

UNDERSTANDING HORMONES



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Understanding Hormones



Understanding how hormones work and how our lifestyle choices affect our hormone levels, is vital if we want to get the best results possible. In fact I'd go as far to say that if our hormones are not regulated properly, it can massively sabotage our results and lead to poor health.

Obesity, diabetes and depression are just a few of the diseases that hormonal imbalances contribute towards. Whilst the diagnosis and treatment of hormonal imbalances should be left to medical experts, we can have a positive impact on our hormones by leading a healthy lifestyle.

A basic understanding of the key hormones that regulate metabolism, hunger, body fat, and energy levels is useful for understanding how different lifestyle choices affect your body.

Every time we eat, exercise, sleep, get stressed or meditate; hormones are released.

We want to make sure that our lifestyle choices help us to optimise the way our hormones are working.

What are hormones?

Hormones are chemical messengers that communicate information throughout the body.

You could think of hormones as radio signals that tell different cells in the body to do different things.

Depending on our lifestyle choices, the hormones released will dictate whether we burn or store body fat, feel hungry or satisfied, build muscle or not, feel relaxed or stressed, and whether we are able to sleep well or have restless nights.



Can you see why this is so important to your health and the results you want to achieve? On the next few pages, we are going to look at a variety of different hormones that influence our health and our body composition. Let's get started...

Insulin

Insulin is released from the pancreas in response to raised blood glucose and increased energy intake. Skimmed milk is more insulinemic than white bread, so insulin is not just a blood glucose hormone. When our blood sugars increase, insulin is released and it's job is to tell the body to store the sugar in our muscles and liver. Insulin transiently inhibits the release of lipids from fat tissue, but even with multiple insulin spikes, energy balance is the sole dictator of fat loss.

To slow the rate in which food leaves the stomach, the majority of our carbohydrate sources should be coming from fibre-rich whole grains. Added sugars offer no nutritional benefits, and so should be minimised but not demonised, as this can lead to poor relationships around food. Insulin's role is to prevent glucose remaining in the blood, as this is toxic. Its role is to move the glucose away from the blood.

The "blood sugar rollercoaster" and the often talked about "crash" is known as *reactive hypoglycemia* and is very rare in non-diabetics. Insulin is actually an anorexogenic hormone, which means it fills you up. Higher insulin releases after meals are associated with increased satiety. This "crash" is often due to postprandial somnolence, which is simply the digestive energy requirement of digesting a large meal. The craving for more sugary food is most likely not due to the drop in blood sugar, but the body craving more easily obtained energy in the form of sugar.





How popular food choices affect energy levels and hunger:

From a fat loss perspective, energy balance should be the key focus. However maintaining good blood glucose control can reduce our risk of metabolic syndrome and diabetes. How well we regulate blood glucose is due to carbohydrate type, fitness level, muscle mass and genetics.

Protein can actually have a higher insulin response than white bread. Both whey protein and skimmed milk stimulate larger releases of insulin. Fibre will slow the rate of gastric emptying and reduce the glycemic load of a meal, while fats on their own, do not raise blood glucose. A combination of carbohydrate and fat will slow down gastric emptying.





Insulin resistance is characterised by either the pancreas secreting too much insulin, or skeletal muscle failing to respond the the effects of insulin. It is a myth that eating too much sugar causes insulin resistance. A cell becoming resistant to insulin is multifaceted and the main culprit is prolonged energy excess in combination with inactivity.

An inactive muscle is less sensitive to the effects of insulin. This can lead to increased likelihood of a build up of serum blood glucose, as the muscle cannot properly utilise the glucose. We then need our pancreas to produce more insulin to shift the same amount of sugar out of the blood and into storage. This can be the beginning of metabolic syndrome and Type 2 diabetes.

The two main culprits behind insulin resistance are a lack of exercise and a hyper-caloric diet high in refined carbohydrates. The good news is that insulin sensitivity can be regained with the right combination of diet and exercise.





Glucagon

If we think of insulin as a **"storage hormone,"** then we can think of glucagon as a **"mobilisation hormone."**

Glucagon tells our muscle and fat cells to release energy for us to use to fuel our daily activities. If we consume a surplus of Calories and lots of sugary carbohydrates, glucagon doesn't need to do its job, because there's already too much energy available. Insulin and glucagon are both released from the pancreas and work with each other to regulate our blood sugars and energy levels. If our insulin levels are chronically high, this could increase our risk of Type 2 diabetes and metabolic syndrome. When our insulin levels are low, this signals to the body that energy availability is low. If we have poor blood glucose control, this may lead to increased appetite and a sudden urge to eat, which is the reactive hypoglycemia mentioned earlier.

In a nutshell, by eating the right foods to prevent insulin spikes, glucagon can do what we want it to do; <u>help us to use our fat stores for energy</u>.





INSULIN



Cortisol

Cortisol is a hormone that is released from the adrenal glands (along with adrenaline). Although cortisol gets a bad wrap, it's actually very necessary for us to have cortisol, just not chronically elevated levels or unhealthy cortisol rhythms.

It's usually described as a stress hormone because we release cortisol (and adrenaline) in stressful situations. If we didn't release cortisol in the morning, then we would struggle to wake up.

Adrenaline tends to be an instant reaction, whereas cortisol works more slowly. Cortisol is a glucocorticoid hormone, so its job is to increase blood glucose to ensure we have an available supply during periods of stress.

Cortisol levels should rise in the mornings so that we feel energetic in the daytime, and gradually lower throughout the day, enabling us to feel relaxed and naturally tired in the evenings.

Modern life can be stressful and if, for example, we are stressing out over a work situation at night, then our cortisol levels can become elevated at a time when they should be low. Overtraining can also cause our cortisol levels to become chronically elevated so it's important that our training programmes are assessed regularly.



How healthy cortisol levels look:



Some of the reasons that our cortisol levels become imbalanced:

- Poor sleeping habits
- Inability to handle or manage stress
- Overconsumption of stimulants; caffeine for example
- Overtraining; training too long / frequently at high intensity

When cortisol gets out of control, we can experience suppressed immune system function, elevated blood sugars, faster ageing and poor insulin sensitivity. This is the perfect recipe for getting sick, overweight and wrinkly. Times of stress often see us reaching for convenient sugary foods that taste good. Stress can often lead to comfort eating, but everyone deals with stress in different ways, so cortisol does not directly cause weight gain, but behaviours associated with stress could.

Things that can help to restore healthy cortisol levels:

- Getting 6-9 hours of good quality sleep every night
- Learning a cognitive strategy such as CBT to learn how to cope better with stress
- Taking time to meditate / relax / chill out more often
- Reducing caffeine intake, especially in the afternoons
- Ensuring your training regimen is assessed regularly

Growth hormone

Human growth hormone has been described as **"the fountain of youth"** and not surprisingly growth hormone supplementation is now big business, especially in the USA. **Good growth hormone levels help to keep us lean, healthy and strong.** As we age, our levels of growth hormone decline. For example, a 60 year old may only produce 25% of the growth hormone of a 20 year old. In that sense, there's not a lot we can do, because we're all getting older. What we can do, however, is to look at ways to help our bodies produce growth hormone normally and naturally.





Growth hormone is mainly released / elevated when we are:

- Sleeping
- Exercising
- Fasting

If we are not sleeping properly, not only is our cortisol rhythm disturbed, we also miss out on our natural growth hormone release during sleep. This is another great reason to get to bed early and to watch our caffeine intake.

Exercise causes the release of growth hormones, so if we are exercising regularly then our bodies will be producing growth hormones naturally. Fasting also increases growth hormone levels, which is one of the reasons intermittent fasting has become popular. Whether or not you should fast is an individual decision and it's important to note that although it can increase growth hormone, it can also increase cortisol levels, so if you're already stressed, then fasting might not be the best option.

In terms of muscle gain, fasting is not an anabolic process. Fasting will initiate certain processes in the body like AMPK and autophagy, which are both catabolic clearance of damaged cells and mitochondria. Eating too many sugary carbohydrates can also lower growth hormone, yet another reason to ditch the junk foods.



Testosterone

Although testosterone is the dominant male sex hormone, it is produced by both men and women. <u>Healthy testosterone levels are associated with drive, motivation and</u> <u>virility.</u> As we age, testosterone production declines and this contributes to the loss of muscle mass that people experience as they age. Low testosterone levels are associated with increased risk of cardiovascular diseases, depression, lethargy and lack of motivation.



It is to be expected that certain hormones decline with age, in fact it's completely normal and natural, but what is a concern is the generational decline in testosterone levels in males. Our grandfathers, on average would have had much higher testosterone levels throughout their lives.





One of the reasons for this is that modern life can be a lot more stressful. So it's not that surprising when we see studies showing that cortisol blocks the effects of testosterone.

What can we do?

Luckily there are things we can do to maintain healthy testosterone levels:

- Get to bed early
- Learn stress management techniques
- Train with heavy weights
- Eat enough fat (our bodies make testosterone from cholesterol)

Training with heavy weights will not cause women to look big and bulky because females have a very small amount of testosterone compared to males, as the table below shows.

TOTAL TESTOSTERONE LEVELS		
SEX	ng/dl	ng/ml
Females	6-86	0.1-1.2
Males	270-1100	1.4-12

This explains the difference in ability between men and women to build muscle mass. It also explains why some men find it easier than other men to build muscle. The normal range has a huge variance, so a man sitting naturally at 1000+ will find it easier to build muscle than a man with low 200s.



Oestrogen

It's often thought that information about oestrogen is only relevant to females. Oestrogen however, is an important topic for any man experiencing the dreaded "man boobs" or "moobs". <u>Men need a normal, healthy level of oestrogen just as women need a normal healthy level of testosterone.</u> The problem arises when oestrogen becomes out of balance with testosterone. This is when men can literally start growing what look like breasts. Obesity, as well as exposure to environmental oestrogens such as plastics, are thought to contribute towards the disruption of healthy sex hormone levels in males.

For women, healthy oestrogen levels are essential for heart and bone health, as well as many other functions in the body.

Estradiol is the primary oestrogen that a woman relies upon during her younger years to keep her healthy and lean. Estradiol also helps to regulate appetite, mood and energy levels. As a woman goes through the menopause, production of estradiol decreases and this leaves another form of oestrogen, estrone, as the main oestrogen. Estrone is linked with increased abdominal fat storage and unfortunately, the more fat that is gained, the more estrone is produced. This can make losing body fat much more difficult, and extra attention must be placed upon diet and exercise during and after the menopause. Estrone can also contribute to insulin resistance, another good reason to avoid bingeing on sugary carbohydrates and opt instead for proteins, fats, vegetables and complex carbohydrates.

Estradiol is also vital for calcium synthesis, and this is why women who have been through the menopause will require more calcium.

Another hormone that drops at the menopause is **progesterone**. Because progesterone is a precursor for testosterone and estradiol, this now means that there is less testosterone and estradiol available to have a positive effect on body composition, mood and appetite regulation. This is why it's so important to do everything within our control to promote healthy body composition, mood and appetite regulation. We can do this by paying attention to diet, exercise and stress levels.



Chronically elevated cortisol levels around the time of the menopause need to be avoided, because cortisol and progesterone may compete for the same receptors. This means that cortisol can exhibit a blocking affect on progesterone. This is definitely not good if we consider progesterone levels are already dramatically lowered after the menopause. **The key message is to learn how to manage stress and make the right lifestyle choices.**



Thyroid

Thyroid hormone is often referred to as "the master hormone" and with good reason. Thyroid hormones have a huge impact on metabolic rate. If you or anyone you know has suffered with under-active thyroid, then you know all about the weight gain and lethargy that can be experienced when the thyroid isn't functioning optimally. On the contrary, when the thyroid is over-active, people lose weight rapidly and can become anxious. **Important nutrients for thyroid health include; iodine, selenium, vitamin D3 and vitamin B12.**



Cruciferous vegetables such as broccoli contain substances called goitrogens that inhibit the thyroid gland. Most of these substances are destroyed by cooking, so it's important to cook your cruciferous vegetables.



Leptin

Leptin is a hormone that decreases hunger by signalling to the brain that we have enough energy (fat) stores in our body. The problem is that, as in the case with insulin resistance, we can become resistant to leptin. The leaner someone is, the more sensitive to leptin they are, so a small amount of leptin does the job of telling us we're not hungry. This makes sense when we consider that leaner people actually have less leptin, even though they have less energy (fat) stored in their bodies.

When someone is leptin resistant, although they may have more leptin, the message doesn't get through and the result is feeling hungry. Not sleeping properly can also decrease leptin levels.

What can we do?

- Take Omega 3 fish oil Omega 3 fats are associated with decreased hunger
- Go to bed early
- Reduce stress
- Reduce caffeine





Ghrelin

Ghrelin is the hormone that tells us we are hungry. When it's coming up to meal time, we will naturally feel hungry, because ghrelin is being released. There's not a whole lot we can do to directly influence ghrelin, apart from, you guessed it, sleep well! Studies show that just 2 hours less sleep can increase ghrelin by 27%.

It's not only leptin and ghrelin that regulate our appetite, so we still can put practices into place to help us get our appetite under control.

There are other ways to help:

- Consume fibre-rich foods to help keep us feeling full
- Consume enough protein and fat because these two nutrients help to satiate us more than carbohydrates
- Drink enough water sometimes when we think we are hungry, we're really just thirsty
- Free sugar containing foods are often not as satiating, so it is likely beneficial to mimimise consumption.









Conclusion

There are many hormones in the body, all having unique actions in maintaining sound health. The interplay between all the different hormones is complex, and while we don't need to understand everything about hormones, we can conclude that <u>the right lifestyle</u> choices play a huge role in balancing our hormones.

To help balance all of our hormones naturally we need to:

- Ensure that we are getting adequate amounts of good quality sleep
- Learn strategies to cope better with stress
- Taking time to meditate / relax / chill out
- Ensure we are not constantly overtraining
- Perform resistance training
- Reduce caffeine intake

Please be aware that this information does not constitute medical advice. If you are concerned about your hormonal health, please see a qualified medical professional.