**The Weight – Hormone Link**

Maintaining proper weight or losing weight is a challenge for people of all ages, however, the older we get, the more difficult it can be. Hormones are the chief executives of the body, governing everything: our metabolism, sex life, levels of stress, immune response and moods. As many as 200 hormones can circulate in the bloodstream at any given time and each sends certain signals to receptors in different parts of the body. The most influential for weight loss are the thyroid hormones, which help regulate metabolism and insulin. Nine out of ten women experience weight gain between the ages of 35 and 55 during perimenopause and menopause and by the time men are between the ages of 40 and 55, they can begin experiencing symptoms of **andropause** (aka man menopause or “MANopause”). While nutrition, exercise and lifestyle are critical elements to weight loss, balancing our hormones is vital to our success in maintaining a healthier weight. Hormonal imbalances are frequently at the root of obesity, diabetes, high cholesterol and heart disease, especially with too much cortisol or too little progesterone, testosterone or estrogen.

It’s important to understand that no hormone acts alone. Most likely, if one hormone is not functioning properly or not being produced optimally, then other hormones will be affected. Hormones work together for proper hormonal balance.

Hormones control almost every aspect of how we gain weight — and how we lose it. There are several hormones that are involved in weight regulation, immunity and anti-aging and getting to know them is critical to our health and wellness success. Key metabolic hormones and the roles each hormone plays in metabolic function, hunger, body fat composition, energy levels, and general health are listed below:

**Metabolic Hormone 1: Insulin**

You’ve already learned that insulin is secreted by the pancreas in response to elevated glucose levels in the blood. Its primary function is to lower glucose concentration in the blood by bringing the glucose to liver where it is converted into glycogen for use by the muscles. When the muscle cells get filled up, insulin helps turn excess glucose into fatty acids and ushers them into fat cells where they will be stored as fuel. Glucose that doesn’t get used as fuel gets stored as fat. The higher the level of glucose in the blood, the higher the level of insulin in the body. Consistent elevated insulin levels are related to insulin resistance (the precursor of Type 2 diabetes), impaired glucose tolerance, heart disease, metabolic syndrome, kidney disease and high blood pressure, just to name a few.

**Metabolic Hormone 2: Thyroid Hormone**

Thyroid hormones help control the amount of oxygen each cell uses, the rate at which your body burns calories, your heart rate, digestion, fertility, body temperature, mood and memory. The pituitary gland creates thyroid stimulating hormone (TSH) to jump start your thyroid. The thyroid then takes iodine from the blood to create thyroxine (T4), which is the inactive thyroid hormone. T4 is then converted to T3, the active thyroid hormone responsible for regulating bodily functions such as metabolism. Environmental toxins, stress, medications, very low calorie diets and food additives (such as hormones and antibiotics) can skew the production of healthy thyroid hormones. When thyroid hormones are out of balance, chemical reactions in the body become disrupted which can cause hypothyroidism and hyperthyroidism.

**Metabolic Hormone 3: Estrogen**

Estrogen is a steroid hormone, meaning the body creates this hormone out of cholesterol. The three main forms of estrogen are: estradiol, estrone, and estriol. Estrogen directs a women’s entire development from childhood into adulthood. Additionally, estrogen has a major impact on a woman’s blood fats, digestive enzymes, water and salt balance, bone density, heart function, and memory. Estradiol lowers insulin and blood pressure levels, raises HDL and lowers LDL cholesterol and helps a woman’s body stay lean. Estradiol also helps regulate hunger, stabilize moods and keep energy levels high. As a women’s body prepares to go through menopause, levels of estradiol decrease and the production of estrone increases which causes a shift of body fat from the hips to the abdomen. As production of estradiol decreases, the body hangs on to fat which helps to produce estrogen, making it more difficult to lose fat stored in the abdomen. Most women tend to gain several pounds during this phase.

Men produce a small amount of estradiol in the testes and adrenal glands. At healthy, normal levels, estrogen helps to protect a man’s heart and bones and supports a healthy libido. When estrogen is out of balance with other hormones (such as testosterone), it can detrimentally impact metabolism and begin the andropause phase. Symptoms of andropause include weight gain (think love handles or a pot belly), muscle and hair loss, irritability and depression.

**Metabolic Hormone 4 – Progesterone**

Progesterone is also a steroid hormone produced by both men and women. Progesterone is a precursor to the production of cortisol, testosterone and estrogen and it can help to balance estrogen and manage some of the above issues associated with estrogen production. When progesterone levels drop, such as right before a woman’s menses, issues arise such as cravings for high carbohydrate foods. Progesterone levels drop even more dramatically than estrogen during menopause. Because progesterone is a precursor for testosterone and estradiol, when a woman’s progesterone production drops, she begins to lose the fat burning effects of those hormones. Stress can make the imbalance worse. Cortisol (produced during stress) and progesterone compete for the same receptors on cells, so when a woman produces excess cortisol, it threatens her healthy progesterone activity.

**Metabolic Hormone 5 – Testosterone**

Testosterone is an androgen hormone produced by both men and women. This hormone helps to increase energy, speed metabolism, build more calorie-burning muscle, boost libido, protect bone and support brain function. Production of testosterone occurs in the reproductive glands in men and in the adrenal glands for women. As estrogen does for women, testosterone helps develop a man’s secondary sex characteristics such body and facial hair. Men have about 100 times the testosterone as women which enables men to build more lean muscle tissue than women. As we age, levels of testosterone decline promoting weight gain. Weight gain results in the conversion of testosterone to estrogen promoting more weight gain! It’s a vicious cycle: more estrogen, more fat; more fat, more estrogen.

**Metabolic Hormones 6 – DHEA**

DHEA is a hormone that is produced by the adrenal glands. It may help prevent diabetes, breast cancer, cardiovascular disease, impaired memory and brain function, and osteoporosis. DHEA also enhances immunity and may help us live longer! DHEA is a precursor to testosterone which is produced from cholesterol. The production of DHEA and testosterone decline as we age, but an optimal diet rich in healthy fats and good cholesterol can help support the production of both hormones.

**Metabolic Hormone 7 – Growth Hormone (GH, aka hGH)**

GH is an anabolic hormone which builds muscle, burns fat, enhances immunity, resists heart disease and protects the bones. GH increases muscle mass by helping the body absorb amino acids and synthesizing them to build lean muscle tissue, and then preventing the breakdown of lean muscle tissue; these actions result in an increase of the metabolism and a more powerful workout. GH also helps to tap into fat stores, burn triglycerides for energy and discourages fat cells from absorbing fat that may be floating around in the blood stream. GH counters insulin’s ability to shuttle glucose into the cells, pushing it into the liver instead which, unfortunately, could cause insulin resistance with elevated GH levels. Taking supplemental GH is not a good idea before you get a recommendation by your doctor. GH declines as we age, but the decline is exaggerated by poor sleep, lack of exercise and poor diet. When too many low quality, processed carbohydrates are eaten, and not enough clean protein is eaten, production of GH may be suppressed.

**Metabolic Hormone 8 – Leptin**

Leptin is a hormone released by adipocytes (fat cells) and is secreted by adipose tissue in direct proportion to the total amount of body fat. Leptin works with other hormones such as thyroid, cortisol and insulin to help your body decipher how hungry it is, how fast it will burn off the food you eat and if it will hang on to (or let go of) weight. Leptin receptors are found throughout the body, but the brain is where this hormone is most active. After a meal is eaten, fat cells release leptin which travels to the hypothalamus – the part of the brain which regulates appetite—and bonds with leptin receptors there. These receptors work with neuropeptides that switch the appetite on. Leptin switches off the neuropeptides and switches on the appetite suppressing signals and the body gets the message to stop being hungry and start burning more calories. In addition to the leptin release after eating, the body experiences a leptin surge while we sleep which boosts thyroid stimulating hormone which helps release T4. When leptin is working properly, it also helps to tap into long term fat stores thereby reducing them. Unfortunately, the more fat someone has, the higher production of leptin; obese individuals typically have elevated levels of leptin. When the body continually secretes leptin in response to overeating, the receptors for leptin start to get worn out and are no longer sensitive to it, resulting in leptin resistance. With leptin resistance, appetite suppressing signals are never shut off and the individual always feels hungry. Insulin and leptin resistance typically go hand in hand and with weight loss, both will become more sensitive to the metabolic hormones insulin and leptin respectively.

**Metabolic Hormone 9 – Ghrelin**

Ghrelin is mainly produced in the stomach. Leptin and ghrelin work together to balance hunger. Just as leptin tells the brain to turn off hunger, ghrelin tells the brain that you’re famished. When you are hungry, about to eat or even think about eating, your stomach releases ghrelin which travels to the hypothalamus and turns on neuropeptides (specifically neuro Y) which increases the appetite and decreases the metabolism. Ghrelin levels will remain elevated until enough nutrients are consumed to satisfy the body’s needs. By the time the stomach fills, ghrelin levels drop again creating a feeling of satiety. Because the signals of satiety may take some time, it’s important to eat slowly and mindfully. It’s also essential to keep ghrelin levels low throughout the day by eating small meals and snacks every three hours. Very low calorie diets will stimulate ghrelin secretion, resulting in bingeing and increased hunger with every new diet. Insulin and ghrelin also go hand in hand. When insulin levels increase, ghrelin levels decrease. For this reason, complex carbs, clean protein and whole, unprocessed foods should be consumed over processed grains, refined sugars and fried foods.

**Metabolic Hormones 10, 11 and 12 – Norepinephrine, epinephrine and cortisol (see week 9 for “Stress and Weight Gain”)**

**Strategies to Balance Hormones**

Eat organic, whole foods – focus on consuming fresh vegetables and fruits, raw nuts and seeds, whole grains, and lean proteins.

Eat plenty of good fats – low fat diets are a major reason individuals have problems with their hormones. Hormones are made out of cholesterol. If you don’t eat enough cholesterol, your body can’t make hormones.

### Avoid white flour, sugar and cut out caffeine -- white flour, sugar and caffeine are unhealthy, and they wreak havoc on the adrenal glands which are responsible for the secretion of several metabolic hormones.

Avoid foods with added hormones – conventionally raised meats and dairy contain hormones (and antibiotics) that can disrupt hormone balance. Choose organic meats and dairy.

Drink water – eight 8 ounce glasses a day may not be enough. Drink half of your body weight in ounces of water. Water is the key to life! It clears out toxins, lowers your levels of histamines—which trigger allergic reactions— nourishes skin, promotes healthy digestion and maintains overall health. Without enough water, dehydration in the body creates an imbalance in minerals, which can throw your hormones off kilter.

Avoid excess consumption of soy – an increase of hormonal problems today is due to the increase of soy in our diets. Soy is a goitrogen, which blocks iodine uptake in the body. In women, iodine is stored in the thyroid gland, the breasts and the ovaries. Iodine deficiency causes thyroid disorders (including goiters, hypothyroidism, hyperthyroidism and thyroid cancer), cysts in the breasts and ovaries, and breast cancer and ovarian cancer. These days, soy is in almost everything in the form of soy protein, soybean oil and soy lecithin. Additionally, most of the meat and dairy (and some farmed fish) we consume is from animals fed soy.

Exercise – It lowers stress hormones, boosts your energy, builds bone mass, and improves immunity. Participate in consistent aerobic and strength training most days of the week for 45 - 60 minutes.

Manage stress – Basic stress management strategies such as diaphragmatic breathing and massage therapy will lead to reduced cortisol secretion and better hormonal balance.

Regular Sleep – Individuals who get less than 6.5 hours of sleep a night have lower levels of leptin and higher levels of ghrelin. Additionally, just three days of sleep disruption can increase the risk of insulin resistance.