The hormones in a human body are everywhere, made by many organs and systems, with each system reacting to certain hormones released. The body is so hormonal, it is a major part of what makes each of us an individual.

Bee venom does so much within the human body on a hormonal level, it is hard to get a visual, never mind understand. Below is a very simplified explanation of the hormones in our bodies, from where they come, and how they react – especially to bee venom. It also explains why and how the body reacts to hormones to the extent of seeing why bee venom is contraindicating.

**Adrenal Cortex Hormones**

The adrenal cortex produces 3 corticosteroid hormones:

- Adrenocorticotropic hormone (ACTH) is triggered by the hypothalamus and anterior pituitary gland and triggers the release of glucocorticoids and adrenal androgens by the adrenal. Glucocorticoids regulate glucose in diabetes. To a lesser extent it also stimulates aldosterone release from the medulla:
  - Commonly known as cortisol, it regulates body metabolism by converting fats, proteins, and carbohydrates to energy. It also helps regulate blood pressure and cardiovascular function. Cortisol stimulates glucose production by mobilizing amino acids and free fatty acids.
  - This hormone works with hydrocortisone to regulate immune response and suppress inflammatory reactions.

When the body is stressed the hypothalamus produces corticotrophin-releasing hormone (CRH), it stimulates the pituitary gland to release adrenal corticotropic hormone (ACTH). These hormones, in turn, alert the adrenal glands to produce corticosteroid hormones.

Mineralocorticoids, triggered by the kidney, is the most important of which is aldosterone. This hormone helps to maintain the body’s salt and water levels which, in turn, regulates blood pressure. Without aldosterone, the kidney loses excessive amounts of salt (sodium) and, consequently, water, leading to severe dehydration.

Adrenal androgens: male sex hormones mainly dehydroepiandrosterone (DHEA) and testosterone. All have weak effects, but play a role in early development of the male sex organs in childhood, and in women during puberty. These are involved in creating and maintaining the differences between men and women.

**Adrenal Medulla Hormones** - effects of bee venom

(Medulla - Systemic pretreatment with the beta- adrenergic receptor antagonist propranolol,
but not the corticosteroid antagonist RU-486, inhibited dBVAI. This suggests that dBVAI is meditated by adrenal medullary catecholamines acting through beta-adrenoceptors expressed by immune cells and that it is not dependent on corticosteroid release from the adrenal cortex. Beta blockers bind to beta-adrenoceptors.

Unlike the adrenal cortex, the adrenal medulla does not perform any vital functions. That is, you don’t need it to live. But that hardly means the adrenal medulla is useless. The hormones of the adrenal medulla are released after the sympathetic nervous system is stimulated (neurotransmitter), which occurs when you’re stressed and contribute to fight-or-flight response. As such, the adrenal medulla helps you deal with physical and emotional stress. The medulla also produces catecholamines, which include adrenaline, noradrenaline and small amounts of dopamine - these hormones are responsible for all the physiological characteristics of the stress response, the so called ‘fight or flight’ response.

The 2 Hormones secreted by the adrenal medulla are:

- **Epinephrine**: Also known as adrenaline, this hormone rapidly responds to stress by increasing your heart rate and rushing blood to the muscles and brain. It also spikes your blood sugar level by helping convert glycogen to glucose in the liver. (Glycogen is the liver’s storage form of glucose.)
- **Norepinephrine**: Also known as noradrenaline, and is also made in the brain and the central nervous system. It works well with epinephrine and is created on an as-needed basis and dissipates quickly after the stressful situation is over. However, it can cause vasoconstriction (the narrowing of blood vessels). This results in high blood pressure. It also directs blood flow away from the skin and into muscles.

Cortisol, on the other hand, lingers in the body where it accumulates, contributing to diseases such as obesity, diabetes, heart disease, and cancer.

**Norepinephrine and Depression**

No one, including the experts, fully understands the biochemical causes of depression.

Norepinephrine, serotonin, and dopamine — neurotransmitters that belong to a group of compounds known as the monoamines — play a role in mood regulation. This is why the most popular antidepressants are selective serotonin reuptake inhibitors (SSRIs) which work by increasing serotonin levels.

Other theories posit that depression is caused by brain inflammation, low dopamine, or low norepinephrine.

The main symptoms of low norepinephrine-based depression are feelings of lethargy, brain fog, and lack of zest for life.

These symptoms are very similar to depression that’s linked to low dopamine.
Norepinephrine: The Bottom Line

Norepinephrine is a stress hormone and neurotransmitter that helps the body respond to danger and stressful situations.

Your level of norepinephrine can be too low, leading to depression and ADHD, or too high, contributing to anxiety.

It is closely linked to both epinephrine (adrenaline) and dopamine in function and structure. Common medications such as antidepressants and stimulants can modify norepinephrine levels, but finding the right drug can be hit or miss.

Fortunately, there are many natural ways to balance norepinephrine levels with food, supplements, exercise, and other lifestyle adjustments.

Norepinephrine Boosting Foods

- The amino acid tyrosine is the basic building block of norepinephrine.
- You can eat foods that contain either tyrosine or phenylalanine, another amino acid that converts into tyrosine.
- Virtually all animal products are good sources of both tyrosine and phenylalanine.
- The foods that increase norepinephrine will be very similar to those that increase dopamine.

How to Balance Norepinephrine Naturally

Here are some foods known to specifically increase norepinephrine:

- If you don’t eat a lot of norepinephrine-boosting foods, you can take supplemental tyrosine or phenylalanine.
- Acetyl-l-tyrosine is the most bioavailable form of tyrosine.
- Unlike other forms, it readily crosses the blood-brain barrier, a filter that protects the brain from foreign substances.
- Tyrosine supplements can help with memory loss caused by acute stress.
- Phenylalanine supplements are available in the “d” form or the “l” form.
- L-phenylalanine is used as a natural antidepressant and for weight loss while d-phenylalanine is used mainly to relieve pain.
- Some supplements combine both and are called dl-phenylalanine or DLPA.
- Another amino acid, l-carnitine, is an excellent brain booster and natural antidepressant that works by increasing levels of both norepinephrine and serotonin.
- If you decide to give it a try, be sure to use acetyl-l-carnitine (ALCAR), a highly bioavailable form of l-carnitine that readily enters the brain.
- Arctic root (Rhodiola rosea) is a popular adaptogenic herb that reduces depression symptoms faster than antidepressant medications.
- It works by decreasing cortisol levels while increasing levels of norepinephrine, serotonin, and

**Supplements to Decrease High Norepinephrine Levels**

- The overwhelming majority of neurotransmitter imbalances are on the low side, but not everyone has low norepinephrine. If you are among those with a high level of norepinephrine, it can really impact your life.
- Signs of high norepinephrine include racing thoughts, anxiety, and high blood pressure.
- If your friends have ever referred to you as an adrenaline junkie or drama queen, or you are prone to addictions, it’s likely you have high norepinephrine.
- While there aren’t as many natural remedies as there are for low norepinephrine, there are some interesting options that use common natural remedies in unexpected ways.
- is a popular supplement for depression, insomnia, and anxiety. It works mainly by boosting serotonin, but it also depletes norepinephrine, dopamine, and epinephrine. This is usually a cautionary side effect when using it to treat these conditions, but you can put it to work for you if you have high norepinephrine.
- is your body’s natural sleep hormone and a common sleep supplement. Reliable decreases in norepinephrine occur after taking melatonin; but only if you take it and lie down.
- Taking baking soda after exercising reduces norepinephrine levels by 30%.
- Asian ginseng (Panax ginseng) is one of the world’s most powerful natural remedies. It’s been wildly popular in Asia for thousands of years as a tonic that brings long life, strength, and wisdom to those who take it. It reduces the stress hormone cortisol while strengthening the adrenal glands. There’s also evidence that it can inhibit the reuptake of norepinephrine.

**Briefly Putting It**

When the body is under stress (bee stings):

**Adrenal Cortex Hormones**

- The hypothalamus releases corticotrophin-releasing hormone (CRH),
  - which stimulates the pituitary gland to release adrenal corticotropic hormone (ACTH).

Both hormones alert the adrenal glands to produce corticosteroid hormones from the adrenal cortex; one of which are the androgens that are also produced in testes and ovaries. Part of the problem for women diagnosed with Polycystic Ovary Syndrome. **PCOS** causes insulin resistance, high testosterone, diabetes, weight gain, difficult cycles …. Cortisol lingers in the body and accumulates, contributing to diseases such as obesity, diabetes, heart disease, and cancer.
Adrenal Medulla Hormones

At the same time the stress causes the adrenal cortex to respond, the sympathetic nervous system is stimulated and neurotransmitters cause flight/fight response. The medulla produces catecholamines: adrenaline, noradrenaline, and a little dopamine. The hormones released by the medulla are:

- Epinephrine (also known as adrenaline) responds by increasing your pulse and pushing blood to muscles and the brain. It also spikes your blood sugar. **DIABETES**
- Norepinephrine (also known as noradrenaline) is made in the brain and the nervous system. It works with epinephrine.

If norepinephrine is too low, it can lead to **DEPRESSION** and **ADHD**, or if too high contributes to anxiety. Someone on anti-depression medication and also have bee stings, will experience blisters or rash on the skin due to too much norepinephrine.

Both hormones last only a short term. Both hormones can cause a person receiving a bee sting to experience a “high” or euphoric sensation.

Both hormones are also associated with **PTSD**, which from personal experience can radically affect your short-term memory. These hormones also cause you to forget your answers when you are taking an important test. Relax and deeply breathe through the anxiety about 3 times and all will be fine.

Resources: