

- Allergy problems, increase in allergies (number, sensitivity, reactions, lengthier reactions)
- Back pain, stiffness, tension, pressure, soreness, spasms, immobility in the back or back muscles
- Blanching (looking pale, loss of color in the face or skin)
- Blushing, turning red, flushed face, flushed skin, blushing, red face or skin
- Body aches, parts of or your entire body feels sore and achy, feels like your body and muscles are bruised
- Body jolts, body zaps, electric jolt feeling in body, intense body tremor or “body shake”
- Body temperature increase or decrease, change in body temperature

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• Burning skin, itchy, “crawly,” prickly or other skin sensations, skin sensitivity, numbness on the skin
• Burning skin sensation on the face, neck, ears, scalp, or shoulders
• Buzzing sensation in the feet, toes, hands, fingers, arms, legs
• Chest pain, chest tightness
• Choking
• Chronic Fatigue, exhaustion, super tired, worn out
• Clumsiness, feeling clumsy, co-ordination problems with the limbs or body
• Cold chills, feeling cold
• Craving sugar, sweets, chocolate, usual craving for sugar and sweets
• Difficulty speaking, moving mouth, talking, co-ordination problems with the mouth or tongue
• Dizziness, feeling lightheaded
• Excess of energy, you feel you can’t relax
• Falling sensation, feel like you are falling or dropping even though you are not
• Feel like you are going to pass out or faint
• Feeling cold or chilled
• Feel wrong, different, foreign, odd, or strange
• Flu-like symptoms, general malaise, feel ill, like you are coming down with a flu
• Flushed face, red face, flushed skin
• Frequent urination
• Heart palpitations, racing heart
• Hyperactivity, excess energy, nervous energy
• Increased or decreased sex drive
• Infection - increased infections, persistent infection
• Mouth or throat clicking or grating sound/noise when you move your mouth or jaw, such as when talking
• Muscles that vibrate, jitter, tremor, or shake when used
• Muscle twitching
• Nausea and/or vomiting
• Neck, back, shoulder pain, tightness/stiffness
• Night sweats, waking up in a sweat, profusely sweating at night
• No energy, feeling lethargic, tired
• Numbness and tingling, and other skin sensations on hands, feet, face, head, or any other places on the body
• Persistent muscle tension, stiffness
• Pounding heart, heart feels like it is beating too hard
• Pulsing or throbbing muscles
• Rib or rib cage tightness, pressure, or feeling like a tight band around the rib cage
• Shooting pains, stabbing pains, and odd pressures in the neck, head, or face
• Sore or tight scalp or back of the neck
• Startle easily
• Sweating, uncontrollable profuse sweating
• The floor feels like it is moving either down or up for no reason
• TMJ
• Trembling, shaking, tremors
• Urgency to urinate, frequent urination, sudden urge to go to the washroom (similar to urinary tract or prostate infection symptoms)
• Warm spells
• Weak legs, arms, or muscles
• Weight loss, weight gain
• Chest (anxiety symptoms commonly associated with the chest area)
• Chest tremors, trembling in the chest, chest feels like it is vibrating
• Concern about the heart
• Feel like you have to force yourself to breathe
• Find it hard to breathe, feeling smothered, shortness of breath
• Frequent yawning to try and catch your breath
• Heart Palpitations – beating hard or too fast, rapid heartbeat
• Heart - Irregular heart rhythms, flutters or ‘skipped’ beats, tickle in the chest that makes you cough
• Fears (anxiety symptoms commonly associated with fear)
• A heightened fear of what people think of you
• Afraid of being trapped in a place with no exits
• Constant feeling of being overwhelmed.
• Fear of being in public
• Fear of dying
• Fear of losing control
• Fear of impending doom
• Fear of making mistakes or making a fool of yourself to others
• Fear of passing out
• Fear that you are losing your mind
• Fears about irrational things, objects, circumstances, or situations
• Heightened self-awareness, or self-consciousness
• Need to find nearest washrooms before you can feel comfortable
• Need to seat near exits
• Burning, itchy, tight scalp
• Frequent headaches, migraine headaches
• Feeling like there is a tight band around your head, pressure, tightness
• Head, neck or shoulder pain, tightness/stiffness
• Head zaps, head tremors
• Giddiness
• When you close your eyes you feel like are beginning to, or will, float upwards
• Sore jaw that feels like a tooth ache
• Feel like there is something stuck in your ear, that your ear canal it plugged or blocked, that there is a pebble in your ear that you can't get out
• Low rumbling sounds
• Reduced hearing, frequent or intermittent reduced hearing or deafness in one or both ears
• Ringing in the ears, noises in the ears, noises in the head
• Pulsing in the ears, throbbing sound in the ear(s)
• Tickle or itch in your ear that you can't seem to get at
• Altered state of reality, consciousness, or universe feeling
• Deja Vu, a feeling like you've done or experienced something before
• Depersonalization
• Derealization
• Desensitization
• Difficulty concentrating, short-term memory loss
• Difficulty thinking, speaking, forming thoughts, following conversations
• Disorientation
• Frequent feeling of being overwhelmed, or that there is just too much to handle or do
• Nightmares, bad dreams
• Obsession about sensations or getting better
• Repetitive thinking or incessant ‘mind chatter’
• Short-term learning impairment, have a hard time learning new information
• Short-term memory impairment, can’t remember what I did a few days, hours, or moments ago
• "Stuck" thoughts, mental images, concepts, songs, or melodies that "stick" in your mind and replay over and over again.
• You often feel you are carrying the world on your shoulders
• Always feeling angry and lack of patience
• Depression
• Dramatic mood swings (emotional flipping)
• Emotionally blunted, flat, or numb
• Frequently being on edge or ‘grouchy’
• Feel like crying for no apparent reason
• Numb feelings
• Not feeling like yourself, detached from loved ones, emotionally numb
• A ‘tinny’, ‘metallic’ or ‘ammonia ‘or unusual smell or taste
• Aerophagia (swallowing too much air, stomach distention, belching)
• Burning mouth, feeling like the inside of your mouth is burning, or tingling, or like pins and needles, or all of these together or at different times
• Choking
• Constipation
• Diarrhea
• Difficulty swallowing
• Dry mouth
• Feeling like you can’t swallow properly or that something will get caught in your throat
• Feeling like your tongue is swollen
• IBS
• Lack of appetite or taste
• Stomach upset, gas, belching, bloating
• Teeth grinding
• Burning skin sensations, skin sensitivity
• Skin problems, infections, rashes
• Difficulty falling or staying asleep
• Frequent bad, bizarre, or crazy dreams
• Hearing sounds in your head that jolt you awake
• Insomnia, or waking up ill in the middle of the night
• Waking up in a panic attack
• You feel worse in the mornings
• Distorted, foggy, or blurred vision
• Dry, watery or itchy eyes
• Eye tricks, seeing things out of the corner of your eye that isn’t there, stars, flashes
• Eyes sensitive to light
• Spots in the vision
• Flashing lights when eyes are closed
• Burning skin sensations, skin sensitivity
• Feeling cold or chilled
• Pain

In addition to these anxiety symptoms, you may also find yourself worrying compulsively about:

• Having a heart attack
• Having a serious undetected illness
• Dying prematurely
• Going insane or losing your mind
• Suddenly snapping
• Losing it
• Uncontrollably harming yourself or someone you love
• Losing control of your thoughts and actions
• Being embarrassed or making a fool out of yourself
• Losing control
• Fainting in public
• Not breathing properly
• Losing control of reality
• Choking or suffocating
• Being alone

There are several recognized types of anxiety disorders including:

1. **Generalized anxiety disorder**: This disorder involves excessive, unrealistic worry and tension, even if there is little or nothing to provoke the anxiety. Individuals with GAD have great difficulty trying to control their worries and may have similar symptoms of depression.
2. **Panic disorder:** People with this condition have feelings of terror that strike suddenly and repeatedly with no warning. Other symptoms of a panic attack include sweating, chest pain, palpitations (irregular heartbeats) and a feeling of choking which may make the person feel like he or she is having a heart attack or "going crazy." These symptoms may occur with or without agoraphobia (morbid fear of having a panic attack or panic-like symptoms in a situation that is perceived to be difficult to escape).

3. **Obsessive-compulsive disorder (OCD):** Characterized by persistent mental images, thoughts, or ideas with compulsive, repetitive behaviours that are rigid and ritualistic.

4. **Post-traumatic stress disorder (PTSD):** A re-experiencing or flashbacks of symptoms, avoidance and hyper-arousal after exposure to a traumatic event.

5. **Social anxiety disorder:** Also called social phobia, social anxiety disorder involves overwhelming worry and self-consciousness about everyday social situations. The worry often centers on a fear of being judged by others or behaving in a way that might cause embarrassment or lead to ridicule.

6. **Specific phobias:** A specific phobia is an intense fear of a specific object or situation such as snakes, heights, or flying. The level of fear usually is inappropriate to the situation and may cause the person to avoid common, everyday situations.

There are a variety of underlying medical conditions, lifestyles, medications and toxins that can cause anxiety disorders. Some of the main medical conditions are listed below.\(^7\)

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### Medical Conditions That Can Cause Anxiety

<table>
<thead>
<tr>
<th>System Involved</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular</td>
<td>Arrhythmia</td>
</tr>
<tr>
<td></td>
<td>Congestive heart failure</td>
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<tr>
<td></td>
<td>Coronary artery disease</td>
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<tr>
<td></td>
<td>Pulmonary embolism</td>
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<tr>
<td>Endocrine/Hormonal</td>
<td>Cushing’s syndrome</td>
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<tr>
<td></td>
<td>Hyper/hypothyroidism</td>
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<tr>
<td></td>
<td>Hypoglycaemia</td>
</tr>
<tr>
<td></td>
<td>Hormonal Imbalances</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Porphyria</td>
</tr>
<tr>
<td></td>
<td>Vitamin B-12 deficiency</td>
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<tr>
<td></td>
<td>B-Vitamin deficiency</td>
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<tr>
<td></td>
<td>Amino Acid deficiency</td>
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<tr>
<td></td>
<td>Mineral deficiency</td>
</tr>
<tr>
<td></td>
<td>Essential fatty acid deficiency</td>
</tr>
<tr>
<td></td>
<td>Cerebral allergies (Foods and food substances)</td>
</tr>
<tr>
<td></td>
<td>Elevated blood lactate levels</td>
</tr>
<tr>
<td>Neurological</td>
<td>Neurotransmitter imbalances</td>
</tr>
<tr>
<td></td>
<td>Encephalitis</td>
</tr>
<tr>
<td></td>
<td>Neoplasms</td>
</tr>
<tr>
<td></td>
<td>Temporal lobe epilepsy</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>Asthma</td>
</tr>
</tbody>
</table>
### Substances That Can Cause Anxiety Symptoms

<table>
<thead>
<tr>
<th>Category of Substances</th>
<th>Various Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medications</td>
<td>Anaesthetics</td>
</tr>
<tr>
<td></td>
<td>Analgesics</td>
</tr>
<tr>
<td></td>
<td>Stimulants</td>
</tr>
<tr>
<td></td>
<td>Anticholinergic</td>
</tr>
<tr>
<td></td>
<td>Insulin</td>
</tr>
<tr>
<td></td>
<td>Thyroid preparations</td>
</tr>
<tr>
<td></td>
<td>Antihistamines</td>
</tr>
<tr>
<td></td>
<td>Corticosteroids</td>
</tr>
<tr>
<td></td>
<td>Anti-hypertensive</td>
</tr>
<tr>
<td></td>
<td>Anti-consultants</td>
</tr>
<tr>
<td></td>
<td>Anti-psychotics</td>
</tr>
<tr>
<td></td>
<td>Anti-depressants</td>
</tr>
<tr>
<td>Dietary Substances</td>
<td>Alcohol</td>
</tr>
<tr>
<td></td>
<td>Caffeine</td>
</tr>
<tr>
<td>Illicit Substances</td>
<td>Cannabis</td>
</tr>
<tr>
<td></td>
<td>Cocaine</td>
</tr>
<tr>
<td></td>
<td>Hallucinogens</td>
</tr>
<tr>
<td></td>
<td>Inhalants</td>
</tr>
<tr>
<td>Accidental/Purposeful Exposure to</td>
<td>Gasoline</td>
</tr>
<tr>
<td>COPD</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
</tr>
</tbody>
</table>
### Volatile Substances
- Paint
- Insecticides
- Carbon monoxide

### Withdrawal from Substances
- Alcohol
- Cocaine
- Sedatives
- Hypnotics
- Anxiolytics

The underlying causes of anxiety disorders are vast and often numerous. In order to identify the medical diagnosis of an anxiety disorder, the following DASS (Depression, Anxiety and Stress Scale) questionnaire can be used to differentiate between depressions, anxiety and stress so that the appropriate healing protocol can be prescribed. The Depression, Anxiety, and Stress Scales (DASS) were developed by researchers at the University of New South Wales (Australia).71

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71 University of New South Wales Depression Anxiety Stress Scales [http://www2.psy.unsw.edu.au/groups/dass/](http://www2.psy.unsw.edu.au/groups/dass/)
### DASS

**Name:**

**Date:**

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement.

*The rating scale is as follows:*

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of the time
- 3 Applied to me very much, or most of the time

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I found myself getting upset by quite trivial things</td>
</tr>
<tr>
<td>2</td>
<td>I was aware of dryness of my mouth</td>
</tr>
<tr>
<td>3</td>
<td>I couldn't seem to experience any positive feeling at all</td>
</tr>
<tr>
<td>4</td>
<td>I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)</td>
</tr>
<tr>
<td>5</td>
<td>I just couldn't seem to get going</td>
</tr>
<tr>
<td>6</td>
<td>I tended to over-react to situations</td>
</tr>
<tr>
<td>7</td>
<td>I had a feeling of shakiness (eg, legs going to give way)</td>
</tr>
<tr>
<td>8</td>
<td>I found it difficult to relax</td>
</tr>
<tr>
<td>9</td>
<td>I found myself in situations that made me so anxious I was most relieved when they ended</td>
</tr>
<tr>
<td>10</td>
<td>I felt that I had nothing to look forward to</td>
</tr>
<tr>
<td>11</td>
<td>I found myself getting upset rather easily</td>
</tr>
<tr>
<td>12</td>
<td>I felt that I was using a lot of nervous energy</td>
</tr>
<tr>
<td>13</td>
<td>I felt sad and depressed</td>
</tr>
<tr>
<td>14</td>
<td>I found myself getting impatient when I was delayed in any way (eg, lifts, traffic lights, being kept waiting)</td>
</tr>
<tr>
<td>15</td>
<td>I had a feeling of faintness</td>
</tr>
<tr>
<td>16</td>
<td>I felt that I had lost interest in just about everything</td>
</tr>
<tr>
<td>17</td>
<td>I felt I wasn't worth much as a person</td>
</tr>
<tr>
<td>18</td>
<td>I felt that I was rather touchy</td>
</tr>
<tr>
<td>19</td>
<td>I perspired noticeably (eg, hands sweaty) in the absence of high temperatures or physical exertion</td>
</tr>
<tr>
<td>20</td>
<td>I felt scared without any good reason</td>
</tr>
<tr>
<td>21</td>
<td>I felt that life wasn't worthwhile</td>
</tr>
</tbody>
</table>
**Reminder of rating scale:**

0  Did not apply to me at all
1  Applied to me to some degree, or some of the time
2  Applied to me to a considerable degree, or a good part of time
3  Applied to me very much, or most of the time

<p>| | | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>I found it hard to wind down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>I had difficulty in swallowing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>I couldn't seem to get any enjoyment out of the things I did</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>26</td>
<td>I felt down-hearted and blue</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>27</td>
<td>I found that I was very irritable</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>28</td>
<td>I felt I was close to panic</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>29</td>
<td>I found it hard to calm down after something upset me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>30</td>
<td>I feared that I would be &quot;thrown&quot; by some trivial but unfamiliar task</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>31</td>
<td>I was unable to become enthusiastic about anything</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>32</td>
<td>I found it difficult to tolerate interruptions to what I was doing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>33</td>
<td>I was in a state of nervous tension</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>34</td>
<td>I felt I was pretty worthless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>35</td>
<td>I was intolerant of anything that kept me from getting on with what I was doing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>36</td>
<td>I felt terrified</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>37</td>
<td>I could see nothing in the future to be hopeful about</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>38</td>
<td>I felt that life was meaningless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>39</td>
<td>I found myself getting agitated</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>40</td>
<td>I was worried about situations in which I might panic and make a fool of myself</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>41</td>
<td>I experienced trembling (eg, in the hands)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>42</td>
<td>I found it difficult to work up the initiative to do things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
### DASS 42 Score Sheet

Enter each score from the questionnaire into the first two columns. Add up each row and enter the score into the available box (D, A or S). Add up the each of the D, A and S columns. The total for each column is the score for that trait:

- **D** = Depression
- **A** = Anxiety
- **S** = Stress

Use the ratings table below to assess the meaning of each score.

#### Score Calculation:

<table>
<thead>
<tr>
<th>Q</th>
<th>Score</th>
<th>Q</th>
<th>Score</th>
<th>All D scores</th>
<th>All A scores</th>
<th>All S scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>24</td>
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<tr>
<td>4</td>
<td>25</td>
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<tr>
<td>5</td>
<td>26</td>
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<tr>
<td>6</td>
<td>27</td>
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<tr>
<td>7</td>
<td>28</td>
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<tr>
<td>8</td>
<td>29</td>
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</tr>
<tr>
<td>9</td>
<td>30</td>
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<tr>
<td>10</td>
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</tr>
<tr>
<td>11</td>
<td>32</td>
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<td></td>
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<tr>
<td>12</td>
<td>33</td>
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<tr>
<td>13</td>
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<tr>
<td>14</td>
<td>35</td>
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<tr>
<td>15</td>
<td>36</td>
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<tr>
<td>16</td>
<td>37</td>
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<tr>
<td>17</td>
<td>38</td>
<td></td>
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<tr>
<td>18</td>
<td>39</td>
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<tr>
<td>19</td>
<td>40</td>
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<tr>
<td>20</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total for D</th>
<th>Total for A</th>
<th>Total for S</th>
</tr>
</thead>
</table>

#### Score Interpretation:

<table>
<thead>
<tr>
<th></th>
<th>Depression (D)</th>
<th>Anxiety (A)</th>
<th>Stress (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0 – 9</td>
<td>0 – 7</td>
<td>0 – 14</td>
</tr>
<tr>
<td>Mild</td>
<td>10 – 13</td>
<td>8 – 9</td>
<td>15 – 18</td>
</tr>
<tr>
<td>Moderate</td>
<td>14 – 20</td>
<td>10 – 14</td>
<td>19 – 25</td>
</tr>
<tr>
<td>Severe</td>
<td>21 – 27</td>
<td>15 – 19</td>
<td>26 – 33</td>
</tr>
<tr>
<td>Extremely Severe</td>
<td>28+</td>
<td>20+</td>
<td>34+</td>
</tr>
</tbody>
</table>
In order to further evaluate the underlying causes of anxiety specific laboratory testing can be implemented.

<table>
<thead>
<tr>
<th>Specific Lab Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELISA/EIA Food Allergy Testing</td>
<td>This is based on the findings that certain subclasses of IgG have been associated with the in vitro degranulation of basophils and mast cells, the activation of the complement cascade, (both of which are important mechanisms in allergy and anaphylaxis) and the observation that high circulating serum concentrations of some IgG subtypes have been measured in certain atopic individuals. The premise behind this testing is that high circulating levels of IgG antibodies are correlated with clinical food allergy signs and symptoms. The ELISA/EIA test itself involves coating a 96 well plate with food antigens, adding a patient's sera and looking for a classic antigen/antibody interaction.</td>
</tr>
<tr>
<td>Micro Nutrient Testing for Nutritional Deficiencies</td>
<td>The micronutrient tests measures how micronutrients are actually functioning within the white blood cells. Micro Nutrient's patented testing chemically-defined control media contains the minimal amount of each essential</td>
</tr>
</tbody>
</table>
micronutrient that is needed to support optimal lymphocyte growth or mitogenic response. The functional intracellular status of micronutrients involved in cell metabolism is evaluated by manipulation of the individual micronutrients in the media followed by mitogenic stimulation and measurement of DNA synthesis.

Neurotransmitter Testing

Medical science has discovered that neurotransmitters are at the foundation of many psychiatric and neurological disorders. Imbalances in neurotransmission, due to excessive or deficient neurotransmitter levels at the synaptic cleft, are associated with depression, insomnia, anxiety, behavioural disorders, memory disorders, and a spectrum of other brain-related functions. Because neurotransmitters play an integral role in these disease states, they are prime targets for treating disorders of the nervous system and mental health concerns. Neurotransmitters are recognized as the primary biochemical messengers of the central and
Peripheral nervous systems. Studies have demonstrated that urinary neurotransmitter measures are reflective of circulating levels as evidenced by renal neurotransmitter clearance mechanisms. Laboratory methodology for the accurate assessment of urinary neurotransmitter levels has been established. Urinary measures are not recognized as a direct reflection of central activity, however definite associations exist. The ability to measure neurotransmitters has led to the generation of scientific literature that demonstrates urinary neurotransmitter measurements have clinical value as representative biomarkers of various neurological, immunological, and endocrinological conditions.

| **Adrenal Stress Index** | The panel utilizes four saliva samples. Salivary cortisol measurement reflect the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. |
The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions.

The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.

<table>
<thead>
<tr>
<th>Complete Female Hormone Panel</th>
<th>Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can</th>
</tr>
</thead>
</table>
Thyroid Hormone Testing

A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism includes feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety,
depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia.

### Conventional Medicine Therapies Commonly Prescribed for Anxiety Disorders

#### Benzodiazepines

The most commonly prescribed pharmacologic therapy for anxiety is Benzodiazepines. Benzodiazepines bind to a macromolecular complex that is found within the central nervous system. This complex is called the Gamma-aminobutyric acid (GABA) - Benzodiazepine receptor-chloride ion channel complex.²²

The somatic symptoms and hypervigilence which are part of anxiety are lowered by Benzodiazepines. Benzodiazepines are usually prescribed on an as needed basis due to their shorter half-life. This shorter half-life also causes them to be rapidly absorbed and therefore often abused.

#### Commonly Prescribed Benzodiazepines²³

<table>
<thead>
<tr>
<th>Name</th>
<th>Half-Life (hours)</th>
<th>Dosage Range (per day)</th>
<th>Initial Dosage (per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alprazolam (Xanax)</td>
<td>14</td>
<td>1-4mg</td>
<td>0.25-0.5mg Q.I.D.</td>
</tr>
<tr>
<td>Chlordiazepoxide (Librium)</td>
<td>20</td>
<td>15-40mg</td>
<td>5-10mg T.I.D.</td>
</tr>
<tr>
<td>Clonazepam (Klonopin)</td>
<td>50</td>
<td>0.5-4.0mg</td>
<td>0.5-1.0mg B.I. D.</td>
</tr>
<tr>
<td>Chlorazepate</td>
<td>60</td>
<td>15-60mg</td>
<td>7.5-15mg B.I. D.</td>
</tr>
</tbody>
</table>

²³ Gliatto MF. Generalized Anxiety Disorder. AM Fam Physician 2000; 62:1591-1600, 1602
<table>
<thead>
<tr>
<th>(Tranxene)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diazepam (Valium)</td>
<td>40</td>
<td>6-40mg</td>
<td>2-5mg T.I.D.</td>
</tr>
<tr>
<td>Lorazepam (Ativan)</td>
<td>14</td>
<td>1-6mg</td>
<td>0.5-1.0mg T.I.D.</td>
</tr>
<tr>
<td>Oxazepam (Serax)</td>
<td>9</td>
<td>30-90mg</td>
<td>15-30mg T.I.D.</td>
</tr>
</tbody>
</table>

**Side Effects of Benzodiazepines**

Chronic use of Benzodiazepines can result in dependence. The dependence is measured by the effects of withdrawal when discontinued. Withdrawal symptoms can include anxiety, irritability and insomnia for up to 72 hours. Following withdrawal, the patient often returns to their recurrent anxiety state.\(^{74}\)

**Selective Serotonin Reuptake Inhibitors (SSRI) and Tricyclic Antidepressants (TCA)**

SSRIs are believed to increase the extracellular level of the neurotransmitter serotonin by inhibiting its reuptake into the presynaptic cell, increasing the level of serotonin in the synaptic cleft available to bind to the postsynaptic receptor. They have varying degrees of selectivity for the other monoamine transporters, with pure SSRIs having only weak affinity for the noradrenaline and dopamine transporter\(^{75}\).

The majority of the TCAs act primarily as serotonin-norepinephrine reuptake inhibitors (SNRIs) by blocking the serotonin transporter (SERT) and the norepinephrine transporter (NET), respectively, which results in an elevation of the extracellular concentrations of these neurotransmitters, and therefore an

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\(^{75}\) http://en.wikipedia.org/wiki/Selective_serotonin_reuptake_inhibitor
enhancement of neurotransmission. Notably, the TCAs have negligible affinity for the dopamine transporter (DAT), and therefore have no efficacy as dopamine reuptake inhibitors (DRIs).  

Commonly Prescribed SSRI’s and TCA’s for Anxiety Disorders

SSRI’s and Newer Agents

<table>
<thead>
<tr>
<th>Name</th>
<th>Usual Starting Dose</th>
<th>Typical Therapeutic Dose</th>
<th>SSRI Side Effects('').</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoxetine (Prozac)</td>
<td>10mg daily am</td>
<td>20-80mg per day</td>
<td>Somnolence, agitation, sweating, nausea, anorexia and sexual dysfunction</td>
</tr>
<tr>
<td>Paroxetine (Paxil)</td>
<td>10mg daily</td>
<td>20-50mg per day</td>
<td>(As above)</td>
</tr>
<tr>
<td>Sertraline (Zoloft)</td>
<td>25mg daily</td>
<td>50-200mg per day</td>
<td>(As above)</td>
</tr>
<tr>
<td>Fluvoxamine (Luvox)</td>
<td>25mg at bedtime</td>
<td>50-300mg per day</td>
<td>(As above)</td>
</tr>
<tr>
<td>Nefazodone (Serzone)</td>
<td>50mg daily</td>
<td>150-300mg per day</td>
<td>(As above)</td>
</tr>
<tr>
<td>Venlafaxine (Effexor)</td>
<td>18.75-25mg daily</td>
<td>75-150mg per day</td>
<td>(As above)</td>
</tr>
</tbody>
</table>

TCA’s

<table>
<thead>
<tr>
<th>Name</th>
<th>Usual Starting Dose</th>
<th>Typical Therapeutic Dose</th>
<th>TCA Side Effects('').</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imipramine (Tofranil)</td>
<td>10mg at bedtime</td>
<td>100-200mg per day</td>
<td>Anticholinergic; dry mouth, constipation, blurred vision, orthostatic hypotension, weight gain and somnolence</td>
</tr>
<tr>
<td>Desipramine (Norpramin)</td>
<td>10mg at bedtime</td>
<td>100-200mg per day</td>
<td>(As above)</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Medicine</th>
<th>Dose at Bedtime</th>
<th>Dose per Day</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amitriptyline (Elavil)</td>
<td>10mg at bedtime</td>
<td>100-200mg per day</td>
<td>(As above)</td>
</tr>
<tr>
<td>Nortriptyline (Pamelor)</td>
<td>10mg at bedtime</td>
<td>50-100mg per day</td>
<td>(As above)</td>
</tr>
</tbody>
</table>

Nutritional Factors Affecting Anxiety

Clinical anxiety, including panic attacks can be produced by caffeine, certain other drugs and the infusion of lactate into the blood. The most significant dietary factor in anxiety is elevated blood lactic acid levels and an increased lactic acid to pyruvic acid ratio. Lactate (the soluble form of lactic acid) is the final breakdown product of blood sugar (glucose) when there is a lack of oxygen. This occurs, for example when a person exercises so vigorously that one cannot catch his/her breath. Lactic acid is changed into lactate and transported to the liver where it is converted into harmless pyruvic acid. People who tend to suffer panic attacks and anxiety are unable to convert lactate into pyruvic acid and so have elevated blood levels of lactate. If people who get panic attacks are injected with lactate, severe panic attacks are produced. In normal individuals, nothing happens. Reducing the level of lactate is a critical goal in the treatment of anxiety disorders.

Nutrition plays a pivotal role in reducing lactate levels and preventing the conversion of lactic acid back to pyruvic acid. There are six main nutritional factors that may be responsible for elevated lactate levels or lactic acid to pyruvic acid ratio:

1. Alcohol
2. Caffeine
3. Sugar
4. Deficiency of the B-vitamins niacin, pyridoxine and thiamine

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78 Encyclopedia of Natural Medicine Revised 2nd ed. Michael Murray MD Joseph Pizzorno ND pg. 254
5. Deficiency of calcium or magnesium

6. Food allergens

Simple avoidance of alcohol, caffeine and refined sugar can make remarkable improvements to anxiety disorders. A small study was conducted on the effects of abstaining from caffeine on anxiety symptoms. Four males and 2 females who had diagnosed generalized anxiety disorder or panic attacks decreased their intake of caffeine consumption from an average of 1 ½ to 3 ½ cups of coffee per day to none. After one week, there was significant reduction in anxiety symptoms. Follow up exams six to eighteen months later indicated that five out of six patients were completely without symptoms and the sixth patient required a very small dose of Valium. Patients with anxiety disorders appear to be more susceptible than healthy individuals to the anxiety-inducing effects of caffeine. This increased sensitivity may be due in part to slower caffeine metabolism, a higher peak caffeine concentration following caffeine ingestion, or exaggerated response to caffeine.

Food Allergens

Disturbances in brain function can also involve masked, hidden or delayed cerebral allergic responses to foods or beverages. These reactions to foods can occur hours or even several days later following the ingestion of allergenic foods. The foods most commonly associated with allergies are as follows:

- Dairy products
- Wheat

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Hypoglycemia and Anxiety

Hypoglycemia and Anxiety

Hypoglycemia results when an excessive fall in the blood glucose level leads to a compensatory response by the sympathetic nervous system which includes the release of epinephrine and nor-epinephrine. This type of a response will enable the glucose levels to restore towards normal levels. It will also induce a “fight or flight” response which can result in anxiety, palpitations, sweating, hunger and irritability. Patients with anxiety caused by reactive hypoglycemia may experience a worsening of
symptoms in the late morning or late afternoon (before mealtime) and a significant improvement after eating. This type of patient tends to crave sweets and may note that consumption of refined sugar relieves their symptoms temporarily but will often be followed by an exacerbation of symptoms. In order to stabilize blood sugar levels, certain dietary recommendations should be taken under counsel. A nutritional regime that involves consuming six smaller meals per day rather than the standard three meals per day has been shown to dramatically decrease hypoglycemic tendencies. The hypoglycemic patient’s diet should consist of one that is high in protein and fats and low in carbohydrates. Protein in moderately high amounts will decrease the release of insulin from the pancreas. If the protein-to-carbohydrate ratio is 0.75 or greater, the insulin release from the pancreas will be slowed down and the subsequent decline in blood glucose following meals will not be as rapid. Macronutrient percentages kept at levels of 40% carbohydrates, 30% protein and 30% fat have been found to balance blood sugar levels substantially.

**Herbal Medicine Indicated for Anxiety Disorders**

**Passion Flower (Passiflora incarnata):**

The alkaloids namely Harman and Harmaline are responsible for sedative and muscle relaxant properties of Passion flower. Passion flower was used traditionally in the Americas and later in Europe as a "calming" herb for anxiety, insomnia, seizures, and hysteria. It is believed that passionflower works by increasing the levels of a chemical called gamma-aminobutyric acid (GABA) in the brain. GABA lowers the activity of some brain cells resulting in noticeable relaxation.

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Valerian (*Valeriana officinalis*):

The volatile oils, mainly valerianic acid, give Valerian its well-known sedative and anti-spasmodic properties. Germany's Commission E approved Valerian as an effective mild sedative and the United States Food and Drug Administration listed valerian as "Generally Recognized As Safe" (GRAS). Scientists aren't sure how valerian works, but they believe it increases the amount of a chemical called gamma aminobutyric acid (GABA) in the brain. GABA helps regulate nerve cells and has a calming effect on anxiety.

Kava kava (*Piper methysticum*):

Kava lactones including kavain, dihydrokavain, methysticum and dihydromethysticum have been found to produce effective anxiolytic effects. Germany’s Commission E has approved Kava for the treatment of conditions of nervous anxiety, stress and restlessness. In a review of seven scientific studies, researchers concluded that a standardized kava extract was significantly more effective than placebo in treating anxiety. Another study found that kava substantially improved symptoms after only 1 week of treatment. Another study found that kava may be as effective as some prescription anti-anxiety medications. In fact, according to one study, kava and diazepam (Valium) cause similar changes in brain wave activity, suggesting that they may work in the same ways to calm the mind.\(^8^4\)

Lemon Balm (*Melissa officinalis*):

Volatile oils including citral, citronellal, citronellol, geraniol and caryophyllene give Lemon Balm is anti-spasmodic and calming effects on the central nervous system. In a double-blind, placebo-controlled study, 18 healthy volunteers received two separate single doses of a standardized lemon balm extract

\(^{84}\) http://www.umm.edu/altmed/articles/kava-kava-000259.htm
(300 mg and 600 mg) or placebo for 7 days. The 600 mg dose of lemon balm increased mood and significantly increased calmness and alertness.85

**Skullcap (Scutellaria lateriflora):**

It is the flavonoid glycosides and the volatile oils that are responsible for Skullcaps calming properties. Skullcap has been used for more than 200 years as a mild relaxant and as a therapy for anxiety, nervous tension, and convulsions.

**Specific Nutrients in the Treatment of Anxiety**

**5-HTP (5-hydroxytryptophan):**

5-HTP, extracted from the seeds of the African plant *Griffonia simplicifolia*, is the intermediate metabolite of the amino acid L-tryptophan in the serotonin pathway. After tryptophan is converted into 5-HTP, the chemical is then converted into another chemical called serotonin (a neurotransmitter, which relays signals between brain cells). 5-HTP acts primarily by increasing levels of serotonin within the central nervous system. 5-HTP dietary supplements help raise serotonin levels in the brain. Since serotonin helps regulate mood and behaviour, 5-HTP may have a positive effect on sleep, mood, anxiety, appetite, and pain sensation. Other neurotransmitters and CNS chemicals such as melatonin, dopamine, norepinephrine and beta endorphin have also been shown to increase following oral administration of 5-HTP. Dosage: 100-600mg per day

**Relora**

Relora is a proprietary blend of the plant extracts from *Magnolia officinalis* and *Phellodendron amurense*. Relora has been found to bind to GABA receptor sites resulting in the immediate relief of

85 http://www.umm.edu/altmed/articles/lemon-balm-000261.htm
anxiety and providing a sense of relaxation. In addition, as Relora binds to GABA sites, the signalling from the brain to produce the stress hormone cortisol is ceased resulting in a calming, non-sedative effect. In central nervous system receptor binding assays, the plant extracts in Relora bind to several important targets associated with anxiety. It does not bind to the benzodiazepine receptors that would cause sedation, yet has the relaxing qualities of the benzodiazepine class of drugs in a validated anxiolytic animal model. In addition, it normalizes hormone levels associated with stress-induced obesity and eating/drinking behaviour. Dosage: 500-1000mg per day

**Gamma-aminobutyric acid (GABA)**

GABA is a major neurotransmitter widely distributed throughout the central nervous system. Due to the fact that too much excitation can lead to irritability, restlessness, insomnia, seizures, and movement disorders, it must be balanced with inhibition. GABA is the most important inhibitory neurotransmitter in the brain which provides this inhibition, acting like a “brake” during times of runaway stress. Medications for anxiety, such as benzodiazepines, stimulate GABA receptors and induce relaxation. Either low GABA levels or decreased GABA function in the brain is associated with several psychiatric and neurological disorders including anxiety, depression, insomnia, and epilepsy. Studies indicate GABA can improve relaxation and enhance sleep. Clinical studies have shown that natural GABA produced via a fermentation process that utilizes Lactobacillus hilgardii which is the bacteria used to ferment vegetables in the preparation of the traditional Korean dish known as kimchi. Gaba increases the production of brain alpha-waves and creates a profound sense of physical relaxation while maintaining mental focus. In contrast, stress related beta-waves are decreased. In addition to changes in brain waves, GABA has been shown to produce relaxation as evidenced by reduced pupil diameter, heart rate, and markers of stress, namely salivary cortisol and chromogranin A. Dosage: 100-600mg per day
Flaxseed Oil

Patients who suffer from panic attacks and anxiety have been shown to be deficient in alpha-linolenic acid which is the essential fatty acid found in high concentrations in flaxseed oil. In one study, three out of four patients with a history of agoraphobia over ten or more years improved within two or three months after taking 2 to 6 tablespoons daily in divided doses depending upon their response. 86

Inositol

Inositol, sometimes referred to as Vitamin B8, is a water soluble fatty lipid that is required by the body for the formation of healthy cells. Inositol has been shown to be effective in treating some cases of depression, anxiety, OCD as well as other psychological disorders that respond to serotonin uptake inhibitors. Inositol is a ‘second messenger’ triggering the release of calcium in cells. It is also involved in the transmission of messages between neural cells and the transport of fats within cells. Its most important role seems to be in the central nervous system where it serves to help transmit messages along neural pathways. Various studies have shown its efficacy in treating a number of psychological disorders that have a chemical basis, including bulimia, OCD, depression and bipolar mood disorder. Inositol is present in greater concentration in the cells in and around the central nervous system, including brain cells and retinal cells, and in other specialized cells such as bone marrow and intestinal cells. Dosage: Large doses (12-18g per day) are used in the treatment of anxiety and psychiatric disorders.


**Vitamin B3 (Niacinamide)**

Niacinamide is involved in over 200 enzymatic reactions in the body. The mechanisms of action of Niacinamide are multifactorial and include the correction of subclinical pellagra, correction of an underlying vitamin B3-dependency disorder, Benzodiazepine-like effects, the ability to increase the production of serotonin and lastly the ability to modify the metabolism of lactic acid.\(^{87}\) Both Benzodiazepines and Niacinamide exert similar anxiolytic effects through the modulation of neurotransmitters commonly unbalanced in anxiety. Optimal doses of Niacinamide increase the production of serotonin by diverting more tryptophan to become a substrate for serotonin synthesis.\(^{88}\)

Dosages: 500-3000mg per day in divided doses

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**Vitamin B1 (Thiamine)**

Thiamine’s effectiveness in the reduction of anxiety symptoms comes from its ability to reduce the production of lactate in the body. Thiamine’s anxiolytic functions result from its coenzyme function in the pyruvate dehydrogenase enzyme resulting in a reduction in blood lactate and less anxiety symptoms due to an increased conversion of pyruvate to acetyl-CoA.\(^{89}\) Dosages: 100mg-1800mg have been observed in the treatment of anxiety

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**Vitamin B6 (Pyrodoxine)**

Pyrodoxine has three critical roles in the treatment of anxiety, the first being its role in the conversion pathways of tryptophan to serotonin. Secondly, Pyrodoxine is involved in the production of GABA. Pyrodoxine is a coenzyme for glutamic acid decarboxylase which facilitates the conversion of glutamic

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\(^{87}\) Anxiety Orthomolecular Diagnosis and Treatment Dr Jonathan Prousky BPHE, BSc, ND, FRSH pg. 47
\(^{88}\) Velling DA, Dodick DW, Muir JJ. Sustained release niacin for prevention of migraine headaches. Mayo clin Proc 2003;78:770-771
\(^{89}\) Buist RA. Anxiety neurosis The Lactate connection. Int Clin Nutr Rev 1985; 5:1-4
acid to GABA. Finally, Pyrodoxine is partly responsible for a reduction in the formation of blood lactate. Dosage: 200mg-600mg per day. Doses higher than 200mg per day should be monitored for the development of neurotoxicity.

**Magnesium**

Magnesium deficiency can cause both anxiety and decreased stress tolerance. In addition, various types of physical and mental stress can lead to Magnesium depletion and an increased requirement for Magnesium. Thus, a vicious cycle can occur in which anxiety and stress leads to a Magnesium depletion which further exacerbates anxiety and stress. It is also indicated that Magnesium depletion is associated with an increased lactate-pyruvate ratio. Dosage: 5mg per kg of body weight

**Adjunctive Therapies**

**Breathing Therapy**

Breathing is not a function that is detached from your emotional and mental states but rather just the opposite because the way in which you breathe reflects your state. When asleep, breathing patterns become deep, slow and forceful. When under strain, breathing patterns become shallow and rapid. During anger, breathing can be quite irregular. Alternatively, a state of relaxation produces slow breathing as well as rhythmic and quiet breathing patterns.

By having knowledge of breathing exercises, you can control panic or distress. You can also steady yourself and reduce tension and this results in lowering blood pressure and cholesterol levels. Breathing techniques can be “First Aid” in preventing stress and tension from injuring your body.
Regular breathing exercises, especially done early in the morning when the air is fresh, will clear the mind and invigorate the body.

**First Aid Breathing**

“First Aid” breathing exercises can be used in times of acute stress. The simplest breathing exercise is an exercise to bring calm. Sit comfortably in a chair and allow the shoulders to drop. Move outward to widen the chest. Allow the head to float upwards from the shoulders as if it was being lifted from above. Look straight ahead as if gazing at a place on a wall. Practice this initial letting go. Once able to do this easily, the lungs will be free to fill from top to bottom. Next, take a few deep, slow but gentle breaths in through the nose. The calming breathing is now ready to be administered. Breathe in freely to the count of three through the nose and out again through the nose also to the count of three. Let the chest expand and deflate. Try not to exaggerate the movements. This is a way of controlling the stress response, quieting the nervous system and allowing for balance to be restored.

**Breathing Exercises to Aid in Sleep**

This is helpful for those whose minds will not switch off from the events of the day. With the eyes closed, breathe deeply and gently letting the stomach expand and contract while deepening the breathing. Visualize the breath as exhaling, moving up from the diaphragm through the lungs and out of the mouth. In the mind’s eye, watch the air; follow an arc like a rainbow from the mouth back to the abdomen and through the imaginary hole and back to the diaphragm. Then start again with a slow rhythm, breathing and seeing the breath flow through the lungs and over the chest to the mouth counting 1-2-3-4, then blow it back to the diaphragm with another 1-2-3-4. Keep visualizing the circle of air as it moves through the body and around to the diaphragm. Keep the mind fully involved with this process and sleep will gently enfold you.
Breathing Exercises to Reduce Tension

Begin by standing up, stretching the arms above the head and then let them fall loosely to the sides of the body. Straighten the back, hold in the stomach, and tuck the gluteal muscles under. Allow your head to rise and the shoulders to drop. This will encourage the blood flow. Take a slow breath in and count 1-2-3-4. Hold it in 1-2-3-4 then breathe out 1-2-3-4 at the same time. This allows the shoulders to drop further. Next, make a circle with the head, let it drop onto the chest, roll the head over the left shoulder, let it drop behind and roll over the right shoulder and back onto the chest. Roll the head three times to the left, then three times to the right, breathing easily all the time. Finally, lift the head and take a deep, steady breath.

EMDR (Eye Movement Desensitization and Reprocessing)

EMDR is an integrative psychotherapy approach that has been extensively researched and proven effective for the treatment of trauma. EMDR is a set of standardized protocols that incorporates elements from many different treatment approaches. To date, EMDR has helped an estimated two million people of all ages relieve many types of psychological stress.

Until recently, psychologists thought trauma permanently altered brain chemistry. It is now believed that eye movement somehow liberates the natural healing process to reverse such effects. It seems that eye movement stimulates the neurochemical communication between the two hemispheres of the brain which results in the trauma no longer containing the negative emotional charge that was originally associated with it.

Researchers in the Human Resource Institute's Trauma Center (Brookline, MA) have been using SPECT brain-scan imaging to map changes that occur from EMDR treatments. They found that traumatic material appears to be held in the right parietal region which is concerned with body states and is
mostly nonverbal. Following EMDR, areas of the left frontal regions that have to do with verbal processing and future planning, come back online. Although the brain has a natural mechanism for processing disturbing events, when a traumatic experience is overwhelming, the brain may not be able to process it in the same way. This is why severely traumatized people often find themselves struck with disturbing memories long after the traumatic event. Research suggests that an important part of the natural trauma processing happens during rapid eye movement (REM) sleep, which provides alternating stimulation of the right and left hemispheres of the brain. This may help explain why EMDR therapy seems to jump-start the brain's natural healing ability, allowing the traumatic memory to become less and less disturbing.

EMDR is now the most researched treatment for Post Traumatic Stress Disorder (PTSD), and many scientific studies have shown it is effective and long-lasting. For example in December 1995, a study by Wilson, Becker, and Tinker was published in the *Journal of Consulting and Clinical Psychology*, where 80 subjects diagnosed with PTSD showed significant improvement after EMDR therapy. Treatment benefits were unchanged at a 15-month follow-up.

**Exercise for Anxiety Reduction**

There is a great deal of recent scientific evidence demonstrating that regular physical activity leads to significant symptom reduction. Consistent findings show that aerobic exercise, such as brisk walking, for at least 30 minutes 3-5 times a week at 60-80% of one’s maximum heart rate results in improved mood in people with depression or anxiety disorder.90

Exercise can help to relieve stress, tension, and anxiety. By expelling your excess negative emotions and adrenaline through physical activity, you can enter a more relaxed, calm state of being from which to

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deal with the issues and conflicts that are causing your anxiety. Exercise is one of the most important coping medium to combat anxiety and stress.

Exactly how exercise helps in relaxation and stress management is not clear. The benefits of exercise can come from many factors: the decision to take up exercise, the symbolic meaning of the activity, the distraction from worries, the acquisition of mastery over a sport, the effects on self-image and the biochemical and physiological changes that accompany the activity.

Exercise increases blood flow to the brain, releases hormones, stimulates the nervous system, and increases levels of morphine-like substances found in the body (such as beta-endorphin) that can have a positive effect on mood. Exercise may trigger a neurophysiological high that produces an antidepressant effect in some, an antianxiety effect in others, and a general sense of "feeling better" in most.91

Exercise is only a short-term fix for anxiety. The relaxation induced by the exercise lasts for only four hours or so. The anxiety returns to its previous level within 24 hours after a workout. So if you are suffering from chronic anxiety, you will have to exercise every day to see an effect. If you become anxious during the day such as the case if you experience job stress, you may want to exercise first thing in the morning. On the other hand, if you suffer from insomnia, you may want to exercise in the late afternoon. (Note: Exercising too late in the day may make it difficult for you to fall asleep.)

Studies are inconclusive when looking at whether you need a vigorous exercise to reduce anxiety. Some studies suggest that exercise should be fairly intense, but not exhausting, to best elicit the tranquilizer effect of exercise. Other researchers have found that light exercise such as walking or swimming decreases anxiety just as effectively as vigorous jogging. Exercises such as golf, tennis, handball, biking,

91 Michael H. Sacks, M.D.: Exercise For Stress Control
and other sports have shown to help people relax. Choose an exercise (the type and the level of exercise) that works best for you.

**Case Study-Anxiety**

Louise is a 46 year old female who presented with severe, progressing and chronic anxiety. Louise is a mother of two teenage children who works full-time. She had seen suffering with anxiety for approximately 10 years. The anxiety began when Louise was 36 years old and suffered a miscarriage at 12 weeks gestation. Shortly after the miscarriage, she underwent a cone biopsy for cervical dysplasia. The stress and grief involved with both of those situations set Louise into a pattern of long-term anxiety.

At first Louise experienced anxiety as short bursts of overwhelming stress that occurred intermittently. The anxiety continued and it grew exponentially into daily anxiety, palpitations, insomnia, severe mood swings, depression, anger and irritability and all of these symptoms which increased the week before her period.

Louise’s diet was sporadic. For a short duration Louise would eat a very well balanced diet with long durations of time when she would skip meals and rely on quick carbohydrate dense convenience snacks to get her through the day. Louise also consumed at least 2 cups of coffee per day and very little water.

One of Louise’s goals was also to lose 5-10 pounds.

**Lab testing:**

- Extremely elevated cortisol, especially between the hours of 4pm to midnight
- Hypoglycemia
- Depressed Salivary SIgA
Depressed progesterone
Elevated testosterone

Management Plan

Louise was administered the following natural medicine therapies:

- Estrogen detoxification: Isoflavones, Turmeric, Rosemary, Resveratrol, B6, B12, Folic acid 3 times per day
- Adrenal Support: Vitamin C, B5, B6, Mg, Citrus Bioflavonoids 2 times per day
- Adrenal Support: Licorice root, Ashwagandha root 2 times per day
- Modified Mediterranean Lifestyle Nutrition Plan to balance hormones and correct hypoglycemia (See Specific Guidelines for Nutritional Lifestyle Management in Weight Gain Section)

Louise returned 3 weeks later for a follow-up visit and reported that during the first week of treatment her anxiety was extreme, but over the course of the following 2 weeks it had dissipated an incredible amount. Insomnia was still a major issue that she was dealing with as well as PMS. Louise was instructed to add the following forms of therapy to her protocol:

- Exercising with a personal trainer 3-5 times per week
- Counseling therapy to deal with the past miscarriage and current issues in her life as well as stress management techniques

The following changes were made to Louise’s protocol:

- Continue with Adrenal Support: Vitamin C, B5, B6, Mg, Citrus Bioflavonoids 2 times per day
- Cortisol Management: Ashwagandha, L-theanine, Phosphatidylserine 1 cap @ 4pm and 1 cap before bed
• Chinese stress reducing formula including: Rhemannia root, Schisandra fruit, Don Quai, Chinese Asparagus root, Scrophularia root, Asian ginseng root and Chinese Salvia root 2-6 tablets per day as needed for stress

• Progesterone balancing formula including Vitex and Black cohosh

• High potency purified fish oils 1000mg 3 times per day

4 weeks later Louise came for a follow up and reported that her anxiety was completely gone. She was sleeping much better at an average nightly amount of 7 hours. She had no PMS symptoms at all during her last cycle and she had lost 8 pounds. She reported that she was exercising regularly, eating consistently and undergoing counseling.
Depression

In affluent countries, depression is already the leading cause of disease burden for women. Studies have also shown that depression will become the second leading cause of death and disability worldwide by 2020. This is second only to ischemic heart disease and the greatest burden of depression occurs in North America and the United Kingdom. The Medical Outcome Study, a four-year longitudinal report, corroborates these projections and adds that depression is more debilitating than other chronic medical disorders such as diabetes, arthritis, hypertension and cardiovascular disease. Over the course of a year, 9.5% of the North American population suffer from depression and depression related mood disorders. In the course of a lifetime, one out of every 4 women and one out of every ten men will develop depression.

The official definition of clinical depression according to the American Psychiatric Association in its Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) is based on the following eight primary criteria:

1. Poor appetite accompanied by weight loss, or increased appetite accompanied by weight gain
2. Insomnia or excessive sleep habits (hypersomnia)
3. Physical hyperactivity or inactivity
4. Loss of interest or pleasure in usual activities or decrease in sexual drive
5. Loss of energy; feelings of fatigue

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6. Feelings of worthlessness, self-reproach, or inappropriate guilt
7. Diminished ability to think or concentrate
8. Recurrent thoughts of death or suicide

The presence of 5 of the 8 symptoms definitely indicates clinical depression; an individual with 4 is likely
depressed. According to the DSM-IV, the symptoms must be present for at least one month to be called
depression. Clinical depression is also referred to as major depression or unipolar depression.

**Symptoms of Depression**

Depression is manifested both physically and emotionally. The classic physical signs of depression are as
follows:

- Headaches
- Fatigue; decreased energy, or a feeling of being “slowed down”
- Digestive problems
- Chronic pain
- Hyperactivity; restlessness or irritability
- Sleeping disorders
- Loss of concentration; difficulty remembering or making decisions
- Distorted eating patterns—either the urge to consistently overeat or loss of appetite (a
  significant change in weight is often evident)

**The emotional side of depression can include the following:**

- Excessive crying
- Persistent sad, anxious or “empty” mood
• Pessimism; hopelessness
• A sense of worthlessness
• Guilt, or self-pity
• Loss of self-esteem
• Loss of enjoyment from normally pleasurable activities
• Decrease in sex drive
• Suicidal tendencies

Types of Depression

Clinical depression is categorized into three types:

1. Major depression manifests a combination of symptoms that interfere with the ability to work, study, sleep, eat and enjoy once pleasurable activities. Such a disabling episode of depression may occur only once but more commonly occurs several times in a lifetime.

2. Dysthymia is a less severe type of depression and involves long-term, chronic symptoms that are not disabling but keep someone from functioning well or feeling good. Many people with dysthymia also experience some episodes of major depression.

3. Bipolar disorder is also called manic-depressive disorder. Not nearly as prevalent as other forms of depressive disorders, bipolar disorder is characterized by cyclic mood changes manifesting in severe highs (mania) and lows (depression). Sometimes the mood switches are dramatic and rapid but more often they are gradual. When in the depressed cycle, an individual can have any or all of the symptoms of depression. When in the manic cycle, the individual may be overactive, over-talkative, and wildly energetic.
Causes of Depression

Depression can often be due to an underlying organic (chemical) or physiological cause. Identification and elimination of the underlying cause should be the primary therapy. The following lists the organic and physiological causes of depression:

- Food allergies
- Heavy metals
- Hypoglycemia
- Hypothyroidism
- Nutritional deficiencies
- Pre-existing physical conditions (cancer, chronic inflammation, chronic pain, diabetes, heart disease, liver disease, lung disease, multiple sclerosis, rheumatoid arthritis)
- Premenstrual syndrome
- Prescription medications (antihistamines, antihypertensive, anti-inflammatory agents, birth control pills, corticosteroids, tranquilizers and sedatives)
- Sleep disturbances
- Stress/low adrenal function

Uncovering the causes of depression can be attained by precise laboratory testing. The following chart outlines specific lab tests that can be a useful diagnostic tool.

<table>
<thead>
<tr>
<th>Specific Lab Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELISA/EIA Food Allergy Testing</td>
<td>This is based on the findings that certain subclasses of IgG have been associated with the in</td>
</tr>
</tbody>
</table>
in vitro degranulation of basophils and mast cells, the activation of the complement cascade, (both of which are important mechanisms in allergy and anaphylaxis) and the observation that high circulating serum concentrations of some IgG subtypes have been measured in certain atopic individuals. The premise behind this testing is that high circulating levels of IgG antibodies are correlated with clinical food allergy signs and symptoms. The ELISA/EIA test itself involves coating a 96 well plate with food antigens, adding a patient's sera and looking for a classic antigen/antibody interaction.

## Micro Nutrient Testing for Nutritional Deficiencies

The micronutrient tests measures how micronutrients are actually functioning within the white blood cells. Micro Nutrient’s patented testing chemically-defined control media contains the minimal amount of each essential micronutrient that is needed to support optimal lymphocyte growth or mitogenic response. The functional intracellular status of micronutrients involved in cell metabolism is evaluated by manipulation of the individual micronutrients in the media followed by mitogenic stimulation and
| Neurotransmitter Testing | Medical science has discovered that neurotransmitters are at the foundation of many psychiatric and neurological disorders. Imbalances in neurotransmission, due to excessive or deficient neurotransmitter levels at the synaptic cleft, are associated with depression, insomnia, anxiety, behavioural disorders, memory disorders, and a spectrum of other brain-related functions. Because neurotransmitters play an integral role in these disease states, they are prime targets for treating disorders of the nervous system and mental health concerns. Neurotransmitters are recognized as the primary biochemical messengers of the central and peripheral nervous systems. Studies have demonstrated that urinary neurotransmitter measures are reflective of circulating levels as evidenced by renal neurotransmitter clearance mechanisms. Laboratory methodology for the measurement of DNA synthesis. |

Accurate assessment of urinary neurotransmitter levels has been established. Urinary measures are not recognized as a direct reflection of central activity, however definite associations exist. The ability to measure neurotransmitters has led to the generation of scientific literature that demonstrates urinary neurotransmitter measurements have clinical value as representative biomarkers of various neurological, immunological, and endocrinological conditions.

| Adrenal Stress Index | The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a |
The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.

### Complete Female Hormone Panel

Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age

Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair.

Polycystic ovarian syndrome (PCOS) is thought to
be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.

<table>
<thead>
<tr>
<th>Thyroid Hormone Testing</th>
<th>A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism include feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemia</td>
<td>Low serum iron, Hematocrit and low blood</td>
</tr>
</tbody>
</table>
Hemoglobin levels can predispose a person to extreme fatigue contributing to depression.

<table>
<thead>
<tr>
<th>Celiac Testing</th>
<th>Celiac disease and gluten sensitivity have been linked into mood disorders. The following tests can detect a gluten allergy:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anti-gliadin IgA/IgG antibody</td>
</tr>
<tr>
<td></td>
<td>Anti-endomysial antibody</td>
</tr>
<tr>
<td></td>
<td>Anti-tissue transglutaminase (tTG)</td>
</tr>
</tbody>
</table>

**Pharmaceutical Medications to Treat Depression**

There are three classes of drugs commonly used to treat depression: selective serotonin reuptake inhibitors (SSRI’s); tricyclic antidepressants (TCA’s) and monoamine oxidase inhibitors (MAOI’s).

SSRIs are believed to increase the extracellular level of the neurotransmitter serotonin by inhibiting its reuptake into the presynaptic cell. SSRI’s also increase the level of serotonin in the synaptic cleft available to bind to the postsynaptic receptor. They have varying degrees of selectivity for the other monoamine transporters, with pure SSRIs having only weak affinity for the noradrenaline and dopamine transporter.⁹⁶

The majority of the TCAs act primarily as serotonin-norepinephrine reuptake inhibitors (SNRIs) by blocking the serotonin transporter (SERT) and the norepinephrine transporter (NET), respectively, which results in an elevation of the extracellular concentrations of these neurotransmitters, and therefore an

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enhancement of neurotransmission. Notably, the TCAs have negligible affinity for the dopamine transporter (DAT), and therefore have no efficacy as dopamine reuptake inhibitors (DRIs).⁹⁷

Monoamine oxidase inhibitors (MAOIs) are one of the oldest classes of antidepressants and are typically used when other antidepressants have not been effective. They are used less frequently because they often interact with certain foods and require strict dietary restrictions. MAOIs prevent monoamine oxidase from breaking down the monoamines. This results in an increased amount of active monoamines in the brain. By increasing the amount of monoamines in the brain, the imbalance of chemicals, thought to be important in causing depression, is altered. This helps relieve the symptoms of depression.⁹⁸

**Pharmaceuticals Used for Depression**

<table>
<thead>
<tr>
<th>SSRI's</th>
<th>Dose Range</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citalopram HBr (Celexa)</td>
<td>20-50mg q.d.</td>
<td>Sexual problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stomach upset</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agitation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weight gain</td>
</tr>
<tr>
<td>Escitalopram oxalate (Lexapro)</td>
<td>10-40mg q.d.</td>
<td>(As above)</td>
</tr>
<tr>
<td>Paroxetine HCl (Paxil)</td>
<td>20-50mg q.d.</td>
<td>(As above)</td>
</tr>
<tr>
<td>Fluoxetine (Prozac)</td>
<td>20-80mg q.d.</td>
<td>(As above)</td>
</tr>
<tr>
<td>Sertralane (Zoloft)</td>
<td>25-200mg q.d.</td>
<td>(As above)</td>
</tr>
<tr>
<td>Fluvoxamine (Luvox)</td>
<td>50-300mg q.d.</td>
<td>(As above)</td>
</tr>
</tbody>
</table>


⁹⁸[http://www.netdoctor.co.uk/diseases/depression/monoamineoxidaseinhibitors_000101.htm](http://www.netdoctor.co.uk/diseases/depression/monoamineoxidaseinhibitors_000101.htm)
<table>
<thead>
<tr>
<th>Serotonin and Norepinephrine Reuptake Inhibitors (SNRI’s)</th>
<th>Dose Range</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duloxetine (Cymbalta)</td>
<td>20-60mg q.d.</td>
<td>Hypertension, nausea, dizziness, drowsiness</td>
</tr>
<tr>
<td>Venlafaxine (Effexor)</td>
<td>37.5mg-300mg q.d.</td>
<td>Can increase diastolic BP and nausea</td>
</tr>
<tr>
<td>Desvenlafaxine succinate (Pristiq)</td>
<td>50mg q.d.</td>
<td>Sexual side effects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TCA</th>
<th>Dose Range</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amitriptyline (Elavil)</td>
<td>25-300mg h.s.</td>
<td>Dry mouth or eyes, taste in mouth, photophobia, blurry vision, constipation, urinary hesitancy, cardiovascular risk, orthostatic hypotension, sedation, risk of mortality in overdose</td>
</tr>
<tr>
<td>Imipramine (Tofranil)</td>
<td>25-300mg h.s.</td>
<td>(As above)</td>
</tr>
<tr>
<td>Nortriptyline (Aventyl)</td>
<td>25-150mg h.s.</td>
<td>(As above)</td>
</tr>
<tr>
<td>Clomipramine (Anafranil)</td>
<td>25-75mg t.i.d. cc</td>
<td>(As above)</td>
</tr>
<tr>
<td>MAOI</td>
<td>Dose Range</td>
<td>Side Effect</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Phenelzine (Nardil)</td>
<td>15-105mg q.d.</td>
<td>Orthostatic hypotension, sedation interaction with tyramine foods</td>
</tr>
<tr>
<td>Parnate (Tranylcypromine)</td>
<td>10-90mg q.d.</td>
<td>(As above)</td>
</tr>
</tbody>
</table>

**Nutritional Factors Affecting Depression**

Modification of lifestyle including nutrition is fundamental to overcoming depression. Nutritional deficiencies are extremely common in the depressed patient. Many different nutrients play a critical role in mood regulation. A diet based on whole foods including a substantial amount of various fresh fruits and vegetables is fundamental to any health concern, especially depression.

Nutritional deficiencies affecting or even causing depression are numerous. Specifically Magnesium, when deficient, can lead to depression, likely by a mechanism that increases inflammation. Other individual deficiencies are listed below:

**Behavioural Effects of Some Vitamin Deficiencies**

<table>
<thead>
<tr>
<th>Deficient Vitamin</th>
<th>Behavioural Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiamine</td>
<td>Korsakoff’s psychosis, mental depression, apathy, anxiety, irritability</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>Depression, irritability</td>
</tr>
</tbody>
</table>

99 Encyclopedia of Natural Medicine Revised 2nd Edition Michael Murray ND Joseph Pizzorno ND pg. 387
### Niacin

- Apathy, anxiety, depression, hyperirritability, mania, memory deficits, delirium, organic dementia, emotional lability

### Biotin

- Depression, extreme lassitude, somnolence

### Pantothenic acid

- Restlessness, irritability, depression, fatigue

### B6

- Depression, irritability, sensitivity to sound

### Folic acid

- Forgetfulness, insomnia, apathy, irritability, depression, psychosis, delirium, dementia

### B12

- Psychotic states, depression, irritability, confusion, memory loss, hallucinations, delusions, paranoia

### Vitamin C

- Lassitude, hypochondriasis, depression, hysteria

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**Reactive Hypoglycemia**

Depression is one of the most common symptoms of reactive hypoglycemia and has been reported to improve after commencement of a dietary program designed to stabilize blood glucose levels.\(^\text{100}\) There are four main mechanisms responsible for reactive hypoglycemic depression:

1. As blood sugar levels are increased, so is cortisol secretion. Elevated cortisol levels are directly connected to the development of depression.
2. Low blood sugar levels are implicated in depression, fatigue and the inability to concentrate.
3. Insulin resistance has been directly connected to reactive hypoglycemia. Neurotransmitter deficiencies are correlated with insulin resistance as insulin is required for the uptake of tryptophan and other amino acid neurotransmitter precursors in the brain.

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\(^{100}\) Salzer HM Relative hypoglycemia as a cause of neuro-psychiatric illness J Natl Med Association 1966; 58:12-17
4. Norepinephrine depletion is caused by the repetitive release of norepinephrine when hypoglycemia is occurring.

In order to stabilize blood sugar levels, specific dietary measures need to be adopted. A nutritional regime that involves consuming six smaller meals per day rather than the standard three meals per day has been shown to dramatically decrease hypoglycemic tendencies. The hypoglycemic patient’s diet should consist of one that is high in protein and fats and low in carbohydrates. Protein in moderately high amounts will decrease the release of insulin from the pancreas. If the protein-to-carbohydrate ratio is 0.75 or greater, the insulin release from the pancreas will be slowed down and the subsequent decline in blood glucose following meals will not be as rapid. Macronutrient percentages kept at levels of 40% carbohydrates, 30% protein and 30% fat have been found to balance blood sugar levels substantially.

**Food Allergies and Depression**

Molecules called exorphins, which are derived from the incomplete breakdown during the digestive process, are small proteins that have morphine-like effects. Five exorphins have been discovered in the breakdown products of gluten and eight others in milk. The study of exorphins has been able to identify a possible explanation for some of the reported psychoactive reactions to these proteins, including the sense of “brain fog”. Exorphins have also been shown to decrease levels of serotonin, dopamine and norepinephrine in the central nervous system contributing to the process of depression. Detection of food allergies can be achieved by the ELISA/EIA Food Allergy Testing or by completing an elimination diet. An elimination diet involves eliminating the most common allergenic foods (gluten, 

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dairy, corn, soy, eggs, peanuts, citrus fruits, sugar, processed foods, alcohol and shellfish) for a period of 21 days and then re-introducing the potential allergens one at a time, three days apart.

**Herbal Medicine Indicated for Depression**

**St. John’s wort (Hypericum perforatum)**

St. John’s wort acts pharmacologically to alter brain chemistry in ways similar to anti-depressant drugs. “Hypericin, hyperforin, and other components (flavonoids) of the plant have been shown to inhibit the breakdown of several neurotransmitters within the brain that maintain normal mood and emotional stability. It appears to improve the signal produced by serotonin after it binds to its receptor sites on the brain cell. Dosage: 300mg-900mg per day

**Kava kava (Piper methysticum)**

Kava kava helps in the treatment of anxiety and depression. Kavalactones are the primary active components. They exhibit sedative, analgesic, anticonvulsant and muscle relaxant effects. Most sedative drugs work by binding to receptor sites (GABA—the brain’s natural calming agent) in the brain to promote sedation. Kava lactones do not appear to bind to these receptors but somehow magnify the area near the receptor site in a way that enhances GABA binding and is therefore not addictive.

**Maidenhair tree (Ginkgo biloba)**

Ginkgo increases the blood flow and oxygen supply to the brain. Ginkgo is therefore useful in the prevention and treatment of strokes. It can be used with standard anti-depressants and it may enhance their effectiveness. Ginkgo biloba standardized extract contains 24% Ginkgo flavone glycoside at a dose
of 40mg three times per day. It should be taken consistently for at least 12 weeks in order to determine the effectiveness.

Specific Nutrients in the Treatment of Depression

5-HTP (5-hydroxytryptophan):

5-HTP, extracted from the seeds of the African plant *Griffonia simplicifolia*, is the intermediate metabolite of the amino acid L-tryptophan in the serotonin pathway. After tryptophan is converted into 5-HTP, the chemical is then converted into another chemical called serotonin (a neurotransmitter which relays signals between brain cells). 5-HTP acts primarily by increasing levels of serotonin within the central nervous system. 5-HTP dietary supplements help raise serotonin levels in the brain. Since serotonin helps regulate mood and behaviour, 5-HTP may have a positive effect on sleep, mood, anxiety, appetite, and pain sensation. Other neurotransmitters and CNS chemicals such as melatonin, dopamine, norepinephrine and beta endorphin have also been shown to increase following oral administration of 5-HTP. Dosage: 100-600mg per day

Essential Fatty Acids

An insufficiency of omega-3 fatty acids in the diet has been linked to depression. This may be related to the impact of dietary fatty acids on the composition of nerve cell membranes. Dietary supplementation with DHA and EPA has proven beneficial for many of the known higher mental functions. Meta-analyses confirm the benefits of Omega-3 fatty acid supplementation in major depressive disorder and bipolar disorder. There are also promising results in schizophrenia with initial benefit for borderline personality disorder. Accelerated cognitive decline and mild cognitive impairment correlate with lowered tissue levels of DHA/EPA and supplementation has improved cognitive function. The brain is the richest source
of fatty acids in the human body. Proper nerve cell function is dependent upon membrane fluidity to prevent behavioural, mood and mental function fluctuations. Dosage: 2-6 grams of fish oils per day

**Folic Acid (Vitamin B9)**

Folic acid deficiency alone can cause depression. Several studies have demonstrated that folic acid is effective in the treatment of depression. One of these studies showed benefit from the use of folic acid supplementation in a group of patients suffering from depression. Results showed that 92% of the folic acid group made a full recovery, compared with only 70% of the control group who took the standard prescription drug therapy. Dosage: 500mcg-1mg per day

**Vitamin B12 (Methylcobalamin)**

A deficiency of Vitamin B12 can result in pernicious anemia, depression, anxiety, fatigue and poor mental function. Vitamin B12 inhibits monoamine oxidase (MAO), an enzyme that metabolizes some of the neurotransmitters that help to elevate mood. Due to these effects, it acts similarly to MAOI medications prescribed for depression but without the negative side-effects. B12 is found mostly in animal products such as beef, liver, chicken liver, clams, oysters and sardines and in smaller amounts in eggs, many fish and cheeses. Therefore vegetarians have a higher risk of Vitamin B12 deficiency. Dosage: 1g-5g per day taken sublingually

**Vitamin D3**

Vitamin D is a fat-soluble vitamin that plays a role in many important body functions. It is best known for working with calcium in your body to help build and maintain strong bones. Vitamin D is also involved in regulating the immune system and cells where it may help prevent cancer. Due to the fact that our

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bodies can produce Vitamin D when exposed to sunlight, Vitamin D is considered both a vitamin and a hormone. Lack of sunshine during winter months can cause a Vitamin D deficiency. Seasonal Affective Disorder (SAD) can surface when there is a deficiency of Vitamin D. Dosage: 1000iu- 5000iu per day

**SAMe (S-Adenosylmethionine)**

SAMe is effective and generally well-tolerated in the treatment of depression with immediate results more beneficial and quicker than conventional treatments. SAMe is a methyl donor and plays a role in monoamine metabolism, membrane function and neurotransmission. SAMe is a naturally-occurring physiological agent in the human body that forms an integral part of the methylation cycle. It is formed in the body through the combination of the amino acid methionine and adenosine triphosphate (ATP). This compound was first isolated in Italy in 1952 and is now a prescription drug in much of Europe, most commonly it seems, as an anti-depressant. Dosage: 400mg-1200mg per day

**L-Tyrosine**

Tyrosine is a precursor to norepinephrine, the level of which has been found to be deficient in depressed patients. It is possible to increase norepinephrine synthesis through supplementation with L-tyrosine. This is due to one of the enzymes involved in the conversion of tyrosine to norepinephrine being only 75% saturated under normal conditions. Patients who recovered from depression after supplementing with L-tyrosine were found to have increased plasma tyrosine levels than those patients who did not supplement with L-tyrosine. Dosage: 500mg-1000mg per day
Adjunct Therapies for Depression

Sleep

Depression is often characterized by sleep disturbances that precede the onset or recurrence of depression. The following strategies will improve the quality and consistency of sleep in depressed individuals:

- Create a sleep environment that involves eliminating bright lights beginning 1 hour before bed. This includes any bright lights, computers, televisions and street lights. Keep the lights very dim in the bedroom. Blackout blinds may need to be utilized.

- Create a night time ritual. Each evening at a specific set time the lights should be dimmed, a cup of relaxation tea (chamomile, lavender, lemon balm, passionflower, catnip, spearmint) can be steeped and sipped along with a relaxation aromatherapy bath (lavender, geranium, chamomile, orange, frankincense, and ylang ylang).

- Go to bed before midnight. Research has shown that going to bed at the same time every night establishes a better quality sleep routine. Additionally, melatonin release begins around 10pm for adults. Therefore, being in bed around that time will allow for adequate secretion of this sleep inducing hormone.

- Ensure that blood sugar levels are balanced. Some patients require a small amount of protein and carbohydrates in order to maintain balanced blood sugar levels throughout the night.

- Avoid alcohol before bed. Studies have shown that consuming alcohol before bed will actually interrupt the sleep cycle. Alcohol consumed at bedtime, after an initial stimulating effect, may decrease the time required to fall asleep. Because of alcohol’s sedating effect, many people with insomnia consume alcohol to promote sleep. However, alcohol consumed within an hour of
bedtime appears to disrupt the second half of the sleep period.\textsuperscript{104} The subject may sleep fitfully during the second half of sleep, awakening from dreams and returning to sleep with difficulty. With continued consumption just before bedtime, alcohol's sleep-inducing effect may decrease, while its disruptive effects continue or increase.\textsuperscript{105} This sleep disruption may lead to daytime fatigue and sleepiness.

\textbf{Exercise for Depression}

There is a great deal of recent scientific evidence demonstrating that regular physical activity leads to significant symptom reduction. Consistent findings show that aerobic exercise, such as brisk walking, for at least 30 minutes 3-5 times a week at 60-80\% of one's maximum heart rate results in improved mood in people with depression or anxiety disorder.

Exercise can help to relieve stress, tension, and anxiety. By expelling your excess negative emotions and adrenaline through physical activity, you can enter a more relaxed, calm state of being from which to deal with the issues and conflicts that are causing your anxiety. Exercise is one of the most important coping mechanisms to combat anxiety and stress.

Exactly how exercise helps in relaxation and stress management is not clear. The benefits of exercise can come from many factors: the decision to take up exercise, the symbolic meaning of the activity, the distraction from worries, the acquisition of mastery over a sport, the effects on self-image and the biochemical and physiological changes that accompany the activity.

Exercise increases blood flow to the brain, releases hormones, stimulates the nervous system, and increases levels of morphine-like substances found in the body (such as beta-endorphin) that can have a

\textsuperscript{105} Vitiello, M.V. Sleep, alcohol and alcohol abuse. Addict Biol (2):151-158, 1997
positive effect on mood. Exercise may trigger a neurophysiological high that produces an anti-depressant effect in some, an anti-anxiety effect in others, and a general sense of "feeling better" in most.

Exercise is only a short-term fix for anxiety. The relaxation induced by the exercise lasts for only four hours or so. The anxiety returns to its previous level within 24 hours after a workout. So if you are suffering from chronic anxiety, you will have to exercise every day to see an effect. If you become anxious during the day such as the case if you experience job stress, you may want to exercise first thing in the morning. On the other hand, if you suffer from insomnia, you may want to exercise in the late afternoon. (Note: Exercising too late in the day may make it difficult for you to fall asleep.)

Studies are inconclusive when looking at whether you need a vigorous exercise to reduce anxiety. Some studies suggest that exercise should be fairly intense, but not exhausting, to best elicit the tranquilizer effect of exercise. Other researchers have found that light exercise such as walking or swimming decreases anxiety just as effectively as vigorous jogging. Exercises such as golf, tennis, handball, biking, and other sports have shown to help people relax. Choose an exercise (the type and the level of exercise) that work best for you.

Case History- Depression

Sandy is a 46 year old female who presented with severe peri-menopausal night sweats which were interrupting her sleep. Sandy had been experiencing night sweats for many years but they had gotten progressively worse in the past four months. Sandy also expressed her deep desire to come off the anti-depressants that she had been on for 12 years. Her depression was also increasing over the past four months and she was also experiencing fatigue and irritability.
Sandy’s menstrual cycle was becoming erratic in timing and in flow. She was experiencing heavier flow, shorter cycles of 21 days instead of 28 days and increasing PMS symptoms.

Sandy’s typical dietary habits included coffee, very few fresh fruits and vegetables and high amounts of animal protein as well as a nightly glass of wine.

Sandy’s medical doctor had tested Sandy’s thyroid as well as FSH and LH levels the previous week all of which were normal.

**Medications:**

- Wellbutrin 300mg per day for 12 years

**Lab testing:**

- Elisa Multi food IgG allergy testing which revealed the following allergies: egg (white and yolk), dairy, walnuts, sesame and scallops

**Management Plan**

Sandy was administered the following natural medicine therapies:

- Peri-menopausal support: Black cohosh and Vitex- 3 caps per day
- Estrogen detoxification: DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylNaringenin) 2 caps with breakfast
- Liver cleansing: a low allergy-potential, powdered medical food that provides a combination of protein, natural phytoestrogens, antioxidants and fiber- 2 scoops 2 times per day for 4 weeks
• Modified Mediterranean Lifestyle Nutrition Plan to balance hormones (See Specific Guidelines for Nutritional Lifestyle Management in Weight Gain Section)

• Decrease or avoid alcohol and caffeine

Sandy returned for a follow-up 4 weeks later and reported that she had experienced much improvement in her symptoms. She had a few night sweats but only 1 or 2 per night compared to hourly and this meant she was sleeping much better. Sandy also reported that she had increased energy and much less PMS symptoms with only 1 reported challenging day. Sandy also revealed that she had decided to go off the Welbutrin “cold turkey” shortly after her first visit. She was not experiencing any withdrawal effects but was concerned about her ability to remain happy on a long-term basis.

The following changes were made to Sandy’s protocol:

• Continue with Perimenopausal support and Estrogen detoxification

• Mood stabilizing agent: 5-HTP, St John’s wort, B3, B5, B6 1 cap 3 times per day

• Methylcobalamin to increase energy levels 1g per day sublingually

Sandy reported back 4 weeks later and stated that she was feeling “stable” with her moods although she was still nervous about the depression returning. She was having little or no night sweats and her energy was mostly improved although she did note the odd day of lower energy. She was struggling with nutrition because she has no interest in cooking and has no knowledge of what to cook. Sandy did also state that she had resumed her gym membership and was working out 4 to 5 times per week and was feeling very proud of herself.

The following changes were made to Sandy’s protocol:

• Finish estrogen detoxification
• Continue with Perimenopausal support

• Increase the mood stabilizing support up to 2 caps 2 times per day

• Liquid Vitamin D3 5000iu per day

• Premenstrual formula to be taken 10 days prior to the onset of menstruation: Vitamin C, B5, B6, Magnesium, Choline, Taurine, Bupleurum, Peony root, Don Quai, Ginger, Licorice root and mint leaf 3 tablets 10 days before the onset of menstruation

• Recommended to purchase a membership to www.eatcleanmenus.com which is a clean eating menu planning website service

Sandy reported back 8 weeks later and stated that her mood was completely stable, her energy was restored, sleep was no longer an issue and there were no night sweats to report. Sandy also stated that she was enjoying cooking with the help of the menu planning membership and found that her whole family was thrilled that she had taken an interest in cooking.
Adrenal Fatigue

The first documented account of adrenal fatigue was in the 1800’s in the medical textbooks and it was listed as a clinical condition. Throughout early history, it was one of the most prevalent conditions commonly affecting the majority of adults. Conventional physicians were not kept abreast of the seriousness of adrenal fatigue despite the fact that there were very effective diagnostic tools and treatment protocols available. Over the past 50 years, adrenal fatigue has very seldom been diagnosed by conventional practitioners and has often dismissed and treated with anti-depressants along with the recommendation to “relax”. Treatments such as these can cause the condition to progress into a complete demise of health for the patient as the natural progression of this pathology takes its course. Even today, adrenal fatigue is not an acknowledged medical condition by mainstream physicians although some forward thinking doctors are now recognizing not only the prevalence but also the significance of this condition.

The adrenal glands are comprised of two small glands which are the size of a large grape located on top of the kidneys. The main function of the adrenal glands is to provide stress coping and survival responses. Each adrenal gland is made up of two parts or cortexes. The inner medulla modulates the sympathetic nervous system through secretion and regulation of two hormones, called epinephrine (adrenalin) and norepinephrine (noradrenalin), which are responsible for the fight or flight response. The outer adrenal cortex comprises 80% of the adrenal gland and is responsible for producing over 50 different types of hormones in three major classes – mineralocorticoids, androgens and glucocorticoids. The main glucocorticoid hormone is cortisol which is produced in response to stress and is considered to be the primary “stress hormone” in the body. Cortisol is a life sustaining adrenal hormone essential to
the maintenance of homeostasis. It influences, regulates or modulates many of the changes that occur in the body in response to stress, including, but not limited to:

- Blood sugar (glucose) levels
- Fat, protein and carbohydrate metabolism to maintain blood glucose (gluconeogenesis)
- Immune responses
- Anti-inflammatory actions
- Blood pressure
- Heart and blood vessel tone and contraction
- Central nervous system activation

Higher and more prolonged levels of circulating cortisol (like those associated with chronic stress) have been shown to have negative effects, such as:106

- Impaired cognitive performance
- Dampened thyroid function
- Blood sugar imbalances, such as hyperglycemia
- Decreased bone density
- Sleep disruption
- Decreased muscle mass
- Elevated blood pressure
- Lowered immune function
- Slow wound healing
- Increased abdominal fat, which has a stronger correlation to certain health problems than fat deposited in other areas of the body. Some of the health problems associated with increased

stomach fat are heart attacks, strokes, higher levels of “bad” cholesterol (LDL) and lower levels of “good” cholesterol (HDL), which can lead to other health problems.

**Chronically lower levels of circulating cortisol (as in adrenal fatigue) have been associated with negative effects such as:**

- Brain fog, cloudy-headedness and mild depression
- Low thyroid function
- Blood sugar imbalances, such as hypoglycemia
- Fatigue – especially morning and mid-afternoon fatigue
- Sleep disruption
- Low blood pressure
- Lowered immune function
- Inflammation

Aldosterone is the primary mineralcorticoid hormone that is responsible for modulating the cellular mineral balance, especially sodium and potassium. Consequently aldosterone plays a pivotal role in regulating blood pressure and the fluid in the body. Stress causes an increase in the secretion of aldosterone which can lead to sodium retention (contributing to water retention and high blood pressure) and the loss of potassium and magnesium in the early stages of adrenal fatigue.

The adrenal cortex is also responsible for producing small amounts of the androgens or sex hormones. DHEA (dehydroepiandrosterone) however is produced in large amounts from the adrenal cortex and is the precursor to many of the adrenal hormones.

Pregnenolone is one of the most important intermediate hormones being produced in the hormonal cascade. Pregnenolone leads to the production of progesterone and is one of the intermediary steps in
the making of cortisol and aldosterone. Prolonged deficiencies in pregnenolone, which are found in
adrenal fatigue, will lead to the reduction of both glucocorticosteroids and mineralocorticoids such as
cortisol and aldosterone respectively.

The adrenal glands are controlled via the hypothalamus-pituitary-adrenal (HPA) axis and are closely
linked with the nervous system. The brain perceives stress and then responds by secreting corticotropin-
releasing hormone (CRH) from the hypothalamus in the brain. The release of CRH causes stimulation of
the pituitary gland to secrete adrenocorticotropic hormone (ACTH) which travels to the adrenal glands
to stimulate cortisol production. Cortisol levels follow a rhythmic fashion throughout the day with
healthy levels being highest in the morning and increasingly lower levels as the day progresses. The
following chart represents a normal diurnal cortisol rhythm:
Symptoms Associated with Adrenal Fatigue

- Always feeling cold
- Anxiety; fearfulness
- Chronic low-grade infections
- Frequent influenza
- Decreased sex drive
- Night sweats
- Needing to go to the bathroom at night
- Depression
- Environmental sensitivities
- Fibromyalgia
- Arthritis
- Headaches
- Hypoglycemia
- Inability to focus or concentrate
- Increased allergies
- Insomnia
- Light-headedness
- Lower back pain in kidney area and sacrum
- Low blood pressure
- Muscular weakness
- Poor memory
- Scanty perspiration
• Sensitivity to light, noise, touch, movement
• Total feeling of exhaustion
• Weight gain or loss
• Feeling overwhelmed by little things
• Nausea
• Lightheaded when rising from a horizontal position
• Lack of energy in the mornings and in the afternoon between 3 to 5 pm
• Feel better suddenly for a brief period after a meal
• Often feel tired from 9 - 10 pm, but resist going to bed
• Need coffee or stimulants to get going in the morning
• Cravings for salty, fatty, and high protein food such as meat and cheese
• Increased symptoms of PMS for women; periods are heavy and then stop, or are almost stopped on the 4th day, only to start flowing again on the 5th or 6th day
• Pain in the upper back or neck with no apparent reason
• Feels better when stress is relieved, such as on a vacation
• Difficulties in getting up in the morning

The “father” of stress research, Hans Selye, developed the classic model for adaptation to stress. His research in rats revealed that in any source of external biological stress, an organism would respond with a predictable biological pattern in an attempt to restore its internal homeostasis. He termed this predictable pattern the “general adaptation syndrome”.

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Three stages of the general adaptation syndrome include:

1. **Alarm Stage**: In the Alarm stage, bursts of the hormones cortisol and adrenaline are released in response to a stressor, resulting in the traditional “fight or flight” responses.

2. **Resistance Stage**: In the resistance stage, the body uses high cortisol levels to free up stored energy that helps the body physically resist the stressor. It is now known that a prolonged resistance stage may increase the risk of developing stress related diseases. If cortisol levels remain elevated, symptoms may include feeling tired but wired, having difficulty sleeping, weight gain around the waist, high blood pressure, hair loss, muscle mass loss and anxiety. Excess cortisol also interferes with the action of other hormones like progesterone, testosterone and thyroid which further creates more imbalances and increasing symptoms.

3. **Exhaustion Stage**: At this stage, the adrenals are either depleted from producing too much cortisol or are reacting to the detrimental effects of high cortisol. This reduces the cortisol production significantly. Symptoms of low cortisol include fatigue (especially morning fatigue), increased susceptibility to infections, decreased recovery from exercise, allergies, and low blood sugar, a burned out feeling, depression and low sex drive.

**Causes of Adrenal Fatigue**

In western society chronic stress is very common and seemingly accepted and “normal”. The most common causes of chronic stress are work pressure, career change, death of a loved one, moving homes, illness and marital disruption. Adrenal fatigue occurs when the amount of stress overextends the capacity of the body to compensate and recover.
Stressors that can lead to Adrenal Fatigue include:\textsuperscript{107}

- Anger
- Chronic fatigue
- Chronic illness
- Chronic infection - An extremely commonly overlooked cause of adrenal fatigue is chronic or severe infection that gives rise to an inflammatory response. Such infection can occur sub-clinically with no obvious signs at all. Parasitic and bacterial infections including Giardia and H. pylori are often the main causes.
- Chronic pain
- Depression
- Excessive exercise
- Fear and guilt
- Gluten intolerance
- Low blood sugar
- Mal-absorption
- Mal-digestion

\textsuperscript{107} Adrenal Fatigue By: Michael Lam, MD, MPH www.DrLam.com
• Toxic exposure

• Severe or chronic stress

• Surgery

• Late hours

• Sleep deprivation

• Excessive exercise

• Excessive sugar in diet

• Excessive caffeine intake from coffee and tea

• Chronically infected root canal
The following questionnaire is a key diagnostic tool used to evaluate the involvement of adrenal gland function in any disease state and is also used to aid in the diagnosis of adrenal fatigue. The questionnaire should be used in conjunction with specific laboratory testing to determine a definitive diagnosis of adrenal fatigue.

**Adrenal Health Questionnaire**

Read each statement and decide its degree of severity based on the severity ranking system below.

0= Never

1= Occasionally (1-4 times per month)

2= Moderate in severity and occurs moderately frequently (1-4 times per week)

3= Intense in severity and occurs frequently (more than 4 times per week)

1. I get dizzy or see spots when standing up rapidly from a sitting or lying position.
2. I urinate more frequently than others and may need to get up at night.
3. I feel as though I might faint or black out.
4. I have chronic fatigue.
5. I have mitral valve prolapse or get heart palpitations.
6. I often have to force myself in order to keep going.
7. I have difficulty getting up in the morning.
8. I have low energy before the noon meal (approximately 11am).
9. I have low energy in the late afternoon between 3-5pm.
10. I usually feel better after 6pm.

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11. I often feel best late at night because I get a ‘second wind’.
12. I have trouble getting to sleep.
13. I tend to wake early (approximately 3-5am) and have trouble getting back to sleep.
14. I have vague feelings of being generally unwell for no apparent reason.
15. I get swelling in the extremities, such as the ankles.
16. I need to rest after times of mental, physical or emotional stress.
17. I feel more tired after exercise or being physical, either soon after or the next day.
18. My muscles feel weak and heavy more that I think they should.
19. I have chronic tenderness in my back area near the bottom of my rib cage.
20. I have a weak back and/or weak knees.
21. I have restless extremities.
22. I am allergic to many things, such as foods, animals and pollens.
23. My allergies are getting worse.
24. I get bags or dark circles under my eyes which may be worse in the morning.
25. I have multiple chemical sensitivities.
26. I have asthma or get regular bouts of bronchitis, pneumonia, or other respiratory infections.
27. I have dermatographism (a white line appears on my skin if I run my fingernail over it and the line persists for one minute).
28. I have an area of pale skin around my lips.
29. The skin on the palms of my hands and soles of my feet tend to be red/orange in color.
30. I tend to have dry skin.
31. I tend to get headaches, a sore neck and shoulders.
32. I am sensitive to bright light.
33. I frequently feel colder than others around me.
34. I have decreased tolerance to cold.

35. I have Raynaud’s syndrome (extremely cold hands/feet).

36. My temperature tends to be below normal when measured with a thermometer.

37. My temperature tends to fluctuate during the day.

38. I have low blood pressure.

39. I become hungry, confused, or shaky if I miss a meal.

40. I crave sugar, sweets or desserts.

41. I use stimulants, such as tea or coffee to get started in the morning.

42. I crave food high in fat and feel better with high-fat foods.

43. I need caffeine (chocolate, tea, coffee, colas) to get me through the day.

44. I often crave salt and/or foods high in salt, such as potato chips.

45. I feel worse if I eat sweets and no protein for breakfast.

46. I do not eat regular meals.

47. I eat fast-foods often.

48. I sensitive to pharmaceutical or nutritional supplements.

49. I have taken steroid medications for a long term or at a high dose.

50. I have symptoms that improve after I eat.

51. I tend to be thin and find it difficult to put weight on.

52. I have feelings of hopelessness and despair or have been diagnosed with depression.

53. I lack motivation because I do not feel I have the energy to get things done.

54. I have decreased tolerance towards other people and tend to get irritated by them.

55. I get more than two colds per year.

56. It takes me a long time to recover from illness.

57. I get rashes, dermatitis, eczema, psoriasis, or other skin conditions.
58. I have an autoimmune disease.
59. I have fibromyalgia.
60. I have had mononucleosis or been diagnosed with Epstein Barr virus.
61. I do not exercise regularly.
62. I have a history of large amounts of stress in my life.
63. I tend to be perfectionist.
64. My health is negatively affected by stress.
65. I tend to avoid stressful situations for the sake of my health.
66. I am less productive at work that I used to be.
67. My ability to focus mentally is generally impaired.
68. Stressful situations hinder my ability to focus.
69. Stress causes me to become overly anxious.
70. I startle easily.
71. It can take me days or weeks to recover from a stressful event.
72. I tend to get digestive disturbances when tense.
73. I tend to get unexplained fears and phobias.
74. My sex drive is very low or non-existent.
75. My relationships at work and or home tend to be strained.
76. My life contains insufficient time for fun and enjoyable activities.
77. I have little control over my life and I feel “stuck”.
78. I tend to get addicted easily to drugs, alcohol or foods.
79. I suffer from post-traumatic distress disorder.
80. I have or have had an eating disorder.
81. I have gum disease and or tooth infections or abscesses.
82. I have symptoms of premenstrual syndrome (PMS)- *for women only*

83. My periods are irregular and or affected by stress- *for women only*

**Interpretation:**

Total score:

Under 40: very slight or no adrenal fatigue

41-80: mild adrenal fatigue

81-120: moderate adrenal fatigue

Above 120: severe adrenal fatigue

The following are three additional tests that can be performed in order to further determine the function or lack of function of the adrenal glands:

**ADRENAL FUNCTION TEST #1-Postural Hypotension:**

Postural hypotension (also known as orthostatic hypotension) is a drop in blood pressure that occurs upon rising from a horizontal position. It is commonly expressed as a feeling of dizziness or lightheadedness, a "head rush", or "standing up too fast".

To do this test, a blood pressure cuff is required. Lie down and rest for 5 minutes. Take a blood pressure reading while still horizontal. Then, stand up and take another reading.

Normally, healthy blood pressure readings should rise 10-20 points. If it drops, particularly by 10 points or more, hypoadrenia is indicated. Generally, the bigger the drop, the greater the adrenal insufficiency.
ADRENAL FUNCTION TEST #2-Iris Contraction Test

For this test, a weak flashlight or penlight and a mirror are both needed. In a dark bathroom or closet, wait a minute for the eyes to adjust to the dark. This will allow the pupils to dilate (open) fully. Then, shine the flashlight into the eyes and watch the reaction of the pupils for at least 30 seconds.

The light should cause the iris to contract, making the pupils (the dark spot in the center of your eye) smaller. Normally, they should stay that way, but if adrenal gland fatigue is occurring, the iris will be weak and will not be able to hold the contraction. It will either waver between being contracted and relaxed, or will contract initially, but then open up after 10-30 seconds.

As with the postural hypotension test, the degree to which you "fail" this test is an indicator of the degree of adrenal insufficiency you are experiencing.

ADRENAL FUNCTION TEST #3-Sergent's Adrenal White Line

With the fingernail or the dull end of a spoon, draw a line across the belly. In moderate to severe cases of adrenal fatigue, the line will stay white, and even get wider over the course of time. The "normal" reaction would be for the line to almost immediately turn red.

This test has historically been used to indicate severe adrenal fatigue and Addison's disease. Milder cases of adrenal fatigue may not exhibit this sign.

The following lab tests will confirm a definitive diagnosis of adrenal fatigue. The ELISA test is included to determine if any food allergies are present. Eliminating positive allergens will improve adrenal function and remove a major body burden.
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<th>Specific Lab Test</th>
<th>Description</th>
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<tr>
<td>ELISA/EIA Food Allergy Testing</td>
<td>This is based on the findings that certain subclasses of IgG have been associated with the in vitro degranulation of basophils and mast cells, the activation of the complement cascade, (both of which are important mechanisms in allergy and anaphylaxis) and the observation that high circulating serum concentrations of some IgG subtypes have been measured in certain atopic individuals. The premise behind this testing is that high circulating levels of IgG antibodies are correlated with clinical food allergy signs and symptoms. The ELISA/EIA test itself involves coating a 96 well plate with food antigens, adding a patient's sera and looking for a classic antigen/antibody interaction.</td>
</tr>
<tr>
<td>Adrenal Stress Index</td>
<td>The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation.</td>
</tr>
</tbody>
</table>
The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions.

The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.
Interpretation of The Adrenal Stress Index Test for DHEA and Cortisol Levels

Levels of DHEA and cortisol vary according to the level of stress and for how long that stress has been applied. Increasing cortisol production is the normal response to stress and is highly desirable, so long as the stress is removed and the adrenal glands can recover.

On-going, unremitting stress means the adrenal gland and the whole body is in a constant state of alert and does not get time to recover, and eventually functionally fails. Therefore there are several stages of adrenal function gradually leading to failure:

1. **Normal levels of cortisol and normal DHEA.** Normal result. Normal adrenal gland.
2. **Raised cortisol, normal DHEA.** This indicates a normal short term response to stress.
3. **Raised cortisol and raised DHEA.** The adrenal gland is functioning normally but the patient is chronically stressed. So long as the stress is removed, the adrenal gland will recover completely.
4. **High levels of cortisol, low levels of DHEA.** The body cannot make enough DHEA to balance cortisol. This is the first sign of adrenal exhaustion. This is the first abnormal response to chronic stress. The patient needs a long break from whatever that chronic stress may be. The commonest chronic stress is hypoglycemia, but also consider insomnia, mental, physical or emotional overload. DHEA can be supplemented to make the patient feel better but it must be part of a package of recovery without which worsening can be expected.
5. **Cortisol levels low, DHEA levels low.** The gland is so exhausted it can't make cortisol or DHEA. By this time patients are usually severely fatigued.
6. **Cortisol levels low, DHEA borderline or normal.** This probably represents the gland beginning to recover after a long rest. DHEA may be used to help patients feel better while they continue their program of rest and rehabilitation.

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Note:

In Addison's disease, there is complete failure of the adrenal gland not because of chronic stress but because of autoimmunity. This is a life threatening disorder and the patient is severely ill. The main clinical symptom is severe postural hypotension (dizziness when rising to an upright position) and chronic hypoglycemia.

Addison's disease is tested for by a short synacthen test in which cortisol levels are measured before and after an adrenal gland stimulant ACTH. Many patients with Chronic Fatigue Syndrome are given this test, which is found to be normal resulting in the patient being told their adrenal gland is fine and no action is required. The problem with this test is that it only shows where the adrenal gland is completely non-functioning. It does not diagnose partial adrenal failure or adrenal stress and no measurements of DHEA are made. This makes it potentially misleading.

**Nutritional Factors Affecting Adrenal Fatigue**

During adrenal fatigue the cells of the body are responding to stress by speeding up the cellular metabolism and subsequently burning precious nutrients at a much higher pace. Very quickly the cells of the body have used up much of the body's supply of stored nutrients and deficiencies may ensue further exacerbating the issues. Nutrition becomes a critical part of the healing and a diet abundant in good quality food is crucial. In addition, not only is the quality of the food important but also the timing in which it is consumed. The adrenal hormone cortisol aids in maintaining balanced blood sugar levels to meet the body's constant demand for energy. During adrenal fatigue, cortisol levels drop lower than normal making it very difficult to maintain balanced blood sugar levels. As a result hypoglycemia (low blood sugar) often accompanies adrenal fatigue.
Eating Patterns

- It is crucial to eat before 10am to replenish glycogen (stored blood sugar) levels.
- Eat lunch early between 11am-11:30am as the body quickly uses up the nutrients from the morning meal.
- Have a nutritious snack between 2pm-3pm in order to prevent the typical hypoglycemic tendencies that occur between 3pm-4pm.
- Dinner should be eaten between 5pm-6pm.
- Just before bed, a small snack may be required to prevent panic attacks, sleep disturbances and anxiety reactions throughout the night.

Foods to Consume

- Combine a fat, protein and carbohydrate at every meal and snack.
- The diet should consist of 30-40% vegetables (50% should be raw or lightly cooked); 30-40% whole grains (brown rice, millet, barley, oats, quinoa, amaranth and buckwheat); 10-20% animal proteins (wild fish, organic poultry, wild game); 10-15% beans, seeds (raw only) and nuts (raw only) and 5-10% fruits.
- Celtic Sea Salt can be added to foods in moderation to improve adrenal function.
- Add 1-2 tablespoons of essential oils into grains, vegetables and proteins daily.

Foods to Avoid

- Refined sugar including cakes, pies, doughnuts, cookies and other foods containing white flour, sugar and chocolate.
- Avoid stimulating beverages such as coffee, colas, black tea, hot chocolate and alcohol.
• Avoid eating fruit in the morning (the naturally occurring fructose in the fruit will cause a spike in blood sugar and an eventual drop which is exacerbated in the morning).

• Avoid processed foods that rob the cells of the body of the critical energy needed to heal. In addition, processed foods put extra stress on the liver which is often already sluggish in adrenal fatigue.

**Herbal Medicine Indicated for Adrenal Fatigue**

There is a class of herbs known as “adaptogens”. An herb classified as an adaptogen has the unique ability to aid in the body’s response system to stress. These herbs allow the body to better adapt to stress and provide a buffering or balancing action that counteracts an exaggerated adrenal response to stress. Adaptogens affect both the adrenal gland function directly as well as the HPA axis (Hypothalamus-pituitary-adrenal axis). There are 6 main herbs that fall into this category:

**Licorice Root (**Glycyrrhiza glabra**)**

Licorice is the one of the most well-known adaptogenic herbs with use dating back thousands of years. The action of licorice comes from the triterpenes, glycyrrhizin and its aglycone component glycyrrhetinic acid. The triterpenes are metabolized to a similar structure as the adrenal cortical hormones which may be responsible for its anti-inflammatory action. Glycerrhizin inhibits liver damage and increases antibody production through a stimulation of interleukin. Glycyrrhetinic acid has also been shown to be similar in structure to corticosteroids and therefore have adrenocorticomimetic actions. Research has shown that licorice can increase cortisol levels and help to resolve issues with low

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blood pressure. Through its effects on the kidneys, it also improves the body’s ability to retain sodium and magnesium and subsequently reduces issues with frequent urination.

There has been much research on the concern that Licorice can increase blood pressure. This is due to the fact that Licorice blocks the conversion of cortisol into cortisone which can produce higher amounts of circulating cortisol. Most patients with adrenal fatigue typically have low blood pressure but simple monitoring of blood pressures levels will allow for the successful and safe administration of Licorice Root.

**Ashwagandha Root (Withania somnifera)**

Ashwagandha is an ancient Indian herb with therapeutic actions dating back to at least 1000 BC. Ashwagandha is commonly called Indian Ginseng, although it is not related to any species of ginseng, it does however have similar therapeutic effects. Traditionally Ashwagandha has been prescribed in the healing of a wide variety of illnesses and been touted as a tonic for weakness and to restore strength and vigor. Research has shown that Ashwagandha can influence hormone activity by providing support to the HPA axis function. As an adaptogen, it also aids in the adaptability to both physical and chemical stress by increasing catecholamine production. More than 35 active constituents have been identified in Ashwagandha but it is the alkaloids and steroidal lactones that are responsible for many of its effects.

Ashwagandha studies have shown that the they plant protects against the physical ravages of stress, preventing adrenal mass increase and increasing vitamin C depletion. In addition, stress induced increases of both blood urea nitrogen and lactic acid were avoided.

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**Rhodiola (Rhodiola rosea/Rhodiola crenulata)**

Rhodiola comes from the mountainous regions of Siberia. It is thought to strengthen the nervous system, fight depression, enhance immunity, elevate the capacity for exercise, enhance memory, aid weight reduction, increase sexual function and improve energy levels. It has long been known as a potent adaptogen. Since Rhodiola rosea administration appears to impact central monoamine levels, it might also provide benefits and be the adaptogen of choice in clinical conditions characterized by an imbalance of central nervous system monoamines.

There have also been claims that this plant has great utility as a therapy in asthenic conditions (decline in work performance, sleep disturbances, poor appetite, irritability, hypertension, headaches, and fatigue) developing subsequent to intense physical or intellectual strain, influenza and other viral exposures, and other illness. Two randomized, double-blind, placebo-controlled trials of the standardized extract of Rhodiola rosea root provide a degree of support for these claimed adaptogenic properties.114

**Siberian Ginseng Root (Eleutherococcus senticosus)**

Siberian ginseng first became medically recognized for its therapeutic benefits in the 1950’s and 1960’s when Dr Brekham studied the attributes of this herb. Eleutherosides have been found to be the main active constituent in Siberian ginseng. Other active constituents include the anti-cancer, anti-inflammatory and anti-hyperglycemic properties of Beta-sitosterol. In addition, the lignans that are produced in this herb are responsible for the immunostimulating effects of this herb. The Eleutherosides were found to have specific binding affinity to adrenal receptor sites, including glucorticoid,

mineralcorticoid and progestin receptors. Siberian ginseng is typically useful in states of exhaustion as it is considered to be one of the more stimulating adaptogens and is also useful in depression and debility.

Siberian ginseng has a wide range of therapeutic benefits including rejuvenating adrenal function, increasing resistance to all forms of stress, normalizing metabolism, regulating neurotransmitters and counteracting mental fatigue.

**Schisandra (Schisandra chinensis)**

Schisandra has been traditionally used to promote energy, alleviate exhaustion and immune system disturbances caused by stress. Schisandra has also been taken to strengthen the sex organs and promote mental function. The herb counteracts testosterone induced atrophy of the adrenal glands in animal studies. Ingestion of the fruit of Schisandra has been shown to increase adrenal and spleen function in animals.

As many as 30 lignans have been identified in Schisandra which are responsible for increasing metabolism of deoxycholic acid which is a risk factor for hepatocarcinogenesis. For this reason Schisandra is used in cases of poor liver function, hepatitis and liver cancer. Due to the fact that it increases the secretion of sexual fluids in both males and females, it is useful in cases of low libido. In addition Schisandra balances fluid and relieves urinary frequency as it tones and strengthens kidney function. It is also useful in cases of excessive thirst and night sweats. It is also used in cases of insomnia as it acts to quiet the spirit and calm the heart. Mental illness, memory lapse and irritability also improve significantly with the use of Schisandra. It is considered as a deep immune activator.
Specific Nutrients in the Treatment of Adrenal Fatigue

Vitamin C

Vitamin C is also known as ascorbic acid and is the primary vitamin for adrenal gland function. With increasing levels of cortisol, the need for vitamin C rises. Vitamin C is critical to the manufacture of adrenal steroid hormones and the homeostasis of the adrenal hormone cascade. Vitamin C is used along the entire adrenal pathway and has antioxidant functions within the adrenal cortex.

Naturally occurring vitamin C always occurs with bioflavonoids. The addition of bioflavonoids to supplemental ascorbic acid more than doubles the effectiveness of the vitamin C. Bioflavonoids are essential if ascorbic acid is to be fully metabolized and utilized by the cells of the body. The best found ratio is 1:2- bioflavonoids to ascorbic acid.

Vitamin C is a water-soluble vitamin and is therefore utilized and excreted by the body very quickly. Therefore doses should be administered several times throughout the day. Individual dosing needs can be determined through a bowel tolerance functional test. Start by taking 1000mg of vitamin C (this should include 500mg of bioflavonoids) and continue this dose every hour until bowel movements become watery. Decrease the dose by 1000mg and continue with that level each day in divided doses.

Vitamin B-Complex

As co-enzymes, the B vitamins are essential components in most major metabolic reactions. They play an important role in energy production, including the metabolism of lipids, carbohydrates, and proteins. B vitamins are also important for blood cells, hormones, adrenal gland and nervous system function. As water-soluble substances, B vitamins are not generally stored in the body in any appreciable amounts.
(with the exception of vitamin B-12). Therefore, the body needs an adequate supply of B vitamins on a daily basis. Dosage: 100 mg-200mg per day with food

**Vitamin B5 (Pantothenic Acid)**

Vitamin B5 is essential for healthy adrenal and immune function. In particular, B5 serves as the starting material for the synthesis of coenzyme A, which acts as the carrier of acyl groups in oxidation, acetylation, and decarboxylation reactions and it is instrumental in the synthesis of fatty acids and adrenal hormones. Thus B5 is important for energy production as acetyl CoA is converted from B5 and is crucial for the conversion of glucose into energy. Dosage: 500mg-1500mg per day with food

**Vitamin B6 (Pyridoxine HCl)**

Vitamin B6 and its bioactive form, pyridoxal 5’-phosphate (P5P), are essential for such processes as amino acid metabolism, neurotransmitter synthesis, and glycogen breakdown. Vitamin B6 is a co-factor in several of the enzymatic pathways in the adrenal cascade. It is also involved in heme synthesis, conversion of tryptophan to niacin and proper metabolism of fatty acids. Due to the fact that the conversion of pyridoxine to P5P occurs in the liver, a compromise in liver function can have deleterious effects on P5P levels in the body, placing one at risk of vitamin B6 deficiency. Recollection of dreams often significantly improves when vitamin B6 deficiency levels are corrected. Dosage: 50-100mg per day with food

**Magnesium**

Adequate magnesium is critical to adrenal gland fatigue recovery. Magnesium is essential to the production of enzymes and the energy necessary for the adrenal hormonal pathway. Magnesium is a mineral that functions as a coenzyme for nerve and muscle function. It is essential for the formation of
bones, regulation of body temperature, energy metabolism and DNA and RNA synthesis. The need for magnesium increases during periods of heightened stress because it is a cofactor for several regulatory enzymes, especially those involved with energy production and nervous system function. Clinical studies have shown that magnesium supplements decrease anxiety and chronic stress. Dosage: 400-600mg per day

**Pregnenolone**

Pregnenolone is the first hormone to be made from cholesterol in the adrenal pathway. It can be converted into several other adrenal hormones including DHEA, sex hormones, aldosterone and cortisol. In advanced cases of adrenal fatigue, it is often required to begin replacing chronically deficient adrenal hormones. Beginning with pregnenolone will allow the body the opportunity to determine which hormones the pregnenolone will be converted into based on specific needs. Often the body naturally converts the pregnenolone into sex hormones which are severely decreased in adrenal fatigue. A specific function of the sex hormones is to act as antioxidants and protect the body from the oxidative damage from high levels of circulating cortisol which is a key factor in rapid aging. Dosage: 20-30mg of the bioidentical cream per day

**DHEA (Dehydroepiandrosterone)**

DHEA levels often become depressed during adrenal fatigue. DHEA is one of the main androgen hormones secreted by the adrenal glands and is the precursor to many of the adrenal sex hormones. It is an important hormone base from which testosterone, progesterone, and corticosterone, either directly or indirectly, can be derived. After age forty, the amount produced in the body starts to decline. Very little is left by age 70. Research indicates that taking DHEA supplements may help to prevent cancer, arterial disease, multiple sclerosis and Alzheimer's disease. DHEA may even be useful in the treatment
of lupus and osteoporosis, may help to improve memory and may enhance the activity of the immune system. DHEA should only be used in extreme cases and the patient should be closely monitored and levels should be tested regularly. Dosage: DHEA for chronic fatigue, 5-25 mg (only if testing shows that levels are low) helps with energy production and the effects of stress.

**Adrenal Cell Extracts**

The action of the adrenal cell extracts is to restore, support and transform adrenal fatigue. It enhances adrenal activity and speeds recovery. Adrenal cell extracts are not replacement hormones but rather contain the essential constituents for adrenal repair including cellular contents such as the nucleic acids RNA and DNA. In addition, cell extracts also contain concentrated nutrients in the form and proportion used by the adrenals to properly function and recover. They contain only minute amounts of the actual hormones in the adrenal gland. The dosage varies depending on individual preparations.

**Phosphorylated Serine (PS)**

PS is of extremely beneficial use in Stage two adrenal dysfunction when cortisol levels are high. PS has the unique ability to decrease circulating cortisol and allows for a dramatic decrease in symptoms such as anxiety and insomnia. It is important to obtain lab testing to determine when to administer PS as it should be taken one hour before cortisol levels are elevated. Dosage 500mg-1000mg one hour before elevated cortisol
Adjunctive Therapies for Adrenal Fatigue

Sleep

Sleep is crucial to full adrenal fatigue recovery. The timing and quality of sleep patterns are inherently involved in the healing process. Although insomnia can be a common symptom of adrenal fatigue, establishing regular sleep patterns will alleviate adrenal fatigue.

- It is important to be in bed by 10:30pm and asleep by 11pm to avoid the pitfall of the second wind commonly experienced by adrenal fatigue patients. Staying up past this time will only further exacerbate the adrenal fatigue.
- The restorative power of sleep between 7-9am should be taken advantage of as time permits to aid in the healing of adrenal fatigue.
- Get enough varied physical exercise during the day.
- Avoid the use of any stimulants such as coffee and other caffeine containing stimulants which can interrupt sleep patterns for several hours.
- Avoid photo stimulation after 8pm but turning off the TV, computer or any other electronic devices.

Case History- Adrenal Fatigue

Cheryl is a 50 year old woman who presented with relentless fatigue. Cheryl stated that the fatigue began as a decrease in motivation 3 years prior. Cheryl also noticed that her sleep had become quite challenging and she was waking frequently throughout the night. Cheryl was still having regular menstrual cycles but she did note that the flow had become heavier in the past year and she was
beginning to experience some night sweats. Cheryl had gained 10 pounds in the previous 4 months with no change to her diet or exercise regime.

Cheryl consumed 1-2 diet sodas per day as well as 5 to 6 alcoholic beverages each weekend and 2-3 cups of coffees per day. She often chose salty foods over fresh foods. She mentioned that she craved salt. She did not consume any fast food and ate at regular intervals throughout the day. Cheryl’s diet diary revealed that she consumed a very large amount of whole grain carbohydrates. Cheryl exercised regularly although she found it very challenging to remain motivated.

**Lab testing:**

- Low morning cortisol levels
- Elevated cortisol levels throughout the day
- Low testosterone levels
- Erratic fluctuations in estrogen levels throughout the month
- Low- normal DHEA

**Management Plan**

Cheryl was administered the following natural medicine therapies:

- Estrogen detoxification: Isoflavones, Turmeric, Rosemary, Resveratrol, B6, B12, Folic acid- 3 times per day
- Adrenal Support: L-Histidine, N-Acetyl-Tyrosine, Rhodiola Rosea- 2 capsules 2 times per day
- Cortisol Management: Ashwagandha, L-theanine, Phosphatidylserine- 1 cap before bed
• Modified Mediterranean Lifestyle Nutrition Plan* to balance hormones

Cheryl reported back 4 weeks later and stated that she had much less daytime fatigue. She also noted that she was going to bed earlier because she was more tired in the evenings. Cheryl had just started noticing an improvement in her sleep about 1 week previously. She was now sleeping 5 hours per night instead of 2 hours. She had improved her nutrition and was no longer consuming aspartame and had dramatically lessened her consumption of both caffeine and alcohol. Cheryl said her biggest improvement was her return of motivation which was thrilling to her. She also took note of some hormonal acne that she was experiencing along her jaw line and had been suffering with this for many years.

The following changes were made to Cheryl’s protocol:

• Continue with the previously mentioned remedies
• Vitex agnus castus fluid extract- 5mls each morning for acne treatment

Cheryl returned 4 weeks later to report that she was feeling much better overall. Her sleep was good most of the time and she had no night sweats to report. Cheryl stated that her motivation was completely back to normal and that she was no longer experiencing fatigue.

Cheryl was recommended to continue with the current protocol.

Cheryl returned 8 weeks later to report that her sleep had become an issue once again. Other than the relentless insomnia, she felt otherwise great and had no issues. Cheryl had lost a total of 15 pounds and she was very happy about this.
The following protocol was administered:

- Discontinue the use of all previous remedies except dietary recommendations
- Neurotransmitter support required for sleep: Vitamin B6, Thera Mix 4 Proprietary Blend (475mg) of: Taurine and 4-amino-3-phenylbutyric acid- 2 caps before bed
- Estrogen support: Isoflavone Complex Herbal Proprietary Blend-Pueraria lobata (Kudzu, root), Red Clover (flowering tops, standardized to 8% isoflavones) and Novasoy™ Isoflavone, Concentrate Black Cohosh, Bacopa monnieri (standardized to 20% bacosides, leaf), Cranberry (fruit), Dong Quai (root), Schisandra (standardized to 0.9% schisandrine, fruit and seeds), Sage (Salvia officinalis leaf), and Hops (aerial parts)- 1 capsule 3 times per day
- Progesterone support: Rehmannia(root), Bupleurum(root), Passion flower(aerial parts), Peony(root), Coleus forskohlii(root, standardized to 10% forskohlin), Dioscorea villosa(root) and chasteberry extract(fruit)- 1 cap 3 times per day

Cheryl returned 8 weeks later and reported that she was feeling fantastic. She was finally able to sleep consistently and she had remained symptom free for the previous 6 weeks. She was recommended to stay on her protocol to support her through menopause.
Thyroid Disorders

Imbalances of the thyroid are connected into many female hormone issues. These can include breast cancer, uterine fibroids, ovarian cysts, endometriosis, infertility, postpartum depression, miscarriage, PMS, amenorrhea and menorrhagia. Hypothyroidism or underactive thyroid is often linked with adrenal fatigue, estrogen dominance and progesterone deficiency. A dysfunctional thyroid can affect almost every aspect of health. It is one of the most under-diagnosed hormonal imbalances of aging, together with estrogen dominance and metabolic syndrome.

More than 10 million Americans have been diagnosed with thyroid disease, and another 13 million people are estimated to have undiagnosed thyroid problems. About 10 percent of the adult population is afflicted with this frequently overlooked disease of epidemic proportions.

The butterfly shaped thyroid gland is located in the neck and covers the anterior surfaces of the second to fourth tracheal rings. Loose tissues in the shape of grape like clusters with many blood vessels make up the thyroid gland. The thyroid depends upon iodine to combine with the amino acid tyrosine to then be converted into the thyroid hormones T3 and T4. T3 is produced in small amounts from the thyroid, but most significantly, it is converted in the liver and kidneys from T4. T4 secretion is controlled by the pituitary secretion of TSH (thyroid stimulating hormone). ¹¹⁵

The thyroid hormone, like other hormones, is regulated by an extensive negative feedback system. The system starts in the hypothalamus of the brain that releases Thyrotropin-releasing Hormone (TRH). TRH signals the pituitary gland to release Thyroid Stimulating Hormone (TSH). TSH in turn instructs the thyroid gland to make thyroid hormones and release them into the bloodstream. When the level of

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thyroid hormone in your body is high, a negative feedback system exists to reduce the production of TSH, and vice-versa. Therefore, a high TSH is indicative of hypothyroidism, while a low TSH can be indicative of hyperthyroidism.\textsuperscript{116}

The following illustration depicts the location of the thyroid gland:\textsuperscript{117}

![Thyroid Gland Diagram]

**Hypothyroidism can be classified into four grades:**

1. Grade 1 is signified by low T3 and low T4
2. Grade 2 has normal T3 and T4 but elevated TSH (above 3.0)
3. Grade 3 has normal T3, T4 and TSH but an aggravated TSH response to TRH challenge

\textsuperscript{116} Michael Lam, MD, MPH www.DrLam.com

\textsuperscript{117} http://www.google.ca/images/thyroid gland
4. Grade 4 has elevated antimicrosomal antibodies and antithyroglobulin antibodies

Hyperthyroidism is a condition in which the thyroid gland makes too much thyroid hormone. The condition is often referred to as an "overactive thyroid." Levels of TSH below 0.3 can indicate hyperthyroidism.

**Symptoms of Thyroid Imbalance**

<table>
<thead>
<tr>
<th>Hypothyroid State</th>
<th>Hyperthyroid State</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Symptoms</td>
<td>General Symptoms</td>
</tr>
<tr>
<td>a.m. underarm temperature lower than 97.8° F</td>
<td>a.m. underarm temperature higher than 98.2° F</td>
</tr>
<tr>
<td>Carpal tunnel syndrome, tendonitis, joint stiffness</td>
<td>Fatigue and weakness</td>
</tr>
<tr>
<td>and swelling, muscle weakness, fibromyalgia,</td>
<td></td>
</tr>
<tr>
<td>muscle and joint pain, increased rheumatoid arthritis</td>
<td></td>
</tr>
<tr>
<td>Puffy face, especially around the eyes, swelling of</td>
<td>Weight loss, increased appetite</td>
</tr>
<tr>
<td>hands and feet, weight gain, difficulty losing weight</td>
<td></td>
</tr>
<tr>
<td>Slower speech, thick tongue, deep, hoarse voice</td>
<td>Hyperactive state, racing thoughts, nervousness</td>
</tr>
<tr>
<td>Feels cold all the time, hard to stay warm</td>
<td>Feels warm most of the time, intolerant to heat</td>
</tr>
<tr>
<td>Frequent or chronic infections, particularly fungal or</td>
<td>Osteoporosis, increased calcium loss in urine</td>
</tr>
<tr>
<td>viral</td>
<td></td>
</tr>
<tr>
<td>Low DHEA, DHEA-S and pregnenolone</td>
<td>High DHEA-S and pregnenolone sulfate</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Hypothyroid State</th>
<th>Hyperthyroid State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reproductive System</td>
<td>Reproductive System</td>
</tr>
<tr>
<td>Low libido</td>
<td>Low or very high libido</td>
</tr>
<tr>
<td>PMS, prolonged heavy period, longer menstrual cycle</td>
<td>Irregular periods, usually more frequent, light menstrual flow</td>
</tr>
<tr>
<td>Failure to ovulate, infertility, easy miscarriage</td>
<td>Infertility</td>
</tr>
<tr>
<td>Premature delivery, stillbirth</td>
<td></td>
</tr>
<tr>
<td>Production of breast milk when not nursing, elevated prolactin</td>
<td></td>
</tr>
<tr>
<td>Decreased sex hormone binding globulin-means more available estrogen, estrogen dominance</td>
<td>Increased sex hormone binding globulin-means less available estrogen</td>
</tr>
<tr>
<td>Severe menopausal symptoms</td>
<td>Increased menopausal symptoms</td>
</tr>
<tr>
<td>Can be increased susceptibility to breast cancer and other cancers</td>
<td>Increased susceptibility to fibrocystic breast disease, breast cancer and other cancers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothyroid State</th>
<th>Hyperthyroid State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular System</td>
<td>Cardiovascular System</td>
</tr>
<tr>
<td>Slow pulse (less than 60 beats per minute)</td>
<td>Fast pulse (more than 100 beats per minute), heart palpitations</td>
</tr>
<tr>
<td>Low blood pressure</td>
<td>High blood pressure (systolic, shortness of breath)</td>
</tr>
<tr>
<td>Sleep apnea</td>
<td>Swollen, red, bulging eyes</td>
</tr>
<tr>
<td>Condition</td>
<td>Effect</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>High cholesterol, high LDL, and triglycerides, low HDL, macrocytic anemia</td>
<td>Reduced platelets causing easy bleeding</td>
</tr>
<tr>
<td>High homocysteine and lipoprotein (a)</td>
<td>Enlarged heart, angina, increased risk of heart disease, increased risk of mitral valve prolapse</td>
</tr>
<tr>
<td></td>
<td>Palpable goiter (swelling) of thyroid gland in throat, atrial fibrillation (fluttering beats), arrhythmia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothyroid State</th>
<th>Hyperthyroid State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hair, Skin and Nails</td>
<td>Hair, Skin and Nails</td>
</tr>
<tr>
<td>Hair is dry, brittle, falling out, loss of lateral 1/3 of eyebrow</td>
<td>Hair loss, thinning, greasiness</td>
</tr>
<tr>
<td>Dry scaly skin, tendency to eczema, psoriasis, no perspiration</td>
<td>Increased perspiration, vitiligo (white patches)</td>
</tr>
<tr>
<td>Yellowing of the skin, especially on the palms</td>
<td>Raised thickened skin over shins</td>
</tr>
<tr>
<td>Thin brittle nails with transverse grooves</td>
<td>Soft nails, easily torn, clubbing of fingertips</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothyroid State</th>
<th>Hyperthyroid State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nervous System, Mental-Emotional Symptoms</td>
<td>Nervous System, Mental-Emotional Symptoms</td>
</tr>
<tr>
<td>Fatigue and muscle weakness, anemia</td>
<td>Over activity, insomnia, eyes sensitive to light</td>
</tr>
<tr>
<td>Depression, memory loss, poor concentration</td>
<td>Confusion, disorganized thinking, depression</td>
</tr>
</tbody>
</table>
Slow thinking, emotional instability, agoraphobia, anxiety, irritability, apathy, dementia | Nervousness, anxiety, panic attacks, irritability, mood swings, paranoia, aggression, psychosis
---|---
Slow reflexes, particularly Achilles tendon reflex | Shakiness and tremor (especially in hands)

<table>
<thead>
<tr>
<th>Hypothyroid State</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal Tract</td>
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</tr>
<tr>
<td>Constipation, frequent headaches</td>
<td>Frequent bowel movements, diarrhea, increased thirst</td>
</tr>
<tr>
<td>Low stomach acid, mineral deficiencies-poor zinc absorption</td>
<td>Increased need for vitamins and minerals; zinc and calcium deficiency</td>
</tr>
</tbody>
</table>

**Causes of Hyperthyroidism**

**There are two major causes of hyperthyroidism:**

- About 95 percent of persons diagnosed with hyperthyroidism are found to have a condition called Graves’ disease.
- Most of the remaining persons have a condition called nodular thyroid disease.
- A less frequent cause is inflammation of the thyroid gland which is called thyroiditis.
- Uncommon causes include hormone producing tumors of the pituitary gland or ovary and iodine- induced hyperthyroidism from iodine-containing drugs.

In Graves' disease the immune system mistakenly directs an immune "attack" against its own healthy cells. Antibodies are manufactured and misdirected against the thyroid gland, mimicking the action of the hormone from the brain (thyroid stimulating hormone) that normally controls the thyroid function.
These antibodies act like a switch put into a permanent "on" position. Thyroid cells are continually stimulated to produce and release thyroid hormone, even after blood levels are already high.

**Causes of Hypothyroidism**

- High or low cortisol, low DHEA
- Estrogen dominance, HRT, BCP
- Progesterone deficiency
- Extreme hormonal fluctuations such as pregnancy, childbirth and menopause
- Increased or prolonged stress
- Sluggish liver
- Iron deficiency anemia
- Nutritional deficiencies (zinc, selenium copper, manganese, magnesium, Vitamins A, B2, B3, B6, B12, C and E
- Iodine deficiency
- Heavy metal toxicity (lead, cadmium and mercury interfere with the conversion of T4 into T3 in the liver)
- Injury to the cervical vertebrae
- Accumulating fluoride levels
- Radiation from x-rays
- Food allergies (gluten, animal protein and dairy)
- Candida overgrowth and bowel toxicity
Lab Testing

Standard laboratory tests have been established for thyroid disease although there are additional hormones that need to be evaluated when examining the many aspects of thyroid imbalances.

The Basal body Temperature test can be used as an indication to the presence of a thyroid disorder. Hormones secreted by the thyroid gland reflect the metabolic rate as the body temperature is examined. This is deemed as the most sensitive thyroid test.

**Basal Body Temperature Test**

1. Shake down the thermometer to below 95°F and place it by your bed before going to bed at night.
2. On waking place the thermometer in the armpit for a full ten minutes. It is important to move as little as possible; lying and resting with closed eyes is best. Do not get up until the 10 minutes has passed
3. After 10 minutes, read and record the temperature and date.
4. Record the temperature for at least three mornings at the same time of day.

A normal temperature is 97.8-98.2°F or 36.6-36.8°C with fluctuations that occur with the menstrual cycle. Menstruating women must perform the test on the 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} days of the menstrual cycle. Post-Menopausal women can perform the tests on any day. If your temperature is consistently lower than this, there may be an indication of hypothyroidism. If the temperature is consistently higher this may be an indication of hyperthyroidism.
| Thyroid Hormone Testing | A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism include feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia. |
| Anemia | Low serum iron, Hematocrit and low blood Hemoglobin levels can predispose a person to extreme fatigue contributing to depression. |
| Adrenal Stress Index | The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a |
multitude of functions.

The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.

<table>
<thead>
<tr>
<th>Complete Female Hormone Panel</th>
<th>Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to</td>
</tr>
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be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.

<table>
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<tr>
<th>Dried Urine - Iodine</th>
<th>Iodine is an essential component of the thyroid hormones T4 and T3, 11. About 90% of iodine consumed from any source (e.g., diet, supplements, medication) is eliminated in urine within 24-48 hours; therefore urine is an excellent source to determine an individual’s iodine status. When urine iodine levels are outside optimal ranges (too low or high), thyroid hormone synthesis can be abnormal. Therefore information about urinary iodine status could provide clues to thyroid dysfunction and the means to correct it.</th>
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Conventional Pharmaceuticals for Hyperthyroidism

- PTU (propylthiouracil) blocks the conversion of T4 to T3
- RAI (radioactive iodine) is the conventional treatment of choice for Graves’ disease and results in non-reversible hypothyroidism
- Surgery is another permanent cure for hyperthyroidism is to surgically remove all or part.
  Surgery is not used as frequently as the other treatments for this disease.

Conventional Pharmaceuticals for Hypothyroidism

- Armour thyroid is used by both conventional and natural medicine practitioners. It is desiccated thyroid from a pig. It contains both T4 and T3 and therefore initiates a better response from many individuals. Dosing with Armour can be arduous which is why many conventional physicians dismiss its usage.
- Levothyroxine (Synthroid, Levothyroid) is the most commonly prescribed drug treatment for hypothyroidism and is a synthetic form of T4. It supresses the function of the thyroid gland and once administered it will often need to be taken for life. One third of all women taking Synthroid still experience hypothyroid symptoms. Many women have difficulty converting T4 into T3 and therefore Synthroid will be of no therapeutic benefit.

Nutritional Factors Affecting Thyroid Disorders

1. Eat nutrient dense food, preferably organic (to avoid pesticides and other chemicals that place additional stress on the body), including plenty of fruit and vegetables, cold water fish.
2. Hypothyroidism: Avoid goitrogens food (esp. raw) – turnips, cabbages, mustard greens, radishes, horseradish, kale, cassava root, soybeans, peanuts, pine nuts, and millet, peaches, pear, spinach,
and turnips. If eaten, make sure they are well cooked (goitrogens reduce thyroid activity by blocking iodine utilization when raw, and cooking inactivate this action).

3. If iodine deficiency is suspected, include kelp, organic/unprocessed sea-salt on diet.

4. Avoid processed and refined foods, especially sugar, white flour, and containing a lot of additives (food dyes, flavoring as MSG, food coloring, especially artificial additives).

5. Include food such as whole grains, green vegetables, lean meat, brown rice that are rich in B vitamins. Some B vitamins (B₂, B₃, and B₆) are needed for production/conversion of thyroid hormones, they also help build resistance to stress, participate in productions of energy, cell proliferation, and the metabolism of fats, proteins, and carbohydrates.

6. Lima beans, tomatoes and salmon are high in potassium and vitamin B5. Potassium can help alleviate symptoms of excess adrenaline (avoiding salt to support the sodium–potassium balance), and Vitamin B5 (considered the anti-stress vitamin) helps with the functioning and production of the adrenal glands hormones.

7. If possible, buy organic products to reduce intake of pesticide residues and other chemicals, and hormones in animal-foods.

8. Hypothyroid: Eat sea vegetables such as kelp, dulse, nori, hiziki, wakami as a source of iodine.

**Herbal Medicine Indicated for Thyroid Disorders**

**Herbal Medicine Indicated for Hyperthyroidism**

**Lemon Balm (Melissa officinalis)**

Lemon balm is useful in the treatment of hyperthyroidism as it inhibits TSH and auto-antibodies binding on thyroid TSH receptors which are likely due to its flavonoids and polyphenols. The active medicinal ingredients in lemon balm include citronella, citral, tannins, and geraniol. Preparations containing lemon
balm should clearly list lemon balm or Melissa officinalis as ingredients rather than lemongrass or lemon oil. Used as essential plant oil, as a tincture, or as a tea composed of dry leaves, lemon balm is used to treat anxiety, depression, palpitations, respiratory congestion, allergic reactions, menstrual pain, and nervousness. Lemon balm is used to mildly reduce thyroid hormone levels and symptoms associated with hyperthyroidism. Lemon balm promotes immune system health by fighting bacteria and viruses, which is demonstrated by its ability to reduce fever, spasms, flatulence and cramps. Lemon balm also promotes detoxification by stimulating liver and gall bladder function. Used as an injection along with Lycopus virginicus or bugleweed, lemon balm is widely used in Europe for treating Graves' disease. Lemon balm is also used as a tonic or tea to reduce and manage symptoms in Graves' disease. Lemon balm slows pituitary function, lowering TSH levels, which, in turn, reduces thyroid hormone levels. Paradoxically, lemon balm is also used to raise thyroid hormone levels in patients with hypothyroidism. Lemon balm strengthens rather than stimulates thyroid function, restoring normal levels to patients with autoimmune thyroid disease.

**Motherwort (Leonurus cardiaca)**

Motherwort is classically used for the treatment of anxiety, depression, heart palpitations, and tachycardia, making it highly appropriate for symptomatic relief in hyperthyroid disease. Chemical analytical and animal studies confirm the herbs sedative, anxiolytic, anti-arrhythmic, and antispasmodic effects. The German Commission E supports the use of motherwort for the treatment of cardiac disorders associated with anxiety and for the symptomatic relief of hyperthyroidism. The alkaloids in motherwort, specifically leonurine, act as a central nervous depressant and hypotensive.
**Bugleweed (Lycopus virginicus)**

The German Commission E Herbal Regulatory Authority monograph recommends the use of Bugleweed for people with hyper functioning thyroid glands. Bugleweed's activity is thought to be mediated by a reduction in thyroid-stimulating hormone (TSH), thyroxine (T4), and inhibition of the conversion of T4 to T3, as well as inhibition of the receptor-binding and biological activity of Graves' immunoglobulin's. In a clinical trial of 905 patients with hyper functioning thyroid glands, symptoms such as restlessness, palpitations, and headaches improved in 87% of those treated with Bugleweed. Bugleweed works as a vascular sedative and is indicated for a rapid pulse and a weak heart which are typical with hyperthyroidism.

**Herbal Medicine Indicated for Hypothyroidism**

**Bladderwrack (Fucus vesiculosos)**

Bladderwrack contains three main constituents: iodine, alginic acid, and fucoidan. The iodine in Bladderwrack helps those people deficient in this trace mineral to regulate and improve thyroid function, thus it is beneficial for hypothyroidism and goiter. It works as an anti-inflammatory and possesses anti-rheumatic properties to relieve arthritis and rheumatism. Bladderwrack's anti-bacterial properties help ward off bacteria and viruses. The alginic acid constituent, a type of dietary fiber, is useful in relieving constipation, diarrhea, and heartburn. The fucoidan constituent, another type of fiber, contributes to lowering cholesterol and glucose levels. The symptoms of iodine deficiency can be relieved with seaweed therapy (Bladderwrack) at 5 grams per day. It contains weak hormone activity with the compound Di iodotyrosine which is the building block for T3 and T4 production.

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119 [http://www.restorativemedicine.org/pages/hyperthyroidism.html](http://www.restorativemedicine.org/pages/hyperthyroidism.html)
Ashwagandha (*Withania somnifera*)

Ashwagandha (*Withania somnifera*) directly affects production of thyroid hormones. Animal studies during the late 1990s demonstrated its ability to directly act on thyroid tissue to bring about a rise in serum levels of thyroid hormones. Serum levels of the thyroid hormone can also be raised in humans and so excessive dosages should be avoided. Studies have been conducted to investigate the effects of Ashwagandha on thyroid and liver function. Mice given high doses (1.4g/kg) of the root extract showed significant increases in serum levels of T3 and T4. Furthermore, the extract was shown to reduce hepatic lipid peroxidation significantly while increasing the activity of superoxide dismutase and catalase. These results indicate that Ashwagandha stimulates both thyroid and hepatic antioxidant activity.  

Coleus (*Coleus Forskohlii*)

Increased cellular cyclic AMP results in inhibition of platelet activation, decreased likelihood of blood clots, reduced release of histamine, decreased allergy symptoms, increased force of contraction of the heart, relaxation of the arteries and other smooth muscles, increased thyroid function, increased fat metabolism and increased energy along with possible weight loss. Cyclic AMP and the chemicals it activates comprise a second messenger system that is responsible for carrying out the complex and powerful effects of hormones in the body. Coleus (*Coleus forskohlii*) contains forskohlin which is specifically able to mimic the effect of TSH in thyroglobulin (TG) production and promote secretion of T3 & T4.

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Guggul (*Commiphora mukul*)

Guggul (*Commiphora mukul*) is considered a rejuvenating herb and a stimulant in Ayurvedic medicine. The resin of the *Commiphora mukul* tree, termed "guggul" or "guggulipid", has been associated with thyroid stimulating activity. Guggul causes the thyroid to increase iodine uptake and increase production of thyroid hormones. Studies in both animals and humans have shown that guggul can also modulate cholesterol levels. 121

Specific Nutrients in the Treatment of Thyroid Disorders

Iodine and Tyrosine

Iodine deficiency is well accepted as the most commonly preventable cause of mental retardation in the world and the most common cause of endocrinopathy (goiter and primary hypothyroidism). Iodine deficiency is most critical in pregnancy due to the consequences for neurological damage during stages of fetal development and lactation. The safety of therapeutic doses of iodine above the established safe range of 1.0 mg may be evident in the lack of obvious toxicity in the Japanese population that consumes 25 times the median intake of iodine consumption of the United States. The Japanese population suffers no demonstrable increased incidence of autoimmune thyroiditis or hypothyroidism. Studies using 3- to 6-mg doses to effectively treat fibrocystic breast disease may reveal an important role for iodine in maintaining normal breast tissue architecture and function. Iodine may also have important antioxidant functions in breast tissue and other tissues that concentrate iodine via the sodium iodide symporter. L-tyrosine is an amino acid necessary for the synthesis of thyroxine (T4) and triiodothyronine (T3). In the process of thyroid hormone synthesis, iodine binds to two positions on the tyrosyl ring of tyrosine. Thus, a deficiency of this important amino acid could contribute to low thyroid hormone levels. Studies have

121 http://www.restorativemedicine.org/pages/hypothyroidism_moderate.html
found tyrosine may be beneficial for treating fatigue which is a common symptom of low thyroid. Iodine is necessary for the formation of T4, but appears to have no effect on peripheral conversion of T4 to T3. Goitrogenic foods can cause a relative iodine deficiency by binding to iodine, making it inaccessible for thyroid hormone synthesis.

**Trace Minerals**

All the essential minerals, including copper and iron, bound to citric acid are required for proper thyroid hormone balance. Besides providing a well-absorbed chelate, citric acid has potential health benefits of its own. As an important Kreb’s cycle intermediate, it is essential for metabolism in all living organisms. Citric acid has been shown to inhibit urinary precipitation of calcium oxalate and phosphate crystals, preventing the formation of kidney stones. Specifically zinc (50mg per day) and selenium (400mcg per day) are an essential part of the conversion of T4 into T3 occurring in the liver.

Vitamin C and the B vitamins riboflavin (B2), niacin (B3), and pyrodoxine (B6) are also necessary for normal thyroid manufacture.

**Case History- Thyroid Disorder**

Teresa is a 42 year old female who presented with the main complaint that she had the inability to lose weight. She stated that she had been dieting her entire life and it was a constant struggle. Teresa is 5 feet 2 inches in height and weighs 254 pounds. She exercises approximately 6 days per week with a mixture of several different types of exercise regimes. She had been exercising for about 5 years and although she thoroughly enjoyed it, she did not see any weight loss results.
Teresa’s diet was generally good. She follows a well-balanced diet most of the time with the occasional break in regime. Upon review of her diet diary it was noted that she was consuming an excess of grains, dairy and nuts. She was relying on granola bars for snacks which are unknowingly weight inducing.

**Lab testing:**

- Fasting insulin levels slightly elevated
- TSH levels elevated
- Free T3 and Free T4 were normal
- TPO (thyroid antibodies) were normal

**Management Plan**

Teresa was administered the following natural medicine therapies:

- Soft heat infrared sauna therapy- 30 minutes 4 times per week for additional calorie burning and detoxification
- Thyroid support: Iodine (as potassium iodide), Zinc (as Zinc Picolinate), Copper (as Copper Chelate), L-tyrosine, Thyroid glandular (thyroxine free)- 2 capsules 2 times per day
- Chromium citrate- 2 capsules 2 times per day
- CLA- 1 capsule 3 times per day
- Modified Mediterranean Lifestyle Nutrition Plan* to balance hormones

Teresa reported back 3 weeks later to state that she was doing well with the remedies and had started to lose a small amount of weight. She also reported that her long-standing rosacea was starting to clear up after no improvement for years.
Teresa was recommended to stay on the same protocol.

Teresa reported back 8 weeks later. BIA testing revealed that she had lost 8 pounds of fat without affecting her lean body mass. Teresa was thrilled with these results as she had not lost any weight in years. Teresa had gone to her own medical doctor and had her TSH retested and it was now back into the normal range. Teresa was recommended to stay on the protocol.
Estrogen Dominance

Dr. John Lee, the world’s authority on natural hormone therapy, coined the phrase “estrogen dominance”. This condition occurs when deficient, normal or excessive estrogen levels are not equally balanced with progesterone. Estrogen and progesterone work synergistically with each other to achieve and maintain hormonal balance in the body. The main cause of many hormonal issues is not the absolute deficiency of estrogen or progesterone but rather when estrogen dominates the hormonal pathway over progesterone.

Presently the average female begins puberty at approximately age 12. She seldom lactates, has few children, and menstruates about 350 to 400 times during her lifetime. This frequent menstruation of the modern day female has been associated with the increased occurrence of a variety of hormonal conditions including infertility, cancer, fibroids, anemia, migraines, mood swings, abdominal pain, fluid retention, and endometriosis. In stark contrast, one hundred years ago, the average female started her menses at approximately age 16. It was common to not only have more children but to conceive at a younger age. She therefore spent more time lactating and having fewer menstrual cycles. In total, women back then experienced the menstrual cycle only about 100 to 200 times in their lifetime.

From age 35 to 50 (peri-menopause), there is a 75% reduction in production of progesterone in the body. Estrogen, during the same period, only declines about 35%. In North America, the prevalence of estrogen dominance syndrome approaches 50% in women over 35 years old. By menopause, the total amount of progesterone made is extremely low, while estrogen is still present in the body at about half its pre-menopausal level.
With the gradual drop in estrogen but severe drop in progesterone, there is insufficient progesterone to counteract the amount of estrogen in the body. According to Dr. John Lee, the key to hormonal health is achieving the balance of progesterone to estrogen ratio. For optimum health, the progesterone to estrogen ratio should be approximately 200-300 to 1 of progesterone to estrogen.

The symptoms and conditions associated with estrogen dominance are:  

- Acceleration of the aging process
- Allergies, including asthma, hives, rashes, sinus congestion
- Autoimmune disorders such as lupus erythematosis and thyroiditis, and possibly Sjoegren's disease
- Breast cancer
- Breast tenderness; Fibrocystic breasts

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122 http://www.johnleemd.com/store/estrogen_dom.html
• Cervical dysplasia

• Cold hands and feet as a symptom of thyroid dysfunction

• Copper excess

• Decreased sex drive

• Depression with anxiety or agitation

• Dry eyes

• Early onset of menstruation

• Endometrial (uterine) cancer

• Fat gain, especially around the abdomen, hips and thighs

• Fatigue

• Foggy thinking

• Gallbladder disease

• Hair Loss

• Headaches

• Hypoglycemia

• Increased blood clotting (increasing risk of strokes)
• Infertility

• Irregular menstrual periods

• Irritability

• Insomnia

• Magnesium deficiency

• Memory loss

• Mood swings

• Osteoporosis

• Polycystic ovaries

• Premenopausal bone loss

• PMS

• Prostate cancer (men only)

• Sluggish metabolism

• Thyroid dysfunction mimicking hypothyroidism

• Uterine cancer

• Uterine fibroids
• Water retention, bloating

• Zinc deficiency

Causes of Estrogen Dominance

During a normal menstrual cycle, estrogen is the naturally dominant hormone for the first two weeks of the cycle leading up to ovulation. In the last two weeks of the menstrual cycle, estrogen is naturally balanced by progesterone. As a woman enters Perimenopause and begins to experience anovulatory cycles (cycles where no ovulation occurs), estrogen can often go unopposed, causing hormonal imbalance. Anovulatory cycles are, however, only one potential factor in estrogen dominance. In industrialized areas such as North America, there can be many other causes leading to estrogen dominance including:

1. **Exposure to In Utero Xenoestrogens**: When symptoms of anovulation or progesterone deficiency are noted in puberty, exposure to xenoestrogens in utero can be a factor. 500,000 to 800,000 follicles are created in the embryo, each enclosing an immature ovum when a female embryo develops in the womb. Outward changes or symptoms to the pregnant mother may not be obvious when exposed to toxic estrogen-like chemicals. However the fragile ovarian follicles are extremely sensitive to the environmental pollutants which can be toxic. The fetus is therefore increasingly affected by the toxins that may damage its ovarian follicles.

2. **Exposure to Petrochemical Compounds**: Petrochemical compounds found in general consumer products such as creams, lotions, soaps, shampoos, perfumes, hair sprays and room deodorizers. These compounds have estrogen like chemical structures and may have estrogen mimicking effects. Other sources of xenoestrogens include car exhausts, petrochemically derived pesticides, herbicides, and fungicides; solvents and adhesives such as those found in nail
polish, paint removers, and glues; dry-cleaning chemicals; practically all plastics and industrial waste such as PCBs and dioxins. Synthetic estrogens from urine of women taking HRT and birth control pills are flushed down the toilet and eventually find their way into the food chain and back into the body. They are fat soluble and non-biodegradable.123

3. Exposure to Industrial solvents: Solvents are a family of chemicals that are often overlooked as a common source of xenoestrogens. These chemicals enter the body through the skin, and accumulate quickly in the lipid-rich tissues such as myelin (nerve sheath) and adipose (fat). Some common organic solvents include alcohol like methanol, aldehydes like acetaldehyde, glycol like ethylene glycol, and ketones like acetone. They are commonly found in cosmetics, fingernail polish and fingernail polish remover, glues, paints, varnishes, and other types of finishes, cleaning products, carpets, fiberboards, and other processed woods. Pesticides and herbicides such as lawn and garden sprays and indoor insect sprays are also sources of minute amounts of xenoestrogens. While the amount may be small in each, the additive effect from years of chronic exposure can lead to estrogen dominance.124

4. Exposure to Hormone Replacement Therapy (HRT): The hormones used in HRT are chemically different in structure to that of the hormones naturally found in humans. This differing structure is processed in a lab in order to patent the medication and therefore make an economic profit. One of the most popular HRT drugs is called Premarin and has been the mainstay choice of Doctors in prescribing HRT. Premarin contains 48% estrone and only a very small amount of progesterone which is insignificant to have enough of an opposing effect. The excessive estrogen from HRT can lead to an increased chance of DNA damage and can result in endometrial and breast cancer.

123 http://www.drlam.com/articles/Estrogen_Dominance.asp
5. **Exposure to Xenoestrogens in Commercially Raised Cattle and Poultry**: 25 million pounds per year, or half the antibiotics used in the United States each year are used in livestock. These antibiotics enter our food supply and result in hormone disruption as we consume them as meat. In poultry farms, it now only takes 6 weeks to grow a chicken to full size compared to 4 months in 1940. Feed containing a cocktail of hormone disrupting toxins including pesticides, antibiotics and drugs are used to combat disease and are necessary due to the overcrowded conditions of animal warehouses.

6. **Exposure to Commercially Grown Fruits and Vegetables Containing Pesticides**: Over the past 100 hundred years, several billion pounds of pesticides have been released into the environment. These pesticides are similar in structure to estrogen and therefore can disrupt our hormonal system. Pesticides that have been previously banned make their way back to our food supply illegally. Approximately 5 billion pounds of chemicals have been added to the world each year in the form of pesticides, herbicides, fungicides and other biocides. It is estimated that the average person eats 75 pounds of illegal pesticides per year just by following the guidelines of eating 5 servings of fruits and vegetables a day if purchasing them from non-organic sources.125

7. **Over production of estrogen**. Excessive estrogen can arise from ovarian cysts or tumors.

8. **Stress**. The effects of chronic stress cause a reduction in progesterone levels and leads to adrenal gland exhaustion. This causes the hormonal pathway to favor estrogen over progesterone. The adrenal glands are further depleted as excessive estrogen causes insomnia and anxiety. The cycle continues as there is a further reduction in progesterone output and even more estrogen dominance results. After a few years in this type of vicious cycle, the adrenal glands become exhausted. This dysfunction leads to blood sugar imbalance, hormonal imbalances, and chronic fatigue.

125 http://www.drlam.com/articles/Estrogen_Dominance.asp
9. **Obesity.** Fat has an enzyme that converts adrenal steroids to estrogen. The higher the fat intake, the higher the conversion of fat to estrogen. Studies have shown that estrogen and progesterone levels fell in women who switched from a typical high-fat, refined-carbohydrate diet to a low-fat, high-fiber and plant-based diet even though they did not adjust their total calorie intake.

10. **Liver diseases.** There is a reduction in the breakdown of estrogen that occurs in liver diseases such as cirrhosis from excessive alcohol intake. Estrogen levels increase when drugs are taken that can impair liver function.

11. **Deficiency of Vitamin B6 and Magnesium.** These are important constituents of hormonal balance and are necessary for the neutralization of estrogen in the liver. Too much estrogen also tends to create deficiencies of zinc, magnesium and B vitamins. Increased consumption of sugar, fast food and processed food leads to a depletion of magnesium.

12. **Increase in caffeine consumption.** Caffeine intake from all sources has been linked with higher estrogen levels. This is true regardless of age, body mass index (BMI), caloric intake, smoking and alcohol habits. Studies have shown that women who consumed at least 500 milligrams of caffeine daily, the equivalent of four or five cups of coffee, had nearly 70% more estrogen during the early follicular phase than women who consume no more than 100 mg of caffeine daily, or less than one cup of coffee. Tea is not much better as it contains about half the amount of caffeine compared to coffee. The exception is herbal teas which contain no caffeine.

**Diagnosing Estrogen Dominance**

The diagnosis of estrogen dominance can be achieved through lab testing.

| Complete Female Hormone Panel | Estradiol and progesterone levels and their ratio |
are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age.

Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair.

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SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.
### Nutritional Factors Affecting Estrogen Dominance

The following table illustrates the specific dietary recommendations to reduce estrogen dominance:

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods To Include</th>
<th>Foods to Exclude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legumes</td>
<td>All legumes and legume products, especially organic non-gmo soy products</td>
<td>None</td>
</tr>
<tr>
<td>Vegetables</td>
<td>All, especially cruciferous (see additional note #1) and sea vegetables (various seaweeds)</td>
<td>None</td>
</tr>
<tr>
<td>Fruits</td>
<td>All whole and dry fruits especially citrus</td>
<td>None</td>
</tr>
<tr>
<td>Grains</td>
<td>All whole grains and whole-grain products especially rye</td>
<td>Non-whole grains, refined flours, refined flour products</td>
</tr>
<tr>
<td>Nuts/Seeds</td>
<td>All nuts and seeds and their butters, especially flax seeds, walnuts and pumpkin seeds (in their raw form only)(See additional note #2)</td>
<td>None</td>
</tr>
<tr>
<td>Fish</td>
<td>All, especially cold water fish: salmon, sardines, tuna, halibut are an excellent source of omega 3 fatty acids</td>
<td>Salted or cured fish</td>
</tr>
<tr>
<td>Eggs</td>
<td>From organically raised hens</td>
<td>Non-organic eggs</td>
</tr>
<tr>
<td>Poultry/Meat</td>
<td>Organic meats and poultry (See additional note #3)</td>
<td>Non-organic meats and poultry, salted and cured meats</td>
</tr>
<tr>
<td>Dairy</td>
<td>Organic dairy products and soy, nut and grain dairy substitutes</td>
<td>Non-organic dairy products</td>
</tr>
<tr>
<td>Oils</td>
<td>Organic cold-pressed, unrefined, seed and nut oils, especially flax seed, walnut, sesame and olive oil (See additional note #4)</td>
<td>Refined vegetable oils, butter, lard, margarine, shortening and saturated or hydrogenated fats</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Beverages</td>
<td>Mineral or filtered water; herbal tea; fresh fruit juice</td>
<td>Alcohol, coffee</td>
</tr>
<tr>
<td>Sweeteners</td>
<td>Brown rice syrup, fruit sweetener, molasses, stevia</td>
<td>Reined or artificial sweeteners</td>
</tr>
<tr>
<td>Spices and Herbs</td>
<td>Especially nutmeg, anise, thyme, sage, fennel, caraway, turmeric and fresh lemon and lime juice</td>
<td>Chocolate, high sodium foods and salt</td>
</tr>
</tbody>
</table>

**Additional Notes:**

1. **Cruciferous vegetables** include: broccoli, cauliflower, all cabbages, Brussels sprouts, kale, bok Choy, arugula, mustard greens, and watercress.

2. **Omega-3** and **some omega-6 fatty acids** help to counteract symptoms associated with hormone imbalance and should be consumed daily.

3. **Non-organically raised livestock** are often given hormones to improve their growth; unfortunately, these hormones can be passed on to the consumer and negatively influence hormone balance.

4. **Important:** **Do not cook with oils** that are not specified for cooking or baking, such as flaxseed or walnut oils. Olive and sesame oils are good choices for cooking or baking. Use flaxseed, olive, sesame, or walnut oils for homemade salad dressings. These provide valuable omega-3 and omega-6 fatty acids. Refrigerate all oils and dressings.
Estrogen Metabolism

The most active estrogen circulating in the body is Estradiol (E2). It is a steroidal hormone that is metabolized in the liver. Estradiol (E2) has a half-life of approximately 3 hours. There are multiple pathways with widely different biological activities that convert E2 to metabolites.

The second most potent estrogen is Estrone. Through enzymatic reactions it is easily converted back and forth from estradiol. Estrone and estradiol are metabolized by a process called hydroxylation. The products from hydroxylation are converted into estriol (E3) or are processed and secreted out of the body and excreted in the urine.

Several hundred micrograms of estradiol is produced in normal pre-menopausal women produce every day. Some of this estradiol find its way to binding with the nuclei in a wide variety of tissues, resulting in genetic transcription as well as cellular division. While the production of estrogen is going on, a similar amount of estradiol is removed from the body, primarily in the liver. Estradiol is continually balanced through a production and destruction process.

The metabolites are all part of the estrogen family because the metabolites are estrogen derivatives. They all possess estrogenic properties in varying degrees. An indication of the metabolites estrogenic potency is the degree of the hydroxylation either through the two-hydroxylation or sixteen alpha-hydroxylation process.

The most prevalent metabolite of estradiol and estrone are metabolites such as 2-(OH)-estrone or 2-(OH)-estradiol are considered good estrogen. They are derived from hydroxylation of estrone. People who are obese and women who consume a diet high in animal fat have been shown to have decreased levels of these good estrogens. Consistent moderate exercise, a diet high in protein and low in fat, and
by the consumption of food containing indol-3-carbinol such as cabbage and broccoli will increase the levels of good estrogen

Another metabolite of estrone is called the 16 alpha-(OH) estrone which has been proven to be more potent than estradiol. This is called the genotoxic form of estrogen or bad estrogen. The risk of breast cancer is increasing significantly due to its ability to combine with estrogen receptors and transforming the nuclei to synthesize DNA. It is also called the transforming estrogen. Another bad metabolite is 4-(OH)-estrone. This is a free radical generator and it is being tested as possibly being a bad estrogen.

It is obvious that there are good and bad estrogens. 2-(OH)-estrone is considered good, being a potent anti-oxidant and has anti-cancer properties. Estrones that are considered bad are 4-(OH)-estrone and 16-alpha (OH) because they are free radical generators and at high level they are considered to be important indicators of cancer risk. The ideal ratio of 2-(OH)-estrone to 16-alpha-(OH)-estrone as measured in the urine is 2.0 or more.

**Herbal Medicine Indicated for Estrogen Dominance**

**Milk Thistle (Silymarin marianus)**

Much research has been done on a special extract of milk thistle known as Silymarin, a group of flavonoid compounds. These compounds protect the liver from damage and enhance the detoxification process. Silymarin prevents damage to the liver by acting as an antioxidant. It is much more effective than vitamin E and vitamin C. Numerous research studies have demonstrated its protective effect on the liver. Silymarin also works by preventing the depletion of glutathione. The higher the glutathione concentration, the greater the liver’s capacity to detoxify harmful chemicals. Moreover, Silymarin is shown to increase the level of glutathione by up to thirty-five percent. In human studies, Silymarin is shown to exhibit positive effects in treating liver diseases of various kinds including cirrhosis, chronic
hepatitis, fatty infiltration of the liver and inflammation of the bile duct. Dosage: standardized extract 200 to 800 mg a day

**Curcumin (Curcuma longa)**

Several studies have illustrated curcumin’s hepatoprotective effects. This has lead researchers to suggest its use in protecting the liver from exogenous insults from environmental toxins, including carbon tetrachloride and acetaminophen. Curcumin also has the capacity to increase bile flow and solubility, making it of potential benefit for someone with a tendency to form gallstones. The hepatoprotective effects of turmeric may stem from its potent antioxidant activity. In addition to its antioxidant effects, Curcumin has also been shown to enhance liver detoxification by increasing the activity of glutathione S-transferase which is an enzyme necessary to conjugate glutathione with a wide variety of toxins in order to facilitate their removal from the body.

**Specific Nutrients for Estrogen Dominance**

**Diindolylmethane (DIM)**

DIM is a powerful metabolizer of estrogen, assisting in removing excess estrogen and benefiting conditions associated with estrogen dominance. Supplementation with DIM can help promote proper estrogen levels through the pre- and peri-menopausal years, and in men experiencing higher estrogen levels. These conditions include uterine fibroid tumors, fibrocystic breasts, glandular dysfunction, and more. It can also benefit men by improving estrogen-dominance related health issues such as hair loss, atherosclerosis, prostrate problems, lowered libido, and impotency. DIM also promotes testosterone action, which improves mood, fights depression, boosts libido, improves cardiovascular health, improves memory, and supports muscular development. DIM is a balancer of estrogen metabolism. It increases 2-
hydroxyestrone (2-OHE), which is also known as the good or protective estrogen to 400 mg may be used.

**N-acetyl-cysteine (NAC)**

N-acetylcysteine (NAC) is the precursor of both the amino acid L-cysteine and reduced glutathione (GSH). Animal and human studies of NAC have shown it to be a powerful antioxidant and a therapeutic agent for heavy metal toxicity and other diseases characterized by free radical, oxidative damage. As a source of sulfhydryl groups, NAC stimulates glutathione synthesis, enhances glutathione- S-transferase activity, promotes liver detoxification by inhibiting xenobiotic biotransformation and is a powerful nucleophile capable of scavenging free radicals. Historically, the most prevalent and well-accepted use of NAC has been as an antidote for acetaminophen (Tylenol) poisoning. The resultant liver toxicity is due to an acetaminophen metabolite that depletes the hepatocytes of glutathione and causes hepatocellular damage and possibly even death. NAC administered intravenously or orally within 24 hours of overdose is effective at preventing liver toxicity; however, improvement is most notable if treatment is initiated within 8-10 hours of acetaminophen overdose. NAC has also been effective for poisoning by carbon tetrachloride, acrylonitriles, halothane, paraquat, acetaldehyde, coumarin, and interferon. In addition to its dramatic effects in liver poisoning, NAC is effective in promoting normal liver detoxification. Dosage: 350 to 2,000 mg a day

**Calcium D-Glucarate**

Calcium D-glucarate is a botanical extract found in grapefruit, apples, oranges, broccoli, spinach, and Brussels sprouts. It is also made naturally in small quantities by the body. Scientists are discovering that it appears to protect against cancer and other diseases via a different mechanism than antioxidants such as vitamin C, carotenoids, and folic acid. These vitamin antioxidants work by neutralizing toxic free
radical damage in the body. However, there are other mechanisms by which the human body can
detoxify itself, such as conjugation and glucuronidation.

Conjugation and Glucuronidation are detoxification processes that occur when toxins, carcinogens, and
used hormones are combined with and bound to water-soluble substances in the liver, thus making
them more easily removed from the body. D-glucarate has been shown to support this vital process by
inhibiting an enzyme called beta-glucuronidase that can break bonds between toxins and used
hormones allowing them to be re-circulated into the blood stream rather than excreted.

D-Glucarate may directly detoxify any environmental agents responsible for cancer formation. It has
been postulated that D-glucarate exerts some of its effects by equilibrium conversion to D-
glucarolactone which is a potent beta-glucuronidase inhibitor. This is one of the most important
nutrients to enhance liver function. Dosage: 250 to 1,000 mg a day

Fish Oil

A diet low in fish oil decreases the ratio of 2-(OH) - estrogen to 16-alpha-(OH)-estrogen and thereby
increases cancer risk. Intake of fish oil also has been observed to inhibit the formation of human breast
cancer cells in laboratory studies. Several theories have been proposed to explain the link between the
high intake of fish oil and the low risk of cancer. Among the most important is the inhibition of
eicosanoids production from AA and omega 6. Eicosanoids belong to a class of compounds that are
derived from poly and saturated fatty acids including prostaglandins, hydroxyl, prostaglandins and
leukotrienes. Prostaglandins are unsaturated fats that perform a wide variety of actions. Prostaglandin
E2 (PGE2) has been linked to the formation of several types of breast and prostate cancer. Tumor cells
generally produce a large amount of AA derived from PGE2. Fish oil inhibits the oxidation of AA to PGE2.
Eicosanoids derived from AA is also related to the modulation of estrogen metabolism. DHA has been shown to improve the response of breast tumors to cytotoxic agents. Dosage: 500 to 10,000 mg a day

**Bioidentical Progesterone Cream**

The USP progesterone used for hormone replacement comes from plant fats and oils, usually a substance called diosgenin which is extracted from a very specific type of wild yam that grows in Mexico or from soybeans. In the laboratory, diosgenin is chemically synthesized into real human progesterone. The other human steroid hormones, including estrogen, testosterone, progesterone and the cortisones are also nearly always synthesized from diosgenin. Because progesterone is very fat-soluble, it is easily absorbed through the skin. From subcutaneous fat, progesterone is absorbed into capillary blood. Thus absorption is best at all the skin sites where people blush: face, neck, chest, breasts, inner arms and palms of the hands. For premenopausal women, the usual dose is 15-24 mg/day for 14 days before expected menses, stopping the day or so before menses. For postmenopausal women, the dose that often works well is 15 mg/day for 25 days of the calendar month. (Bioidentical Progesterone Cream should contain 450-500mg of progesterone per ounce and 900-1000mg per 2oz container).

**Case History-Estrogen Dominance**

Tina is a 37 year old female who presented with the main concern of weight gain. Tina stated that before she had children, she had no weight issues at all and could virtually eat anything she wanted without consequence. Tina stuck to a very strict eating plan that should have produced the wanted effects of weight loss but instead a total of only 4 pounds were lost over the course of a 6 month period. Tina also enjoyed going to bootcamp classes 4 times per week which were intense workouts designed to achieve weight loss goals.
Tina had been a hairdresser for 15 years and recently made a career change. She is the mother of 3 teenage children.

Although Tina slept an average of 7 to 9 hours per night, she still complained of fatigue and likened it to doing all of the intense physical exercise. Tina’s cycles were regular but were consistently heavier in flow since having children and she also experienced breast tenderness, weight gain, mood swings and cramping with each cycle.

**Lab testing:**

- Low progesterone levels
- High estrogen levels
- Low progesterone to estrogen ratio
- Poor hepatic conversion of T4 into T3

**Management Plan**

Tina was administered the following natural medicine therapies:

- Modified Mediterranean Lifestyle Nutrition Plan to balance hormones (See Specific Guidelines for Nutritional Lifestyle Management Plan in Weight Gain Section)
- Estrogen detoxification: DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin) 2 caps with breakfast
- Bioidentical Progesterone Cream 1 pump Days 14-28 of the cycle
- Thyroid support: Iodine (as potassium iodide), Zinc (as Zinc Picolinate), Copper (as Copper Chelate), L-tyrosine, Thyroid glandular (thyroxine free)- 2 capsules 2 times per day
• Medical food: a powdered medical food designed to nutritionally support the management of conditions associated with metabolic syndrome (including altered body composition)

Tina returned for a follow-up 4 weeks later to report that she had been feeling well with the plan but felt that it was too soon to tell. BIA testing revealed a 2 pound weight loss in fat.

Tina was recommended to stay on the same protocol.

Tina returned 8 weeks later to report that her cycles were dramatically improved. In fact, she had experienced no symptoms in the previous 2 cycles and for this she was very happy. She continued to battle with fatigue but not as much as before. She was recommended to find an alternative form of exercise that was not so physically demanding to see if her energy improved. Tina had been battling with nutrition as her children and career kept her too busy to prepare meals and snacks in advance. By the time, she got home there was no time left to prepare a healthy choice. Due to this situation, the choice would be something fast and not on her plan. She felt ashamed of this fact but was assured that it was normal for struggles like this to occur.

The following changes were made to Tina’s protocol:

• Stay with the above recommendations
• Purchase a membership to www.eatcleanmenus.com which is a clean eating menu planning website service

Tina came for a follow-up 12 weeks later. She happily reported that she had lost 7 pounds and BIA testing confirmed those findings. Tina also stated that she no longer had any hormonal issues with PMS. She was very thankful for Eat Clean Menus as it gave her the tools she needed to have healthy meals all the time. Tina was recommended to stay with the current medical foods, thyroid support and meal plan.
but to slowly decrease the progesterone cream to ½ pump for one month and then ¼ pump for one month and then to go completely off the progesterone cream. She was also advised to continue with the estrogen detoxification remedy but at half the dose for continual detoxification because of the years of accumulated endocrine disruptors to which she was exposed during her hairdressing career.
Pre Menstrual Tension (PMS)

Premenstrual syndrome (PMS) is a common disorder in women of reproductive age that is characterized by the cyclic recurrence of physical, affective, and cognitive (or performance) symptoms. The symptoms typically occur in the second half of the menstrual cycle, resolve after menses begins and are often absent during the early phase of the menstrual cycle. As many as 85% of menstruating women experience one or more symptoms of PMS. Approximately 5% to 10% of women have symptoms severe enough to be debilitating. PMS affects women of all cultures and socioeconomic levels but types of symptoms and levels of discomfort vary from woman to woman and may have cultural influences. More than 300 symptoms have been associated with PMS. Among the most prominent and consistently described symptoms are depression, anxiety, irritability, craving for sweet or salty foods, headaches, weight gain, fluid retention, breast pain and swelling, abdominal bloating and acne flare-ups on the face and shoulders. Up to as many as 400 symptoms have been identified with PMS and here the following lists some of the other commonly associated symptoms:

- Abdominal bloating
- Abdominal cramping
- Accident proneness, coordination difficulties
- Acne, hives
- Aggression, rage
- Alcohol intolerance
- Anxiety, irritability, suicidal thoughts

• Asthma
• Back pain
• Breast swelling and pain
• Bruising
• Confusion
• Depression, withdrawal from others, emotional lability
• Edema
• Exacerbation of pre-existing conditions (lupus, arthritis, ulcers, herpes, etc.)
• Fatigue, lethargy
• Fainting (vasovagal syncope)
• Food binges, salt cravings, sweet cravings
• Headache, migraine
• Heart palpitations
• Insomnia
• Joint swelling and pain
• Nausea
• Seizures
• Sex drive changes
• Sinus problems
• Sore throat
• Urinary difficulties
Hormonal fluctuations during the menstrual cycle have been identified as possible underlying causes of menstrual complaints. A normal menstrual cycle in a woman of reproductive age can be divided into three distinct phases: follicular, ovulatory, and luteal.\textsuperscript{128}

**Follicular Phase**—the follicular phase, which initiates the development of an ovarian follicle, is characterized by a rise in estrogen and follicle stimulating hormone (FSH). It begins when gonadotropin releasing hormone (GnRH) is secreted from neurons in the hypothalamus and transported to the anterior pituitary, stimulating the anterior pituitary to release FSH. FSH stimulates the development of an ovarian follicle. The rising FSH levels also activate aromatase and FSH receptors, resulting in a higher ratio of estrogens to androgens within the follicle. The rising estrogen levels trigger a negative feedback mechanism on the pituitary—inhibiting the pituitary production of FSH—while a positive feedback mechanism stimulates the pituitary to begin secreting luteinizing hormone (LH).

**Ovulatory Phase**—a peak in LH and estrogen levels predicts ovulation, taking place at the middle of the menstrual cycle. At this point, the follicle has acquired LH receptors and is responsive to LH, which induces the secretion of enzymes to rupture the follicular wall, releasing the egg into a fallopian tube. The rise in LH also allows the remaining follicular cells which organize on the corpus luteum (a process known as luteinization) to secrete small amounts of progesterone.

**Luteal Phase**—the shift from estrogen dominance to progesterone dominance and the gradual reduction in LH and FSH levels characterize the luteal phase. This is the last part of the menstrual cycle in which premenstrual symptoms can begin, followed by their remittance during the beginning of the subsequent follicular phase. In the luteal phase, the egg travels through the fallopian tube, wherein fertilization can occur. The ruptured follicle, which has formed the corpus luteum, continues to release

\textsuperscript{128} Natural Interventions for Premenstrual Syndrome BY JOSEPH L. MAYO, MD, FACOG APPLIED NUTRITIONAL SCIENCE REPORTS 2004 by Advanced Nutrition Publications, Inc.
moderate amounts of estrogen and also starts to secrete progesterone. If the egg is fertilized, it will implant on the lining of the uterus and if it is not fertilized the corpus luteum will disintegrate, stopping its production of estrogen and progesterone. This rapid fall in estrogen and progesterone causes the lining of the uterus to shed along with the unfertilized egg and blood, marking the beginning of menses and the end of the menstrual cycle.

**Causes of PMS**

The exact cause of PMS is not fully understood and may be related to a number of factors. The current theories on the underlying causes focus mostly on levels of sex hormones (e.g., estrogen, progesterone) and neurotransmitters (i.e., brain chemicals that control mood), dietary influences and emotional factors.

**Dietary Factors Influencing PMS**

- Diets high in animal fats have been shown to increase prostaglandin (PGE2) production that aggravate PMS symptoms.
- Increased alcohol consumption during the premenstrual phase interferes with the liver’s ability to detoxify excess circulating hormones.
- Nutritional deficiencies such as calcium, magnesium, zinc, vitamin B6, vitamin E and essential fatty acids also contribute to PMS.
- Increased caffeine consumption causes an imbalance of cortisol and blood sugar and further inhibits the liver’s ability to balance serotonin, estrogen and progesterone leading to breast tenderness and swelling.
Many events and other factors can contribute to or trigger PMS by resulting in hormonal changes in the body, including:

- Onset of menses
- Perimenopause
- Discontinuing birth control pills
- Amenorrhea
- Childbirth, or termination of pregnancy
- Toxemia during pregnancy
- Tubal ligation
- Unusual trauma
- Decreased light associated with autumn and winter

Other Factors:

- High consumption of dairy products
- Excessive consumption of caffeine (soft drinks, coffee, chocolate)
- Excessive consumption of high glycemic foods
- A relatively high blood level of estrogen
- A relatively low blood level of progesterone
- Diet that leads to increased levels of the hormone prostaglandin F2
- Excess body weight
- Low levels of vitamins C, E, and selenium
- Magnesium deficiency
- Lack of exercise
PMS has been divided into 4 categories according to specific sets of symptoms.

PMS, Symptoms and Imbalances

<table>
<thead>
<tr>
<th>PMS-A ANXIETY (affects 65-75% of PMS sufferers)</th>
<th>PMS-A ANXIETY (affects 65-75% of PMS sufferers)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td><strong>Imbalances</strong></td>
</tr>
<tr>
<td>• Anxiety</td>
<td>• Too much estrogen relative to progesterone in the latter half of the menstrual cycle (luteal phase)</td>
</tr>
<tr>
<td>• Tension, feeling on edge</td>
<td>• Low serotonin</td>
</tr>
<tr>
<td>• Irritability, anger</td>
<td>• Drop is TSH and cortisol (thyroid and adrenal function) during luteal phase</td>
</tr>
<tr>
<td>• Fault finding with one’s partner</td>
<td>• High epinephrine/cortisol ratio</td>
</tr>
<tr>
<td>• Mood swings</td>
<td>• Increased testosterone</td>
</tr>
<tr>
<td>• Insomnia</td>
<td></td>
</tr>
<tr>
<td>• Depression</td>
<td></td>
</tr>
<tr>
<td>• Suicidal thoughts</td>
<td></td>
</tr>
<tr>
<td>• Low self esteem</td>
<td></td>
</tr>
<tr>
<td>• Sensitive to rejection or criticism</td>
<td></td>
</tr>
<tr>
<td>• Feeling overwhelmed</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PMS-C CRAVINGS (affects 33% of PMS sufferers)</th>
<th>PMS-C CRAVINGS (affects 33% of PMS sufferers)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td><strong>Imbalances</strong></td>
</tr>
<tr>
<td>• Cravings (sweets, chocolate, CHO’s)</td>
<td>• Drop in cortisol causes sugar cravings</td>
</tr>
<tr>
<td>• Increased appetite</td>
<td>• Imbalance in body’s regulation of insulin and cortisol</td>
</tr>
<tr>
<td>• Headaches</td>
<td></td>
</tr>
</tbody>
</table>

269
- Fatigue
- Fainting spells, dizziness
- Heart palpitations

- Low serotonin may cause CHO cravings-
  CHO ingestion can temporarily raise serotonin levels
- Deficiency in PGEI (a beneficial prostaglandin) can cause low blood sugar with sweet and food cravings

<table>
<thead>
<tr>
<th>PMS-D DEPRESSION (affects 25-35% of PMS sufferers)</th>
<th>PMS-D DEPRESSION (affects 25-35% of PMS sufferers)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td><strong>Imbalances</strong></td>
</tr>
<tr>
<td>• Depression</td>
<td>• Drop in thyroid hormones during the luteal phase may trigger symptoms</td>
</tr>
<tr>
<td>• Forgetfulness</td>
<td>• Low serotonin levels may cause low melatonin</td>
</tr>
<tr>
<td>• Confusion</td>
<td></td>
</tr>
<tr>
<td>• Lethargy, sluggishness, tires easily</td>
<td></td>
</tr>
<tr>
<td>• Withdrawal, disinterest in usual activities</td>
<td></td>
</tr>
<tr>
<td>• Insomnia</td>
<td></td>
</tr>
</tbody>
</table>
Laboratory Testing for PMS

The signs and symptoms of PMS are not unique, and there are currently no laboratory tests to confirm a definitive diagnosis. There are however many contributing factors that can be tested in laboratories to refine the treatment protocol. Uncovering hormonal imbalances is imperative to treating the underlying causes of PMS. The following lab panels have been proven effective in identifying any imbalances in regards to PMS:
| Neurotransmitter Testing | Medical science has discovered that neurotransmitters are at the foundation of many psychiatric and neurological disorders. Imbalances in neurotransmission, due to excessive or deficient neurotransmitter levels at the synaptic cleft, are associated with depression, insomnia, anxiety, behavioural disorders, memory disorders, and a spectrum of other brain-related functions. Because neurotransmitters play an integral role in these disease states, they are prime targets for treating disorders of the nervous system and mental health concerns.

Neurotransmitters are recognized as the primary biochemical messengers of the central and peripheral nervous systems. Studies have demonstrated that urinary neurotransmitter measures are reflective of circulating levels as evidenced by renal neurotransmitter clearance mechanisms. Laboratory methodology for the accurate assessment of urinary neurotransmitter levels has been established. Urinary measures are not recognized as a direct reflection of central activity, however definite associations exist. The |
| **Adrenal Stress Index** | The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress.

The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions.

The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal |
| Complete Female Hormone Panel | Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age. Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to |

fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.
symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.

<table>
<thead>
<tr>
<th>Thyroid Hormone Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism includes feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low serum iron, Hematocrit and low blood Hemoglobin levels can predispose a person to extreme fatigue contributing to depression.</td>
</tr>
</tbody>
</table>
**Conventional Pharmaceutical Medications Indicated for PMS**

Conventional medicine is limited in therapeutic treatments for PMS. Typically, a patient is administered either the birth control pill (BCP) or an anti-depressant (SSRI).

**Selective Serotonin Reuptake Inhibitors (SSRI’s)**

SSRIs are believed to increase the extracellular level of the neurotransmitter serotonin by inhibiting its reuptake into the presynaptic cell, increasing the level of serotonin in the synaptic cleft available to bind to the postsynaptic receptor. They have varying degrees of selectivity for the other monoamine transporters, with pure SSRIs having only weak affinity for the noradrenaline and dopamine transporter<sup>129</sup>. The antidepressants Prozac (fluoxetine) and sertraline are effective when taken for the 2 weeks preceding the menstrual period as the prolong serotonin activity. There are many side effects associated with this type of therapy.

**Birth Control Pills (BCP)**

BCP decrease estrogen, progesterone and testosterone and provide temporary relief of symptoms that return once the BCP is discontinued. Typical side effects can include acne, breast tenderness and enlargement, breakthrough bleeding and spotting between periods as well as nausea and vomiting. Additional side effects include changes in your eyes that make it more difficult to wear contact lenses, bloating, headaches, changes in sex drive (typically a decrease), and increased risk of blood clotting disorders.

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## Nutritional Factors Affecting PMS

<table>
<thead>
<tr>
<th>Foods to Avoid</th>
<th>Foods to Eat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>2-3 fruits daily plus 4-6 servings of vegetables daily</td>
</tr>
<tr>
<td>White flour products and baked goods</td>
<td>Whole grains: barley, rice, amaranth, quinoa, millet, buckwheat</td>
</tr>
<tr>
<td>Caffeine</td>
<td>Herbal teas</td>
</tr>
<tr>
<td>Foods that contain PCB’s, dioxin and brominated fire retardants- these include non-organic fish, dairy, beef, pork, lamb, eggs</td>
<td>Limited quantities of organic poultry and meats, tofu, beans, nuts and seeds</td>
</tr>
<tr>
<td>Peanuts increase arachidonic acid production which aggravate PMS</td>
<td>Other raw nuts and seeds in moderation, especially sunflower, pumpkin and almond</td>
</tr>
<tr>
<td>Fruits and vegetables sprayed with pesticides (which disrupt hormones and are estrogenic)</td>
<td>Organic fruits and vegetables</td>
</tr>
<tr>
<td>Animal derived-saturated fats and most vegetable oils</td>
<td>Extra-virgin olive oil-1 tbsp.; Flaxseed oil- 2 tbsp daily; Pure fish oil- 1-2 tbsp.</td>
</tr>
<tr>
<td>Excessive amounts of raw Brassicas (cabbage, cauliflower and broccoli)-if there is a thyroid issue only</td>
<td>2 tbsp. of seaweed daily to support thyroid function (Nori, dulse, hiziki); Use cooked Brassicas liberally</td>
</tr>
<tr>
<td>Excess salt if there is water retention</td>
<td>2 tsp. of turmeric, 2 tbsp. freshly ground flax seeds and 1 tbsp. psyllium daily to improve estrogen metabolism and elimination</td>
</tr>
<tr>
<td>Alcohol</td>
<td>2 liters of purified water daily</td>
</tr>
</tbody>
</table>
Herbal Medicine Indicated for PMS

Chasteberry (*Vitex agnus castus*)

Native to the Mediterranean, Chasteberry has been used for centuries in the management of gynecological complaints. The greatest use of chaste berry has been in disorders associated with hormone function such as premenstrual distress and dysmenorrhea.\(^{130}\) Evidence on its effectiveness has led to its approval by the German Commission E as an intervention for premenstrual complaints, cyclical breast tenderness, and menstrual cycle irregularities.\(^{131}\) Today, Chasteberry is among the most popular herbs to help relieve a broad spectrum of PMS symptoms, such as breast tenderness, weight gain, abdominal cramps, depression, and mood swings.

Various mechanisms related to the menstrual cycle have been demonstrated through Chasteberry’s properties. Chasteberry has the ability to decrease prolactin via binding at pituitary dopamine-D2 receptors and has therefore been shown to be a dopamine agonist.\(^{132}\) Elevated prolactin levels are thought to be associated with PMS and may play a role in complaints of cyclical breast tenderness. Chasteberry also appears to contain constituents that influence mood by acting via opioid receptors or the GABA-system. Regardless of its mode of action, Chasteberry’s clinical efficacy and tolerability is well documented.

Any hepatoprotective herb is well suited in the treatment of PMS. Liver detoxifying is central to the treatment of any hormonal condition, especially PMS.

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Milk thistle (*Silymarin marianus*)

Much research has been done on a special extract of milk thistle known as Silymarin, a group of flavonoid compounds. These compounds protect the liver from damage and enhance the detoxification process. Silymarin prevents damage to the liver by acting as an antioxidant. It is much more effective than vitamin E and vitamin C. Numerous research studies have demonstrated its protective effect on the liver. Silymarin also works by preventing the depletion of glutathione. The higher the glutathione concentration, the greater the liver’s capacity to detoxify harmful chemicals. Moreover, Silymarin is shown to increase the level of glutathione by up to thirty-five percent. In human studies, Silymarin is shown to exhibit positive effects in treating liver diseases of various kinds including cirrhosis, chronic hepatitis, fatty infiltration of the liver, and inflammation of the bile duct. Dosage: standardized extract 200 to 800 mg a day

Curcumin (*Curcuma longa*)

Several studies have illustrated curcumin’s hepatoprotective effects. This has lead researchers to suggest its use in protecting the liver from exogenous insults from environmental toxins, including carbon tetrachloride and acetaminophen. Curcumin also has the capacity to increase bile flow and solubility, making it of potential benefit for someone with a tendency to form gallstones. The hepatoprotective effects of turmeric may stem from its potent antioxidant activity. In addition to its antioxidant effects, Curcumin has also been shown to enhance liver detoxification by increasing the activity of glutathione S-transferase, an enzyme necessary to conjugate glutathione with a wide variety of toxins in order to facilitate their removal from the body.
St John’s wort (*Hypericum perforatum*)

St. John’s wort (*Hypericum perforatum*) has been popularly used for decades in the management of mild to moderate depression. With its extensive history, St. John’s wort has been approved by the German Commission E health authorities for the management of depressive moods, anxiety, and nervous unrest. In a recent pilot study, St. John’s wort was also shown to be effective in women with PMS. In this study, 19 women with PMS given St. John’s wort extract (300 mg/day) for 2 menstrual cycles reported significant improvements in overall symptoms. The greatest reductions in symptoms included depression, confusion, anxiety, and insomnia. There are several factors involved in St John’s wort antidepressive abilities. It appears to inhibit serotonin, norepinephrine, and dopamine reuptake by postsynaptic receptors; increase the density of serotonin and dopamine receptors; elevate the affinity for GABA receptors; and inhibit monoamine concentrations in the synaptic cleft. Caution: St John’s wort should not be taken with conventional anti-depressants.

**Specific Nutrients for PMS**

**Vitamin B6**

Vitamin B6 can be used to increase levels of serotonin, dopamine and progesterone which are commonly deficient in PMS sufferers. Since these neurotransmitters are crucial for control of depression, pain perception, and anxiety, pyridoxine deficiency may exacerbate premenstrual dysphoria, whereas adequate pyridoxine status has a favorable impact on affect. Typical symptoms that respond to B6 therapy include acne flares, depression, irritability, breast tenderness, headaches, edema and bloating. In a study of 32 women with moderate to severe PMS, vitamin B6 given at a low dose of 50

mg/day for 7 months was shown to provide a significant beneficial effect on symptoms—such as depression, irritability, and fatigue—during the premenstrual period. In fact, these symptoms were approximately halved in the treatment months when compared to the placebo months.\textsuperscript{135} Dosage: 50-100mg per day

**Magnesium**

Symptoms of PMS are similar to a deficiency in magnesium and can present with a wide variety of neuropsychological symptoms, including depression, agitation, personality changes, and memory and concentration difficulties, as well as physical complaints surrounding fluid balance. Magnesium is an essential cofactor in over 300 enzymatic actions and plays a role in the maintenance of cell membrane electrical potential and electrolyte balance. It has therefore been postulated that magnesium deficiency may exacerbate certain PMS symptoms. Magnesium also reduces water retention, weight gain, swollen limbs and abdominal bloating. It assists Vitamin B6 and essential fatty acid metabolism. Dosage 200mg-600mg per day

**Vitamin E**

Prostaglandin synthesis has been implicated in PMS, and a deficiency of prostaglandin PgE1 has been proposed to be involved in PMS. Vitamin E inhibits the negative prostaglandin PgF2 and increases the anti-inflammatory prostaglandin PgE1 which helps to relieve premenstrual swelling and breast tenderness. Vitamin E reduces the arachidonic acid. Dosage 400-800 IU per day

\textsuperscript{135}Doll H, Brown S, Thurston A, Vessey M. Pyridoxine (vitamin B6) and the premenstrual syndrome: a randomized crossover trial. \textit{J R Coll Gen Pract} 1989; 39(326):364-68.
Evening Primrose Oil (EPO)

A defect in the linoleic acid conversion to gamma linolenic acid (GLA) is common to PMS sufferers. EPO contains preformed GLA and therefore ingestion of EPO can bypass the metabolic block in prostaglandin synthesis. Four double-blind, crossover, controlled trials of EPO have demonstrated a significant effect over the placebo group. EPO has been shown to be most effective for relieving clumsiness, headaches, although all symptoms including depression, irritability, and bloating and breast tenderness showed a marked improvement. Dosage 1000mg-4000mg per day

Diindolylmethane (DIM)

DIM is a powerful metabolizer of estrogen, assisting in removing excess estrogen and benefiting conditions associated with estrogen dominance. Supplementation with DIM can help promote proper estrogen levels through the pre and peri-menopausal years and in men experiencing higher estrogen levels. These conditions include uterine fibroid tumors, fibrocystic breasts and glandular dysfunction. It can also benefit men by improving estrogen-dominance related health issues such as hair loss, atherosclerosis, prostrate problems, lowered libido and impotency. DIM also promotes testosterone action which improves mood, fights depression, boosts libido, improves cardiovascular health, improves memory, and supports muscular development. DIM is a balancer of estrogen metabolism. It increases 2-hydroxyestrone (2-OHE) which is also known as the good or protective estrogen. Dosage: 70 to 400 mg per day

5-Hydroxytryptophan (5-HTP)

5-HTP is extracted from the seeds of the African plant, Griffonia simplicifolia. It is the intermediate metabolite of the essential amino acid L-tryptophan in the biosynthesis of serotonin. Unlike L-tryptophan, 5-HTP cannot be shunted into niacin or protein production. Therapeutic use of 5-HTP
bypasses the conversion of L-tryptophan into 5-HTP by the enzyme tryptophan hydroxylase. This is the rate-limiting step in the synthesis of serotonin but is inhibited by numerous factors which include stress, insulin resistance, vitamin B6 deficiency, magnesium deficiency and increasing age. It easily crosses the blood-brain barrier and effectively increases central nervous system (CNS) synthesis of serotonin. This makes it an effective treatment in a wide variety of conditions, including depression, fibromyalgia, insomnia, binge eating associated with obesity and chronic headaches. In combination with vitamin B6, it may improve PMS tension, mood swings and irritability by increasing serotonin levels. Dosage: 50mg-600mg per day with food.

**Bioidentical Progesterone Cream**

For severe PMS symptoms that have not responded to nutritional, botanical and lifestyle changes and for those whose symptoms start a few days to one week before the menses, bioidentical progesterone cream can be of extreme benefit. The USP progesterone used for hormone replacement comes from plant fats and oils, usually a substance called diosgenin which is extracted from a very specific type of wild yam that grows in Mexico or from soybeans. In the laboratory, diosgenin is chemically synthesized into real human progesterone. The other human steroid hormones, including estrogen, testosterone, progesterone and the cortisones are also nearly always synthesized from diosgenin. Because progesterone is very fat-soluble, it is easily absorbed through the skin. From subcutaneous fat, progesterone is absorbed into capillary blood. Thus absorption is best at all the skin sites where people blush: face, neck, chest, breasts, inner arms and palms of the hands. For premenopausal women, the usual dose is 15-24 mg/day for 14 days before expected menses, stopping the day or so before menses. (Bioidentical Progesterone Cream should contain 450-500mg of progesterone per ounce and 900-1000mg per 2oz container).
Exercise Indicated for PMS

Several studies have shown that regular exercise greatly diminishes PMS. Although the mechanisms of action remain elusive, the evidence is clear. Aerobic training (walking, jogging, swimming, and cycling) appears more effective at reducing PMS symptoms than strength training (weight lifting). Frequency of exercise but not intensity seems to relate to decreased rating of selected menstrual distress symptoms. Gradual increase in running distances correlates directly with greater reduction in PMS symptoms. Regular exercisers show improvement in all PMS parameters including concentration, affect, pain, hostility, fear, guilt and sadness. Regular exercising women report a significant decrease in anxiety following base line relaxation but show greater increase in anxiety during a stress task than non-exercisers.

Case History- PMS

Samantha is a 35 year old female who presented with complaints of PMS. Sam stated that although her cycles were totally regular in length, she did experience severe PMS symptoms including mood swings, acne, weight gain and breast tenderness. Sam noted that she had been dealing with these issues for years.

Sam is a busy, working mom with 2 young children. She runs her own business and has therefore increasing amounts of stress in her life. She also stated that she had a long history of “yo-yo” dieting and had a tendency to gain weight easily. She would skip meals in order to lose weight which often

worked in the past but was no longer working for the past year. Sam worked out vigorously 5 days per week without fail and had done so for years.

**Lab testing:**

- Low progesterone
- Low progesterone to estrogen ratio
- Low mid-day cortisol
- Elevated night time cortisol
- Low Free T3
- Elisa Multi food allergy testing revealed allergies to dairy and shellfish

Sam was administered the following natural medicine therapies:

- **Estrogen detoxification:** DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin) -2 caps with breakfast
- **Thyroid support:** Iodine (as potassium iodide), Zinc (as Zinc Picolinate), Copper (as Copper Chelate), L-tyrosine, Thyroid glandular (thyoxyline free)- 2 capsules 2 times per day
- **Medical food:** a powdered medical food designed to nutritionally support the management of conditions associated with metabolic syndrome (including altered body composition)
- **Modified Mediterranean Lifestyle Nutrition Plan** to balance hormones (See Specific Guidelines for Nutritional Lifestyle Management Plan in Weight Gain Section)
- **Cortisol Management:** Ashwagandha, L-theanine, Phosphatidy1serine- 1 cap before bed
- **Blackcurrant oil**- 1 cap 2 times per day
- **Multi B-6:** a B-complex with additional B6- 1 cap 2x per day
Sam came back for a follow-up 8 weeks later because she was out of town on business for much of the previous month. She noted that she was sleeping very well. She had not really noticed beforehand that her sleep was below average as she always just felt wired. She was now experiencing 8 hours of very good quality sleep per night. She did admit to have more difficulty sticking to the meal plan while travelling but made the best choices that she could at the time. She had lost a total of 6 pounds which BIA testing confirmed. Sam also stated that the previous 2 cycles were about 50% better than before but she was still experiencing some PMS symptoms but not as severe.

The following modifications were made for the protocol:

- Continue with all previous remedies
- Bioidentical Progesterone Cream- 1 pump days 14-28 of the cycle

Sam returned 8 weeks later to happily report that she had lost a total of 12 pounds which was more than she had ever lost on any other plan. She stated that her previous 2 cycles were much less severe and that she thought the progesterone cream really made a difference. She was no longer experiencing any acne, breast tenderness or pre-cycle weight gain. Sam noted that she had only a half day of irritability before her cycle which was a marked improvement from previous cycles. She was recommended to stay on the protocol except to discontinue the estrogen detoxification formula.
Fibroids

Fibroids, also called leiomyoma or myomas, are the most common benign uterine tumors of smooth muscle origin. Fibroids are typically slow-growing, non-cancerous growths which occur on the inside or outside walls of the uterus. They have a round and firm texture to them and are usually found in groups and can vary in size from microscopic to larger than a grapefruit. They cause enlargement and distortion of the uterus in 20-25% women by age 40 and account for 1/3 of hysterectomies each year.

Fibroids are classified according to their location: submucosal (just under the endometrium); intamural (within the uterine wall) and subserosal (on the outer wall of uterus).

**Symptoms of Fibroids**

The majority of fibroids (an estimated 50-80%) are asymptomatic, but when symptoms do begin to occur they often start as a vague feeling of pelvic discomfort. Whether or not fibroids cause symptoms depends on their size and location. The most common symptoms of fibroids are heavy and irregular menstruation with menstrual cramps and pelvic pain. Other symptoms associated with fibroids may include:

- Increased menstrual symptoms-pain, heavy bleeding, irregular periods, mid-cycle bleeding
- Feeling of pressure, congestion or bloating
- Pain or bleeding with intercourse
- Urinary frequency and/or increasing irritation of the bladder
- Back pain
- Excessive vaginal discharge
- Abdominal enlargement
• Anemia (due to heavy blood loss during menstruation) and fatigue.
• Infertility
• Miscarriage
• Compression of the ureter resulting in kidney enlargement
• Obstruction of the bowel

The Cause of Fibroids

The cause of fibroids is uncertain but researchers have confirmed that fibroids have more estrogen receptors than normal uterine tissue and are stimulated by high estrogen levels. Fibroids will often experience a growth spurt during peri-menopausal periods and pregnancy where there are increased levels of estrogen. Conversely, fibroids tend to atrophy after menopause when estrogen levels drop. The presence and size of fibroids is greater in women who do not ovulate (i.e. ovaries fail to release eggs). Anything that interferes with ovulation will decrease the levels of progesterone in the body and increase the relative levels of estrogen. There have been several other factors that contribute to the development of fibroids:

Dietary Factors

• Excess consumption of dietary acids (animal proteins and grains) and a lack of alkaline forming foods (fruits and vegetables)
• Both pesticides and heavy metals are linked in the growth of fibroids as the increase estrogen dominance
• Excess animal protein which increases the inflammatory agent arachidonic acid and disrupts natural hormone rhythms
• Insufficient dietary fiber causes the buildup of harmful estrogens in the body leading to estrogen dominance which is the driving force behind fibroids

**Bowel and Liver Toxicity**

• Constipation increases levels of circulating estrogens
• An imbalance between the beneficial bacteria and pathogenic bacteria in the bowel can increase the risk factor for the development of fibroids
• If the liver is over-burdened with alcohol and other toxins, there will be a decrease in its ability to detoxify harmful estrogens

**Other Predisposing Factors**

• Birth Control Pills (increased estrogen; anovulatory)
• Hormone Replacement Therapy (increased estrogen)
• Pregnancy (increased blood supply and high estrogen levels)
• Perimenopause (anovulatory)
• Pituitary tumors, or tumors of the hypothalamus gland
• Ovarian cysts
• Polycystic ovary syndrome
• Thyroid dysfunction (hyper or hypo thyroid)
• Amenorrhea
• Anorexia or low BMI
• Function problems in ovaries
• Melatonin deficiency (as melatonin decreases the number of estrogen receptors in the body)
Laboratory Testing and Diagnosing Fibroids

If a fibroid tumor is present, it can often be felt during a pelvic examination. The uterus can be irregularly shaped or irregularly enlarged and often feels like it has protrusions. Upon discovery of a fibroid during a physical examination, a pelvic ultrasound is the most useful tool in diagnosing a fibroid. An ultrasound will be able to identify fibroids and delineate the size and to some degree the location. The ultrasound can also detect the contour of the uterus, compression of the ureters, and potential enlargement of the kidneys and the presence of an enlarged uterus.

Lab testing will help to determine the presence of estrogen dominance which greatly contributes to fibroid presence. In addition, the thyroid should be evaluated to determine whether or not an imbalance is an underlying cause and anemia should be ruled out.

| Complete Female Hormone Panel | Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age. Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, |

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and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.

**Thyroid Hormone Testing**

A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism include feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia.

**Anemia**

Low serum iron, Hematocrit and low blood Hemoglobin levels can predispose a person to extreme fatigue contributing to depression.
Conventional Medicine Indicated for Fibroids

Many fibroids require no treatment conventionally, only an observation of growth at annual pelvic exams. Fibroids that are manifesting negative symptoms the following are options:

- **Myomectomy**: removal of the fibroid, leaving the uterus in place
- **Hysterectomy**: removal of the uterus (this remains the only proven permanent solution for uterine fibroids)
- **Myoma coagulation and reconstruction**: fibroids are eliminated with the special use of lasers that puncture the fibroid and deflate it
- **Gonadotropin-releasing hormones (Gn-RH) agonists**: produces opposite effects to that of the natural hormones causing estrogen and progesterone levels to fall, menstruation to stop, fibroids to shrink and anemia to improve
- **Androgens**: shrink fibroids, reduce uterine size, stop menstruation and correct anemia
- **Uterine artery embolization**: small particles are injected into the arteries supplying the uterus and cutting off blood flow to the fibroid causing them to shrink.
- **Endometrial ablation** can be used if the fibroids are only within the uterus and not intramural and relatively small. High failure and recurrence rates are expected in the presence of larger or intramural fibroids.

Nutritional Factors Affecting Fibroids

Although dietary changes will not “cure” fibroids, improving one’s diet may help in small ways to decrease heavy bleeding or the pain and discomfort caused by the fibroids. Poor nutritional habits can lead to dysfunctional estrogen metabolism and inhibit the body’s ability to break down and excrete excess estrogen. Estrogen is metabolized in the liver so it can be eliminated from the body by converting
it to estrone and finally to estriol, a weaker form of estrogen that has very little ability to stimulated the uterus. If the liver cannot effectively metabolize estradiol, the uterus may become over estrogenized and respond with fibroid growths.

Increase:

- **Complex carbohydrates**: whole grains such as brown rice, oats, buckwheat, millet and rye are excellent sources of B vitamins. Whole grains also help the body to excrete estrogens through the bowel.

- **Fruits and vegetables**

- **Fiber**: low fiber diets are associated with elevated estrogen levels and poor excretion of estrogen. A high fiber diet may also help to relieve some of the bloating and congestion associated with fibroids. By bulking up the stool and regulating bowel movements some of these symptoms may improve. Some women have a hard time tolerating increased fiber in their diet because of compromised digestive function. In these cases, it may be necessary to increased fiber slowly and include digestive support supplement such as enzymes or acidophilus.

- **Increase legumes and flaxseeds**: these contain phytoestrogens which bind with estrogen receptor sites in the body and stop the update of more harmful xenoestrogens (from chemicals) and stronger estrogens (i.e. estradiol) This decreases estrogen stimulation of the uterus.

- **Cruciferous vegetables**: such as broccoli, cabbage, cauliflower, kale and Brussels sprouts. These contain a phytonutrient called diindolylmethane (DIM) which supports the activity of enzymes that improve estrogen metabolism.

- **Bitter greens**: such as dandelion greens, endive and radicchio added to your salad will help to stimulate the liver and other digestive enzymes.

- **Hot water and lemon juice**: will also help to stimulate the liver and digestive enzymes.
• **Blackstrap molasses**: contains high levels of bioavailable iron (good for those who have heavy menstrual flow) and B-vitamins (used by the liver to metabolize estrogens).

Decrease:

• **Saturated fats**: diets high in saturated fats are associated with high blood levels of estrogen, potentially exacerbating the problem.

• **Caffeine and alcohol**: these interfere with the liver’s ability to transform estrogen into safe metabolites.

• **Sugar**: this interferes with the body’s ability to metabolize estradiol to estrone and to estriol and is also deficient in B vitamins or interferes with B-vitamin metabolism. If B vitamins are lacking in the diet, the liver is missing some of the raw materials it needs to carry out its metabolic processes, and regulate estrogen levels.

• **Red meats**: contribute to the production of inflammatory prostaglandins (hormone-like substances that can contribute to menstrual cramping and pain).

**Herbal Medicine Indicated for Fibroids**

**Chaste berry (*Vitex agnus castus*)**

Chasteberry regulates pituitary function which in turn will help to regulate ovulation and production of progesterone. It can help stabilize an irregular cycle and reduce many of the symptoms of fibroids (including heavy bleeding, menstrual cramps and clotting). Chasteberry has dopaminergic action in that it inhibits the secretion of prolactin from the pituitary gland and normalizes pituitary gland function. This will in turn restore levels of progesterone decreasing the prevalence of estrogen dominance.
Chasteberry has the therapeutic effect of lowering harmful estrogen levels while also maintaining progesterone levels at very small doses (5mls per day).

Liver Stimulating Herbs: these include dandelion root, milk thistle, burdock, artichoke and turmeric. These can be taken in tincture, tea, juice or capsule form.

**Specific Nutrients Indicated for Fibroids**

The liver is responsible for the conversion of the most potent form of estrogen, estradiol, to a weaker form of estrogen (estriol) which can then be eliminated from the body. Therefore the main treatment motivation is to detoxify and protect the liver.

**Lipotropic Factors**: Nutrients such as inositol and choline exert a lipotropic effect, meaning they promote the removal of fat from the liver. They are designed to support the liver’s function in removing fat, detoxifying the body’s wastes, detoxifying external harmful substances (pesticides, fossil fuels, etc.) and metabolizing and excreting estrogens. As a precursor to phosphatidylcholine and glycine and their derivatives – betaine, dimethylglycine, and serine – choline is a premier lipotropic. Choline deficiency is a well-documented cause of fatty liver. Choline emulsifies lipids and provides the substrate for phosphatidylcholine biosynthesis and promotes repair of damaged hepatic cell membranes. Dosage is dependent upon formulation and is usually taken 2 times per day.

**Calcium-d-glucarate**: Supports estrogen metabolism in the liver and excretion out of the colon.

Conjugation and Glucuronidation are detoxification processes that occur when toxins, carcinogens, and used hormones are combined with and bound to water-soluble substances in the liver, thus making them more easily removed from the body. D-glucarate has been shown to support this vital process by inhibiting an enzyme called beta-glucuronidase that can break bonds between toxins and used hormones allowing them to be re-circulated into the blood stream rather than excreted.
D-Glucarate may directly detoxify any environmental agents responsible for cancer formation. It has been postulated that D-glucarate exerts some of its effects by equilibrium conversion to D-glucarolactone which is a potent beta-glucuronidase inhibitor. This is one of the most important nutrients to enhance liver function. Dosage: 250 to 1,000 mg a day

**B-Complex:** B-vitamins are the raw materials needed for enzyme reactions carried out in the liver to metabolize estrogens. Vitamin B6, in particular, enhances the breakdown and removal of estrogen from the body. Dosage 50-100mg per day

**Essential Fatty Acids (EFA'S):** These good fats are required for the production of hormones and the production of anti-inflammatory and anti-spasmodic prostaglandins (hormone-like substances). A combination of Omega-6 fatty acids (evening primrose oil; borage oil) and Omega-3 fatty acids (fish oils) has been found to be most beneficial for the treatment of fibroids.

**N-acetyl cysteine (NAC)**

NAC is the precursor of both the amino acid L-cysteine and reduced glutathione (GSH). Animal and human studies of NAC have shown it to be a powerful antioxidant and a therapeutic agent for heavy metal toxicity and other diseases characterized by free radical, oxidative damage. As a source of sulphydryl groups, NAC stimulates glutathione synthesis, enhances glutathione- S-transferase activity, promotes liver detoxification by inhibiting xenobiotic biotransformation and is a powerful nucleophile capable of scavenging free radicals. Dosage: 500mg-1500mg per day

**Curcumin (Curcuma longa)**

Several studies have illustrated curcumin's hepatoprotective effects. This has lead researchers to suggest its use in protecting the liver from exogenous insults from environmental toxins including...
carbon tetrachloride and acetaminophen. Curcumin also has the capacity to increase bile flow and solubility, making it of potential benefit for someone with a tendency to form gallstones. The hepatoprotective effects of turmeric may stem from its potent antioxidant activity. In addition to its antioxidant effects, Curcumin has also been shown to enhance liver detoxification by increasing the activity of glutathione S-transferase which is an enzyme necessary to conjugate glutathione with a wide variety of toxins in order to facilitate their removal from the body.

**Diindolylmethane (DIM)**

DIM is a powerful metabolizer of estrogen, assisting in removing excess estrogen and benefiting conditions associated with estrogen dominance. Supplementation with DIM can help promote proper estrogen levels through the pre and peri-menopausal years and in men experiencing higher estrogen levels. These conditions include uterine fibroid tumors, fibrocystic breasts and glandular dysfunction. It can also benefit men by improving estrogen-dominance related health issues such as hair loss, atherosclerosis, prostrate problems, lowered libido, and impotency. DIM also promotes the action of testosterone which improves mood, fights depression, boosts libido, improves cardiovascular health, improves memory, and supports muscular development. DIM is a balancer of estrogen metabolism. It increases 2-hydroxyestrone (2-OHE) which is also known as the good or protective estrogen. Dosage 300mg per day

**Pancreatic Enzymes**

Pancreatic enzymes taken between meals have been shown to aid in the breakdown of fibroid tumors. Dosage: 2-4 capsules 3 times per day in between meals
**Bioidentical Progesterone**

Historically studies have shown that progesterone may inhibit the growth of uterine fibroids. The USP progesterone used for hormone replacement comes from plant fats and oils usually a substance called diosgenin which is extracted from a very specific type of wild yam that grows in Mexico, or from soybeans. In the laboratory, diosgenin is chemically synthesized into real human progesterone. The other human steroid hormones, including estrogen, testosterone, progesterone and the cortisones are also nearly always synthesized from diosgenin. Because progesterone is very fat-soluble, it is easily absorbed through the skin. From subcutaneous fat, progesterone is absorbed into capillary blood. Thus absorption is best at all the skin sites where people blush: face, neck, chest, breasts, inner arms and palms of the hands. For premenopausal women, the usual dose is 15-24 mg/day for 14 days before expected menses, stopping the day or so before menses. (Bioidentical Progesterone Cream should contain 450-500mg of progesterone per ounce and 900-1000mg per 2oz container).

**Castor Oil Packs:** Apply a castor oil pack to the lower abdomen 3-5 times per week. The skin absorbs the warm castor oil’s active constituents, lectins, which stimulate the immune response to help shrink fibroids. Castor oil is extracted from the castor plant (*Ricinus communis*). Taken internally, it acts as a powerful laxative and is not recommended to be used in this way. But if applied externally or topically, it has unique medicinal actions on the body. It penetrates skin and muscle to reach right into underlying tissue and assists in the decongestion and the breakdown of inflammatory material through enhancing blood flow and lymphatic flow in the area. This also helps very much in the removal of toxins and the elimination of wastes. Castor oil is also warming to the tissues and this eases stiffness and pain.

**Occasions to use a castor oil pack**

- Lymphatic congestion
• Arthritis or Rheumatism
• Fibromyalgia
• Muscle spasms
• Abdominal inflammations
• Pelvic congestion
• Glandular swellings
• Deep infections
• Adhesions Fibroids
• Endometriosis Back ache
• Muscle tension
• Local pain due to inflammation or spasm

**How to make a castor oil pack**

• Take a piece of flannel or toweling folded 3 or 4 times and large enough to entirely cover the area to be treated.

• Lightly heat the castor oil and pour the oil all over it until thoroughly soaked.

• Place over the skin and cover with a large piece of saran wrap.

• Cover this all with a heating pad or hot water bottle and leave in place for one to two hours.

• After use the pack can be wrapped in plastic and stored in fridge (bring back to room temperature before re-use). You may wish to add a little more castor oil with each use. The pack should be discarded after 10 uses.
**Exercise:** Regular exercise can help to increase the circulation to the pelvic area, decrease the number of anovulatory cycles and decrease menstrual cramping. Exercise will also help you to shed a few pounds which will also help to decrease the estrogen load in your body.

**Reduce Exposure to Environmental Estrogens**

Xenoestrogens found in certain pesticides, plastics, fuels and drugs are usually synthetic and difficult for the body to break down and can amplify the effects of estrogen. These substances can increase the estrogen load in the body over time and are difficult to detoxify through the liver. Exposure to xenoestrogens is a concern for everyone. Those with an estrogen dominance condition such as fibroids should be particularly concerned about avoiding xenoestrogens.

Xenoestrogens can be found in many of our meats and dairy products in the form of chemicals and growth hormones that are given to the animals. These can be quite powerful, and should be avoided where possible. Choosing meat and dairy items that do not contain Rbst can help decrease xenoestrogen exposure.

**Sources of Xenoestrogens that should be avoided:**

- Commercially raised meat
- Canned foods
- Plastics, plastic food wraps
- Styrofoam cups
- Industrial wastes
- Personal care products
- Pesticides and herbicides
- Car exhaust and indoor toxins
- Cosmetics
- Birth control pills and spermicide
- Detergents
- All artificial scents
- Air fresheners, perfumes, etc.)
Case History- Fibroids

Diana is a 48 year old woman who had recently cancelled a scheduled surgery for fibroid removal. She had decided that she would seek alternative medicine in lieu of surgery and if it did not work, then she would go ahead with the surgery. Diana was extremely uncomfortable as the fibroid was sitting on her bladder which caused pressure and frequency. She was carrying approximately 50 extra pounds and stated that she would love to lose some weight. Diana had been suffering with a long term thyroid dysfunction and despite the fact that she was on medication, her thyroid still remained unbalanced.

Diana was under an extreme amount of stress and described herself as a typical “Type A” personality type. She was always rushing and rarely ate regular meals. She often drank pre-made meal replacement drinks and consumed large amounts of coffee with sugar. She had very sluggish bowels and relied heavily on a natural laxative remedy in order to have a bowel movement.

Medications:

- Levothyroxine (Synthroid)- 100mcg per day

Lab testing:

- Low progesterone levels
- Estrogen dominance
- Elevated TSH
- Low DHEA
• Low cortisol levels

Management Plan

Diana was administered the following natural medicine therapies:

• Modified Mediterranean Lifestyle Nutrition Plan to balance hormones (See Specific Guidelines for Nutritional Lifestyle Management in Weight Gain Section)
• Liver detoxification formula: Choline, betaine, methionine, Taraxacum (dandelion), Silymarin marianus, Cynara scolymus (artichoke) and Curcumin- 2 tablets 2 times per day
• Adrenal Support: Vitamin C, B5, B6, Mg, Citrus Bioflavonoids 2 times per day
• Adrenal Support: Licorice root, Ashwagandha root 2 times per day
• Estrogen detoxification: DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin) 2 caps with breakfast
• 2 tbsp. ground flax seed per day
• 2 tbsp. multi fiber formula: psyllium, prune powder and apple pectin
• Calcium/Magnesium citrate 1:1 ratio- 3 tablets before bed
• Decrease coffee consumption
• Daily exercise for 30 minutes (walking, biking, swimming or dancing)

Diana returned 4 weeks later to report that the fibroid cramping and pain had decreased by about 35%. For this she was grateful. She also stated that she was no longer using her natural laxative formula and was having at least one proper bowel movement per day. She had been trying to stick to the eating plan as best she could and she did feel much less stress when eating regularly but admitted her nutrition was still in process.
The following modifications were made to the protocol:

- Castor oil packs- 3-4 times per week at night
- Bioidentical progesterone cream- 1 pump 25 days on and 5 days off
- Everything else remains the same

Diana reported back 8 weeks later to state that the pressure on her bladder had almost completely gone, she was still having regular bowel movements, her perception of stress was much less heightened and she had much more energy. She also noted that she was much quicker to get out of bed in the morning instead of dragging herself out of bed. She had her TSH levels testing 4 weeks previous and for the first time in years, they were stable and within the normal range. She was happy to continue on with the protocol until her next ultrasound to determine the level of fibroid shrinkage.
Endometriosis

Endometriosis is a very common condition affecting approximately 10-15% of women in their reproductive years from age 25 to 45. About 30% of affected women are infertile. In some cases, symptoms begin with the onset of menstruation and in others symptoms begin later and progressively become worse until menopause.

Endometriosis is a condition where the endometrium (the lining of the uterus) is found in locations outside the uterus. Locations can include the ovaries, fallopian tubes, vagina, abdomen, deep inside the uterine muscle, bowel, bladder, utero-sacral ligaments (ligaments that hold the uterus in place), peritoneum (covering lining of the pelvis and abdominal cavity), or other parts of the body. Endometriosis can grow between organs and cause adhesions. When the uterine endometrial lining is shed at the end of a menstrual period, the cells in the rampant tissue also bleed into surrounding tissue, forming blood blisters that become cysts. These cells can also run on their own monthly rhythm. This creates local inflammation and pain and the cysts form scars or adhesions. Scars or adhesions on the fallopian tubes can cause infertility.

Symptoms of Endometriosis

The most common symptoms of endometriosis are:

• Pain before and during periods

• Pain with intercourse

• General, chronic pelvic pain throughout the month
• Low back pain

• Heavy and/or irregular periods

• Painful bowel movements, especially during menstruation

• Painful urination during menstruation

• Fatigue

• Infertility

• Diarrhea or constipation

Other symptoms which are common with endometriosis include:

• Headaches

• Low grade fevers

• Depression

• Hypoglycemia (low blood sugar)

• Anxiety

• Susceptibility to infections, allergies

In the later stages of Endometriosis, adhesions usually develop in the pelvic cavity, which are caused by untreated cysts which can ‘glue’ pelvic organs together. These adhesions will seriously interfere with
normal functions of organs in the pelvis, causing bowel obstructions, digestive problems, infertility, urinary problems and agonizing pains when the adhesions are pulled.

As Endometriosis develops a woman’s immune system becomes more and more impaired and this leads to further health problems. Due to increased research, as well as surveys of Endometriosis patients, it is now becoming clear that women with the disease are susceptible to other serious health problems including:

- Chronic Fatigue Syndrome (100 times more common in women with endometriosis)
- Hypothyroidism (7 times more common in women with endometriosis)
- Fibromyalgia
- Rheumatoid arthritis

**Causes of Endometriosis**

- **Retrograde menstruation** - this theory was postulated in the early 1920s by Dr Sampson. He speculated that during menstruation, a certain amount of menstrual fluid flowed backward from the uterus to ‘shower the pelvic organs and pelvis lining’ with endometrium cells. However, studies have shown that many women experience retrograde menstruation but do not go on to develop Endometriosis. In fact, it is thought that 90 percent of women have retrograde menstruation. This theory also fails to explain why Endometriosis can be found in remote areas such as the lungs, breasts, lymph nodes and even the eyes.
- **Altered Immune Function**- the endometrial tissue survives and responds to the hormone estrogen
• **Free Radical Production** - Increased free radical production promotes the growth of endometrial tissue.

• **The transplantation theory** - That Endometriosis spreads via the circulatory and lymphatic system.

• **Coelomic Metaplasia** - This theory holds that certain cells, when stimulated, can transform themselves into a different kind of cells’, as in women taking estrogen replacement therapy.

• **The hereditary theory** - Women with family members who have endometriosis are more likely, or are susceptible to developing the disease. Similar to this theory, is the idea that women can be born with migrant endometrial cells in the pelvic cavity, which in later life can develop into endometriosis.

• **Environmental factors** - A great deal of research is clearly highlighting that women who are exposed to environmental toxins are at much greater risk of developing endometriosis along with other serious health disorders. These toxins include PCBs, DDT and Dioxin, all of which are widely spread throughout the world today. The other major environmental toxins are collectively known as Xenoestrogens. These are compounds and chemicals found in the environment and food chain that react negatively with the natural balance of the body, both male and female, causing a damaging imbalance in the system.
• **Liver disorders** - The liver regulates and removes estrogen from the body. If the function of the liver is compromised then serious health problems can emerge, including Endometriosis.

• **Auto-immune disorder** - Of all the theories being postulated for the cause of Endometriosis, the idea that this disease is an autoimmune disease seems the very likely, credible and feasible. Autoimmune diseases are now widely believed to occur based on genetic predisposition that may be triggered by environmental and other external factors.

**Risk Factors for Endometriosis**

- Family history of endometriosis, especially mother or sister
- Late childbearing (after age 30)
- History of long menstrual cycles (longer than 7 days) with a shorter than normal time between cycles (shorter than 25 days)
- Abnormal uterus structure
- Diet high in hydrogenated fat (trans-fat), animal fats
- Higher stress levels and poor adaptation to stress
- Estrogen dominance
- Hormone replacement therapy
- Environmental estrogen exposure
- Increased body fat
- Lack of exercise from an early age
- Use of an IUD
- Being a redhead
- Childhood sexual abuse
- Alcohol use
• Prenatal exposure to high estrogen levels
• Poor liver function
• Bowel toxicity and constipation
• Dysbiosis- imbalance in the bowel flora

Protective Factors

• Vegetarian diet that restricts dairy and sugar
• Avoidance of animal fat to reduce arachidonic acid which causes inflammation and pain
• Increased dietary fiber
• Balanced bowel flora
• Optimal bowel function- 3 bowel movements daily reduces estrogen
• High intake of antioxidants reduces adhesions
• Optimal liver function
• Regular exercise

Laboratory Testing and Diagnosis of Endometriosis

Diagnosis methods of Endometriosis can include:

Physical examination

A pelvic examination involves the physician feeling and looking for abnormalities that are associated with endometriosis. Physical findings depend on the severity and location of the disease. There may be palpable nodules or tenderness in the pelvic region, enlarged ovaries, a tipped-back (retro-displaced) uterus, or lesions on the vagina or on surgical scars.
**Laparoscopy**

A laparoscopy is an exploratory procedure that allows the physician to see inside the pelvic region to observe and check for endometrial growths. The procedure involves making a small incision near the navel and inserting a laparoscope (a long, thin, lighted instrument) into the abdomen. The abdomen is distended with carbon dioxide gas to make it easier to see the abdominal organs. Usually, the endometrial growths can easily be seen. Because Endometriosis implants or growths vary in appearance and can be mistaken for other conditions, the lesions should be surgically removed and examined under a microscope to confirm the presence of the disease.

**Imaging tests**

Imaging tests (e.g. pelvic ultrasound, magnetic resonance imaging) may be used to identify individual endometrial lesions, but they are not used to determine the extent of the disease. The implants are not easily identified using this method.

**Biochemical markers**

There has been extensive investigation of a membrane antigen called CA-125 in women with Endometriosis. Several reports suggest that levels of CA-125 are elevated in women with Endometriosis, particularly those in the advanced stages of the disease. A recent study of this antigen level showed it to be high in 90 percent of women with Endometriosis. Possible diagnosis with a blood test to check levels of CA-125 could be used to check for Endometriosis.
In addition lab tests to determine if estrogen dominance is a factor should be administered.

<table>
<thead>
<tr>
<th>Complete Female Hormone Panel</th>
<th>Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age. Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses. SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.</th>
</tr>
</thead>
</table>
Conventional Medicine Treatments Indicated for Endometriosis

Drug Therapy

- Non-steroidal anti-inflammatory drugs, such as ibuprofen, naproxen and mefenamic acid relieve mild to moderate pain in about 80% of women
- Drug treatments are geared towards manipulating hormone levels, either through oral contraceptive use, progestins, or gonadotrophin releasing hormone (GnRH) analogs, which cause a decline in FSH and LH and inhibit ovulation and menstruation, putting women in a menopausal state
- Oral contraceptives are usually recommended to be taken continuously so there is no menstrual bleeding, and this prevents implanted endometrial tissue from enlarging, bleeding and causing pain. Oral contraceptives they must be continued long term to be effective.

Surgery

- Surgery can bring long lasting pain relief to some women
- Adhesions are removed, so pregnancy becomes possible. Surgical techniques include laser surgery, electro cautery (burning), knife excision and scraping and a partial or full hysterectomy

Nutritional Factors Affecting Endometriosis

Populations from certain countries show a much higher incidence of hormonal symptoms especially in the Western hemisphere where they derive a large part of their dietary calories from fat. Women who switched from a typical high-fat, refined-carbohydrate diet to a low-fat, high-fiber, plant-based diet have shown to have decreasing estrogen levels even though they did not adjust their total calorie intake.

138 Complete Natural Medicine Guide to Women’s Health Sat Dharam Kaur, ND pg. 366
Plants contain over 5,000 known sterols that have progestogenic effects. Cultures whose eating habits are more wholesome and who exercise more have a far lower incidence of hormonal symptoms because their pre and postmenopausal levels of estrogen do not drop as significantly.

The following recommendations are specifically indicated for endometriosis:

- Eat a high fiber diet: Use 2 tbsp per day of ground flax seed to displace strong estrogens and cleanse the bowel; Use 45mg of fiber daily: 2 tbsp. of wheat bran (if not allergic). 1 tbsp. of psyllium, 2 tbsp. freshly ground flax seed and 1 cup of beans daily to improve elimination of estrogen
- Add 2 tbsp. of unheated flax seed oil to your food to decrease inflammation
- Use 2 tsp. or more of turmeric daily to inactivate environmental estrogens, cleanse your liver and decrease inflammation
- Eat a high protein vegetarian diet
- Increase intake of vegetable, nuts and seeds
- Eat cold water fish (salmon, tuna, sardines, mackerel, herring) 2 to 3 times per week
- Eat organic foods
- Omit alcohol, dairy, red meat, sugar and caffeine
- Studies have shown that drinking more than two cups of coffee a day may increase estrogen levels in women. It could also lead to problems such as endometriosis and breast pain. An average cup of coffee (4 oz.) contains about 100 mg of caffeine, and an average cup of tea (8 oz.) contains about a third to half the caffeine content of coffee.
**Herbal Medicine Indicated for Endometriosis**

Estrogen is metabolized in the liver. Herbs that fortify the liver will speed up estrogen clearance from the body. Estrogen that is not metabolized by the liver will continue to circulate and exert its effect on the body, worsening any developing endometriosis.

**Milk Thistle (Silymarin marianus)**

Much research has been done on a special extract of milk thistle known as Silymarin, a group of flavonoid compounds. These compounds protect the liver from damage and enhance the detoxification process. Silymarin prevents damage to the liver by acting as an antioxidant. It is much more effective than vitamin E and vitamin C. Numerous research studies have demonstrated its protective effect on the liver. Silymarin also works by preventing the depletion of glutathione. The higher the glutathione concentration, the greater the liver’s capacity to detoxify harmful chemicals. Moreover, Silymarin is shown to increase the level of glutathione by up to thirty-five percent. In human studies, Silymarin is shown to exhibit positive effects in treating liver diseases of various kinds including cirrhosis, chronic hepatitis, fatty infiltration of the liver, and inflammation of the bile duct. Dosage: standardized extract 200 to 800 mg a day

**Dandelion Root (Taraxacum officinalis)**

Dandelion root works on the liver and gallbladder to help remove waste products and has been deemed as one of nature’s most detoxifying herbs. By supporting the liver, excessive estrogens and toxins can be deactivated. In addition, Dandelion leaf contains vitamins A, C, K, potassium, calcium and choline.
Prickly Ash (*Xanthoxylum americanum*)

Through its stimulation of blood flow throughout the body, Prickly ash helps enhance the transport of oxygen and nutrients and the removal of cellular waste products. Prickly ash is known for its specific action on capillary engorgement and sluggish circulation. For women with pelvic congestion, this herb enhances circulation throughout the pelvis.

Motherwort (*Leonorus cardiaca*)

Motherwort is a mild sedative and is a well-known anti-spasmodic. Women with endometriosis generally experience uterine cramps and pain, Motherwort is useful in promoting relaxing during times of extreme bearing down pain in the uterus and other regions. The alkaloids stachydrine, betonicine and leonurine are responsible for these anti-spasmodic effects. Motherwort promotes blood flow to reproductive organs, balances hormones affecting the menstrual cycle and is of specific use in conditions with associated nervous origin such as anxiety or tension.

Chasteberry (*Vitex agnus castus*)

Chasteberry regulates pituitary function which in turn will help to regulate ovulation and production of progesterone. It can help stabilize an irregular cycle and reduce many of the symptoms of fibroids (including heavy bleeding, menstrual cramps and clotting). Chasteberry has dopaminergic action in that it inhibits the secretion of prolactin from the pituitary gland and normalizes pituitary gland function. This will in turn restore levels of progesterone decreasing the prevalence of estrogen dominance. Chasteberry has the therapeutic effect of lowering harmful estrogen levels while also maintaining progesterone levels at very small doses (5mls per day).
Specific Nutrients Indicated for Endometriosis

Magnesium

Magnesium is a mineral and is believed to ease cramping with menstruation. Low levels in the diet and in our bodies increase susceptibility of diseases. These include heart disease, high blood pressure, kidney stones, cancer, insomnia, PMS and menstrual cramps. Dosage: 200mg-600mg per day

Zinc

Zinc is essential for enzyme activity, helping cells to reproduce which will help with healing. Zinc is also reported to improve the immune system and helping to create an emotional sense of well-being. Zinc also lowers estrogen production in endometrial cells by inhibiting aromatase enzyme. 33 % of healthy adults over age 50 have zinc deficiency and don't know it. The percentage increases to 90 % for those older Dosage: 50mg per day

Calcium

Levels of calcium in menstruating women decrease 10 to 14 days before the onset of menstruation. Deficiency may lead to muscle cramps, headache or pelvic pain. Dosage: 500mg-1500mg per day

Beta Carotene

Beta Carotene (or pro Vitamin A) is the compound which colours vegetables yellow or orange. Beta Carotene, one of over 400 identified carotenes, protects plants from oxidative damage during photosynthesis. Beta Carotene consists of two molecules of Vitamin A linked to each other. The body converts Beta Carotene into Vitamin A as needed. This conversion is inhibited in diabetics. Beta Carotene acts as an anti-oxidant, trapping and neutralizing single oxygen molecules and other free-
radicals which can damage the body’s cellular membranes, lipids, proteins, and vitamins. In addition, Beta Carotene enhances the immune system by stimulating the activity of interferon. Dosage: 15-45 mg of Beta Carotene/day (25,000-75,000 IU)

**B vitamins**

B vitamins are important for the breakdown of proteins, carbohydrates and fats in the body. B vitamins are reported to improve the emotional symptoms of endometriosis and have proved helpful in dealing with PMS. They act by enabling the liver to inactivate estrogen. Studies have shown that supplementation of B vitamins may cause the liver to become more efficient in processing estrogen. Dosage: 50-100mg per day

**Vitamin C**

Vitamin C is well known for helping to boost the immune system and help provide resistance to disease. It is also used in the body to build and maintain collagen within the body. Studies using Vitamin C show an increase in cellular immunity and decreases in autoimmune progression and fatigue. Vitamin C also enhances immunity and decreases capillary fragility as well as tumor growth all of which are involved in various levels in endometriosis. Dosage: 6-10 grams per day in divided doses starting at 1 g and increasing every 4 days

**Vitamin E**

Vitamin E plays an important role by increasing oxygen carrying capacities and also strengthens the immune system. Vitamin E helps to correct abnormal progesterone/estradiol ratios through the inhibition of the arachidonic lipid pathway. Inhibiting the arachidonic pathway helps to prevent the
release of chemicals that would normally cause edema, inflammation and smooth muscle contraction.

Dosage: 400-800 IU per day

**Fish Oils (Omega 3 Fatty Acids)**

Fish oils increase anti-inflammatory prostaglandins and decrease inflammatory prostaglandins (PGE2, PGF2-alpha). Fish oils have also been shown to decrease endometrial growth and decrease pain. Recent research demonstrates that having a higher omega 3 to omega 6 fatty acid ratios may have a suppressive effect on the in vitro survival of endometrial cells. The obvious conclusion is that omega 3 fatty acids may be useful in the management of endometriosis by decreasing inflammation. Dosage: 1000-6000mg per day

**Bioidentical Progesterone**

Natural progesterone helps to reduce the risk of ovarian, endometrial and breast cancers. Unopposed estradiol causes are frequently associated with fibrocystic breast disease, endometriosis, PMS, fibroids, and breast cancer. Specific dosage varies depending on the condition. For endometriosis, apply 20 mg of natural progesterone cream starting at day 8 and continue until day 26 of a usual 28-day cycle. It takes up to 6 months to notice the effect, and if no results are seen within 2 months, the dosage may have to be increased up to 40 mg a day. As the desired results are obtained, the dosage can be decreased until the lowest effective dose is found. Continue until menopause, and if flare ups occur, increase the dosage to reduce symptoms.

**Castor Oil Packs**

**Castor Oil Packs:** Apply a castor oil pack to the lower abdomen 3-5 times per week. The skin absorbs the warm castor oil’s active constituents, lectins, which stimulate the immune response to help shrink
fibroids. Castor oil is extracted from the castor plant (*Ricinus communis*). Taken internally, it acts as a powerful laxative and is not recommended to be used in this way. But if applied externally or topically it has unique medicinal actions on the body. It penetrates skin and muscle to reach right into underlying tissue and assists in decongestion and breakdown of inflammatory material through enhancing blood flow and lymphatic flow in the area. This also helps very much in the removal of toxins and the elimination of wastes. Castor oil is also warming to the tissues and this eases stiffness and pain.

**Occasions to use a castor oil pack**

- Lymphatic congestion
- Arthritis or Rheumatism
- Fibromyalgia
- Muscle spasms
- Abdominal inflammations
- Pelvic congestion
- Glandular swellings
- Deep infections
- Adhesions Fibroids
- Endometriosis Back ache
- Muscle tension
- Local pain due to inflammation or spasm

**How to make a castor oil pack**

- Take a piece of flannel or toweling folded 3 or 4 times and large enough to entirely cover the area to be treated.
• Lightly heat castor oil and pour oil all over it until thoroughly soaked.
• Place over the skin and cover with a large piece of saran wrap.
• Cover this all with a heating pad or hot water bottle and leave in place for one to two hours.
• After use the pack can be wrapped in plastic and stored in fridge (bring back to room temperature before re-use). You may wish to add a little more castor oil with each use. The pack should be discarded after 10 uses.

Exercise

Properly performed exercises have been shown to modulate hormonal imbalances. Moderate exercise also increases the body's production of endorphins which are natural pain relievers. Those who exercise regularly are also happier, less depressed and have an optimistic outlook on life. This results in increased life expectancy. Statistically, life expectancy increases by two hours for every hour spent doing the proper exercises.

Precision anti-aging exercises must incorporate flexibility, cardiovascular and strength training exercises. All it takes is 5 minutes of flexibility training every day, 20-30 minutes of cardiovascular training 3 times a week and 15-20 minutes of strength training 2 times a week. A properly structured program takes an average of 30 minutes a day which is less than 2% of the entire day.

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- Industrial wastes
- Personal care products
- Pesticides and herbicides
- Paints, lacquers and solvents
- Car exhaust and indoor toxins
- Cosmetics
- Birth control pills and spermicide
- Detergents
- All artificial scents
- Air fresheners, perfumes, etc.)
Polycystic Ovarian Syndrome (PCOS)

PCOS is a common condition that affects 4-10% of North American women of reproductive age and accounts for approximately 8% of all anovulation cases. PCOS is a syndrome rather than a disease because it is not a specific and constant set of symptoms and physical characteristics. PCOS is rather used to describe a group of clinical presentations characterized by bilateral polycystic ovaries potentially combined with amenorrhea, anovulation, infertility, insulin resistance, truncal obesity and hirsuitism. Hormone imbalances can range from the hypothalamus, pituitary gland, ovaries, and adrenal glands to insulin excess, androgen excess and prolactin excess.\textsuperscript{139} Polycystic ovaries are defined as 12 or more follicles in at least one ovary as seen by an ultrasound. Follicles are small, fluid-filled sacs containing eggs. In PCOS, the follicles bunch together to form cysts. Note that not every woman with PCOS has polycystic ovaries.

Symptoms of PCOS

- **Weight gain or inability to lose weight.** Weight accumulation is particularly found around the waist (waist: hip ratio is >0.85) and this weight gain is linked with imbalances of glucose and insulin in the body.

- **Absent or Irregular Periods** (amenorrhea or oligomenorrhea). Nine or few menstrual cycles per year may be a sign of PCOS. Bleeding may be heavier than normal. These conditions are caused because the ovaries are not producing hormones that keep the menstrual cycle regular. Irregular or absent menses indicate that a woman is not likely not ovulating.

\textsuperscript{139} Fundamentals of Naturopathic Endocrinology Michael Friedman, MD pg. 151
• **Infertility.** The high levels of excess insulin seen with PCOS can stimulate the ovaries to produce large amounts of the male hormone (androgens) which can possibly prevent the ovaries from releasing an egg each month, thus causing infertility.

• **Excess hair growth** (Hirsuitism). High levels of circulating testosterone cause excess hair in the facial area, arms and legs, abdomen, chest and back.

• **Thinning hair.** This is caused by higher levels of androgens in women.

• **Acne.** Due to the higher levels of androgens, the acne is usually found around the face (especially along the jaw line), chest and back.

• **Ovarian Cysts.** The elevation in insulin levels contributes to the formation of cysts in the ovaries in part due to the hormonal imbalances and also because the ovaries are highly sensitive to the influence of insulin.

• **Recurrent miscarriage.** 45%miscarry in the first trimester.

• **Fatigue.** Fatigue is a common symptom that may be related to PCOS in that insulin resistance and the possibility of hypothyroidism can be one cause of reduced energy levels.

• **Other Skin Problems.** Skin tags - thick lumps of skin sometimes as large as raisins - can form as a result of PCOS. They are usually found in the armpits, at the bra line or on the neck. Darkening and thickening of the skin can also occur around the neck, groin, underarms or skin folds. This condition, called Acanthosis Nigricans, is a sign of insulin resistance. Other women with PCOS note an increase in dandruff.

• **Mood Swings.** Many women with PCOS may find themselves more anxious or depressed by their appearance or their inability to become pregnant.

• **High cholesterol** (Hyperlipidemia) and **high blood pressure** (Hypertension).

• **Sleep Apnea.** Women with PCOS have a high risk for sleep apnea. This may be due to the increased BMI (Body Mass Index) in about half of women with PCOS. Another possible reason
for the increased prevalence of sleep apnea in people with PCOS is the effect of testosterone on blood vessels.

Current studies clearly link Polycystic Ovarian Syndrome and Insulin Resistance. A report released in the British Journal of Obstetrics and Gynecology in 2000 indicated that up to 40 percent of women with PCOS have either impaired glucose tolerance or Type 2 Diabetes by age 40. In addition, with Polycystic Ovarian Syndrome, high levels of insulin stimulate the ovaries to produce large amounts of testosterone which can possibly prevent the ovaries from releasing an egg each month, thus causing infertility. High testosterone levels can also cause excessive hair growth, male pattern baldness and acne. Researchers have also found a link between Polycystic Ovarian Syndrome and other metabolic conditions such as high levels of obesity, LDL (the "bad" cholesterol) and high blood pressure. These are all risk factors for coronary heart disease, as well as symptoms of Metabolic Syndrome. Also known as Syndrome X, this disorder substantially increases your chances of developing Cardiovascular Disease.

The underlying cause of PCOS is varied and still evolving. Some of the most current findings include:

- Elevated secretions of androgens from the ovaries and/or adrenal glands that overwhelm the body’s ability to convert these androgens to estrogen
- Abnormal ratios of the pituitary hormones, luteinizing hormone (LH) to follicle stimulating hormone (FSH)
- Failure of the monthly maturing of a follicle in the ovaries
- A resistance to insulin
- Likely a genetically driven defect in the action of insulin
Laboratory Testing and Diagnosis of PCOS

Women with PCOS are strongly at risk for diabetes, high blood pressure, heart disease and cancer. Findings substantially raised the bar on the seriousness of the condition and made it even more important that physicians correctly diagnose PCOS and recommend appropriate therapy. Specific hormonal imbalances are typically seen in patients with PCOS and testing should therefore include the following:

- Elevated fasting insulin levels
- Elevated LH, which causes the ovaries to produce more androgens
- Elevated androstenedione and testosterone
- Elevated prolactin (in 25% of cases)
- Elevated estrogen, specifically estrone
- Decrease SHBG (sex hormone binding globulin)
- Increased levels of growth hormone
- Increased levels of IGF-1
- Elevated triglycerides
- Elevated LDL; low HDL
- Elevated cortisol

The following lab panels are indicated:

<table>
<thead>
<tr>
<th>Adrenal Stress Index</th>
<th>The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in</th>
</tr>
</thead>
</table>
response to real-life stress.

The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions.

The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.
are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.

<table>
<thead>
<tr>
<th>Thyroid Hormone Testing</th>
<th>A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism</th>
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include feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia.

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<tr>
<th>Cardiometabolic Profile (hs-CRP), Fasting Insulin, Hemoglobin A1c (HbA1c), Fasting Triglycerides, Total Cholesterol, LDL Cholesterol, VLDL Cholesterol, and HDL Cholesterol</th>
<th>High Sensitivity C-Reactive Protein (hs-CRP)</th>
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<tr>
<td>C-reactive protein (CRP) is an established marker of inflammation and has recently been suggested to be an important contributor to pro-inflammatory and prothrombic elements of CVD risk. Increased CRP levels, which correlate inversely with insulin sensitivity, have been found in individuals with polycystic ovarian syndrome and may be a marker of early cardiovascular risk in these patients.</td>
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<tr>
<td>Fasting Insulin</td>
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<tr>
<td>High fasting insulin levels are a good indicator of insulin resistance, which occurs when the cellular response to the presence of insulin is impaired, resulting in a reduced ability of tissues to take up glucose for energy production. Chronically high insulin levels are seen as the body attempts</td>
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to normalize blood sugar levels.
HbA1c
HbA1c levels above 6% can predict CVD and DM2 in high risk individuals
Fasting Triglycerides
Hypertriglyceridemia, a triglyceride level >150 mg/dL, is an established indicator of atherogenic dyslipidemia and is often found in untreated DM2 and obesity.
Total Cholesterol, LDL Cholesterol, VLDL Cholesterol, and HDL Cholesterol
Abnormalities in the lipid profile, including high total cholesterol, high LDL cholesterol, high VLDL cholesterol, and low HDL cholesterol, are a significant component of coronary heart disease risk because of their contribution to the development of atherosclerosis.

**Conventional Pharmaceutical Indications for PCOS**

- **Oral Contraceptives**: These artificially regulate the menstrual cycle and prevent excess hair growth but will cause insulin levels to become higher and increase long term risk of heart disease and breast cancer
• Ovulation induction: Drugs such as Clomid are used to induce ovulation in women who are attempting to conceive and more than six cycles increase the risk of ovarian cancer

• Metformin: This is the most commonly prescribed medication for PCOS. It increases body cell sensitivity to insulin so that less needs to be secreted. By lowering insulin levels, Metformin will lower testosterone, androstenedione and LH levels and increases SHBG and enhances ovulation.

• Spironolactone: This is a drug that inhibits the binding of testosterone to receptors in hair follicles and therefore decreases abnormal hair growth. Side effects include excess urination, weight gain, breast tenderness and dizziness

**Nutritional Factors Affecting PCOS**

• Avoid all sugars and sweeteners other than stevia and moderate amounts of whole fruit

• Avoid carbohydrates that have a high glycemic index such as white rice, corn, millet and white flour

• Avoid all refined and processed foods

• Consume low glycemic carbohydrates such as pearl barley and specifically legumes

• Avoid red meat and dairy as they increase the risk factors for heart disease and cancer

• Eat small, frequent meals throughout the day rather than the typical 2-3 large meals

• Combine protein with every meal or snack to lower insulin resistance

• Eat high fiber foods that are low in the glycemic load such as apples, cabbage, raw carrots, oatmeal, oat bran, sesame seeds, flax seeds, psyllium seed powder and beans (legumes)

• Consume 3-4 cups of organic green tea daily to lower testosterone and insulin

• Consume complex carbohydrates at breakfast such as steel cut oatmeal or buckwheat (which contains D-chiro-Inositol), oat bran with sliced organic apple and cinnamon (to lower blood sugar) with unsweetened soy, almond or hemp milk
Herbal Medicine Indicated for PCOS

**Saw palmetto (Serenoa serrulata)**

Saw palmetto reduces the conversion of testosterone to dihydrotestosterone which is the more potent form by inhibiting the activity of the enzyme, 5-alpha reductase. This reduction of testosterone aids in decreasing the PCOS symptoms of acne, excess facial and body hair as well as hair loss from the scalp. Saw Palmetto’s actions are mainly due to its content of polysaccharides, steroids, fixed oils including free fatty acids. These constituents inhibit androgen binding action and are estrogenic in nature.

**Gymnema (Gymnema sylvestre)**

Gymnema is a plant that has been used for over 2000 years in Ayurvedic medicine in India to treat diabetes and to improve the blood glucose lowering effects of insulin. Gymnema is often given clinically to women with polycystic ovarian syndrome because it acts in a very similar manner to metformin. One study of lab animals showed that Gymnema suppresses the elevation of blood glucose level by inhibiting glucose uptake in the intestine.\(^{140}\) Gymnema actions have numerous effects on the body. It regenerates the cells in the islets of Langerhans which are specialized cells in the pancreas which produce insulin. Gymnema also stimulates the pancreas to produce more insulin and increases the activity of certain enzymes which help the cells to utilize glucose therefore increasing their sensitivity. In addition, Gymnema increases the uptake of glucose into the muscles and cells of the body where it can be used for energy and it reverses damage done to the liver by high blood sugar.

\(^{140}\) http://www.ovarian-cysts-pcos.com/gymnema.html
**Licorice Root (Glycyrrhiza glabra)**

In a 1982 trial, eight anovulatory infertile women with elevated testosterone were investigated for lowering serum testosterone levels and inducing regular ovulation by a formula containing equal parts of peony root (Paeonia lactiflora) and licorice root (Glycyrrhiza glabra). Serum testosterone levels were significantly lowered in seven patients by doses of 5-10 grams of the combination daily for 2-8 weeks. Six of seven patients ovulated regularly and two of six patients conceived (Yaginuma et al.)

In a similar trial in 1988, a significant reduction of circulating testosterone occurred in 18 of 20 female subjects with PCOS (Takahashi et al.). Five of the 18 became pregnant. The mechanisms of action are partly due to its content of glycyrrhetic acid, a metabolite of glycyrrhizin which inhibits the conversion of androstenedione to testosterone. Armanini et al. suggested that glycyrrhizin, or its metabolites, act on the enzymes that convert 17-hydroxy-progesterone to androstenedione, effectively lowering testosterone.

**Chasteberry (Vitex agnus castus)**

Chasteberry acts on the hypothalamus and pituitary glands by increasing luteinizing hormone (LH) production and mildly inhibiting the release of follicle stimulating hormone (FSH). The result is a shift in the ratio of estrogen to progesterone, in favor of progesterone. The ability of chaste tree berry to raise progesterone levels in the body is an indirect effect, so the herb itself is not a hormone. It may be helpful for women with PCOS who do not have a normal menstrual cycle and thus don't ovulate or menstruate. A large percentage of these menstrual problems are related to insufficient progesterone during the luteal phase of the menstrual cycle which is called a luteal phase defect or corpus luteum insufficiency. A corpus luteum insufficiency is defined as an abnormally low progesterone level 3 weeks after ovulation.

141 http://www.digitalnaturopath.com/cond/C485625.html
after the onset of menstruation. Insufficient levels of progesterone may result in the formation of ovarian cysts. In addition, some PCOS women have too much prolactin which can inhibit fertility.

**Specific Nutrients Indicated for PCOS**

**D-chiro-inositol**

D-chiro-inositol is a relative of common inositol (a B vitamin) and is found in small concentrations in the human body and in some foods. It is a compound that has been reported to affect the action of insulin. There is evidence that the insulin resistance seen in women with PCOS is due in part to a deficiency of D-chiro-inositol or to a defect in its utilization in the tissues. If these abnormalities can be reversed by supplementation with D-chiro-inositol, then this compound might be beneficial for women with PCOS. To test that possibility, 44 obese women with PCOS were randomly assigned to receive, in double-blind fashion, D-chiro-inositol (1,200 mg once a day) or placebo for eight weeks. Supplementation with D-chiro-inositol resulted in an improvement in insulin resistance and a 55% reduction in testosterone levels compared to the placebo group. Significantly more women ovulated in the D-chiro-inositol group than in the placebo group (86% vs. 27%). D-chiro-inositol supplementation decreased testosterone levels and improved ovulatory function, presumably by enhancing the action of insulin.\(^ {142}\) Dosage: 1200mg per day

**Vitamin D**

Vitamin D also plays a role in glucose metabolism and is commonly deficient in individuals with type 2 diabetes, a common complication of PCOS. Supplementing with vitamin D has been shown to improve glucose tolerance, insulin secretion and insulin sensitivity in those with DM. A deficiency of vitamin D

may be more frequent in women with PCOS and in a small study, five of thirteen women had an overt
vitamin D deficiency. Seven of the nine women with no menses or infrequent menses had a return to a
normal menstrual cycle within two months of being given 50,000 IU once or twice per week of vitamin D
and 1,500 mg per day of calcium.\textsuperscript{143} Dosage: 1000iu-10 000 IU

\textbf{Chromium}

Chromium potentiates the action of insulin, probably by facilitating the binding of insulin to its receptor,
by enhancing insulin-dependent functions, or both.\textsuperscript{144} Supplementing with chromium has been shown in
some studies to improve the blood sugar control in those with type 2 DM. Giving PCOS women 1,000
mcg per day of chromium for as little as two months was able to improve insulin sensitivity by 30% and
by 38% in obese women with PCOS.\textsuperscript{145} Dosage: 600-1000mcg per day

\textbf{Fish Oils (Omega 3)}

Fish oil supplements rich in the omega-3 fatty acids EPA and DHA can decrease insulin resistance to aid
in the treatment of PCOS. In addition to being characterized by insulin resistance as well as
hyperinsulinemia, or high blood insulin levels, the hormonal imbalance underlying PCOS also includes
high androgen levels. A study published in the March 2011 issue of the "American Journal of Clinical
Nutrition" showed that omega-3 fat supplementation in young women with PCOS resulted in improved
androgen levels.\textsuperscript{146} Fish oils also help to keep cell membranes flexible with more insulin receptors. In

\textsuperscript{143} Prager N, Bicket K, French N, Marovici G. A randomized, double-blind, placebo-controlled trial to determine the
effectiveness of botanically derived inhibitors of 5-alpha-reductase in the treatment of androgenetic alopecia. JAH
\textsuperscript{144} Mertz W. Chromium and it relation to carbohydrate metabolism. Med Clin North Am 1976;60:739-744
\textsuperscript{145} Lydic L, McNurlan M. Komaroff E, et al. Effects of chromium supplementation on insulin sensitivity and
\textsuperscript{146} http://www.todaysdietitian.com/newarchives/td\_1004p14.shtml
addition, they improve glucose metabolism and promote healthy prostaglandin production. Dosage: 2000-4000mg per day

**N-acetyl-cysteine (NAC)**

NAC is a derivative of the amino acid cysteine which has antioxidant properties and is required for the body’s production of glutathione. Glutathione, along with NAC, are powerful antioxidants that are needed in the treatment of PCOS. NAC is not found in the diet but is available as a nutritional supplement. It has been shown to be incredibly beneficial in controlling PCOS. A recent study evaluated the effect of NAC on insulin secretion and insulin resistance in 6 lean and 31 obese women with polycystic ovary syndrome. They took 1.8 grams of NAC daily for 5-6 weeks. A dose of 3 grams per day was arbitrarily chosen for the massively obese. Six of the 31 obese patients were treated with placebo. Those treated with NAC had a reduction of their insulin resistance and a significant fall in testosterone levels. **147 Dosage: 1800mg-3000mg per day**

**Alpha Lipoic Acid (ALA)**

ALA is one of the most potent antioxidants with the unique ability to cross the blood-brain barrier and work as a free radical scavenger in the brain. ALA is both water soluble and fat soluble and is therefore capable of providing antioxidant benefits to both the inside and outside of the cells. ALA also helps the body to re-use other antioxidants such as vitamins C & E, the amino acid glutathione and substances such as Co-Enzyme Q10 which is very important in glucose metabolism and regulation of blood sugar levels. Of particular relevance to women with PCOS, ALA has been shown to greatly increase insulin sensitivity. It has also been proven to increase the rate of glucose transportation from the blood into the cells where it can provide energy to the muscles and brain, increasing muscle performance (under

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exercise conditions) and provide increased brain energy availability. Dosage: 600mg per day in divided doses

**Bioidentical Progesterone Cream**

Women with PCOS always have low progesterone levels and therefore one of the core treatments is correcting these levels by supplementing with bioidentical progesterone. Bioidentical progesterone is progesterone which is derived from a natural plant source, yam and then converted to progesterone. Bioidentical progesterone has the same molecular configuration as the progesterone produced by the body and can be used to supplement the progesterone produced by the body and to balance estrogen, testosterone and progesterone levels. Bioidentical progesterone has no side effects when 20 mg to 40 mg a day is used. In early PCOS, use 32mg from day 12-26; in advanced PCOS, use 54mg from day 12-26 of the cycle; in severe PCOS with pain, use 64mg of progesterone cream from day 5-26

**Exercise and PCOS**

By exercising 4-8 hours per week, muscle mass can be increased, fat mass can be decreased and hormones can be balanced. A number of studies have demonstrated that women with PCOS or insulin resistance can greatly benefit from regular exercise. For example, a study conducted at the University of Adelaide in Australia showed that a six month program of diet and exercise helped 18 overweight PCOS women normalize their hormones. They experienced an 11% reduction in central fat, 71% improvement in insulin sensitivity, 33% fall in insulin levels, and a 39% reduction in LH (luteinizing hormone) levels. The women in this study achieved surprising results with a combination of diet and exercise in just six
months. This study is relevant because insulin resistance and chronically high insulin and LH are reasons why PCOS women don't ovulate and why they have a number of other troubling symptoms.148

Case History- PCOS

Kristi is a 30 year old female who presented with hormonal imbalances and migraine headaches. Kristi had been on the birth control pill for 15 years to regulate her period. Although she had ceased using the BCP over one year ago, she had still not had a period. Kristi was concerned that she might not be able to conceive when the time was right. Kristi also had weight issues. She was 5 feet 2 inches tall and weighed 214 pounds. Kristi attributed her weight issues to her poor nutritional choices. It was common for Kristi to go without eating for an entire day and have her first meal at dinner time. She consumed large amounts of coffee throughout the day.

Kristi wanted to know the underlying cause of her hormonal issues and also wanted her thyroid tested as she had a strong family history of hypothyroidism.

Lab Testing:

- Elevated testosterone levels
- Very low progesterone levels
- Estrogen dominance
- Elevated Androstenedione levels
- Elevated TSH levels
- Elisa multi food allergy testing revealed severe allergies to dairy, eggs, wheat and sugar

Kristi was administered the following natural medicine remedies:

- **Detoxification diet and cleanse for 21 days;** Elimination of allergenic foods as well as inflammatory foods including dairy, wheat, eggs, soy, beef, pork, shellfish, peanuts, corn, sugar, processed foods and alcohol
- **Thyroid support:** Iodine (as potassium iodide), Zinc (as Zinc Picolinate), Copper (as Copper Chelate), L-tyrosine, Thyroid glandular (thyroxine free)- 2 capsules 2 times per day
- **Estrogen detoxification:** DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin)- 2 caps with breakfast

Kristi returned 3 weeks later to report that she felt much better overall from the cleanse. She reported more energy, better digestion, clearer thinking and improved sleep. She did not however experience any hormonal improvements.

The following modifications were made to the protocol:

- **Continue with the thyroid support and estrogen detoxification**
- **Medical food:** a powdered medical food designed to nutritionally support the management of conditions associated with metabolic syndrome (including altered body composition)
- **Modified Mediterranean Lifestyle Nutrition Plan to balance hormones** (See Specific Guidelines for Nutritional Lifestyle Management Plan in Weight Gain Section)
- **Bioidentical progesterone cream-** ½ pump on days 14-28 of the cycle
- **Testosterone lowering formula:** Saw Palmetto(berry, standardized to 25% fatty acids), Fennel(*Foeniculum vulgare*, seed), Urtica dioica(leaf, standardized to 1% plant silica), Ocimum
sanctum(leaf), Trigonella foenum-graecum(seed) and Pygeum africanum(bark, standardized to 12% phytosterols)

- Vitex agnus castus- 5 mls per day

Kristi reported back 8 weeks later. She was thrilled that she had lost 11 pounds and she was really being diligent with her meal plan and avoidance of allergenic foods. Kristi stated that she did not have any migraines in the past 2 months which was a marked improvement. Kristi had not yet had any signs of a cycle but was happy to continue on with the regime.

The following modifications were made to the protocol:

- Increase bioidentical progesterone cream to 1 full pump days 14 to 28 of the cycle
- Blood sugar management: A multi nutrient formulated product containing a full range of multi vitamins as well as chromium, alpha lipoic acid, cinnamon, Taurine, L-carnosine and Catechins- 1 tablet before each meal

Kristi reported back 8 weeks later and stated that she had now lost a total of 23 pounds and she was really feeling great. She had noticed over the last 2 cycle’s signs of a cycle starting including mild pelvic cramping.

The following modifications were made to the protocol:

- Increase bioidentical progesterone cream to 1 full pump 25 days of the month with a 5 day break
- Increase testosterone lowering product to 2 capsules 2 times per day
- Myo-Inositol- 1 scoop 2 times per day

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Kristi returned 12 weeks later and was very happy to report that she had experienced 2 normal menstrual cycles. She continued to lose weight and was recommended to stay on her current protocol.
Ovarian Cysts

Ovarian cysts are a common gynecological problem that can affect any woman at any stage of life. This chronic disease is difficult to diagnose at times as the symptoms are not always apparent but can be the cause of vague feeling of heaviness or pressure in the lower abdomen. Ovarian cysts are fluid filled sacks which are formed within the ovary. Ovarian cysts may form when ovulation fails to occur (the eggs are not released from the follicle), leaving the developing follicle to grow beyond its normal time. Cysts may also form after ovulation if the corpus luteum persists. Cysts, which are bigger than two centimeters, are formally diagnosed as ovarian cysts. Many ovarian cysts are functional in nature in that they rarely ever cause complications. However, in some cases, the cysts may develop certain complications such as rupturing, bleeding or becoming twisted. Risks and complications of ovarian cysts depend on the type of cyst and the stage of treatment.

Symptoms of Ovarian Cysts

Often ovarian cysts cause no issues and may resolve on their own. However certain symptoms may occur in some women including the following:

- Pain in the pelvic area
- Severe sudden pain is a symptom of ruptured ovarian cysts
- A sensation of pressure or fullness in the lower abdomen or pelvis
- Irregular or absent menstrual periods
- Pelvic pain during menstrual periods
- Pain in the pelvic area after exercise
- Pelvic pain following sexual intercourse
• Vaginal discharge
• Pressure or pain when urinating or having a bowel movement
• Nausea and vomiting
• Breast tenderness
• Weight gain
• Aches in the thighs and lower back
• Infertility

**Causes of Ovarian Cysts**

There are many primary factors leading to ovarian cysts. These factors should not be isolated, because the combination of these factors can lead to the causes of ovarian cysts. These factors may include the following:

• **Genetic predisposition**: Research has shown that genetic predisposition is often considered to be the primary cause of ovarian cysts.

• **Poor nutritional habits**: Diets high in refined, processed foods that are also high in sugar have been linked as a common cause of hormonal imbalances that can weaken the immune system.

• **Poor immune function**: Decreased immune function inhibits the body’s ability to fight off and eliminate harmful toxins that can contribute to the process of ovarian cysts.

• **Insulin resistance**: High level of insulin can stimulate ovarian androgen production. This reduces the serum sex-hormone binding globulin or SHGB which can in turn aggravate ovarian cysts.

• **Anovulation**: When the ovaries fail to release egg on a monthly basis, progesterone production in inhibited leading to hormonal imbalances such as estrogen dominance. This can then lead to the formation of ovarian cysts.
• **Accumulation of xenoestrogens** along with liver and bowel toxicity can lead to ovarian cysts.

• **Hormonal imbalances** such as adrenal fatigue, hypothyroidism or a melatonin deficiency can all be an underlying factor in ovarian cyst formation.

• **Emotional factors** relating to sexuality, reproduction and creativity can trigger the onset of ovarian cysts. The ovaries are a common place for women to store tension, anger or jealousy.

**Complications of Ovarian Cysts**

• **Ruptured ovarian cyst**: This is one the most serious complications that can lead to internal bleeding. Ruptured ovarian cysts can cause hemorrhages which require immediate medical attention.

• **Ovarian torsion**: There can be twisting of the ovary which can lead to infertility. Ovarian torsion may disturb blood supply to the ovary as well which can lead to another complication known as ovarian necrosis, inflammation and septic shock.

• **Peritonitis**: Inflammation of the mucus membrane that lines the abdominal cavity can cause excruciating pain and in some cases the resulting complications can be life threatening.

• **Infertility**: Infertility caused by ovarian cysts can be temporary or permanent depending upon the extent of the damage.

• **Cancer**: In rare but significant instances, ovarian cysts may even turn cancerous.

**Lab Testing**

A pelvic exam and ultrasound will confirm the presence of a cyst but additional lab testing is required to rule out hormonal imbalances as a cause.
| Adrenal Stress Index | The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions. The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone. The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin |
deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.

| Complete Female Hormone Panel | Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age. Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses. SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of |
thyroid function. Hypothyroidism include feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss, tired but wired visual disturbances and insomnia.

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<th>Melatonin</th>
<th>Salivary hormone testing for melatonin will determine a deficiency in this hormone.</th>
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**Conventional Pharmaceutical Medicine and Treatments Indicated for Ovarian Cysts**

- Ultrasound Monitoring using transvaginal ultrasound to monitor the size of the cysts
- Oral Contraceptives can hasten the regression of ovarian cysts
- Surgery is required for cysts larger than 6cm (2.5 in) to rule out ovarian cancer
Nutritional Factors Affecting Ovarian Cysts

- Avoid chocolate, alcohol and coffee as these interfere with the liver’s ability to transform estrogen into safe metabolites.

- Use olive oil for cooking and use flaxseed oil on your food after it has been cooked- avoid butter, margarine and all other oils.

- Use 2 tsp. or more of turmeric daily.

- Use 2 tbsp. of organic ground flax seed daily.

- Avoid all sugars and sweeteners other than stevia and moderate amounts of whole fruit.

- Avoid carbohydrates that have a high glycemic index such as white rice, corn, millet and white flour.

- Avoid all refined and processed foods.

- Consume low glycemic carbohydrates such as pearl barley and legumes specifically.

- Avoid red meat and dairy as they increase the risk factors for heart disease and cancer.

- Eat small, frequent meals throughout the day rather than the typical 2-3 large meals.

- Combine protein with every meal or snack to lower insulin resistance.

- Eat high fiber foods that are low in the glycemic load such as apples, cabbage, raw carrots, oatmeal, oat bran, sesame seeds, flax seeds, psyllium seed powder and beans (legumes).
Herbal Medicine Indicated for Ovarian Cysts

Maca (Lepidium meyenii)

Maca is an herbal remedy that assists the body in increasing the production of progesterone to normal levels. This herb is great for increasing fertility in women and it has no hormonal effect which makes it effective in shrinking overgrowth of tissues which respond to hormonal stimulation. These tissues are endometrium, fibroids, cysts in breasts and ovaries. It is recommended to take 1,000 mg of Maca daily to balance progesterone and to establish regular menstrual cycles and reduce the size of the cysts.

Chasteberry (Vitex agnus castus)

Chasteberry acts on the hypothalamus and pituitary glands by increasing luteinizing hormone (LH) production and mildly inhibiting the release of follicle stimulating hormone (FSH). The result is a shift in the ratio of estrogen to progesterone, in favor of progesterone. The ability of Chasteberry to raise progesterone levels in the body is an indirect effect, so the herb itself is not a hormone. A large percentage of hormonal problems in ovarian cysts are related to insufficient progesterone during the luteal phase of the menstrual cycle which is called a luteal phase defect or corpus luteum insufficiency. A corpus luteum insufficiency is defined as an abnormally low progesterone level 3 weeks after the onset of menstruation. Insufficient levels of progesterone may result in the formation of ovarian cysts. In addition, some PCOS women have too much prolactin which can inhibit fertility.

Hepatotropic and hepatoprotective herbs are useful in the treatment of ovarian cysts to improve the ability of the liver to detoxify harmful estrogens.
**Milk Thistle** (*Silymarin marianus*)

Much research has been done on a special extract of milk thistle known as Silymarin, a group of flavonoid compounds. These compounds protect the liver from damage and enhance the detoxification process. Silymarin prevents damage to the liver by acting as an antioxidant. It is much more effective than vitamin E and vitamin C. Numerous research studies have demonstrated its protective effect on the liver. Silymarin also works by preventing the depletion of glutathione. The higher the glutathione concentration, the greater the liver's capacity to detoxify harmful chemicals. Moreover, Silymarin is shown to increase the level of glutathione by up to thirty-five percent. In human studies, Silymarin is shown to exhibit positive effects in treating liver diseases of various kinds including cirrhosis, chronic hepatitis, fatty infiltration of the liver and inflammation of the bile duct. Dosage: standardized extract 200 to 800 mg a day

**Curcumin** (*Curcuma longa*)

Several studies have illustrated curcumin’s hepatoprotective effects. This has lead researchers to suggest its use in protecting the liver from exogenous insults from environmental toxins, including carbon tetrachloride and acetaminophen. Curcumin also has the capacity to increase bile flow and solubility, making it of potential benefit for someone with a tendency to form gallstones. The hepatoprotective effects of turmeric may stem from its potent antioxidant activity. In addition to its antioxidant effects, Curcumin has also been shown to enhance liver detoxification by increasing the activity of glutathione S-transferase, an enzyme necessary to conjugate glutathione with a wide variety of toxins in order to facilitate their removal from the body.
**Burdock Root (Arctium lappa)**

Burdock Root is one of the foremost cleansing herbs, providing nourishing support for the blood, the liver, and the natural defense system. It is rich in Vitamins B-1, B-6, B-12, and E, plus manganese, copper, iron, zinc and sulfur. Burdock root contains Inulin along with bitter compounds and mucilage which allows its ability to control liver damage and protection from further burdens to the liver. Burdock root also promotes the flow and release of bile which not only helps in cleansing the liver but also aids the digestive process.

**Dandelion Root (Taraxacum officinalis)**

The Australian Journal of Medicinal Herbalism has cited two studies that showed the liver-regenerating properties of dandelion in cases of jaundice, liver swelling, hepatitis and indigestion. The root of the Dandelion plant is effective as a detoxifying agent acting especially on the liver and gallbladder and it helps to remove toxins and waste products. It stimulates and tonifies the digestive system. Its cholagogue or bile secreting effect creates a mild laxative effect which allows for expulsion of toxins. Dandelion root is therefore useful in the treatment of liver conditions such as jaundice, metabolic toxicity, hepatitis, cholelithiasis (gallstones), as well as chronic conditions of the digestive system, conditions of the skin such as acne and eczema and joint problems such as arthritis.

**Globe Artichoke (Cynara scolymus)**

Globe Artichoke contains a powerful compound called cynaropicrin which is a sesquiterpene lactone that stimulates the flow of bile from the liver and makes it a useful liver detoxifier and protector. Due to its ability to promote detoxification and improve bile flow, Globe Artichoke is useful in all cases of insufficient liver production and digestive insufficiencies.
Specific Nutrients Indicated in Ovarian Cysts

Bioidentical Progesterone Cream

Natural progesterone is one of the most important natural ovarian cysts treatment methods available to women. It nourishes the endocrine system leading to the shrinkage of the functional cyst and leading to more regular cycles, healthy ovulation and increased fertility. According to Dr. John Lee, natural progesterone cream usage is the most effective natural treatment for ovarian cysts. Natural progesterone cream should be applied from day 10 to day 28 of the menstrual cycle. This type of treatment suppresses ovulation, preventing the formation of new follicles and allowing the body to naturally re-absorb the cyst. This form of natural hormone therapy should be followed for at least three months in order to give the body enough time to shrink the cyst. If you are trying to conceive, you should use natural progesterone cream only from day 14 (after ovulation) until day 28.

Diindolylmethane (DIM)

DIM is a powerful metabolizer of estrogen, assisting in removing excess estrogen and benefiting conditions associated with estrogen dominance. Supplementation with DIM can help promote proper estrogen levels through the pre and peri-menopausal years and in men experiencing higher estrogen levels. These conditions include uterine fibroid tumors, fibrocystic breasts and glandular dysfunction. It can also benefit men by improving estrogen-dominance related health issues such as hair loss, atherosclerosis, prostrate problems, lowered libido, and impotency. DIM also promotes testosterone action which improves mood, fights depression, boosts libido, improves cardiovascular health, improves memory, and supports muscular development. DIM is a balancer of estrogen metabolism. It increases 2-hydroxyestrone (2-OHE), which is also known as the good or protective estrogen. Dosage:70 to 400 mg may be used.
**Alpha-Lipoic Acid (ALA)**

ALA is the remarkable “universal antioxidant” as it is both water and fat soluble proving to have antioxidant effects on the inside and outside of the cells. ALA helps to neutralize the effects of all free radicals and enhances the antioxidant functions of vitamins C and E and glutathione. Research shows ALA is effective in neutralizing toxins from over-the-counter and prescription drugs before they can cause liver damage.

**Glutathione**

Glutathione is one of the molecules used in Phase 2 detoxification and is produced in the body by the liver. Levels of glutathione naturally decrease with the aging process. Glutathione is made up of cysteine, glutamic acid and glycine. The amount of cysteine in the body will determine how much glutathione is produced. Glutathione has tremendous liver protecting effects which blocks the effects of environmental pollution, medications, radiation, mercury and other heavy metals. As well, glutathione aids in detoxification by removing fungicides, herbicides, carbamate, organophosphates, pesticides, nitrates, notrosamines, flavorings, plastics, steroids, phenolic compounds and certain medications.

**Vitamin C**

Vitamin C is a water-soluble antioxidant vitamin which is not produced within the body and therefore must be replenished through dietary means on a daily basis. Deficiencies in Vitamin C have been shown to decrease the metabolism of xenobiotics by lowering the level of cytochrome P-450. Vitamin C aids in detoxification by combating all free radicals. Vitamin C also prevents damage from exposure to numerous hepato-toxic agents including pollutants, carbon monoxide, heavy metals, sulfur dioxide, carcinogens, stored lipophilic chemicals, medications, anesthetics, radiation, bacterial toxins and poisons.
**N-Acetyl Cysteine (NAC)**

NAC is thought to be an intermediate compound in cysteine metabolism which makes it a derivative of cysteine. NAC has the ability to boost glutathione levels which is critical to Phase 2 detoxification. NAC protects the liver from toxic compounds, has tremendous chemo-protectant effects and also protects the body from radiation. NAC is a potent liver vasodilator which increases the blood flow to the liver thereby enhances its detoxification abilities.

**Methionine**

Due to methionine’s sulfur content, it is a powerful antioxidant that has the ability to inactivate free radicals, support liver detoxification, protect cell membranes against lipid peroxidation and protect precious glutathione levels in the body. Methionine, when in non-deficient levels, has the added effect of preventing the accumulation of fat in the liver.

**Coenzyme Q10**

COQ10 is the most powerful antioxidant in the body. COQ10, also called Ubiquinone, is a potent free radical scavenger, which protects the cellular membranes, protecting against damage caused by toxins and is a crucial co-factor for energy production within the body.

**Vitamin B5**

Vitamin B5, also known as pantothenic acid, is part of the B-complex family of vitamins. B5 is the main vitamin that is used in times of stress as it stimulates adrenal hormone production and supports adrenal function preventing adrenal exhaustion during prolonged stress. B5 is a critical nutrient involved in Phase 1 detoxification. It aids the body in its detoxification efforts by protecting the body against
harmful radiation. It also counters the effects and toxicity of antibiotics, aids in the production of hydrochloric acid in the stomach and stimulates the synthesis of cholesterol.

**Vitamin B6**

Pyrodoxine or Vitamin B6 is involved in more bodily processes than any other single nutrient and has an effect on both physical and mental health. B6 is needed for the metabolism of methionine, aids in the transport of amino acids across the cellular membrane and supports liver detoxification. B6 is also needed for the proper metabolism and use of protein, fats, carbohydrates and hormones.

**Castor Oil Packs for Ovarian Cysts**

Castor Oil Packs: Apply a castor oil pack to the lower abdomen 3-5 times per week. The skin absorbs the warm castor oil’s active constituents, lectins, which stimulate the immune response to help shrink fibroids. Castor oil is extracted from the castor plant (Ricinus communis). Taken internally it acts as a powerful laxative and is not recommended to be used in this way. But if applied externally or topically it has unique medicinal actions on the body. It penetrates skin and muscle to reach right into underlying tissue and assists in decongestion and breakdown of inflammatory material through enhancing blood flow and lymphatic flow in the area. This also helps very much in the removal of toxins and the elimination of wastes. Castor oil is also warming to the tissues and this eases stiffness and pain.

**Occasions to use a castor oil pack**

- Lymphatic congestion
- Arthritis or Rheumatism
- Fibromyalgia
• Muscle spasms

• Abdominal inflammations

• Pelvic congestion

• Glandular swellings

• Deep infections

• Adhesions Fibroids

• Endometriosis Back ache

• Muscle tension

• Local pain due to inflammation or spasm

**How to make a castor oil pack**

• Take a piece of flannel or toweling folded 3 or 4 times and large enough to entirely cover the area to be treated.

• Lightly heat castor oil and pour oil all over it until thoroughly soaked.

• Place over the skin and cover with a large piece of saran wrap.

• Cover this all with a heating pad or hot water bottle and leave in place for one to two hours.
• After use the pack can be wrapped in plastic and stored in fridge (bring back to room
temperature before re-use). You may wish to add a little more castor oil with each use. The pack
should be discarded after 10 uses.

Case History- Ovarian Cysts

Denise is a 42 year old female who is the single mother of 3 teenage daughters. Denise presented with a
long standing history of monthly ovarian cyst ruptures. Denise stated that each month during ovulation
she would experience severe and debilitation pain as the cyst would rupture and this would be followed
by 2 to 3 days of moderate cramping. Denise’s cycles were regular in occurrence but extremely heavy in
flow. She also experienced intolerable sugar cravings which often led to binge eating and consequently
unwanted weight gain.

Denise’s diet was very high in dairy products, red meat and refined sugar. She did report that she felt
the need to eat every 2 to 3 hours or she would feel anxious and shaky.

Denise had lost her father one year ago and was still grieving the loss in her life. She was currently under
the guidance of a grief counselor but admitted that she was moderately depressed.

Lab testing:

• Elevated testosterone levels
• Low progesterone levels
• Elevated estrogen levels
• Elevated fasting insulin levels
• High levels of circulating candida (a common yeast overgrowth)
Management Plan:

Denise was administered the following natural medicine therapies:

- **Liver detoxification formula**: Choline, betaine, methionine, Taraxacum (dandelion), Silymarin marianus, Cynara scolymus (artichoke) and Curcumin- 2 tablets 2 times per day
- **Testosterone lowering formula**: Saw Palmetto (berry, standardized to 25% fatty acids), Fennel (Foeniculum vulgare, seed), Urtica dioica (leaf, standardized to 1% plant silica), Ocimum sanctum (leaf), Trigonella foenum-graecum (seed) and Pygeum africanum (bark, standardized to 12% phytosterols)
- **Estrogen detoxification**: DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin-) 2 caps with breakfast
- **Candida lowering agent**: Calcium-Magnesium- Caprylate Complex- 2 tablets daily on an empty stomach
- **High potency probiotics**: 2 capsules before bed away from Caprylic acid
- **Candida cleansing nutritional regime**: Avoid the following sugar and all of its forms including fruit, yeast, alcohol, the flour of any grain, dairy except for yogurt, process foods, red meat, pork, vinegar and any fermented foods

Denise retuned 4 weeks later to report that she had a very difficult time with the Candida diet at first and experienced severe sugar cravings. After 3 weeks, the cravings started to subside and she persisted anyway. She noticed that her digestion had a marked improvement but she still had an ovarian cyst rupture during her previous cycle. She also mentioned that her depression was becoming worse.
The following modifications were made to the protocol:

- Keep the previous recommendations the same
- Castor Oil Packs nightly for the first 14 days of the cycle or until ovulation occurs
- Mood stabilizing support: 5-HTP, St John’s wort, Vitamins B3, B5, B6, folic acid

Denise reported back 8 weeks later. She had lost a marked amount of weight. BIA testing revealed her total loss was 21 pounds. She was very happy with these results. Denise stated that although she still experienced the ovarian cysts each month, they were much less severe. She also noted that her mood had greatly improved about 2 weeks after starting the mood stabilizing formula.

The following modifications were made to the protocol:

- Keep the previous recommendations the same
- Bioidentical progesterone cream- 1 pump days 14-28 of the cycle
- Ovarian cyst pain formula- Viburnum opulus, Valeriana officinalis, Piscidia erythrina, Zingiber officinalis- 5 mls as needed for ovarian cyst pain- not to exceed a daily max of 20 mls

Denise returned 12 weeks later. She was happy to report that she did not have any ovarian cyst issues over the past 3 cycles. In fact, she had not even opened the ovarian cyst pain formula. She had now lost a total of 32 pounds. She was feeling much more energy and her mood was stable.

Denise was advised to go off the Candida lowering agent, the testosterone lowering formula and the liver detoxification. She was also told to decrease the probiotics to 1 capsule before bed and otherwise stay with the same current protocol.
Menopause

The word “menopause” literally means “cessation of the monthly cycle.” It is derived from the Greek words “meno” (month, menses) and “pausis” (cessation). When the ovaries no longer respond to stimulation from the pituitary gland to secrete estrogen and progesterone, menopause naturally occurs. Between the ages of 45 and 55 with the average age being 52, the menses usually become irregular and stop. Menopause can last from 6 to 13 years. Menopause is strictly defined as the point after 12 consecutive months of no menses following the final menstrual period. Despite our aging population and greater life expectancy, the age of menopause has not changed in the last few centuries. Three important factors which influence the age of onset of menopause are current smoking habits, familial factors and genetic factors involving the estrogen receptors. Other influences that may also affect the onset of menopause are increasing BMI, more than one pregnancy, history of no pregnancy, toxic chemical exposures, treatment of childhood cancers and radiation, epilepsy and cognitive scores in childhood (the higher the score the later the menopause). There appears to be no link between the age of onset of menopause and the history of hormonal contraception, socioeconomic or marital status, race and the age of the first menstrual cycle.

3 Types of Menopause

1. **Natural Menopause:** Between the ages of 45-55 in a woman who has at least one of her ovaries enters into a 5 to 10 year process that can sometimes take up to 13 years. Periods are intermittent in duration, intensity and flow.

2. **Premature Menopause:** This occurs in women in their 30’s or early 40’s who have at least one ovary. Premature menopause is characterized by an earlier, faster and shorter journey through menopause which can last for 1 to 3 years. Approximately 1 in 100 women completes this
menopausal transition by age 40 or younger. Illness or stress can affect the hormone related reproductive function.

3. **Surgical Menopause:** This is induced by the surgical removal or disruption of the reproductive tract (including removal of ovaries or surgical disruption of the blood supply to the ovaries). This can also be caused by radiation or chemotherapy or by the administration of certain medications that mimic menopause for medical reasons such as to shrink uterine fibroids.

**Primer on Sex Hormones**

Estrogen and progesterone are the two primary hormones secreted by the ovaries. The properties of one offset the other and together they are maintained in optimal opposing balance in our body at all times. An excess or deficiency of either hormone leads to significant medical problems.

Estrogen is not a single hormone but rather a trio of hormones working together. The three components of estrogen are estrone, estradiol, and estriol. In healthy young women, the typical mix approximates 15/15/70 percent respectively. Out of the three components of estrogen, estrone and estradiol are pro-cancer, while estriol is anti-cancer. Synthetic estrogen such as Premarin contains the pro-cancer components of estrogen (estrone and estradiol) in higher proportions compared to estriol. After menopause, estrogen levels drop to 40% to 60% of premenopausal levels.

Progesterone is made from pregnenolone, which in turn comes from cholesterol. Production occurs at several places including the ovaries just before ovulation and increasing rapidly after ovulation as well as the adrenal glands in both sexes and in the testes in males. Its level is highest during ovulation period (day 13-15 of the menstrual cycle) and if fertilization does not take place, the secretion of progesterone decreases and menstruation occurs. If fertilization does occur, progesterone is secreted during pregnancy by the placenta and acts to prevent spontaneous abortion. About 20-25 mg of progesterone
is produced per day during a woman's monthly cycle. Up to 300-400 mg are produced daily during pregnancy. During menopause, the total amount of progesterone produced declines to a startling less than 1% of the pre-menopausal level.

Functionally, progesterone acts as an antagonist (opposite to) to estrogen. For example, estrogen stimulates breast cysts while progesterone protects against breast cysts. Estrogen enhances salt and water retention while progesterone is a natural diuretic. Estrogen has been associated with breast and endometrial cancer, while progesterone has cancer preventive effect. Most significantly, it is known that high amounts of estrogen can induce a host of metabolic disturbances, and the body's way of counterbalancing estrogen naturally is progesterone. When this balancing mechanism is dysfunctional, a multitude of health related problems arise.

Symptoms of Menopause

The Most Common Symptoms of Menopause are:

- Hot flashes, flushes, night sweats and/or cold flashes, clammy feeling
- Irregular heart beat
- Irritability
- Mood swings, sudden tears
- Trouble sleeping through the night (with or without night sweats)
- Irregular periods; shorter, lighter periods; heavier periods, flooding; phantom periods, shorter cycles, longer cycles
- Loss of libido
- Dry vagina
- Crashing fatigue
- Anxiety, feeling ill at ease
- Feelings of dread, apprehension, doom
- Difficulty concentrating, disorientation, mental confusion
- Disturbing memory lapses
- Incontinence, especially upon sneezing, laughing, urge incontinence
- Itchy, crawly skin
- Aching, sore joints, muscles and tendons
- Increased tension in muscles
- Breast tenderness
- Headache change: increase or decrease
- Gastrointestinal distress, indigestion, flatulence, gas pain, nausea
- Sudden bouts of bloat
- Depression
- Exacerbation of existing conditions
- Increase in allergies
• Weight gain

• Hair loss or thinning, head, pubic, or whole body, increase in facial hair

• Dizziness, light-headedness, episodes of loss of balance

• Changes in body odor

• Electric shock sensation under the skin and in the head

• Tingling in the extremities

• Gum problems, increased bleeding

• Burning tongue, burning roof of mouth, bad taste in mouth, change in breath odor

• Osteoporosis (after several years)

• Changes in fingernails- softer, crack or break easier

• Tinnitus: ringing in ears, bells, 'whooshing,' buzzing etc.

Additional Notes on Symptoms of Menopause:

• Hot flashes are due to the hypothalamic response to declining ovarian estrogen production. The declining estrogen state induces hypophysiotropic neurons in the arcuate nucleus of the hypothalamus to release gonadotropin-releasing hormone (GnRH) in a pulsatile fashion. This in turn stimulates the release of luteinizing hormone (LH). Extremely high pulses of LH occur during the period of declining estrogen production. The LH has vasodilator effects which lead to flushing.

• For some women the libido loss is so great that they actually find sex repulsive in much the same way as they felt before puberty.

• Dry vagina results in painful intercourse.

• Doom thoughts include thoughts of death and picturing one's own death.

• Incontinence reflects a general loss of smooth muscle tone.
• Itchy, crawly skin feeling like ants crawling under the skin- not just dry itchy skin.
• Aching sore joints may include such problems as carpal tunnel syndrome.
• Depression different from other depression- the inability to cope is overwhelming. There is a feeling of loss of self. Hormone therapy ameliorates the depression dramatically.
• Weight gain often around the waist and thighs.
• Shock sensation “the feeling of a rubber band snapping in the layer of tissue between the skin and muscle. It is a precursor to a” hot flash”.
• Tingling in extremities can also be a symptom of B-12 deficiency, diabetes, alterations in the flexibility of blood vessels, or a depletion of potassium or calcium.
• Tinnitus one of those physical conditions that seems to manifest in some women at the same time as menopause. It can be associated with health conditions such as hypothyroidism and heart disease. It is also a known side-effect of many medications, including aspirin (salicylates) and Prozac.

Hot flashes are the most common symptom of menopause. They are characterized by episodes of flushing lasting a few seconds to a few minutes with increased heart rate, palpitations, skin blood flow and skin temperature accompanied by a sensation of heat and sometimes dizziness. Hot flashes last from 1 to 5 years.

Causes of Hot Flashes

• The hypothalamus is the part of the brain that regulates temperature. An imbalance in the hypothalamus causes hot flashes. Hot flashes coincide with ultradian surges in LH which is

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secreted in bursts every 30 to 60 minutes of longer. Each hot flash begins as an LH level spike.

- Dilation of blood vessels, flushing, and sweating occurs when a drop in estrogen levels activates the sympathetic nervous system to release higher amounts of the stimulating brain neurotransmitter norepinephrine.

- Neurotransmitters such as GABA, serotonin and endorphins modulate the hypothalamic release of a hormone that causes LH to be released. A disturbance in their actions on the hypothalamus may also cause the LH rise and this disturbance is magnified by stress.

- Specific prostaglandins stimulate the hypothalamus. These prostaglandins are increased by a diet containing red meat, dairy fat, peanuts, sugar and shellfish. The prostaglandins are inhibited by bromelain, fish oil, antioxidants and Curcumin.

- During menopause, the liver has to go through significant adjustments due to hormonal changes. When the liver is sluggish, the energy flow in the liver encounters too much resistance due to the adjustments and therefore produces "heat". If the liver is healthy, both the blood flow and energy flow are smooth and no "heat" will result.

**Factors that Aggravate Hot Flashes**

- Alcohol
- Food containing histamine (cheese and red wine)
- Spicy foods
- Hot drinks
- Chocolate
- Caffeine
- Smoking
• Stress and overwork
• Inability to relax
• Exhaustion
• Physical inactivity
• Hot weather or very cold weather
• Drop in estrogen levels
• Maternal history of hot flashes
• Early onset menopause
• Early onset of menses
• History of irregular periods
• Hypothyroidism
• Red meat, dairy fat, peanuts, shellfish
• Pharmaceuticals (Tamoxifen, Aromatase inhibitors)

**Menopause and Thyroid Imbalances**

• 26% of women in or near perimenopause are diagnosed with hypothyroidism likely due to a cause and effect relationship between hypothyroidism and estrogen dominance
• When estrogen is not properly counterbalanced with progesterone, the action of thyroid hormone can be blocked and rendered ineffective leading to symptoms of hypothyroidism
• Lab tests may show normal thyroid hormone levels because the thyroid gland itself is not malfunctioning
Menopause and Adrenal Imbalances

- As a woman reaches perimenopause or menopause and her adrenal glands are in a state of exhaustion, this will make the journey through menopause much more difficult
- Perimenopause and menopause are another form of stress when the adrenals are already exhausted
- DHEA, cortisol and adrenalin levels begin to fluctuate as the adrenal glands attempt to take over the role of the once fully functioning ovaries
- Common signs of adrenal exhaustion are exacerbated as a woman enters into menopause (fatigue, depression, irritability, loss of interest in life, anxiety, weight gain and insomnia)
- Symptoms often experienced in menopause mirror those common to adrenal fatigue

Laboratory Testing for Menopause

It is usually very obvious when menopause is reached as there is a complete cessation of the menstrual cycle. However in cases of surgical menopause or drug induced menopause or even early onset menopause, testing becomes of the utmost importance. Determining the levels of all hormones involved in menopause, including the sex hormones, adrenal hormones and thyroid hormones will help to bring clarity to the underlying causes of symptoms that occur in the completely normal occurrence of menopause. Lab tests can include the following:

<table>
<thead>
<tr>
<th>Neurotransmitter Testing</th>
<th>Medical science has discovered that neurotransmitters are at the foundation of many psychiatric and neurological disorders. Imbalances in neurotransmission, due to excessive or deficient</th>
</tr>
</thead>
</table>
neurotransmitter levels at the synaptic cleft, are
associated with depression, insomnia, anxiety,
behavioural disorders, memory disorders, and a
spectrum of other brain-related functions. Because
neurotransmitters play an integral role in these
disease states, they are prime targets for treating
disorders of the nervous system and mental health
concerns.

Neurotransmitters are recognized as the primary
biochemical messengers of the central and
peripheral nervous
systems. Studies have demonstrated that urinary
neurotransmitter measures are reflective of
circulating levels as
evidenced by renal neurotransmitter clearance
mechanisms. Laboratory methodology for the
accurate assessment of
urinary neurotransmitter levels has been
established. Urinary measures are not recognized
as a direct reflection of
central activity, however definite associations
exist. The ability to measure neurotransmitters has led to the generation of scientific literature that demonstrates urinary neurotransmitter measurements have clinical value as representative biomarkers of various neurological, immunological, and endocrinological conditions.

| Adrenal Stress Index | The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions. The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of |
adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone.

The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.

<table>
<thead>
<tr>
<th>Complete Female Hormone Panel</th>
<th>Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age. Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives,</th>
</tr>
</thead>
</table>


and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses.

SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of the body’s overall exposure to estrogens.

| Thyroid Hormone Testing | A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function. Hypothyroidism includes feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia. |

**Conventional Pharmaceutical Treatments Indicated for Menopause**

**Hormone Replacement Therapy**

Hormone replacement therapy (HRT) is a system of medical treatments for surgically menopausal, perimenopausal and to lesser extent postmenopausal women. It is based on the idea that the treatment
may prevent discomfort caused by diminished circulating estrogen and progesterone hormones. In the case of the surgically or prematurely menopausal women, it may prolong life and may reduce the incidence of dementia. It involves the use of one or more of a group of medications designed to artificially boost hormone levels. The main types of hormones involved are estrogens, progesterone or progestins, and sometimes testosterone. It often referred to as "treatment" rather than therapy.

Attitudes towards HRT changed in 2002 following the announcement by the Women’s Health Initiative of the National Institutes of Health that those receiving the treatment (Prempro) in the main part of their study had a larger incidence of breast cancer, heart attacks and strokes. The WHI findings were reconfirmed in a larger national study done in the UK, known as The Million Women Study. As a result of these findings, the number of women taking hormone treatment dropped precipitously. The Women’s Health Initiative recommended that women with normal rather than surgical menopause should take the lowest feasible dose of HRT for the shortest possible time to avoid these risks.

**Type of hormone replacement therapy**

If, after weighing all the evidence with a physician, HRT is chosen – either for short-term relief or for long-term use because of a high risk for osteoporosis – natural hormone replacement using hormones identical to human estrogen and progesterone is recommended.

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Conjugated estrogens (e.g., Premarin, Genisis), which are derived from pregnant mares’ urine, progestins (synthetic progesterone formulations) and medroxyprogesterone products (e.g., Provera, Cycrin, Amen) are not biochemically identical and do not produce effects identical to human hormones.

Human estrogen is actually composed of three estrogens: estriol, estrone, and estradiol. Tri-Est, a formulation containing these three natural forms of human estrogen in a ratio equivalent to that found in the human body along with natural progesterone, derived from wild yam but biochemically identical to human progesterone, is preferred.

**Nutritional Factors Affecting Menopause**

**Soy Protein and Soy Isoflavones**

Phytoestrogens such as genestein and diadzen are isoflavones which have weak estrogenic activity. Phytoestrogens are a diverse group of plant-derived substances that have estrogenic properties. The structure of these compounds is very close to estrogen but their actions are much less powerful (about 1/1000 as potent). Consequently, when estrogen levels are high, phytoestrogens compete for estrogen receptors, reducing the number of estrogen receptor sites and thus decreasing the effects of excessive estrogen. The excess estrogens, in this case, are safely metabolized (broken down) by the liver. When estrogen levels are low, as in peri and post-menopause states, phytoestrogens act as an estrogen supplement. Phytoestrogens therefore help balance both excess and insufficient estrogen by acting both as an anti-estrogen as well as a weak estrogen, respectively.

It has been suggested that one of the reasons that hot flashes and other menopausal symptoms are much less common in Japanese women in that they consume large amounts of soy foods. Asians also depend on soy (such as tofu) as a source of protein (rather than red meat). The active ingredient in tofu
is genistein. Studies have shown that genistein may reduce the symptoms of menopause, prevent bone loss, and possibly provide a safe alternative for prescription estrogens.

A reasonable approach would be to ingest a daily level of isoflavones that does not exceed ethnic diets that contain high amounts of isoflavones. The amount should be approximately 50 to 150mg of isoflavones per day. The isoflavone content of soy foods varies with the form and therefore the following list will help to determine the daily amount.

<table>
<thead>
<tr>
<th>Soy Food</th>
<th>Amount</th>
<th>Isoflavones (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textured soy protein granules</td>
<td>¼ cup</td>
<td>62</td>
</tr>
<tr>
<td>Roasted soy nuts</td>
<td>¼ cup</td>
<td>60</td>
</tr>
<tr>
<td>Tofu, low fat and regular</td>
<td>½ cup</td>
<td>35</td>
</tr>
<tr>
<td>Tempeh</td>
<td>½ cup</td>
<td>35</td>
</tr>
<tr>
<td>Soy beverage powders</td>
<td>1-2 scoops</td>
<td>20-50</td>
</tr>
<tr>
<td>Regular soy milk</td>
<td>1 cup</td>
<td>30</td>
</tr>
<tr>
<td>Low fat soy milk</td>
<td>1 cup</td>
<td>20</td>
</tr>
<tr>
<td>Roasted soy butter</td>
<td>2 tbsp.</td>
<td>17</td>
</tr>
<tr>
<td>Cooked soybeans</td>
<td>½ cup</td>
<td>35</td>
</tr>
</tbody>
</table>

Flax Seed

Flaxseed contains 2 important lignans, namely matairesinol and secoisolariciresinol which are known to have estrogenic activity. Other lignans are modified by intestinal bacteria to form estrogenic compounds. Lignans from plants such as flaxseed are absorbed in the circulation and have both estrogenic and anti-estrogenic activity much like soy but to a lesser degree. Flaxseed flour and its defatted meal (flaxseed meal) are the highest plant producers of lignans.
The following table illustrates the specific dietary recommendations to reduce estrogen dominance which is the main therapeutic dietary approach for balancing the hormones of menopause:

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Foods To Include</th>
<th>Foods to Exclude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legumes</td>
<td>All legumes and legume products, especially organic non-gmo soy products</td>
<td>None</td>
</tr>
<tr>
<td>Vegetables</td>
<td>All, especially cruciferous (See note #1) and sea vegetables (various seaweeds)</td>
<td>None</td>
</tr>
<tr>
<td>Fruits</td>
<td>All whole and dry fruits especially citrus</td>
<td>None</td>
</tr>
<tr>
<td>Grains</td>
<td>All whole grains and whole-grain products especially rye</td>
<td>Non-whole grains, refined flours, refined flour products</td>
</tr>
<tr>
<td>Nuts/Seeds</td>
<td>All nuts and seeds and their butters, especially flax seeds, walnuts and pumpkin seeds (in their raw form only)(See note #2)</td>
<td>None</td>
</tr>
<tr>
<td>Fish</td>
<td>All, especially cold water fish: salmon, sardines, tuna, halibut are an excellent source of omega 3 fatty acids</td>
<td>Salted or cured fish</td>
</tr>
<tr>
<td>Eggs</td>
<td>From organically raised hens</td>
<td>Non-organic eggs</td>
</tr>
<tr>
<td>Poultry/Meat</td>
<td>Organic meats and poultry (See note #3)</td>
<td>Non-organic meats and poultry, salted and cured meats</td>
</tr>
<tr>
<td>Dairy</td>
<td>Organic dairy products, nut and grain dairy substitutes</td>
<td>Non-organic dairy products</td>
</tr>
<tr>
<td>Oils</td>
<td>Organic cold-pressed, unrefined, seed and nut oils,</td>
<td>Refined vegetable oils,</td>
</tr>
</tbody>
</table>
especially flax seed, walnut, sesame and olive oil (See note #4)

<table>
<thead>
<tr>
<th>Beverages</th>
<th>Mineral or filtered water; herbal tea; fresh fruit juice</th>
<th>Alcohol, coffee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweeteners</td>
<td>Brown rice syrup, fruit sweetener, molasses, stevia</td>
<td>Reined or artificial sweeteners</td>
</tr>
<tr>
<td>Spices and Herbs</td>
<td>Especially nutmeg, anise, thyme, sage, fennel, caraway, turmeric and fresh lemon and lime juice</td>
<td>Chocolate, high sodium foods and salt</td>
</tr>
</tbody>
</table>

**Additional Notes:**

1. **Cruciferous vegetables include:** broccoli, cauliflower, all cabbages, Brussels sprouts, kale, bok Choy, arugula, mustard greens, and watercress.
2. **Omega-3 and some omega-6 fatty acids help to counteract symptoms associated with hormone imbalance and should be consumed daily.**
3. **Non-organically raised livestock are often given hormones to improve their growth; unfortunately, these hormones can be passed on to the consumer and negatively influence hormone balance.**
4. **Important:** Do not cook with oils that are not specified for cooking or baking, such as flaxseed or walnut oils. Olive and sesame oils are good choices for cooking or baking. Use flaxseed, olive, sesame, or walnut oils for homemade salad dressings. These provide valuable omega-3 and omega-6 fatty acids. Refrigerate all oils and dressings.
Herbal Medicine Indicated for Menopause

Licorice Root (Glycyrrhiza glabra)

During Perimenopause, estrogen levels fluctuate widely while progesterone levels consistently drop. Licorice increases the estrogen-to-progesterone ratio by lowering estrogen levels while simultaneously raising progesterone levels, thus restoring hormonal balance. Licorice’s phytoestrogenic properties are from its formononetin, coumarin and beta-sitosterol, which is $1/400^{th}$ as active as estradiol. 154

Chasteberry (Vitex agnus-castus)

Chasteberry’s therapeutic effects on pituitary function, specifically altering LH and FSH secretion, are likely the cause of its beneficial effects on menopausal symptoms. It has been shown to have a profound effect on pituitary function, increasing the secretion of LH and decreasing the production of FSH, which in turn shifts the production of hormones toward more progesterone and less estrogen. Although traditionally used in countries around the Mediterranean to suppress libido of women of childbearing age, Chasteberry does not reduce libido during menopause.

Black Cohosh (Cimicifuga racemosa)

A specific extract of Black Cohosh standardized to contain 1 mg of triterpenes calculated as 27-deoxyactein per tablet (trade name Remifemin) is the most widely used and thoroughly studied natural alternative to HRT. In 1997, 10 million monthly units of this extract were sold in Germany, the US, and Australia. A large open study involving 131 doctors and 629 patients found Black Cohosh extract produced clear improvement in menopausal symptoms (hot flashes, depression, and vaginal atrophy) in over 80% of patients within 6–8 weeks. Additional studies that have compared Black Cohosh to

conjugated estrogens (0.625 mg q.d.) or diazepam (a Valium-like drug) (2 mg q.d.) indicate Black Cohosh extract is far more effective than either drug in relieving hot flashes, vaginal atrophy, and the depressive mood and anxiety associated with menopause. Black Cohosh not only does not stimulate breast tumor cells but even inhibits their growth. When combined with Tamoxifen (an anti-estrogen drug often used to prevent a recurrence of breast cancer), Black Cohosh improved Tamoxifen’s effectiveness. Detailed toxicology studies have shown no mutagenic or carcinogenic effects, indicating that even long-term use is safe. One of Black Cohosh’s most important effects is that it inhibits the pituitary’s release of LH without affecting the release of prolactin and FSH. FSH is responsible for stimulating estrogen so further balancing FSH will only help the process.

**Maidenhair Tree (Ginkgo biloba)**

Ginkgo’s effects of improving blood flow throughout the vascular system make it especially useful for the cold hands and feet and the forgetfulness that often accompanies menopause. In human clinical trials, Ginkgo extract has been shown to be effective in the treatment of Raynaud’s disease which is a peripheral vascular disease of the extremities characterized by very cold fingers and toes. Ginkgo is also very effective in improving mental health in patients with cerebral vascular insufficiency. It works not only by increasing blood flow to the brain but also by enhancing energy production within the brain. It increases the uptake of glucose by brain cells and even improves the transmission of nerve signals (memory is directly related to the speed at which the nerve impulse can be transmitted). The two groups of active compounds-terpene lactones and ginkgo flavone glycosides are responsible in part for many of Ginkgo’s therapeutic actions. Although most people report benefits within 2–3 weeks, Ginkgo should be taken for at least 12 weeks in order to determine effectiveness.
**Dong quai (Angelica sinensis)**

Dong quai is the predominant “female” remedy in Asia and is used to treat menopausal symptoms especially hot flashes as well as menstrual difficulties such as painful menstruation. It also corrects menstruation that is too frequent, lack of menstruation and works to ensure a healthy pregnancy and delivery. Dong quai has the active components coumarins which have both mild estrogenic effects and a stabilizing action on blood vessels and this all contributes to its effectiveness in relieving hot flashes.

**St John’s wort (Hypericum perforatum)**

St. John’s wort acts pharmacologically to alter brain chemistry in ways similar to anti-depressant drugs. “Hypericin, hyperforin, and other components (flavonoids) of the plant have been shown to inhibit the breakdown of several neurotransmitters within the brain that maintain normal mood and emotional stability. It appears to improve the signal produced by serotonin after it binds to its receptor sites on the brain cell. St John’s wort is of specific benefit in menopause for the associated depression and mood fluctuations that may occur. Dosage: 300mg-900mg per day

**Maca (Lepidium peruvium chacon)**

Maca, a plant native to Peru, is a cruciferous plant whose roots are eaten as a vegetable by the native people. Along with a rich mineral content, Maca contains four alkaloids called macainas which clinical and anecdotal experience suggests may nourish the endocrine glands in an adaptogenic fashion. By balancing the effects of major steroid hormones such as estrogen, progesterone, and testosterone, Maca may create effects that are specific to the age and neuroendocrine condition of the individual while elevating low levels of some hormones as well as lowering the levels of hormones present in excess. The scientist responsible for much of the current knowledge of the Maca root is Dr Gloria Chacon de Popivici, a biologist trained at the University of San Marcos in Lima, Peru. Dr Chacon says that
Maca root works in a fundamentally different way than HRT as working promotes optimal functioning of the hypothalamus as well as the pituitary and consequently improves the functioning of all the endocrine glands.

Specific Nutrient Therapies Indicated for Menopause

Vitamin E

Vitamin E is found primarily in the lipid (fatty) membrane of cells which it protects from free radical damage. Vitamin E is the main antioxidant in all fat-soluble areas of the body. A healthy cell membrane is essential for the passage of nutrients into and wastes out of cells and so an adequate supply of vitamin E is essential for healthy cellular metabolism. Vitamin E is particularly important during menopause as it not only relieves menopausal symptoms but also protects against cancer and heart disease. In several clinical studies, vitamin E has been found to improve blood supply to the vaginal wall and to relieve atrophic vaginitis and hot flashes. In premenstrual syndrome and fibrocystic breast disease, two other female complaints related to hormonal imbalances, vitamin E has been shown to normalize circulating hormone levels and thus relieves many symptoms. Of all the antioxidants, vitamin E may offer the most protection against cardiovascular disease. Vitamin E reduces LDL (bad) cholesterol peroxidation, improves plasma LDL breakdown, inhibits excessive platelet aggregation, increases HDL (good) cholesterol levels, and increases the breakdown of fibrin which is a clot-forming protein. Vitamin E significantly enhances both types of immune defense: non-specific or cell-mediated immunity and specific or humoral immunity. Cell-mediated immunity is the body’s primary mode of protection against cancer. Dosage: oral use – 800 IU (mixed tocopherols) per day until symptoms have improved, then 400 IU per day; topical use – vitamin E oil, creams, ointments or suppositories can be used topically for symptomatic relief of vaginal dryness and irritation.
**Hesperidin**

Like many other flavonoids, hesperidin improves vascular integrity and lessens excessive capillary permeability which is a primary factor in hot flashes. Hesperidin is one of the bioflavonoids and is a naturally occurring nutrient usually found in association with vitamin C. Hesperidin is a flavone glycoside (glucoside) comprised of the flavone hesperidin and the disaccharide rutinose. Hesperidin is the predominant flavonoid in lemons and oranges. Hesperidin, in combination with a flavone glycoside called diosmin, is used in the treatment of venous insufficiency and hemorrhoids. Hesperidin is an important nutrient that works synergistically with vitamin C to maintain the health of collagen. Hesperidin, rutin and other flavonoids thought to reduce capillary permeability and to have anti-inflammatory action were collectively known as vitamin P. Hesperidin is useful in treating the complaints of menopause. After supplementation of hesperidin for one month in combination with vitamin C, symptoms of hot flashes were relieved in 53% of patients and reduced in 34%. Nocturnal leg cramps, nosebleeds and easy bruising were also lessened. The only side effects were a slight body odor and a tendency for perspiration to discolor clothing. Dosage: 900 mg per day in combination with at least 1,200 mg vitamin C.

**Vitamin C**

Vitamin C, the body’s primary antioxidant in all water-soluble areas inside and outside cells, works synergistically with vitamin E and carotenes (its fat-soluble partners). As noted under hesperidin, vitamin C helps to alleviate hot flashes by strengthening the collagen structures of the vascular system, thus preventing excessive capillary permeability. Vitamin C regenerates oxidized vitamin E and enables it to resume its many beneficial activities. Vitamin C is also effective in reducing harmful prostaglandins that contribute to hot flashes. Vitamin C is extremely effective in its own right in protecting against cardiovascular disease by preventing oxidation of LDL cholesterol. Vitamin C also raises HDL cholesterol.
levels, lowers the total cholesterol level and blood pressure and inhibits platelet aggregation. Dosage: 1,200mg per day

**Gamma-oryzanol (ferulic acid)**

Gamma-oryzanol or ferulic acid is a growth promoting substance found in grains and isolated from rice bran oil. It is also commonly found in wheat, barley, oats, tomatoes, asparagus, olives, berries, peas and citrus fruits. It has been shown to be effective in alleviating menopausal symptoms including hot flashes.

Gamma-oryzanol also lowers blood cholesterol and triglyceride levels. In treating hot flashes, gamma-oryzanol’s primary action is to enhance pituitary function and promote the release of endorphins by the hypothalamus. An extremely safe, natural substance, gamma-oryzanol has produced no significant side effects in experimental or clinical studies. Dosage: 300mg per day

**Vitamin B6**

Vitamin B6 plays a critical role in the manufacture of serotonin as well as other neurotransmitters.

Vitamin B6 is therefore beneficial in the treatment of depression which is a common symptom of menopause. B6 declines as menopause sets in and mood swings become evident. In addition, Vitamin B6 supports the adrenal glands. Dosage: 50-200mg per day

**Calcium**

The majority of the body's calcium is found in the skeletal system. Because of this, there is a constant exchange mechanism between the calcium which is held in the bones and the calcium which is in the blood stream. As long as there is adequate calcium in the blood stream from dietary sources, bone calcium can remain fairly consistent with calcium being reabsorbed from the bone and deposited at
similar rates. However when blood serum calcium levels are constantly low, the body reabsorbs calcium into the blood from the bone faster than it can be deposited back and this results in a loss of bone mass.

Magnesium and calcium appear to work in tandem in the body and both are necessary for many functions including maintaining normal blood pressure as well as preventing muscle spasms and dysmenorrhea. In addition to calcium, magnesium is essential for helping maintain bone density. Magnesium depletion impairs mineral homeostasis by reducing skeletal and renal sensitivity to parathyroid hormone and by reducing the activation of vitamin D. Dosage: 1000mg of Calcium citrate; 500mg of Magnesium citrate; 1000 IU of Vitamin D3

**Exercise and Menopause**

A minimum of 30 minutes of exercise done four times a week for 3–4 hours per week is recommended for women in menopause. Impaired endorphin activity within the hypothalamus is a major factor in provoking hot flashes. Regular exercise increases the production and secretion of endorphins and thus reduces the frequency and severity of hot flashes. Endorphins are the body’s internally produced mood-elevating and pain-relieving compounds which reduce hot flashes via their effects on the functioning of the hypothalamus. Located in the center of the brain, the hypothalamus serves as the bridge between the nervous system and the endocrine system and controls many body functions. The hypothalamus regulates body temperature, metabolic rate, sleep patterns, libido, reactions to stress and mood. It is also responsible for the release of pituitary hormones including FSH which is the hormone whose excessive secretion results in hot flashes. In a study in Sweden of 79 postmenopausal women who took part in a regular exercise program, those who exercised an average of 3.5 hours per week experienced no hot flashes. Similar results have been reported in other studies of women both on and off HRT. Regular exercise provides numerous other benefits including decreasing blood cholesterol levels, decreasing bone loss as well as improving the ability to deal with stress. Regular exercise also improves
circulation, improves heart function and improves oxygen and nutrient utilization in all tissues. It also increases endurance and energy levels as well as increasing self-esteem, mood and frame of mind with the benefit of reducing blood pressure.

Case History- Menopause

Susan is a 53 year old female who presented with increasing menopausal symptoms and pain. Susan had not had a menstrual cycle in 15 months. Over the past year, she began to experience increasing hot flashes, night sweats, vaginal dryness, weight gain and increased body pain. At times the pain was so debilitating it prevented Susan from carrying on normal daily activities. She stated that felt like hormones were “a mess”. She had continual mood swings often commented on by her husband. Previous to menopause, Susan did not experience these issues at all. She had however been struggling with her weight issues for several years. She was noticeable obese. Susan was 5 feet 8 inches in height and weighed 267 pounds.

Lab testing:

- Elisa multi food allergy testing revealed allergies to eggs and shellfish
- Low progesterone
- Low estrogen
- Low progesterone to estrogen ratio
- Low morning and daytime cortisol
- Elevated fasting insulin
- Elevated LDL
- Elevated triglycerides
• Low HDL

Management Plan

Susan was administered the following natural medicine therapies:

• Wobenzyme Professional Strength- 3 caps 2 times per day without food
• Modified Mediterranean Lifestyle Nutrition Plan to balance hormones and correct hyperglycemia (See Specific Dietary Modifications for Nutritional Lifestyle Management Plan in Weight Gain Section)
• Medical food: a powdered medical food designed to nutritionally support the management of conditions associated with metabolic syndrome (including altered body composition)- 2 scoops 2 times per day
• Estrogen detoxification: DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin-) 2 caps with breakfast
• Thyroid support: Iodine (as potassium iodide), Zinc (as Zinc Picolinate), Copper (as Copper Chelate), L-tyrosine, Thyroid glandular (thyroxine free)- 2 capsules 2 times per day
• Adrenal support: L-Histidine, N-Acetyl-Tyrosine, Rhodiola Rosea- 2 caps 2 times per day
• Blood sugar management: A multi nutrient formulate product containing a full range of multi vitamins as well as chromium, alpha lipoic acid, cinnamon, Taurine, L-carnosine and Catechins- 1 tablet before each meal

Susan reported back 4 weeks later with absolutely no pain. She was very surprised that the pain had completely disappeared so quickly after she had been suffering with it for so many years. She had years of testing from her medical doctor who only ever recommended anti-depressants. BIA testing revealed that Susan had lost 13 pounds so far. She was thrilled with the meal plan and found it very easy to
follow. She stated that even her husband had lost weight as well. Susan reported that her menopausal symptoms had already improved by about 40% and she was very hopeful for a complete resolution.

There were no modifications made to the plan.

Susan returned 8 weeks later to report that she had experienced very few night sweats and virtually no hot flashes. She also said she had a massive improvement in energy and focus. She still had no pain in her body and this allowed her to begin a walking program. BIA testing revealed a total weight loss of 21 pounds.

There were no modifications made to the plan.

Susan returned 8 weeks later and reported that she felt great. She had now lost a total of 33 pounds and was experiencing absolutely no symptoms of menopause. Susan was advised to taper off the following therapies: estrogen detoxification and adrenal support. The others remained the same.

In total Susan lost 74 pounds.
Weight Gain

Obesity is one of the most tragic, costly, and preventable public health problems. An epidemic of obesity that drains the economy of billions of dollars annually in direct medical expenses, disability and lost productivity and together with a sedentary lifestyle contributes to over three hundred thousand excess deaths each year. Next to smoking, obesity is the second leading cause of preventable death in the United States. According to the results of The National Health and Nutrition Examination Survey 111, one in three North American adults is obese. The number of obese children doubled from 1960 to 1991. Obesity in North America was considered an issue of cosmetics and poor self-control, much lower on the scale of importance in comparison to the needs of developing countries. This negligence allowed obesity to run rampant in North American society, gorging on our affluence and economic prosperity.

Obesity is the excess accumulation of body fat in an individual. The Palo Alto Medical Foundation (PAMF) further narrows this definition to individuals who exceed ideal Body Mass Index (BMI) by 20%, in other words, BMI in excess of 25. The BMI is a number calculated from a person's weight relative to their height, measuring, with fairly reliable accuracy, a person's volume of fat and is used to determine weight categories at risk of health problems.

**BMI is classified into six categories, each representing a different level of risk:**

<table>
<thead>
<tr>
<th>BMI range</th>
<th>Risk of developing health problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
</tr>
</tbody>
</table>

155 http://www.statcan.gc.ca/pub/82-620-m/2005001/article/adults-adultes/4053561-eng.htm
BMI is calculated as follows:

\[
\text{BMI} = \left( \frac{\text{Weight in Pounds}}{\text{Height in inches} \times \text{Height in inches}} \right) \times 703
\]

or

\[
\text{BMI} = \left( \frac{\text{Weight in Kilograms}}{\text{Height in Meters} \times \text{Height in Meters}} \right)
\]

For example, for someone who is 5 feet, 7 inches tall (67") and weighs 220 pounds, the calculation would look like this: 220 divided by 4489 (67" X 67") multiplied by 703 = 34.45 BMI
Obesity often leads to numerous health problems including heart disease, gallbladder disease, diabetes, hypertension, stroke and some forms of cancer. Obesity has also been known to shorten life spans.

**Causes of Weight Gain**

The obvious cause of unwanted weight gain is simple— an excess amount of calories are consumed compared to a decreased amount of calories burned. There are however several other underlying factors that may be at work in the cause of unwanted weight gain and the inability to lose it.
Common Nutritional Mistakes That Lead to Unwanted Weight Gain:

- Skipping meals leads to a dramatic slowdown of the body’s metabolism which creates a fat storing environment
- Calorie counting meal plans do not ensure proper weight loss as the specific type of calorie is not always considered
- Low fat diets lead to hormonal disruptions and unwanted weight gain
- A diet with no carbohydrates creates an acidic environment which leads to many health conditions as well as unwanted weight gain
- Skipping breakfast slows the metabolism down by 35% for the rest of the day
- Dehydration leads to a slower metabolism as the muscles of the body are partly responsible for the rate of metabolism and they are made up of 2/3 water
- Consuming foods that a person is unknowingly allergic to can contribute to weight gain

The main cause of weight gain in women is hormonal imbalances. There are numerous hormones that can be part of the underlying cause of the weight gain. The following chart outlines the hormonal imbalances that can cause weight gain.\(^{156}\)

<table>
<thead>
<tr>
<th>Specific Hormone</th>
<th>Imbalance that Causes Weight Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin, the hormone that regulates blood sugar. It is the ONLY hormone that is always telling your body to store energy as fat.</td>
<td>Excess insulin- (insulin resistance or metabolic syndrome) usually arising as a result of a poor diet, lack of exercise, excess alcohol consumption, stress or sleep deprivation.</td>
</tr>
<tr>
<td>Estrogen, the sex hormone dominant in the first</td>
<td>Excess estrogen- estrogen dominance, which</td>
</tr>
</tbody>
</table>

\(^{156}\) The Super-Charged Hormone Diet Dr Natasha Turner ND pg. 6
<table>
<thead>
<tr>
<th>Hormone</th>
<th>Description</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen</td>
<td>A major cause of weight gain for both men and women. Excess estrogen usually arises from estrogen exposure in our environment or because we fail to eliminate estrogen via regular bowel movements and liver detoxification.</td>
<td></td>
</tr>
<tr>
<td>Ghrelin</td>
<td>The hormone released from the stomach that increases appetite. Excess Ghrelin released as a result of sleep deprivation or in between meals to trigger hunger.</td>
<td></td>
</tr>
<tr>
<td>Inflammation</td>
<td>Not a hormone but a definite cause of hormonal imbalance and obesity When inflammation is too high as a result of poor nutrition, digestion, lack of sleep or a medical condition.</td>
<td></td>
</tr>
<tr>
<td>Cortisol</td>
<td>The hormone released while under chronic stress. It has detrimental effects on our immune system, bones, brain, muscles and increases belly fat when present in excess. Excess cortisol due to any type of chronic stress such as emotional, physical or physiological can cause weight gain.</td>
<td></td>
</tr>
<tr>
<td>Thyroid hormones</td>
<td>Thyroid hormone control the metabolism of every single cell in the body. Deficiency of thyroid hormone usually as a result of nutrient deficiency, stress, toxin exposure or an immune system imbalance.</td>
<td></td>
</tr>
<tr>
<td>Adrenalin and Noradrenalin</td>
<td>The immediate, stress response hormones which increase alertness and fat burning. An excess of both hormones is usually as a result of stress.</td>
<td></td>
</tr>
<tr>
<td>Glucagon</td>
<td>The hormone that works opposite to insulin to boost blood sugar and encourage fat burning. It is released when our blood sugar drops (between meals) or during exercise. Glucagon is too low usually as a result to eat enough protein, regularly exercise or excess carbohydrate consumption which spikes insulin and blocks glucagon activity</td>
<td></td>
</tr>
<tr>
<td>Hormone</td>
<td>Description</td>
<td>Deficiency or Abnormality</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Progesterone</td>
<td>The sex hormone dominant in the second half of the menstrual cycle.</td>
<td>A deficiency of progesterone is almost always associated with PMS or fertility concerns.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low progesterone in men and women, normally as a result of stress or aging.</td>
</tr>
<tr>
<td>DHEA</td>
<td>The anti-stress, anti-aging, anti-inflammatory, metabolism enhancing hormone with masculinizing properties.</td>
<td>DHEA is too low; often as a result of stress or aging.</td>
</tr>
<tr>
<td>Testosterone</td>
<td>The masculinizing sex hormone that builds and maintains muscle.</td>
<td>Low testosterone in men- often resulting from stress or toxin exposure.</td>
</tr>
<tr>
<td></td>
<td>A deficiency of testosterone can prevent weight loss in both men and women even with dieting and exercise.</td>
<td>Excess testosterone in women causes weight gain-usually as a result of insulin resistance or PCOS.</td>
</tr>
<tr>
<td>Growth hormone</td>
<td>The hormone that handles growth and repair, particularly of the bone cells, muscle cells and skin cells while we sleep. It is also released in response to exercise.</td>
<td>Growth hormone deficiency usually as a result of poor sleep, lack of exercise, low protein intake or stress.</td>
</tr>
<tr>
<td>Melatonin, Serotonin, Dopamine, Acetylcholine and GABA</td>
<td>The hormones that influence motivation, mood, sleep and cravings.</td>
<td>Deficiency of all of these hormones; abnormal highs and lows of dopamine are common in individuals with addictions to food, smoking, gambling, alcohol and drugs. Low Serotonin is related to depression, food cravings, eating disorders, sleep disruption and anxiety.</td>
</tr>
<tr>
<td>Vitamin D3 acts like a hormone in the body.</td>
<td>Vitamin D supports immunity, protects us from</td>
<td>Vitamin D3 deficiency (blood levels less than 125). Low Vitamin D3 is common in individuals who live</td>
</tr>
</tbody>
</table>
cancer, aids weight loss as well as ensures success while on a weight loss program. It also reduces inflammation, boosts mood and can help to reduce pain.

in Northern climates, cover-up in the sun or use sunscreen.

**Insulin Resistance**

Many people with fatigue, depression, hypoglycemia, excess weight, or sugar/starch cravings are suffering from dysglycemia which is a disruption in blood sugar metabolism caused primarily by diet.

Other conditions that can also be linked to this problem include high blood pressure, some types of high cholesterol, metabolic syndrome, prediabetes, adult onset diabetes, and polycystic ovarian syndrome (PCOS).

Insulin is a hormone that is produced by the beta cells which are cells that are scattered throughout the pancreas. The insulin produced is released into the blood stream and travels throughout the body.

Insulin is an important hormone that has many actions within the body. Most of the actions of insulin are directed at metabolism (control) of carbohydrates (sugars and starches), lipids (fats), and proteins. Insulin also is important in regulating the cells of the body including their growth.

Insulin resistance (IR) is a condition in which the cells of the body become resistant to the effects of insulin, that is, the normal response to a given amount of insulin is reduced. As a result, higher levels of insulin are needed in order for insulin to have its effects. The resistance is seen with both the body’s own insulin (endogenous) and if insulin is given through injection (exogenous).

People with insulin resistance tend to gain weight and suffer from carbohydrate cravings that in some cases can be quite intense. They may not feel satisfied if they eat a meal that doesn’t contain
carbohydrates and they may find it difficult to stop eating carbohydrates once they’ve started, even binging at times. They will also frequently experience elevated cholesterol and triglyceride levels and lowered HDL cholesterol levels. HDL cholesterol is the good type of cholesterol that offers protection against heart disease. Many of these people also suffer from hypoglycemia which is a condition that can cause fatigue, anxiety, and shakiness if they don’t eat frequently enough.

**Insulin Resistance is diagnosed when at least 3 out of the following 5 findings are present:**

1. Blood pressure equal to or higher than 130/85 mmHg
2. Fasting blood sugar (glucose) equal to or higher than 100 mg/dL
3. Large waist circumference (length around the waist):
   - Men - 40 inches or more
   - Women - 35 inches or more
4. Low HDL cholesterol:
   - Men - under 40 mg/dL
   - Women - under 50 mg/dL
5. Triglycerides equal to or higher than 150 mg/dL

**Tests that may be done to diagnose metabolic syndrome include:**

- Blood pressure measurement
- Glucose test
- HDL cholesterol level
- LDL cholesterol level
- Total cholesterol level
- Triglyceride level
| Adrenal Stress Index | The panel utilizes four saliva samples. Salivary cortisol measurement reflects the free (bioactive) fraction of serum cortisol. The test report shows the awake diurnal cortisol rhythm generated in response to real-life stress. The cortisol-to-DHEA (cortisol/DHEA) relationship highlights the many facets of stress maladaptation. The cortisol/DHEA ratio helps determine the projected time for recovery, and the substances (hormones, supplements, botanicals) that promote this recovery. The cortisol/DHEA ratio regulates a multitude of functions. The panel measures P17-OH levels in order to evaluate the efficiency of the conversion of adrenal precursors into cortisol. Certain adrenal fatigue patients who are genetically predisposed to low production of cortisol will not benefit from exogenous supplementation of pregnenolone or progesterone. The panel includes fasting and non-fasting insulin measurements. The insulin values are used to diagnose insulin resistance-functional insulin |
deficit (pre-diabetes), as well as to correlate elevated cortisol with insulin to help explain glycemic dysregulation problems.

<p>| Complete Female Hormone Panel | Estradiol and progesterone levels and their ratio are an index of estrogen/progesterone balance. An excess of estradiol, relative to progesterone, can explain many symptoms in reproductive age. Testosterone levels can also be either too high or too low. Testosterone in excess, often caused by ovarian cysts, leads to conditions such as excessive facial and body hair, acne, and oily skin and hair. Polycystic ovarian syndrome (PCOS) is thought to be caused, in part, by insulin resistance. On the other hand, too little testosterone is often caused by excessive stress, medications, contraceptives, and surgical removal of the ovaries. This leads to symptoms of androgen deficiency including loss of libido, thinning skin, vaginal dryness, loss of bone and muscle mass, depression, and memory lapses. SHBG binds tightly to circulating estradiol and testosterone, preventing their rapid metabolism and clearance and limiting their bioavailability to tissues. SHBG gives a good index of the extent of |</p>
<table>
<thead>
<tr>
<th>Thyroid Hormone Testing</th>
<th>the body’s overall exposure to estrogens.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A complete thyroid profile includes free T4, free T3, TSH, and TPO and can indicate the presence of an imbalance in thyroid function.</strong> Hypothyroidism include feeling cold all the time, low stamina, fatigue (particularly in the evening), anxiety, depression, low sex drive, weight gain, and high cholesterol. Hyperthyroidism include heat intolerance, anxiety, palpitations, weight loss tired but wired visual disturbances and insomnia.</td>
<td></td>
</tr>
<tr>
<td>Cardiometabolic Profile (hs-CRP), Fasting Insulin, Hemoglobin A1c (HbA1c), Fasting Triglycerides, Total Cholesterol, LDL Cholesterol, VLDL Cholesterol, and HDL Cholesterol</td>
<td>High Sensitivity C-Reactive Protein (hs-CRP) C-reactive protein (CRP) is an established marker of inflammation and has recently been suggested to be an important contributor to pro-inflammatory and prothrombic elements of CVD risk. Increased CRP levels, which correlate inversely with insulin sensitivity, have been found in individuals with polycystic ovarian syndrome and may be a marker of early cardiovascular risk in these patients. Fasting Insulin High fasting insulin levels are a good indicator of insulin resistance which occurs when the cellular...</td>
</tr>
</tbody>
</table>
response to the presence of insulin is impaired, resulting in a reduced ability of tissues to take up glucose for energy production. Chronically high insulin levels are seen as the body attempts to normalize blood sugar levels.

HbA1c

HbA1c levels above 6% can predict CVD and DM2 in high risk individuals

Fasting Triglycerides

Hypertriglyceridemia, a triglyceride level >150 mg/dL, is an established indicator of atherogenic dyslipidemia and is often found in untreated DM2 and obesity.

Total Cholesterol, LDL Cholesterol, VLDL Cholesterol, and HDL Cholesterol Abnormalities in the lipid profile, including high total cholesterol, high LDL cholesterol, high VLDL cholesterol, and low HDL cholesterol, are a significant component of coronary heart disease risk because of their contribution to the development of atherosclerosis.

<p>| ELISA/EIA Food Allergy Testing | This is based on the findings that certain subclasses of IgG have been associated with the in vitro degranulation of basophils and mast cells, the |</p>
<table>
<thead>
<tr>
<th>Bio Impedance Analysis (BIA) Testing</th>
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<tbody>
<tr>
<td><strong>What Bio Impedance Analysis Can Reveal</strong></td>
</tr>
<tr>
<td>Bio Impedance analysis, or bioelectrical impedance analysis (BIA), is a commonly used, accurate measurement of body composition. BIA can serve as an important assessment of the metabolic status of patients and assist in the recommendation of a lifestyle intervention program as well as tracking its progress for better patient health.</td>
</tr>
<tr>
<td>BIA is a simple, rapid, and non-invasive method of measuring body composition (fat to-lean tissue ratio) that uses imperceptible electric signals at different frequencies. These signals flow through the body via sensor pads placed on one hand and one foot of a patient lying in a prone position on an examination table. The electric signals are impeded variably by body water, fat, and fat-free mass to produce...</td>
</tr>
</tbody>
</table>
measurements of each. Healthcare practitioners can then utilize these measurements in the assessment of body composition in determining clinical therapies which is particularly important as people age.\textsuperscript{157}

A certain amount of fat is necessary for normal body functioning and a normal balance of body fat in relation to lean muscle tissue is associated with good health (especially in the aging process). Excess fat in relation to lean body mass, a condition known as altered body composition, can greatly increase the risk to a variety of serious health conditions and concerns.

**These health concerns include:**

- Cardiovascular Disease
- Type II Diabetes
- Arthritis
- Hormonal Imbalance
- Back Pain
- Fatigue

A higher ratio of muscle increases metabolism because muscle requires a greater amount of caloric fuel for maintenance. As people age, however, their percentage of fat-free mass diminishes.\textsuperscript{158} Lifestyle changes such as exercise, diet, and nutritional supplementation can be recommended to help increase the amount of fat-free mass for better health. BIA provides reliable results that are easy to interpret. Research has shown that BIA is capable of reproducible measurements of water compartments. This


makes BIA an excellent tool in accurately tracking the progress of fat loss and other health measurements in a therapeutic lifestyle program or body composition program. To establish "normal" values for both men and women, BIA measurements have been collected from a large population of healthy, diseased, obese, and elderly subjects. Using differential equations, these results are used to calculate reference values for age ranges by gender. These reference values are useful in evaluating the health status of patients whose measurements differ from what are considered to be healthy values for men or women.159

**Nutritional Indications for Weight Loss**

The following list of foods should be decreased or avoided at all times as they disrupt hormones and cause weight gain:

- **Foods that cause allergies:** Food sensitivities cause inflammation, faulty digestion and a compromised immune system and therefore should be detected and then eliminated through food allergy testing.

- **Refined sugars:** Refined white sugar and its products can trigger inflammation by raising blood sugar and insulin. 1 gram of sugar is equal to 4 teaspoons of white sugar in any ingredient list and is automatically stored as fat. Each year the average person consumes 45 kg (100 pounds) of sweetener per year. The average adult consumes 10 to 14 teaspoons of sugar daily.

- **Refined grains:** White flour, white rice and other refined grains all spike insulin levels and contribute to insulin resistance. Refined grains are blamed for the obesity epidemic in our nation.

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• **Excess saturated fats** naturally found in meats, shellfish, egg yolks and dairy products can promote inflammation as they contain arachidonic acid which contribute to the inflammatory process.

• **Excess Omega 6 fatty acid.** Omega 6 and Omega 3 fatty acids cannot be produced in the body and therefore need to be consumed through the diet. Omega 6 fatty acids are found in abundance in today’s diet in foods such as corn, safflower and sunflower oils which are found in processed and packaged food items in place of Trans fatty acids. 60 years ago the average American diet included a 1:2 ratio of Omega 6 to Omega 3 and today the ratio is estimate at approximately 25:1. The optimal ratio is 1:1.

• **Foods that contain Trans fats** including margarine and partially hydrogenated oils greatly contribute to the free radical process in the body and stimulate weight gain.

• **Processed meats** containing nitrates and sulfites including hot dogs, sausages and deli meats are all associated with increased inflammation.

• **Artificial sweeteners** such as aspartame have been shown to make their consumers gain weight. People who consume artificial sweeteners are 65% more likely to gain weight than those who do not consume them.

• **High fructose corn syrup (HFCS)** production has increased from 3,000 tons in 1967 to 9,227,000 tons in 2005. North Americans consume more calories from HFCS than from any other source. HFCS has been shown to cause leptin resistance (the hormone that is secreted from our brains to tell our stomachs that we are full).

• **Artificial preservatives and colors** have been determined to disrupt our endocrine system, inhibit the metabolism and interfere with the body’s ability to lose weight.

• **Starchy root vegetables** should not be consumed in quantities of more than ½ cup one time per day. These calorie dense vegetables include yams, sweet potatoes, potatoes, carrots, beets and
some squashes. Non starchy vegetables contain 25 calories and 5 grams of carbohydrates per half cup cooked. Starchy vegetables contain 80 calories and 15 grams of carbohydrates per half cup cooked.

- **Tropical, dried and canned fruits** are high in sugar and should therefore be avoided or very limited (2-3 servings per week). Dried fruits in particular contain sulfites which are highly inflammatory and can cause severe allergic reactions such as hives, nausea, diarrhea, shortness of breath and can mimic asthma symptoms.

- **Excess alcohol** releases estrogen into the bloodstream, promotes fat storage and decreases muscle growth. The average glass of wine contains approximately 150 calories. Consuming 2 glasses of wine per night will account for a 1 pound weight gain every 12 days.

- **Excess caffeine** damages the metabolism and causes hormone imbalance. After the 3rd cup of coffee, the body is set into “fight or flight” mode. The adrenal glands release epinephrine and norepinephrine which sets off a cascade of weight inducing hormonal actions. The liver releases blood sugar for quick energy and the pancreas secretes insulin to counter the blood sugar and the result is a drop in blood sugar levels which causes hunger. The acidity in one cup of coffee will elevate cortisol for up to 14 hours.

**Top 10 High-Glycemic Foods to Avoid:**

- Candy
- Cookies
- Juices with added sugar
- White potatoes
- Chips (corn & potato)
• Sweetened cereal

• Sweetened soda

• Sweet snacks

• White bread & bagels (processed flour)

• White rice

**Top 10 Low-Glycemic Foods**

• Apples

• Berries & cherries

• Barley

• Grapefruit

• Legumes (lentils, beans, peanuts)

• Nuts (almonds, walnuts, soy nuts)

• Oatmeal (unsweetened)

• Green peas

• Tomatoes

• Plain yogurt (unsweetened)
Specific Guidelines for Nutritional Lifestyle Management

There are several categories of food that need to be consumed each day. The following is a list of categories with the recommended food examples:

**Protein:** Serving size: 3-4 oz. cooked, or as indicated

(1 serving = approximately 150 calories)

Organic chicken, turkey, fish, lamb, buffalo, venison, elk, organic eggs, tofu, tempeh, 1% cottage cheese, ricotta cheese, partly skim mozzarella

**Legumes:** Serving size: 1/2 cup cooked, or as indicated

(1 serving = approximately 110 calories)

Beans including garbanzo, pinto, kidney, black, lima, cannellini, navy, mung, fat-free refried, green, soy beans; Split peas, sweet green peas, lentils

**Dairy/Dairy Alternatives**

Serving size: 6 oz., or as indicated

(1 serving = approximately 80 calories)

Almond milk- plain, Hemp milk- plain, organic milk- nonfat or 1%, Soy milk- plain, organic yogurt -plain -unsweetened, yogurt (goat milk or Greek)- plain unsweetened, fat-free feta cheese, 2 Oz.
**Nuts**

Serving size: 8-12 nuts or 1 tbsp. of sesame seeds

(1 serving = approximately 100 calories)

Almonds, hazelnuts, pine nuts, pistachios, sunflower, pumpkin, walnut or pecan halves or sesame seeds

**Low Glycemic Vegetables**

Serving size: 1/2 cup — min. 3-4 servings unlimited

(1 serving = approximately 10-25 calories)

Artichokes, asparagus, bamboo shoots, bean sprouts, bell or other peppers, broccoli, broccoflower, Brussels sprouts, cabbage (all types), cauliflower, celery, chives, cucumber, eggplant, garlic, green beans, greens, bok Choy, escarole, Swiss chard, kale, collards, spinach, dandelion, mustard and beet greens, leeks, lettuce/mixed greens, romaine, red and green leaf, endive, spinach, arugula, radicchio, watercress, chicory, mushrooms, okra, onion, radishes, salsa (sugar-free), scallions, sea vegetables (kelp, etc.), snow peas, sprouts, squash, zucchini, yellow, summer, spaghetti, tomatoes or mixed vegetable juice (low sodium), water chestnuts

**Medium Glycemic Vegetables**

Serving size: 1/2 cup

(1 serving = approximately 45 calories)

Beets, winter squash (acorn, butternut), carrots, sweet potatoes or yams, Yukon gold, new or red potato
**Fruits**

Serving size as indicated

(1 serving = approximately 80 calories)

Apple- 1 medium, apricots- 3 medium, berries, blackberries & blueberries- 1 cup, raspberries & strawberries- 1 1/2 cups, cantaloupe- 1/2 medium, cherries- 15, fresh figs- 2, grapefruit- 1 whole, grapes- 15, honeydew melon- 1/4 small, mango- 1/2 medium, nectarines- 2 small orange-1 large, peaches- 2 small, pear- 1 medium, plums- 2 small, persimmon- ½, tangerines- 2 small, watermelon- 2 cups

**Grains**

Serving size: 1/2 cup cooked, or as indicated

(1 serving = approximately 75-100 calories)

Basmati or other brown rice, wild rice, barley, buckwheat grouts, or millet, bulgur (cracked wheat), quinoa, teff, whole oats, raw- 1/3 cup, cooked oatmeal- 3/4 cup, whole wheat, spelt, or kamut berries, 100% whole wheat, spelt, or kamut, whole grain rye crackers- 2 each, bread: mixed whole grain or 100% whole rye- 1 slice, whole wheat tortilla or pita- ½, low-carb tortillas- 2 small or 1 large, kashi® 7 whole grain puffs cereal- 1 cup

**Good Fats**

Serving size: 1 tsp. or as indicated

Oils should be cold pressed
Plant oils: avocado (fruit)-1/8, coconut milk, light- 3 tbsp., coconut milk, regular- 1 ½ tbsp., flaxseed oil, olives- 8-10 medium, olive oil, extra virgin (preferable), coconut oil- 1 tsp. -ghee (clarified butter)- 1 tsp., grapeseed oil- 1 tsp., earth balance® spread- 1 ½ tsp.

The following table outlines the recommended allowable number of servings for each category of food depending upon daily caloric requirements:

<table>
<thead>
<tr>
<th>Category</th>
<th>1300 calories</th>
<th>1600 calories</th>
<th>1800 calories</th>
<th>2000 calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein Shake *</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Protein</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Legumes</td>
<td>1</td>
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<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Dairy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nuts and Seeds</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Low Glycemic</td>
<td>Minimum 3-4</td>
<td>Minimum 3-4</td>
<td>Minimum 3-4</td>
<td>Minimum 3-4</td>
</tr>
<tr>
<td>Vegetables</td>
<td>servings</td>
<td>servings</td>
<td>servings</td>
<td>servings</td>
</tr>
<tr>
<td>Medium Glycemic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
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</tr>
<tr>
<td>Fruits</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Oils</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

*2 scoops of protein powder per day provide additional blood sugar and hormone balancing as well as feeling satisfied. Protein choices include rice, soy, hemp, pea and isolated whey.
Herbal Medicine Indicated for Weight Management

Any hepatotropic or hepatoprotective herb will increase the body’s ability to detoxify harmful agents that disrupt the hormonal system. Liver detoxification will speed up the metabolism and aid in the elimination of years’ worth of fermenting fecal matter stored in the colon.

Milk thistle (*Carduus marianus*)

Silymarin, a flavonolignan is the main active compound that gives Milk Thistle its well-researched liver protecting effects. Silymarin protects the liver by inhibiting damaging substances in the liver that cause liver damage. Silymarin has the added ability to increase glutathione, one of the most critical nutrients for liver detoxification in the liver, intestine and stomach. There are over one hundred studies that involve the ability of Milk thistle to protect and regenerate the liver. Milk thistle is proved to be useful in all liver conditions such as hepatitis, cirrhosis, liver damage, cholestasis and fatty liver. Silymarins ability to promote the regeneration of damaged hepatocytes renders it as one of the most potent liver detoxifiers.

Turmeric (*Curcuma longa*)

Curcumin, one of the active compounds in Turmeric, is a potent liver detoxifier and anti-inflammatory agent. Curcumin is of exponential use in Phase 2 detoxification pathways in the liver as it increases the levels of the enzymes needed to facilitate the action of Phase 2 detoxification. Curcumin also increases the production of bile from the liver which helps to expel toxins and reduce liver inflammation.
**Burdock Root (Arctium lappa)**

Burdock Root is one of the foremost cleansing herbs, providing nourishing support for the blood, the liver, and the natural defense system. It is rich in Vitamins B-1, B-6, B-12, and E, plus manganese, copper, iron, zinc and sulfur. Burdock root contains Inulin along with bitter compounds and mucilage which allows its ability to control liver damage and protection from further burdens to the liver. Burdock root also promotes the flow and release of bile, which not only helps in cleansing the liver, but also aids the digestive process.

**Dandelion Root (Taraxacum officinalis)**

The Australian Journal of Medicinal Herbalism has cited two studies that showed the liver-regenerating properties of dandelion in cases of jaundice, liver swelling, hepatitis and indigestion.

The root of the Dandelion plant is effective as a detoxifying agent acting especially on the liver and gallbladder and it helps to remove toxins and waste products. It stimulates and tonifies the digestive system. Its cholagogue or bile secreting effect creates a mild laxative effect which allows for expulsion of toxins. Dandelion root is therefore useful in the treatment of liver conditions such as jaundice, metabolic toxicity, hepatitis, cholelithiasis (gallstones), as well as chronic conditions of the digestive system, conditions of the skin such as acne and eczema and joint problems such as arthritis.

**Globe Artichoke (Cynara scolymus)**

Globe Artichoke contains a powerful compound called cynaropicrin which is a sesquiterpene lactone that stimulates the flow of bile from the liver and makes it a useful liver detoxifier and protector. Due to its ability to promote detoxification and improve bile flow, Globe Artichoke is useful in all cases of insufficient liver production and digestive insufficiencies.
Blue Flag (*Iris Versicolor*)

Blue Flag has the ability to detoxify almost all channels of elimination. It stimulates the flow and release of bile from the liver, purges the intestines, promotes secretions from the pancreas. Blue flag also cleanses the blood of impurities and stimulates the lymphatic system which enhances whole body cleansing effects.

Yellow Dock (*Rumex crispus*)

The major plant chemicals in yellow dock are tannins, oxalates, anthraquinone glycosides (about 3-4%) and include nepodin, as well as others based on chrysophanol, physcion and emodin. These constituents produce alterative, gentle purgative, mild laxative, and mild astringent tonic effects. The iron content of the yellow dock makes it powerful in treating anemia symptoms. Chrysarobin in yellow dock is known to relieve a congested liver.

The Anthraquinone glycosides contained in Yellow dock have a laxative effect on the bowels making it useful in all detoxification strategies. The release of toxins from the tissues can create an increasingly symptomatic effect on the body if the channels of elimination are not working efficiently. Yellow dock has the ability to expel toxins from the bowels as well as from the liver and blood.

Barberry (*Berberis vulgaris*)

Barberry is known for containing Berberine, the powerful agent which has numerous actions including its potent anti-microbial effects, hepato-protectant, bile secreting and liver detoxifying benefits. Apart from berberine in the chemical composition of the plant, there are numerous active substances. The bark contains a large number of alkaloids (berberine, berbamine, oxyacantha) and tannins. Barberry is
also effective in reducing nausea and vomiting. It also tones and strengthens the body and stimulates bowel action.

**Specific Nutrient Therapies Indicated for Weight Management**

**Hydroxycitric acid**

Hydroxycitric acid from standardized Garcinia cambogia extract is a natural extract that comes from a tropical fruit grown in several Asian rain forest areas. Research shows that hydroxycitric acid helps maintain a healthy balance of hepatic lipogenesis and gluconeogenesis, thus preventing excessive conversion of glucose from dietary carbohydrate into body fat. Research also indicates that hydroxycitric acid plays an important role in the regulation of normal appetite. Unlike many commonly used diet ingredients, hydroxy-citric acid is not a central nervous stimulant. Dosage: 1000mg per day

**Chromium**

Chromium is an essential trace mineral that potentiates insulin’s action and thus influences carbohydrate, protein, and fat metabolism. In its biologically active form, sometimes called glucose tolerance factor (GTF) from brewer’s yeast, chromium is associated with nicotinic acid (vitamin B-3). Chromium polynicotinate closely resembles the brewer’s yeast GTF in both biological activity and chemical composition as it also contains chromium associated with nicotinic acid. Chromium polynicotinate is yeast-free and has documented high bioavailability. Dosage: 200mcg-1000mcg per day

**Conjugated Linoleic Acid (CLA)**

CLA is a mixture of conjugated dienoic derivatives of linoleic acid from safflower oil. Conjugated linoleic acid is found mainly in meat and dairy foods and it can also be found in certain vegetable oils. Its
presence in human tissue comes not only from dietary sources but also from in vivo oxidation of linoleic acid. CLA’s activity as a potent metabolic modulator was first recognized in metabolic activity studies of its anti-carcinogenic properties in fried hamburger. Research has now expanded to include its ability to modulate lipid and energy metabolism, particularly control of body fat and muscle, as well as atherosclerosis. Research in several animal models has demonstrated that CLA reduces body fat accumulation. Some studies have shown that the reduction in body fat occurs regardless of whether the diet is high or low in fat. It appears that increased energy expenditure is responsible for the decreased fat accumulation. Dosage: 1000-1500mg per day

**Dietary Fiber**

A dietary fiber is defined as complex carbohydrates that are resistant to the action of digestive enzymes, and therefore passes through the intestinal tract, unabsorbed. Dietary fiber includes substances such as cellulose, hemicellulose (xylans, galactans and mannans), pectins, gums, and lignin. Dietary fiber has many nutritional benefits for the health of the gastrointestinal tract. Insoluble dietary fiber such as cellulose and many hemicelluloses are not efficiently fermented in the colon. As a result, they provide fecal bulk, bind water, and help soften stools. Soluble dietary fiber, such as pectin, many gums and some hemicelluloses are fermented in the colon to varying degrees. This results in lower colonic pH (acidity) and the production of short chain fatty acids which are important for the intestinal micro flora and the health of the mucosal cells. Short chain fatty acids also have a role in facilitating colonic water absorption. Many insoluble and soluble fiber types bind dietary cholesterol and bile acids in the intestine and therefore play an important nutritional role in the enterohepatic circulation of cholesterol and cholesterol metabolism in general. Most types of dietary fiber, when hydrated, contribute substantially to the volume of stomach contents and help provide a feeling of fullness. Dosage: 30-45g per day
Relora

Relora® is a patent-pending combination of the two herbal extracts Magnolia and Phellodendron bark. Both herbs have been used in Traditional Chinese Medicine for several hundred years. In a human study, 82% of the participants found that Relora® helped control irritability, emotional ups and downs, restlessness, tense muscles as well as poor sleep, fatigue, and concentration difficulties. Relora® was found not to cause sedation, although 74% of the patients had more restful sleep. Additionally, no adverse side effects were reported during the trial. A second human trial studied the effects of Relora® on salivary dehydroepistandrosterone (DHEA) and cortisol levels in patients with mild to moderate stress. The effects of stress on the body are sometimes associated with lower levels of DHEA and higher levels of cortisol. Two weeks of Relora® increased salivary DHEA by 227% and decreased total salivary cortisol by 37%. Both hormones were brought into the normal range. Dosage: 500-1000mg per day

Infrared Sauna and Weight Management

Methods to induce sweating have been used for centuries by many cultures to bring about improved health and relief from disease. Over 2000 years ago, the famous Greek physician Parmenides stated “give me a chance to create fever, and I will cure any disease”. This traditional wisdom has certainly stood the test of time and is now coupled with the most advanced technology to create the Soft Heat Infrared Sauna.

Reducing toxic burdens of the body is a critically important factor in restoring health and vitality to individuals with chronic illness. The main drawback to using saunas in the past has been the discomfort many people experience during a sauna treatment. Traditional saunas use extremely high temperatures to warm the body by intensively heating the surface of the body only. Many people feel claustrophobic and find it hard to breathe. Fortunately, technological advances have resulted in a new type of sauna
which is superior in many ways to traditional saunas. The new soft heat infrared sauna utilizes completely invisible infrared light to warm deeply inside the body tissues without heating the air or external parts of the body much at all. Many people who could not tolerate the traditional saunas will find the soft heat infrared sauna very pleasant and extremely effective at restoring health and well-being.

**Health Benefits Include:**

- **Weight loss (burn 600 calories in one half hour session)**
- **Pain relief from arthritis, back pain, chronic fatigue syndrome, fibromyalgia, headaches, etc.**
- **Eliminate harmful toxins including heavy metals, cholesterol, pesticides, environmental contaminants, etc.**
- **Increase circulation and cardiovascular function**
- **Clear cellulite**
- **Boost immune response**
- **Improve and eliminate skin conditions such as acne, eczema, psoriasis**

**Exercise and Weight Management**

**Exercise influences the hormones in the following ways:**

- **Improved fat burning and appetite control through leptin sensitivity**
- Growth hormone is secreted in higher amounts as skin, bone and muscle cells are repaired quicker
- Exercise decreases the accumulation of harmful estrogens
- Decreases insulin resistance results in improved fat loss and increased energy levels
- Secretion of serotonin in higher amounts leads to improved mood, sleep and cravings
- TSH, T4 and T3 levels are more balanced and therefore the metabolic rate is increased
- Levels of elevated cortisol are decreased resulting in a balanced nervous system
- Increased dopamine secretion improves mood, motivation and appetite control
- Increased DHEA aids in anti-aging effects and improved lean body mass development
- Improved testosterone positively influence motivation and muscle building

**Types of Exercise**

Studies show that even the most inactive people can gain significant health benefits if they accumulate just 30 minutes or more of exercise or other physical activity per day. For the greatest overall health benefits, experts suggest 30 minutes of moderate-intensity aerobic exercise most days of the week plus some form of anaerobic exercise such as muscle strengthening activity and stretching at least two to three times a week.

**Aerobic Exercise**

Aerobic exercise is any activity involving large muscles, done for an extended period of time, that makes the heart and lungs work harder. Aerobic exercise can be done for weight loss but it also provides cardiovascular benefits. Examples of aerobic exercise include walking, biking, jogging, running, dancing, boot camp classes, swimming, aerobic classes and cross-country skiing.
**Anaerobic Exercise**

Anaerobic exercise usually refers to resistance training, such as lifting weights. Anaerobic exercise is done primarily for increased muscle mass. Weight training and strength-resistance is a form of anaerobic exercise.

**Moderate-Intensity Activities**

Moderate-intensity exercise includes normal daily activities such as gardening and housework. These activities are often done in short spurts but the accumulation of 30 minutes of moderate-intensity activities can result in substantial health benefits. To become more active throughout your day, take advantage of any chance to get up and move around.

**Here are some examples:**

- Take a short walk around the block.
- Rake leaves.
- Play actively with the kids.
- Walk up the stairs instead of taking the elevator.
- Mow the lawn.
- Take an activity break - get up and stretch or walk around.
- Park your car a little farther away from your destination and walk the extra distance.

**Case History- Weight Gain**

Nadege is a 31 year old busy working mom whose main complaint was weight gain. Nadege had been on a popular weight loss program for about 1 year and had only lost 10 pounds after spending thousands of
dollars. Nadege wanted a different approach to weight loss. Nadege complained of severe PMS symptoms and felt cold all the time with Raynaud’s syndrome as well as repeated chest infections.

Nadege was 5 feet 2 inches and weighed 192 pounds.

Nadege was a pack a day smoker who commonly skipped breakfast. At lunch and dinner she ate large amounts of meat and dairy products. She also consumed 3-4 cups of coffee per day with artificial sweeteners and at night lemon gelato with aspartame.

Lab testing:

- Low progesterone levels
- Estrogen dominance
- Low Free T3
- Low testosterone levels
- Low daytime cortisol levels
- Low DHEA levels

Management Plan

Nadege was administered the following natural medicine therapies:

- Infrared sauna sessions- 30 minutes 3 times per week for detoxification and added calorie burning
- Estrogen detoxification: DIM, Calcium D-Glucarate, SGS (standardized to contain 30mg glucoraphanin glucosinolate), Hops extract (0.12% 8-prenylnaringenin)- 2 caps with breakfast
- Thyroid support: Iodine (as potassium iodide), Zinc (as Zinc Picolinate), Copper (as Copper Chelate), L-tyrosine, Thyroid glandular (thryoxine free)- 2 capsules 2 times per day
• Medical food: a powdered medical food designed to nutritionally support the management of conditions associated with metabolic syndrome (including altered body composition)

• Modified Mediterranean Lifestyle Nutrition Plan to balance hormones (See Specific Guidelines for Nutritional Lifestyle Plan in Weight Gain Section)

• Bioidentical progesterone-1 pump on days 14-28 days

• Vitamin B-complex-1 capsule 2 times per day

• Exercise regime including 1 hour of a mixture of cardio and strength resistance training 4 times per week

• Smoking cessation

Nadege reported back 12 weeks later as she was away on holidays. She said that she was doing very well with the plan. She had quit smoking “cold turkey” right after our initial appointment 12 weeks ago. She had not had a chest infection since. She stated that some of her PMS symptoms had improved such as the breast tenderness and cramping. She added that the moods were much better but were still an issue for 2 to 3 days. BIA testing revealed that Nadege had lost a total of 23 pounds of fat mass and gained 3 pounds of lean body mass.

Nadege was recommended to quit drinking coffee altogether and to concentrate on improving water consumption. The remainder of the protocol stayed the same.

Nadege reported back 8 weeks later and stated that all of her PMS symptoms were gone. She felt more “grounded” and calm now that she was not relying on caffeine. Nadege had lost a total of 34 pounds.

Over the following 9 months, Nadege reached her goal weight of 125 pounds. She was thrilled and was strongly counseled on the importance of lifestyle changes versus diets so that she could maintain her weight loss.
Women are experiencing increasing endocrine dysfunction in our society today. There are a plethora of symptoms that are plaguing women of all ages that can be linked to imbalances within the hormonal cascade. Mainstream medicine has limited therapeutic tools to treat the very conditions that comprise most medical visits. The underlying cause is often overlooked or undiscovered and women are recommended masking medications that ultimately offer no cure. Cultural changes have contributed to the accelerated lifestyle to which many women have now become accustomed. It is normal for a woman to have a full-time career and raise children while under the expectation to maintain composure while running ragged.

In the world today, endocrine disruptors have inundated women's bodies and driven hormonal excesses and deficiencies to the extreme. These disruptors invade the body and terrorize the hormonal balance as they lock into the estrogen receptor sites. Our bodies are at war with a constant barrage of chemicals that invade and attack our bodies unknowingly. From the shampoo in the shower to the make-up in the drawer and the pesticides in our morning fruit the stage is set for xenoestrogen dominance.

Centuries ago, women did not face the same challenges as the modern day woman. Today's woman consumes toxins that were not even thought of or needed by our ancestors. Life was simpler and the drive for consumerism was rare and therefore this driven mentality was not the norm. There was minimal or no exposure to electromagnetic pollution, noise pollution, air pollution and internal stress pollution.

Uncovering the disharmony in the endocrine system is the first step towards healing. A complete holistic approach is needed in order to truly restore balance. Factors such as liver function, nutrition, stress...
levels, lifestyle, toxin exposure and stark hormone imbalances all need to be addressed to bring transformation. Conditions such as depression, anxiety, stress, PCOS, ovarian cysts, adrenal fatigue, PMS, endometriosis, fibroids, weight gain, menopause and thyroid dysfunction all share common denominators and are intertwined through the hormonal pathways. The body cannot be compartmentalized and separated into self-functioning systems but rather be recognized as an interwoven unit that requires all-encompassing consideration.
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