3

HORMONES, WEIGHT GAIN & METABOLISM

WELCOME TO MODULE 3

Hormones, weight gain & **metabolism**

Understanding the delicate balance of hormones on our overall health is a powerful revelation. Far from blaming an individual gland or hormone for "messing things up" when we understand the delicate relationship these hormones have across our entire system we can begin to appreciate them in a whole new light.

Hormones affect not just our reproductive health but our metabolism, appetite, energy levels, sleep, digestion and so much more. We need all of our hormones working in balance in order to thrive.

I like to imagine them as a symphony- when all instruments are playing their part, at the right volume and right tempo the effect is magical. However too much or too little of any one instrument and the end result is not at all the same, sometimes even an insult to your senses! The balance of our hormones is much the same. When everything works together the results are wonderful, but should one become imbalanced it can have cascading effects across many others as we know the body works as a whole, not as separate parts.

UNDERSTANDING OUR *Metabolism*

When we talk about our metabolism many of us automatically think about our weight. We often place all blame and emphasis on our ability (or lack thereof) to maintain a healthy weight with ease. This is a gross oversimplification of the role our metabolism has in our health.

Our Metabolism is NOT just our ability to burn fuel or maintain a healthy weight. Metabolism refers to all the chemical processes going on that control how your body creates and uses energy.

Our Metabolism is affected by:

- ***Genes*** *– genes influence muscle size and growth*
- ***Body size*** *– larger adult bodies have more metabolising tissue*
- ***Muscle mass*** *–muscle burns energy more rapidly*
- ***Gender*** *– males typically have faster metabolisms because they tend to be larger and have higher muscle mass*
- ***Growth***
- ***Diet*** *– including fasting, crash dieting, under eating and nutritional deficiencies*
- ***Sleep***
- ***Exercise***
- ***Hormones*** *– controlled by hormones (including stress hormones and insulin) and the nervous system*
- ***Health conditions*** *– hyperthyroidism etc*

NORMAL FUNCTIONING OF OUR *Body*

RESPONSIBILITIES OF OUR METABOLISM ARE . . .

1. **BREATHING**
2. **DIGESTION OF FOOD**
3. **CIRCULATION OF BLOOD**
4. **REPAIRING & GROWING OF CELLS**

Essentially, our metabolism also governs our breathing, digestion, blood flow and the growth and repair of cells in our body, not just our weight. Each of these systems on their own are a massive deal! So, aside from the things we cannot control, like genes, gender, predisposed body size, growth periods etc... our metabolism is also affected by sleep, diet, exercise, our muscle mass and our hormone health.

Cellular energy is derived from the food we eat and the air we breathe. We break down carbohydrates, fat and protein from food and drink, and convert them into cellular energy.

When we refer to our metabolic rate, this is the amount of energy our body uses each day to carry out these functions. If we are regularly consuming more food than our body needs to function, the excess is usually stored as fat.

UNDERSTANDING YOUR *Metabolism*

Use the following questions to explore the relationship you have with your metabolism.

Question 1: How have you thought or felt about your metabolism in the past?

Question 2: Have you ever thought or felt that your metabolism was playing a part in affecting your current state of health?

Question 3: Have you ever blamed your metabolism for aspects of your health or weight that you're unhappy about? If so share your experience.

UNDERSTANDING YOUR *Metabolism*

Question 4: How has your understanding of your metabolism changed? What have you learned about your metabolism you didn't know before?

Question 5: What do you now appreciate about your metabolism?

HORMONES & THEIR ROLE IN YOUR *Health*

When we talk about hormones and their impact on our health, we're referring to all hormones, not just our sex hormones. This includes our thyroid hormones, stress hormones as well as those that affect our blood sugar regulation like insulin.

OUR HORMONES INCLUDE, BUT ARE NOT LIMITED TO:

- ***SEX HORMONES*** *- Oestrogen, progesterone, LH, FSH, Testosterone, Androgens, Prolactin*
- ***THYROID HORMONES*** *- TSH, parathyroid, Free T3 and Free T4*
- ***GROWTH HORMONES***
- ***CORTISOL, ADRENALINE & NOREPINEPHRINE***
- ***BLOOD SUGAR REGULATORS*** *- Insulin, glucagon*
- ***ADRENOCORTICOTROPIC HORMONE (ACTH)*** *– regulates cortisol and androgens*
- ***SLEEP HORMONES*** *- Melatonin*
- ***ALDOSTERONE***

Feeling out imbalances in our hormones can be tricky, as it will be highly dependent on what systems and symptoms are involved as to the symptoms you experience.

It can be much easier to identify sex hormone imbalances in females as we will often find issues present in the menstrual cycle such as irregular cycles, heavy bleeding, PMS and more.

That's why we'll explore Thyroid health, stress and blood sugar regulation separately, even though they all fall under the banner of "hormones".

But before we do, let's reflect on your current understanding and sense of your overall hormone balance.

Do you have any current health concerns you feel may be related to your hormones?

What is the relationship you have had with your hormone balance over your lifetime? Have you blamed or resented your hormone balance for any aspects of your health?

What have you learned about your hormones that you may not have known before?

THYROID *Health*

Our thyroid plays a major role in our metabolism, growth and development of our body. While we often simplify its role in our minds to regulating our weight, the jobs it's responsible for are much broader than that.

1. *It regulates your body temperature*
2. *Controls your heart rate*
3. *Controls your metabolism, which means it converts the energy for our body to run on as well as the speed at which we do this*
4. *Influences how quickly food moves through the digestive tract*
5. *Affects brain development*
6. *Controls how your muscles contract*
7. *And controls the rate at which your body replaces dying cells which has a major influence on skin and bone maintenance*

Our thyroid is easily impacted by many different things including stress, nutritional deficiencies, our immune balance, our gut health and even environmental chemicals. When our thyroid balance is out of whack, many symptoms can occur.

SIGNS & SYMPTOMS OF *Thyroid* CONDITIONS

HYPOTHYROIDISM
(A Low Functioning Thyroid)

- Fatigue
- Increased sensitivity to cold
- Constipation
- Dry skin
- Weight gain
- Puffy face
- Hoarseness
- Muscle weakness
- Elevated blood cholesterol level
- Muscle aches, tenderness and stiffness
- Pain, stiffness or swelling in your joints
- Heavier than normal or irregular menstrual periods
- Thinning hair
- Slowed heart rate
- Depression
- Impaired memory
- Enlarged thyroid gland (goiter)

HYPERTHYROIDISM
(A High Functioning Thyroid)

- Unintentional weight loss, even when your appetite and food intake stay the same or increase
- Rapid heartbeat (tachycardia)
- Irregular heartbeat (arrhythmia)
- Pounding of your heart (palpitations)
- Increased appetite
- Nervousness, anxiety and irritability
- Tremor — usually a fine trembling in your hands and fingers
- Sweating
- Changes in menstrual patterns
- Increased sensitivity to heat
- Changes in bowel patterns, especially more frequent bowel movements
- An enlarged thyroid gland (goiter)
- Fatigue, muscle weakness
- Difficulty sleeping
- Skin thinning
- Fine, brittle hair

YOUR THYROID *Health*

How have you previously felt about your thyroid?	
Do you have any concerns around your thyroid health?	
Have you had any testing done on your thyroid to investigate concerns? What were your results? And, do you feel it was investigated thoroughly? Are you happy with what was checked?	
Have you been told your thyroid is normal but still feel something isn't quite right? If so, what is it that is still causing concern?	
Did you learn anything new in regards to thyroid health you didn't know before?	

REFLECTING ON YOUR CURRENT *Weight*

Maintaining a weight that is true for you is a vital part of good health. Being both under or overweight can have a negative impact on your health. A true weight is much less about what you look like, a number on the scale, an exact BMI (Body Mass Index) or body fat percentage. While BMI is a useful guideline for a suitable range for your height, it doesn't take into account frame size or muscle mass. We should be focusing more on how you feel, and the biochemical signals our body gives as to the impacts on our health.

A weight that is true for us should be a weight which feels easy to carry, with no strain or stress on your body, and a point at which you feel vibrant and strong with ample energy. It should not be really difficult to maintain, requiring excessive exercise or restrictive eating.

Maintaining a healthy weight extends beyond our appearance or comfort in our body. There are many health impacts due to being over or underweight.

REFLECTING ON YOUR CURRENT *Weight*

CONDITIONS THAT ARE CAUSED FROM BEING *Under-weight*

Malnutrition, vitamin deficiencies, or anaemia

Osteoporosis from too little vitamin D and calcium

Decreased immune function

Increased risk for complications from surgery

Fertility issues caused by irregular menstrual cycles

Growth and development issues, especially in children and teenagers

Increased risk of mortality compared to normal BMI

CONDITIONS THAT ARE CAUSED FROM BEING *Over-weight*

Type 2 diabetes

High blood pressure

Heart disease

Stroke

Gallstones

Breathing problems and sleep apnoea

Certain cancers

Bone/joint health – osteoarthritis, body pain and difficulty with physical functioning

Mental illness such as clinical depression, anxiety, and other mental disorders

Low quality of life

Overall risk of death is increased

ADDITIONAL IMPLICATIONS ON OUR HEALTH

For a long time fat was simply thought of as excess energy stored away. An additional load on your skeletal system, and a problem for diabetes and heart health perhaps.

However we now know that obesity can significantly affect inflammation, and this is one of the key ways it has a negative impact on our health.

Adipose (fat) tissue releases many inflammatory mediators and these can impair the way insulin works, leading to insulin resistance and other metabolic disturbances. Studies have also shown that blood concentrations of inflammatory markers are lowered following weight loss, showing that less fat means less production of inflammation.

Adipose tissue is now starting to be recognised as a type of endocrine organ (and potential hormone disruptor). While this might sound far reaching to consider our fat stores as an organ like our liver or heart, adipose tissue is a major site of oestrogen production as well as the conversion of androgens to oestrogen. Fat tissue also lowers testosterone, through suppressed testicular function, more conversion of testosterone into oestrogen. Adipose tissue also increases production of hormones such as leptin, which is thought to help control body weight through appetite regulation, increasing energy expenditure and reducing body fat.

We're sure you can now appreciate how having excess adipose tissue (through changes in our inflammatory response and hormone balance) would be detrimental to our health.

REFLECTING ON YOUR CURRENT *Weight*

Now that we understand that being both under or overweight can have a negative impact on your health and have an awareness of the many reasons why maintaining a weight that is true for you is so important, use the following questions to reflect on where your body is at.

Question 6: How do you feel about your current weight? Do you feel it is true for you, or would you like it to be different?

Question 7: How do you maintain your current weight? Do you find it easy or do you feel like it takes a great level of control with your dietary intake and exercise habits?

Question 8: Do you feel like your weight impacts on your current state of health or quality of life? For example, do you ever blame your weight for things you cannot do or feel it is holding you back in any way?

THE HEALTH IMPACTS OF *Stress*

Stress can have an impact on our health through a number of ways. Everything from changing our dietary habits, depleting magnesium, altering sex hormone balance and thyroid function to affecting hunger signalling and fat accumulation.

While the stress response is usually activated in situations involving real danger or urgency, it can also be triggered by situations or places our brain deems threatening, and this is often based on our past experiences.

We often think of stress as affecting more the mental/emotional side of things, and often we associate it with feeling overwhelmed or of not coping. However stress can still be having a big biochemical impact on us, even if we feel we are "coping" ok.

When we consider our stress levels we're also considering general life stresses, financial worries, busyness, long hours, missing meals, poor nutrition and lack of sleep as contributors to stress. Remember it's not only the big life events or trauma that can trigger stress responses in our body (though of course these are significant).

Chronic stress (through elevated stress hormones) has several negative impacts on our body:

- ☐ *Changes our dietary habits - comfort food, quick options, caffeine to function (esp if not sleeping well),*
- ☐ *Alcohol to switch off affects our nutritional intake/ availability*
- ☐ *Impacts hunger signalling*
- ☐ *Fat accumulation*
- ☐ *Alters your metabolism*
- ☐ *Alters normal function of sex hormones testosterone, estrogen and progesterone*
- ☐ *Depletes magnesium (increased losses)*
- ☐ *Promotes acidity – loss of alkaline minerals*
- ☐ *Inhibits secretion of thyroid stimulating hormone (TSH) from the pituitary*
- ☐ *Affects bone density (more prone to osteoporosis)*

WHAT HAPPENS IN OUR BODY WHEN WE EXPERIENCE *Stress*

Sooo let's break it down.

When we perceive something to be stressful or a danger, signals are sent from our brain, triggering a cascade of events that result in the release of large amounts of stress hormones. These include adrenaline, norepinephrine, and cortisol.

Firstly, our adrenals produce Adrenaline, our main fight or flight hormone. Adrenaline is responsible for the immediate reaction we feel - pounding heart, tense muscles, breathing faster, sweating etc as we prepare to get ready to run and get out of there! Adrenaline also gives us a surge of energy and focuses our attention, all needed to get out of a dangerous situation fast.

Norepinephrine is also produced by our adrenals and brain. It has a similar role to adrenaline. It works on increasing arousal, so we're awake, alert, and focused, meaning we're more responsive. It shifts blood away from areas that aren't so crucial like the skin, towards muscles, so you can flee.

Cortisol – produced by our adrenals in response to signalling from our brain and hypothalamus. It comes in slightly later. Cortisol helps maintain our blood sugar, fluid balance and blood pressure while down regulating some body functions that aren't crucial in the moment, like reproductive health, immunity, digestion and growth.

> *"Being in a constant state of stress can easily leave us feeling hyperalert, stimulated, racey and on edge. This is coupled with cortisol's actions of down regulating digestion, immunity, growth and fertility. You can see how this would be a problem for our overall health!"*
>
> Sandi Cooper

STRESS & *You*

Question 9: How do you feel you handle stress?

Question 10: Do you feel stress is having a negative impact on your health and/or contributing to your current symptoms? If so, can you share more on this?

Question 11: How have you noticed your eating patterns or food choices change in response to stress?

STRESS & *You*

Question 12: Have there been times where you know stress was negatively influencing your physical health?

Question 13: What are some triggers of stress for you?

Question 14: What are some signs or symptoms you experience in your body when under stress?

STRESS & *You*

Question 15: What are some things that help you to manage stress in your life?

Question 16: After taking the time to reflect on your relationship with stress, is there anything you've learnt that you perhaps didn't realise, regarding its impact on your broader health?

BLOOD SUGAR *Regulation*

Having stable blood sugar is a key part to maintaining good energy levels throughout the day and ensuring we're not contributing to greater cortisol signalling or insulin resistance.

When our blood sugars drop, it sends a stress response out, triggering the release of cortisol, one of our stress hormones. One of cortisol's roles is to increase blood sugar, to provide energy to flee, to get out of that dangerous situation. But too much cortisol also has a negative impact on our body - down regulating digestion, growth, repair, and immunity as well as interfering with thyroid hormones and contributing to insulin resistance.

When our blood glucose level is regularly or consistently elevated (through poor diet choices or the impact of chronically elevated stress hormones) then our pancreas will continue to pump out insulin in response.

Insulin is an important hormone produced by the pancreas and is used in regulating our blood sugar. It acts like a key, unlocking our cells to allow sugar (glucose) to enter to be used for fuel or if in excess, stored as fat.

Our liver and muscle cells need to be receptive and responsive to allow glucose from the blood into the cells. If our cells are constantly bombarded by high insulin (due to high glucose levels in our blood) they get tired and start to ignore insulin. They can become a little deaf to the signal as such.

This is insulin resistance - cells becoming resistant to the signal of insulin.

That means over time even more insulin is needed to be produced by the pancreas in order to be heard (to have the same affect).

Signs & Symptoms
OF POOR BLOOD SUGAR REGULATION

USE THIS CHECKLIST TO OBSERVE YOUR BLOOD SUGAR REGULATION

- ☐ *Feel dizzy, lightheaded, shaky, cranky, headachy when skipping meals or not eating for awhile? Or experience feeling "hangry"?*
- ☐ *Feel less irritable, headachy or reactive after you eat?*
- ☐ *Often crave carbohydrates or sugar?*
- ☐ *Find your energy levels fluctuate rapidly over the day?*
- ☐ *Feel fatigued/crash or feel sleepy or drowsy after eating carbohydrates?*
- ☐ *Or buzzed, racey or even a bit hyperactive after carbohydrates?*
- ☐ *Gaining weight mostly across the abdomen?*

Question 17: Do you have any concerns around your blood sugar regulation?

Question 18: Do you need to be very vigilant with what/how/when you eat to regulate your blood sugar or is there an ease to it?

WHY THE HYPE ABOUT *Insulin* RESISTANCE?

Having an awareness of your blood sugar levels and your insulin resistance is a huge preventative measure for future health problems, and if it is not addressed any efforts you make around weight management will be an uphill battle.

The reason for this is because insulin is a fattening hormone, it's anabolic, which means it preserves, builds, restores and conserves. Our liver and muscle cells are responsible for taking up over three quarters of our glucose to be used for energy or fueling our bodily functions. Our fat cells then store whatever is leftover. Over time, our muscle and liver cells can become less responsive (or "deaf"), to the signals of insulin (insulin resistant) and stop taking up glucose effectively.

Interestingly, our fat cells don't become insulin resistant, in fact they tend to welcome it with open arms. The problem is that the glucose taken up by our fat cells isn't used for energy or fueling our bodily functions but is simply stored as fat. So we end up with more fat stored, and less energy.

Insulin resistance can lead to type 2 diabetes, stroke, fatty liver, and arteriosclerosis, a process of progressive thickening and hardening of the walls of medium and large sized arteries. What's most important to note is that studies have shown evidence that insulin resistance and changes in blood sugar linked to diabetes occur more than a decade before the disease occurs!

This is precisely why we want to be identifying a problem and beginning to address it at an early stage, while it is in the pre-disease state, before it has gone so far that it's a diagnosable disease.

> *"Everyone benefits from a low sugar way of eating but some people are more sensitive to high sugar and consistently high insulin levels. Our cells are delicate and responsive to their environment, if we make the environment of our body a harsh place for our cells to live they will lose some of their delicate responsive nature"*
>
> Rebecca Poole

Question 19: Do you feel there may be something to explore for you in regards to blood sugar stability or Insulin resistance? If yes, what makes you feel that way?

Question 20: What are some steps you can take to explore if blood sugar instability or insulin resistance is a factor for you?

Question 21: What have you learned about Insulin Resistance you didn't know before? What has surprised you the most?

HOW IS YOUR *Environment* AFFECTING YOUR HEALTH?

Endocrine-disrupting chemicals (EDCs) are substances that interfere with the normal function of our endocrine system. We can be exposed to them in a variety of ways - through our environment (air, soil, water), food sources, personal care products and manufactured products.

They interfere with the way our hormones work. Some act like "hormone mimics", tricking our body into thinking that they are hormones, while others block natural hormones from doing their job. Others can increase or decrease the levels of hormones in our blood by affecting how they are made, broken down, or stored in our body. Some can change how sensitive our bodies are to different hormones.

EDCs affect our entire endocrine system and impact sex hormone balance, menstrual health including early menarche and puberty, thyroid health, male and female fertility, testicular function and suppression of testosterone synthesis, Immune and nervous system function, respiratory problems, certain cancers and more.

They are also known as Obesogens, as they are known to contribute to obesity.

THEY INCLUDE:

- ***Organotine*** *- fungicides used for treating wood for building materials*
- ***Polycyclic aromatic hydrocarbons (PAHs)*** *- By-product of burning some types of fuel resulting in air pollution*
- ***BPA (Bisphenol)*** *- commonly used in plastics*
- ***Polybrominated biphenyl ethers (PBDEs)*** *- Flame retardants*
- ***Phthalates*** *(plasticising agents found in cosmetics, medicines, paint)*
- ***Pesticides***
- ***Alkylphenols*** *used in manufacturing certain goods like rubber or paint*

HOW IS YOUR *Environment* AFFECTING YOUR HEALTH?

Now that we've briefly touched on the impact of numerous chemicals in our environment and the way they can impact our health, our hormone balance, and our weight, consider the following questions.

How much awareness did you have before the webinar in terms of the impact of chemicals on your health in this way?

Have you ever thought about what you put on your skin, what you wash your clothes with or clean your house with as a contributor to your health? If not, how do you feel about this now you have that awareness?

Are there any areas in your environment that you may have already had an understanding of the need for safer/ healthier options?

Where do you feel you could begin to improve on this? This may be through seeking out better alternatives, finding out more information etc.

WANT TO LEARN MORE?

The Environmental Working Group has a number of resources and information on their site to help with this. They also have an app called Skin Deep that allows you to look up particular cosmetic/skin care products to investigate their safety. If the product isn't available in their database you can also look up the individual ingredients. This can be a very helpful tool when navigating all of this in the early stages.

WHERE TO NEXT?

Write down a summary of everything you learned or realised during Module 3.

MODULE 3 - CHECKLIST

- ☐ **Watch Module 3 Video**
- ☐ **Complete Module 3 in the workbook**