HORMONES & NEUROTRANSMITTERS

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Hormones & Neurotransmitters

Creating the perfect physiological environment for your best ever results & life.

Mood & Motivation

Creating the perfect physiological environment for your best ever results & life.

Most people think of mood and motivation as only being psychological, but when you dive deeper you can see this isn't the case.

As part of our coaching we unlock the physiological factors to build motivation, enhance mood and deliver focus.

If you have ever struggled with low mood, procrastination and a less than optimum outlook then this section of the coaching will truly change you. We look at the biology of mood and motivation and create the habits and changes need to increase the effectiveness of your body and mind boosting hormones and neurotransmitters.

In this particular coaching section we are focussing on Dopamine and Serotonin.

First things first - What are they?

What is dopamine?

Dopamine is a neurotransmitter. Neurons in the brain release dopamine, it's role is carrying signals between neurons.

Our bodies use dopamine to create chemicals called norepinephrine and epinephrine.

Dopamine plays a crucial role in our reward system. This is a group of brain processes that control motivation, desire, and cravings.

Dopamine levels also influence the following bodily functions:

mood sleep learning movement alertness blood flow urine output Neurotransmitt

Neurotransmitters are defined as a group of chemical agents released by neurons. These messengers link the brain and spinal cord to muscles, glands and organs by sending signals to perform certain functions.

Also, they interact with sites called receptors located throughout the brain to regulate memory, emotions, cognitive function, attention, energy, appetite, cravings, sensitivity to pain, and sleep patterns.

Imbalances impact our quality of life and behaviour and can create a vast amount of health issues, such as:

Anxiety Addiction Behavioral disturbances Cognitive disorders Diseases (Such as Parkinson's) Fatigue Hormonal imbalances Mood disorders Obesity Pain There are over 100 different kinds of neurotransmitters known to date. These neurotransmitters have different functions and affect different parts of the body, but they all fall into one these categories:

Excitatory neurotransmitters encourage a cell to take action.

Inhibitory neurotransmitters decrease the chances of a cell taking any type of action, leading to a relaxationlike effect on the body.

Modulatory neurotransmitters can send messages to several different neurons at the same time. They can also communicate with other neurotransmitters.

Dopamine is an excitatory neurotransmitter. Dopamine communicates with brain cells and encourages them to act in a pleasurable, excitable, euphoric way.

The excitatory nature of dopamine is also the main reason why it motivates us. It encourages our brain cells to take certain actions, influencing our behavior.



How Dopamine Impacts Our Behavior

Dopamine is one of the most prominent neurotransmitters that impact human behavior.

When we have pleasurable experiences like eating satisfying food, sexual activity, or drug use, our body releases dopamine.

Our brain then associates the release of dopamine with pleasure and creates a reward system.

An example would be when you eat comforting food, your brain releases dopamine, which makes you feel good.

Your brain therefore, assumes this is a reward and encourages you to repeat this behavior, even though the comforting food may not be a good long term choice.

Dopamine is associated with reinforcement behaviour. It is thought to be the chemical that motivates a person to do something repeatedly.

Humans gravitate to positive experiences and try to avoid negative ones. Dopamine is what drives us to create these patterns. This is why people with low dopamine levels may be more likely to develop addictions to drugs, food, sex, or alcohol.

The origins of motivation (hint: it's neuroscience)

To trace the source of motivation it matters which pathway dopamine takes. The mesolimbic pathway, which comes from the middle of the brain and branches to various places like the cerebral cortex, is the most important reward pathway in the brain.

When there's an increased amount of dopamine in the nucleus accumbens, it triggers feedback for predicting rewards. Essentially, your brain recognizes that something important is about to happen, so dopamine kicks in.

What causes your dopamine to spike

Dopamine performs its tasks before we obtain rewards, meaning that its real job is to encourage us to act, either to achieve something good or to avoid something bad.

It was thought that dopamine was only a neurotransmitter for pleasure, but when researchers looked more closely, they began to notice other influences. Spikes in dopamine also occurred in moments of high stress — like when soldiers with PTSD heard gunfire.

A study by a team of Vanderbilt scientists mapped the brains of "go-getters" and "slackers." They found that people willing to work hard had higher dopamine levels in the striatum and prefrontal cortex — two areas known to impact motivation and reward. Among slackers, dopamine was present in the anterior insula, an area of the brain involved in emotion and risk perception.

As UConn Researcher John Salamone explains, "Low levels of dopamine make people and other animals less likely to work for things, so it has more to do with motivation and cost/benefit analyses than pleasure itself."

How do we increase them?

Causes of Low Dopamine

There are a number of factors to consider when it comes to understanding what may be responsible for reduced dopamine in the body. These include sleep deprivation, drug abuse, obesity, saturated fat, and stress. Let's look more closely at each.

Sleep Deprivation

Dopamine is one of the reasons you feel refreshed and alert most mornings. This wakefulness is promoted by dopamine receptors, in particular the D2 receptor. These receptors help to mediate the functions of dopamine in the body.

Sleep deprivation can reduce the number of D2 receptors in important parts of the brain. When this happens, the transmission and production of dopamine is impacted.

Obesity

Obesity is linked to a vast number of health conditions, but one less known effect is the role it plays in downregulating or reducing the amount of dopamine in the brain.

Like the results of sleep deprivation, obesity can lead to a reduction in D2 receptors in the brain. This becomes especially obvious when comparisons are made with the number of receptors in people who are not obese.

Drug Abuse

Certain drugs in early use may contribute to an increase in dopamine. Cocaine for example is a drug that has been known to produce an increased dopamine level following usage.

However, long-term use of these drugs is certain to offer diminishing returns, especially where dopamine production is concerned.

Because of the sustained increase in dopamine production following drug use, the brain intervenes to reduce the number of dopamine receptors available.16

Saturated Fat

Over time, persistently observing a high-fat diet disrupts central nervous system functioning, where dopamine is produced. When it is disrupted, this can lead to a dopamine deficit.

Stress

When you are regularly exposed to stressors like financial difficulty, relationship troubles, workplace stress, and more, this can affect your body's production of dopamine. Over time, this may also lead to a deficiency of the neurotransmitter in the body.

Hack your dopamine to boost your productivity

Motivation happens when your dopamine spikes because you anticipate something important is about to happen. Here's how it can affect your productivity.

The brain can be trained to feed off of bursts of dopamine sparked by rewarding experiences. You create the dopamine environment, and the brain does the rest.

One way to achieve those rewarding experiences is by setting incremental goals. Dopamine will flow as a result of your brain's positive reinforcement every time you complete a step and meet a challenge.

Here's how to get your dopamine flowing:

Record small accomplishments. A to-do list (or a "digital done list") reinforces how you're chipping away at your goals. As you feel yourself making more progress, you'll feel the greater effects of dopamine.

Tell people about your results. Sharing your results or progress (whether they're positive or negative) means that others will recognize your work, resulting in more



positive feedback. Praising and recognizing the work of your colleagues can also increase your dopamine.

Use micro-deadlines. Keeping focused on one task at a time will force you to sit down and get shit done. The more you do that, the more you'll see positive feedback (via your work getting done), which will increase your dopamine.

Focus on how great you'll feel when your project is complete. A study by University of Michigan professors found that results-driven focus motivated people to complete their work. Imagine the outcome and how life looks and how you will feel. Don't just think about it. Really imagine it.

Health tricks to kick your dopamine into a higher gear

Dopamine has a biological connection to our motivation to achieve. You can also spur your capacity to accomplish tasks by building healthful habits.

Boost your diet with dopamine-filled foods (or supps). Make sure you're eating food with plenty of natural pre & probiotics, like yogurt and sauerkraut, and fibre plus natural glucose, which occurs in raw fruits and nuts.

Take a 10-minute nap. Research shows that 10 minutes is the optimal length. After that, "sleep inertia" can set in, making you sluggish and unproductive.

Get moving at midday. Even a 20-minute walk will yield positive results. And if you opt for a short, high-intensity workout, it can propel your dopamine to new heights.

How do we coach you through this change?

Nutrition

Pre & Probiotics

Looking at foods and supplements to support the physiological side of mood and motivation is crucial. We start in your gut bacteria, supporting healthy gut bacteria to encourage optimum neurotransmitters.

Here is a look at what science says about probiotics.

Probiotic strain	What science says
B. longum	may reduce depression and anxiety, helps people with IBS
B. bifidum	helps generate vitamins such as K and B-12, which may also influence mood
B. infantis	increased relaxation in rats Trusted Source and helped with treating irritable bowel syndrome
L. reuteri	known to have an anti-pain effect in mice and can help increase excitability
L. plantarum	significantly increased serotonin and dopamine in mice and reduced anxious behavior when they were in a maze
L. acidophilus	may help reduce cholesterol and supports nutrient absorption
L. helveticus	rats administered with <i>L. helveticus</i> showed a decline in anxiety scores but another 2017 study found no difference

You can supplement with prebiotics but we also like to work in food that are naturally high in them.

A high quality, plain yogurt with live cultures can be a fantastic addition to your diet if you want to add beneficial bacteria.

Fermented foods are a great option, as they contain beneficial bacteria that thrive on the naturally occurring sugar or fiber in the food.

Examples of fermented foods include:

sauerkraut

kimchi

kombucha tea

kefir (dairy and nondairy)

some types of pickles (unpasteurized)

other pickled vegetables (unpasteurized)

Prebiotics are a lot less talked about than probiotics. Less well known but equally as important.

Prebiotics have a positive impact on the central nervous system by supporting critical neurotransmitters.

Chicory root

Chicory root is a great source of prebiotics.

Approximately 68% of chicory root fiber comes from the prebiotic fiber inulin (4) Its inulin fiber promotes friendly gut bacteria, reduces constipation, and can help control glucose levels.

It may also help prevent diabetes by raising levels of adiponectin, a protein that helps control blood glucose levels (8)

Additionally, chicory root is high in antioxidant compounds that may protect your liver from oxidative damage (9).

Jerusalem artichoke

The Jerusalem artichoke — also known as the sunroot, sunchoke, or earth apple — is part of the sunflower family and has great health benefits.

Known for its sunflower-like appearance, the vegetable provides about 2 grams of inulin-rich dietary fiber per 100 grams (13).

Inulin helps increase the friendly bacteria in your colon, promoting greater digestive health (16). It can also aid in the absorption of minerals in your large intestine.

Adding Jerusalem artichokes to your diet may help strengthen your immune system, lower cholesterol, and even prevent certain metabolic disorders (16)

Garlic

Garlic is a flavorful herb linked to various health benefits due to its antioxidant, anti-inflammatory, and lipid-lowering properties (19).

Garlic acts as a prebiotic by promoting the growth of beneficial Bifidobacteria in the gut. It also helps prevent disease-promoting bacteria from growing (20).

Research shows that different compounds in garlic reduce the risk of cardiovascular diseases, have anti-tumor effects, and lower blood glucose levels (19).

Onions

Onions are a tasty and versatile vegetable linked to various health benefits. Similar to garlic, onions are rich in inulin and FOS (22).



FOS strengthens gut flora, helps with fat breakdown, and boosts your immune system by increasing nitric oxide production in cells (22, 24).

Onions are also rich in the flavonoid quercetin, which gives onions antioxidant and anticancer properties (24)

Leeks

Leeks are nutrient dense, which means they're low in calories but high in vitamins and minerals. They have high inulin content which promotes healthy gut bacteria and helps to break down fat (28).

Asparagus

Asparagus is a popular vegetable and another great source of prebiotics.

The nutritious vegetable naturally contains inulin, which can improve your digestive health and help your body maintain optimum levels of glucose and insulin (33).

Inulin is also a soluble fiber, which feeds the friendly bacteria in the gut, such as Bifidobacteria and Lactobacillus (34)

Oats

Whole oats are a healthy grain with prebiotic benefits. They contain large amounts of beta-glucan fiber, as well as some resistant starch.

Beta-glucan from oats has been linked to (47, 48, 49):

healthy gut bacteria

lower LDL (bad) cholesterol

better blood sugar control

reduced cancer risk

Apples

The pectin in apples has prebiotic benefits.

A 2016 study found that pectin from apples could promote healthy gut microbiota, decrease inflammation, and suppress weight gain and fat accumulation in rats with obesity (52).

Pectin increases butyrate, a short-chain fatty acid that feeds beneficial gut bacteria and decreases the population of harmful bacteria (53, 54).

Konjac root

Flour made from this contains 70-90% glucomannan fiber, a powerful dietary fiber (57).

Konjac glucomannan promotes the growth of friendly bacteria in your colon and may help relieve constipation (58).

Glucomannan has also been shown to lower blood cholesterol and help with weight loss — all while improving carbohydrate metabolism (59, 60).

You can consume it in the form of foods made with the konjac root, such as shirataki noodles. You can also take glucomannan supplements.

Cocoa

Cocoa powder can be added cocoa to oatmeal, smoothies, yogurt, and other recipes.

Cocoa and its products are rich sources of polyphenols such as flavanols, which exert antioxidant and anti-inflammatory effects (61).

These compounds also help grow beneficial gut bacteria while reducing the growth of harmful bacteria (61).

Flaxseeds.

The fiber in flaxseeds promotes healthy gut bacteria, encourages regular bowel movements, and reduces the amount of dietary fat you digest and absorb (65, 66).

Habits.

As we now know our dopamine helps us to build motivation and positive habits. We work with you to celebrate your wins, share your journey and reward positive change.

Record small accomplishments. Record and Celebrate your wins, big or small.

Tell people about your results. Sharing your results or progress with us as coaches and our other members.

Use micro-deadlines. We use small weekly goals that are achievable to create positive associations.

Focus on the outcome. We work with you to build a big enough "why" and then create a visualisation of this for powerful motivation.

Sleep & Stress. We use our habits coaching to increase the quality and quantity of your sleep and stress management.

Serotonin

What is serotonin?

Serotonin is a neurotransmitter present in the brain. And also in the gut with more than 90% of the body's total serotonin resides in the enterochromaffin cells there, where it helps regulate the movement of the digestive system.

As well as supporting digestion serotonin also supports the below actions

the sleep-wake cycle

mood and emotions

metabolism and appetite

cognition and concentration

hormonal activity

body temperature

blood clotting

How is serotonin made?

Serotonin is manufactured by the brain from the essential amino acid I-tryptophan. Cells that make serotonin combine tryptophan with tryptophan hydroxylase, a chemical reactor, to form 5-hydroxytryptamine — what you and I know as serotonin.

What is serotonin's role in digestion?

Serotonin joins with receptors in the muscle lining of the gut, to enhance movement of the food you eat through your intestines. When you eat something harmful your gut reacts by producing a extra serotonin. This moves up the offensive food or substance, helping you get it out of your body fast.

What is the difference between serotonin vs. dopamine?

Serotonin and dopamine both promote communication between brain cells. They are sometimes called the "happy hormones" because of their function as mood and emotion regulators. An imbalance in their levels is also involved in certain mental health conditions like depression.

The main function of serotonin is slightly different from dopamine's main function — dopamine makes you feel pleasure and happiness after engaging in a particular activity, serotonin brings feelings of happiness by stabilising your mood. Dopamine is mainly concerned with controlling movement, while serotonin focuses on sleep and digestive function.

How Does Serotonin Regulate Body Function?

Neurotransmitters are involved in a lot of things your body does on a daily basis. In addition to digestion and mood regulation, what is serotonin's role in terms of body function?

Sleep

Research shows that the time of day can affect your serotonin levels as can how well you sleep, as well as the amount of sleep you get. Melatonin the hormone responsible for regulating your sleep cycle — is produced from serotonin in the pineal gland of the brain, so an excess or a deficiency of serotonin can affect the quality of your sleep.

Sleeping, however, isn't limited to serotonin alone. Other brain chemicals like dopamine are also involved in the process.

Blood clotting

The excess serotonin that's not used up in the gut goes into the bloodstream, where it's quickly taken up by platelets — the smallest of our blood cells that work to prevent bleeding. These tiny blood cells store up the serotonin and release some of it to help heal cuts, bruises, and other kinds of tissue damage.

When you have higher serotonin levels, the arterioles — small-diameter blood vessels in your circulatory system — become narrow. As they reduce in size, blood flow slows down. This process is key to the function of blood clotting, which is also an important step in healing wounds.

Bone density

What is serotonin's role in the strength of your bones? Studies show that higher serotonin levels in the gut may be linked to low bone density and other conditions such as osteoporosis.

Research has also shown that a class of antidepressants called selective serotonin reuptake inhibitors (SSRIs) are linked to a decrease in bone mineral density, and could make one more susceptible to fractures.

Sexual function

Serotonin doesn't just influence your mood, it also affects the intensity of your sexual urges, and how often you feel them. The neurotransmitter dopamine also controls the brain's pleasure and reward system, which kicks in during sex. The relationship between serotonin and dopamine also affects libido. Higher serotonin levels are associated with lower levels of sexual urges but also of delayed ejaculation in men.

How do we optimise serotonin?

Understanding of what causes serotonin deficiency is limited. Some research shows early life stressors might have a negative impact on the transport of serotonin in the body.

Additional research shows that microbes in our gut help produce serotonin. This production might be disrupted when the microbiome, or gut bacteria as a whole, is disturbed because of stress, disease, diet, or other causes.

These studies were done with animals and further clinical research in humans is needed.

Other potential causes of serotonin deficiency include:

chronic stress

nutritional deficiencies

digestion issues

certain drugs

hormone changes

lack of sunlight

Lower levels of serotonin are also thought to be related to a person's particular biology, which may include: fewer or less effective serotonin receptors

a body that breaks down serotonin or absorbs it too soon

low levels of substances used to produce serotonin, including L-tryptophan, vitamin D, vitamin B6, and omega-3 fatty acids

How to boost serotonin.

Reported levels of happiness are positively correlated and reported levels of sadness are negatively correlated with serotonin synthesis in the right anterior cingulate cortex.

The idea that alterations in thought, either selfinduced or due to psychotherapy, can alter brain metabolism is not new. Numerous studies have demonstrated changes in blood flow in such circumstances. However, reports related to specific transmitters are much less common. In one recent study, meditation was reported to increase release of dopamine.37 The study by Perreau-Linck and colleagues36 is the first to report that selfinduced changes in mood can influence serotonin synthesis. This raises the possibility that the interaction between serotonin synthesis and mood may be 2-way, with serotonin influencing mood and mood influencing serotonin.

Exposure to bright light is a second possible approach to increasing serotonin without drugs. Bright light is, of course, a standard treatment for seasonal depression, but a few studies also suggest that it is an effective treatment for nonseasonal depression38 and also reduces depressed mood in women with premenstrual dysphoric disorder39 and in pregnant women suffering from depression.40 There was also a positive correlation between serotonin synthesis and the hours of sunlight on the day the measurements were made, independent of season. In humans, there is certainly an interaction between bright light and the serotonin system. The mood-lowering effect of acute tryptophan depletion in healthy women is completely blocked by carrying out the study in bright light (3000 lux) instead of dim light.49

A third strategy that may raise brain serotonin is exercise. A comprehensive review of the relation between exercise and mood concluded that antidepressant and anxiolytic effects have been clearly demonstrated.53 In the United Kingdom the National Institute for Health and Clinical Excellence, which works on behalf of the National Health Service and makes recommendations on treatments according to the best available evidence, has published a guide on the treatment of depression.54

Several lines of research suggest that exercise increases brain serotonin function in the human brain. Post and colleagues56 measured biogenic amine metabolites in cerebrospinal fluid (CSF) of patients with depression before and after they increased their physical activity to simulate mania.

The fourth factor that could play a role in raising brain serotonin is diet. According to some evidence, tryptophan, which increases brain serotonin in humans as in experimental animals,69 is an effective antidepressant in mild-to-moderate depression.67,70 Further, in healthy people with high trait irritability, it increases agreeableness, decreases quarrelsomeness and improves mood.34

How we support you through this?

Actioning this information and evidence is part of our coaching protocol. We show you how to utilize the techniques for optimum serotonin levels.

Light exposure - Using a daylight light box

Start with 30 minutes of light exposure per day. Start light therapy in the early morning, as soon as possible after awakening (between 6:00 a.m. and 9:00 a.m.).

Response usually starts in a few days, and by two weeks the symptoms should be definitely improving. Most people need to continue light therapy throughout the winter until the springtime. When light therapy is stopped, symptoms do not usually reappear for a few days, so most people can stop the treatment for one or two days without much problem (e.g., for a weekend trip).

If the symptoms are not improving after 10-14 days, try spending up to 60 minutes per day in front of lights each morning, or divided between the morning and evening.

When there is a good response to light therapy, some patients like to experiment with the timing and duration of daily light exposure, e.g., by reducing the daily exposure to 15 minutes, or using the light at a more convenient time of the day (e.g., 7:00 p.m.). We suggest making one change at a time, for 2 weeks. If symptoms start returning, go back to the original dosing schedule.

Positive mindset work

As stated above the interaction between serotonin synthesis and mood may be 2-way, with serotonin influencing mood and mood influencing serotonin.

We therefore focus on helping you to improve mood. Using but not limited to this list.

Exercise

Visualization

Practicing gratitude

Improve sleep quantity and quality

Reward positive outcomes

Pro & prebiotics

Utilising the same system to promote optimum gut health and bacteria.

What we track.

How we measure this

Score 1-5 each section Weekly total = score



SCORE TOTAL

