



Since 2013

Hormonal Obesity



THE METABOLIC SYNDROME



HEART DISEASE



LIPID PROBLEMS



HYPERTENSION



TYPE 2 DIABETES



DEMENTIA



CANCER



POLYCYSTIC
OVARIAN
SYNDROME



NON-ALCOHOLIC
FATTY LIVER
DISEASE

COMFORT KETO

By **MyKetoPal**



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What Makes Us Fat In The First Place?

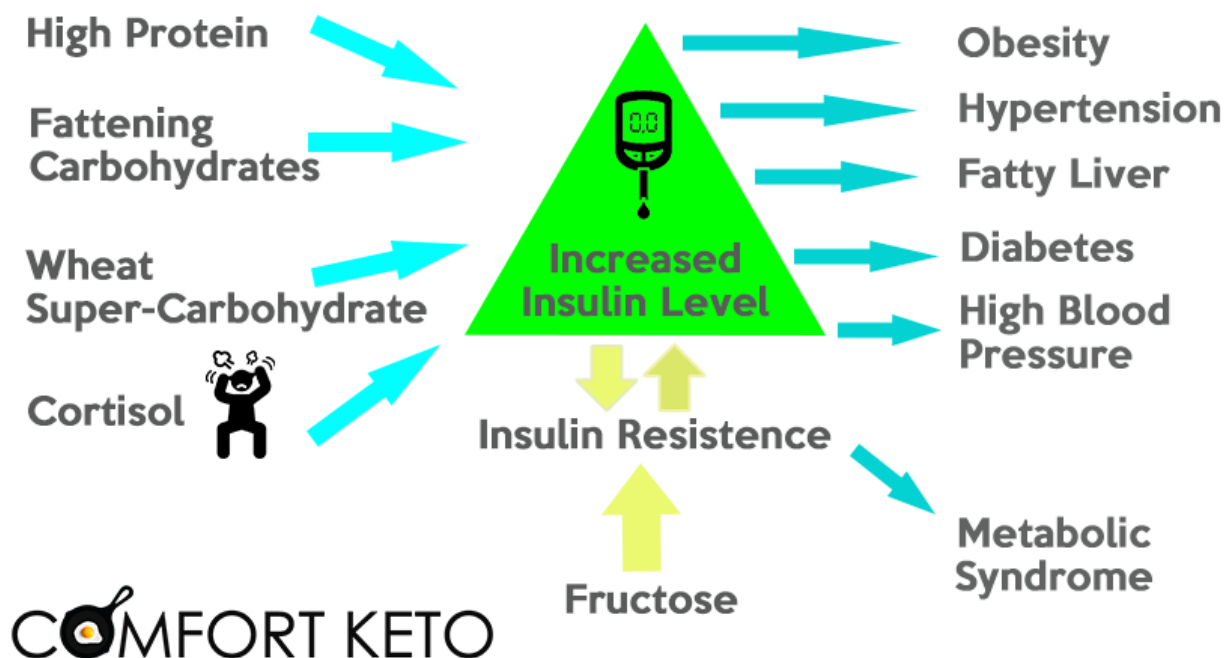
In your body, nothing happens by accident. Every single physiological process is a tight orchestration of **hormonal signals**.

How so?

- Whether our heart beats faster or slower is tightly controlled by hormones.
- Whether we urinate a lot or a little is tightly controlled by hormones.
- Whether the calories we eat are burned as energy or stored as body fat is also tightly controlled by hormones.

Hormones are central to obesity as is everything about human metabolism, including body weight. A critical physiological variable such as body fatness is not left up to the unpredictable changes of daily caloric intake and exercise. If early humans were too fat, they could not easily run and catch prey and would be more easily caught themselves. If they were too skinny, they would not be able to survive the lean times. Body fatness is a critical determinant of species survival.

Hormonal Obesity

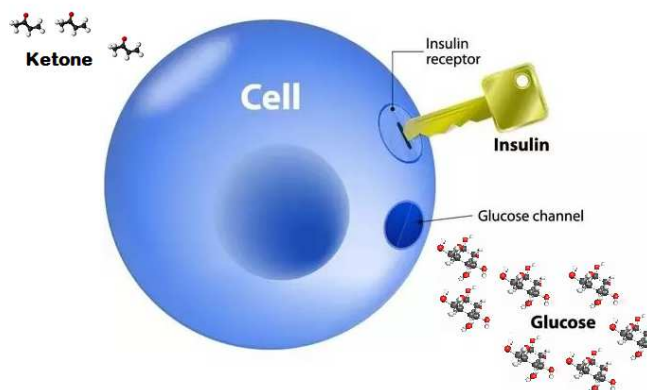




Insulin

The main problem of obesity is not the calories we eat, but how they are spent. And the main hormone we need to know about is **insulin**. Insulin is our **fat-storing hormone**. There's nothing wrong with that – that is simply its job.

When we eat, insulin goes up, signaling the body to store some food energy as body fat.



When we don't eat, then insulin goes down, signaling the body to burn this stored energy (body fat and glycogen).

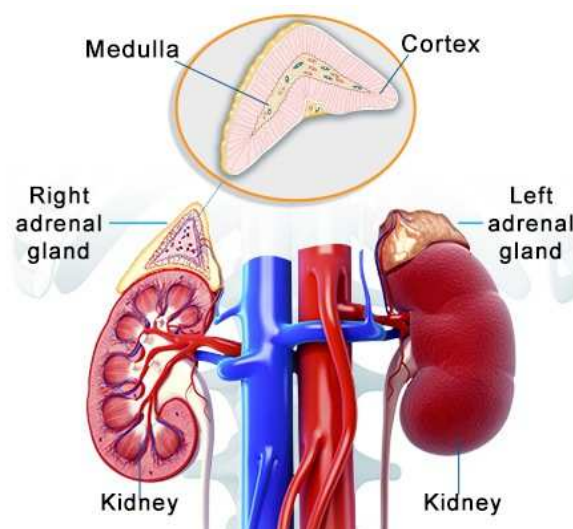
Higher than usual insulin levels tell our body to store more food energy as body fat.

Cortisol

Cortisol is our **stress hormone**. It is produced in the adrenal cortex and released throughout the body via our bloodstream.

Cortisol increases alertness and decreases the need for sleep. It also regulates the "flight or fight response" by activating the sympathetic nervous system. Besides the body's response to stress, cortisol has several other key functions:

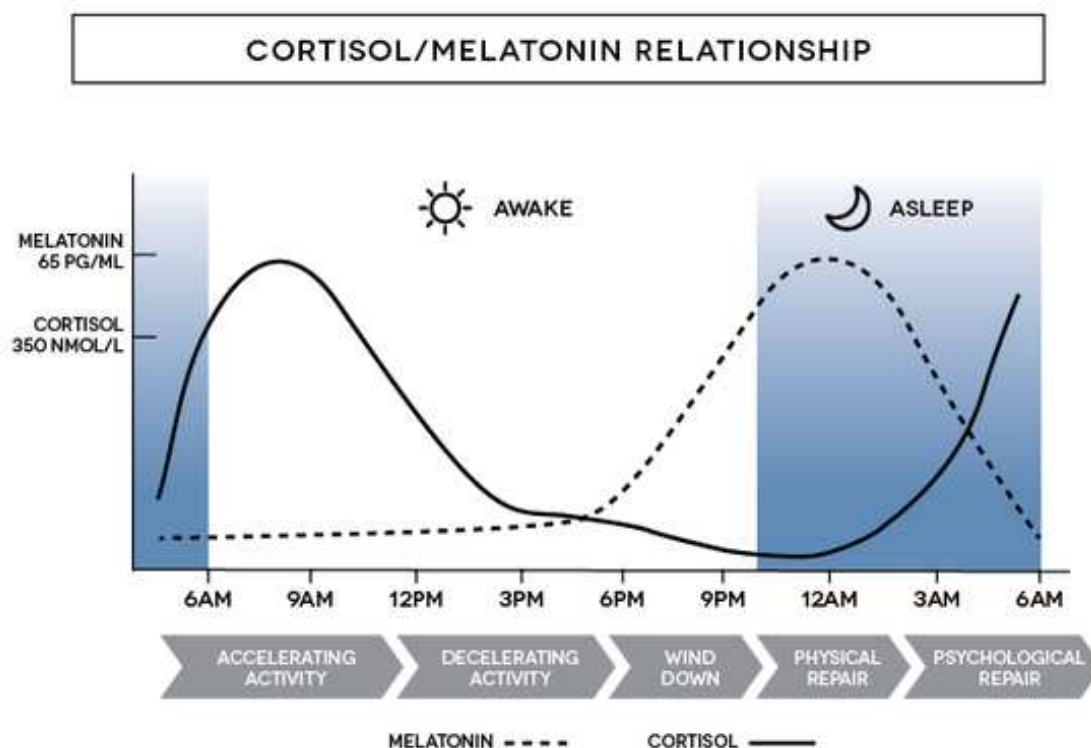
- immune responses,
- the regulation of metabolism, and
- acting as an anti-inflammatory (pain relief).





The balance of cortisol levels in the body at any one time is extremely important for the overall health.

| Too much cortisol in your system can cause: | Extremely low cortisol in your system can cause: |
|--|---|
| <ul style="list-style-type: none">• rapid weight gain,• high blood pressure,• muscle weakness, and• severe mood swings that manifest in anxiety and depression. | <ul style="list-style-type: none">• dizziness,• fatigue,• weight loss, and• skin darkening in certain areas of the body. |



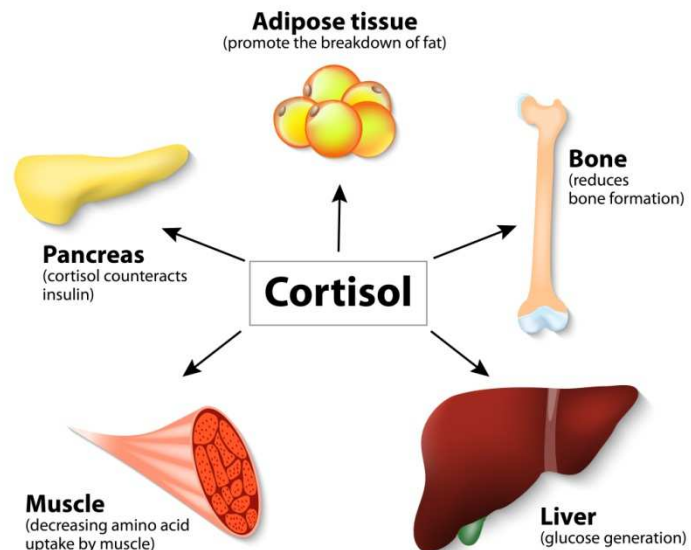
There is a daily pattern to our baseline levels of cortisol production – healthy people living with close to optimum levels of stress typically experience a spike around waking (to get you going), and a steady decrease throughout the day. Note: *Melatonin* hormone follows reverse cycle relative to cortisol. It is produced by the *pineal gland* and regulates the sleep/wakefulness cycle throughout the day.

Cortisol levels are not just dependent on the time of day. Stress plays a very significant role. The exact response depends on the type of stress, whether its short-term acute stress or long-term chronic stress. During vigorous physical exertion (fight or flight), the newly available stores of glucose are used up. As the stress condition passes, the cortisol level decreases again back to optimal levels.



The body is well adapted to the short-term increase in cortisol and glucose produced in response to stress. The body reacts to stress in following ways:

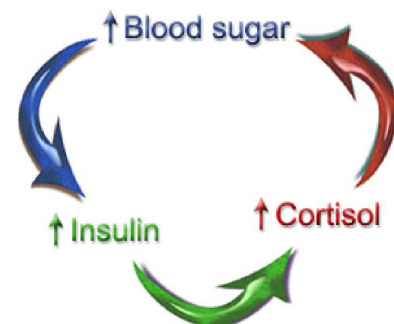
- Glucose availability in the body is substantially enhanced - provides energy for muscles that are needed to fight or flee.
- Gluconeogenesis in the liver is stimulated.
- Stored fat and amino acid breakdown is stimulated [helps provide substrate for hepatic (liver) gluconeogenesis].
- Proteins are broken down and converted to glucose (gluconeogenesis).
- Glucose uptake in peripheral tissues are inhibited.
- All non-essential metabolic activities are curtailed.
- All available energy is directed towards surviving the cause of stress.
- All long-term bodily functions such as growth, digestion, etc. are temporarily restricted.



In the fasted state, cortisol has several mechanisms to increase glucose in the body. More about fasted state later.

Cortisol Raises Insulin

At first glance cortisol and insulin appear to have opposite effects. With **short-term physical stress**, insulin and cortisol play opposite roles. However, this situation is quite different for **long-term psychological stress** where cortisol and insulin have similar weight gain effects.

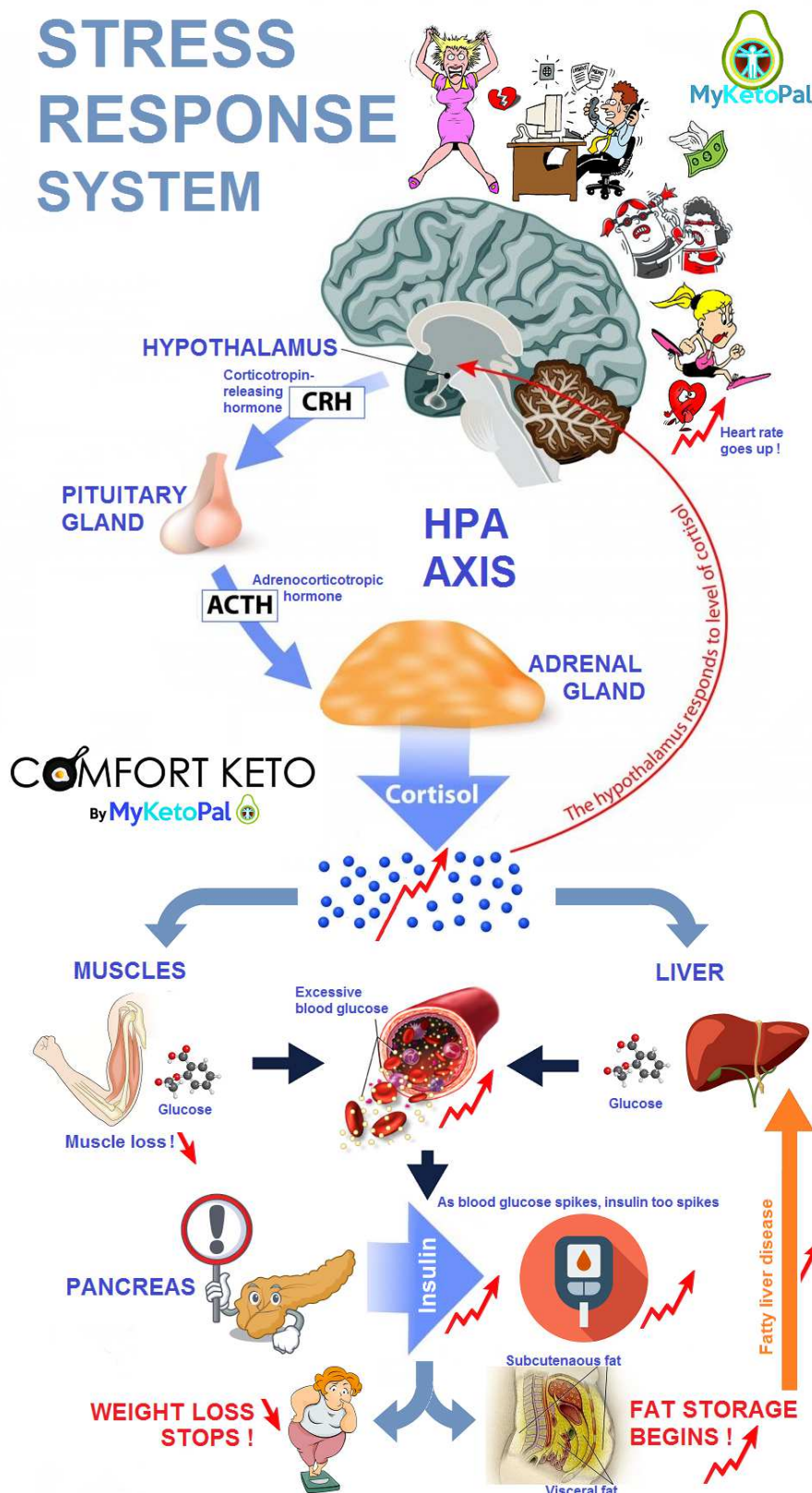


In modern times, primary cause of increased cortisol are **chronic, non-physical stressors** such as marital issues, struggles with children, problems at work, financial challenges, and sleep deprivation.



Clinical studies demonstrate that chronically elevated cortisol level due to non-stop psychological stress leads to increased insulin. This is because cortisol triggers stored energy to be moved out of stores and converted into readily usable glucose. As a result of elevated blood glucose triggers insulin secretion.

STRESS RESPONSE SYSTEM



If a threat – whether physical or psychological – doesn't quickly vanish, communication between a trio of brain regions – the **hypothalamus**, the **pituitary glands** and the **adrenal cortex** (known collectively as the **HPA axis**) – causes, among other things, an increase in levels of the hormone **cortisol**, which triggers the release of **glucose**, for energy, into the bloodstream. This **stress response** effectively provides our muscles with extra fuel to fight or flee. There may be other pathways of obesity yet to be discovered. Nevertheless, the fact is undeniable that excess cortisol causes weight gain. By extension, **self-perceived stress increases cortisol** levels and drives increased glucose and insulin levels, thus causes weight gain. This is something that many people have intuitively understood despite the lack of rigorous evidence. It certainly makes sense. Much more sense than calories causing weight gain.

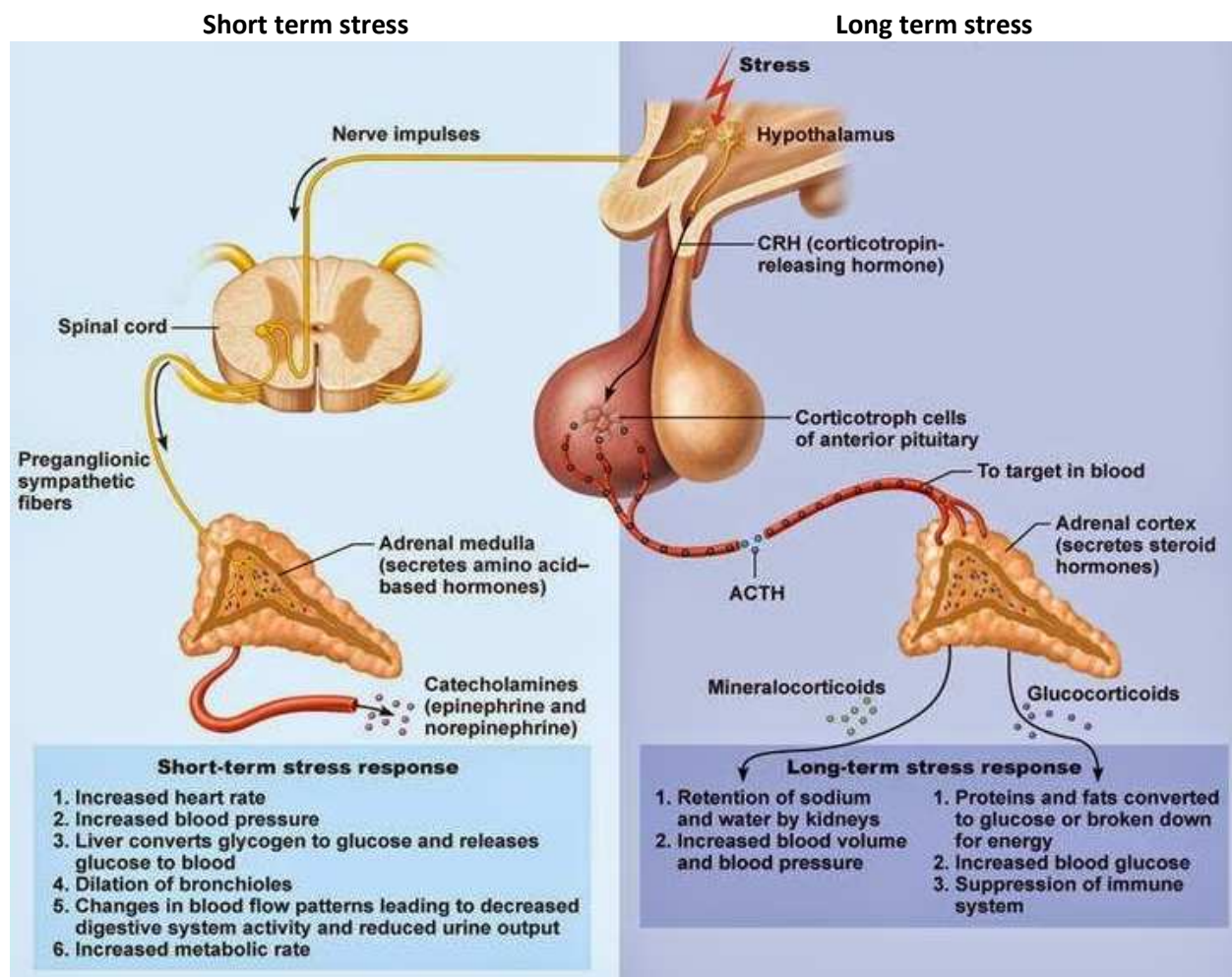


Under conditions of chronic stress, glucose levels remain high. While there is no vigorous physical exertion to burn off the glucose, the blood glucose can remain elevated for months.

To summarize, lastingly increased cortisol level is the major driver of:

- insulin resistance (leads to Type II diabetes and many other metabolic complications),
- abdominal obesity (more dangerous to the health than generalized fat),
- truncal obesity (redistribution of the fat from the limbs to the trunk),
- increased waist/hip ratio (WHR),
- 'moon face' (weight gain in the face),
- 'buffalo hump' (deposition of fat in the back),
- metabolic syndrome -high blood sugar, blood pressure, cholesterol,
- overt diabetes, and elevated BMI (measure of body fat based on height and weight).

CORTISOL FUNCTION UNDER STRESS





Reducing Stress Is Difficult, But Vitally Important

Contrary to popular belief, sitting in front of the television or computer is a poor way to relieve stress. Instead, stress relief is an active process. There are many time-tested methods of stress relief. These include:

- meditation,
- yoga,
- massage therapy, and
- exercise.



MyKetoPal program recommends **low impact exercises** (without increasing the heart rate extremely) on an empty stomach, so that exercises such as moderate pace **walking, swimming or cycling, resistance bands** and **free weights** work excellent during intermittent fasting. You never want to exercise, especially high intensity cardio routines, on a full stomach, as the sudden demand for blood flow from the muscles will steal vital blood flow needed by the digestive system for digestion and assimilation of nutrients.

