



In this newsletter, we will explore the science of how obesity works, and the many factors that can cause people to gain weight.

Understanding the science of obesity can help to explain why obesity is often not your fault

Obesity is the result of several factors, some of which are out of our control. This explains why weight management can be so difficult and is more than just diet and exercise.

As has been discussed in previous newsletters, obesity is a complex, chronic medical condition that is influenced by multiple factors, such as our:¹



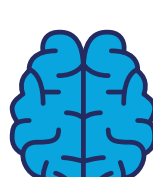
Environment
(Our surroundings and their effect on our lifestyle and health)



Genetics
(Characteristics inherited from our parents)



Physiology
(The biology of the body's functions)



Psychology
(Mental state)



Socio-economic status
(A person's social and economic position)

Diving deeper into the physiological factors that are involved in obesity provides a basis that can help us to understand the consequences that accompany weight loss or gain, and it also helps us to identify the appropriate solutions.^{1,2}

Why is it hard to lose weight and keep it off?

It turns out that the body's natural reaction to weight loss is to try to regain it!

What are hormones?

Hormones are essential chemical signals in our bodies. There are hundreds of different hormones that the body uses as messengers to communicate and organize the complex processes that regulate many bodily functions. Several hormones are involved in regulating appetite and body weight.

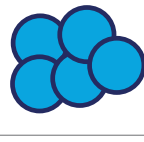

How do they influence appetite and the intake of food?

Changes in our appetite hormone levels can make us feel hungry or full. Organs in our bodies, such as the stomach, intestines, and fat tissue, use hormones to send messages to the brain to let us know if we are feeling hungry or feeling full.³

What hormones are involved in appetite management?

There are 3 main hormones responsible for signalling to the brain that a person has had enough to eat:³


The "I'm full" hormones

What it's called:	Where it's from:
Leptin 	Fat cells
PYY GLP-1 	The intestines

GLP-1: glucagon-like peptide-1; PYY: peptide YY.

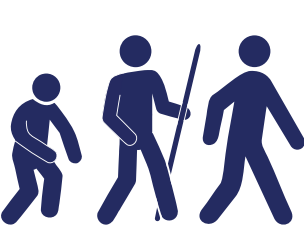
On the other hand, there is one major hormone that tells a person when they are hungry:³

The "Feed me" hormone

What it's called:	Where it's from:
Ghrelin 	The stomach

The quantity of each of these hormones and their interaction within the body and the brain, combined with external factors, such as easy access to food, control how much we eat, and ultimately affects a person's ability to manage their weight.

After losing weight, the body's biological response is to try to regain it.



This has been described as an evolutionary response, where in order to prevent starvation and survive, our cavemen ancestors constantly looked for food and stored fat, since food was not easy to come by.

Humans are still biologically hardwired to seek out and consume food, but now we live in an environment where we have greater and easier access to food than ever before, which makes long-term weight loss challenging.⁴

Scientists have found that **when weight is lost, the hormones that stimulate weight gain are increased within the body.** They have also found that the imbalance in hormone levels can be sustained for at least 1 year after losing weight. This is due to the fact that the changes in hormone levels alter our appetite, leading to increased hunger and eating more food than our bodies need.^{5,6}

Obesity is not only caused by a lack of willpower or motivation. Biological factors, including changes in appetite hormone levels, contribute to making weight loss a long-term challenge.^{5,7}

Hear from someone living with obesity

"I could successfully lose weight but I couldn't successfully keep it off."

Remember, weight management is a lifelong process, so don't be discouraged if you gain back some of the weight that you lost. With proper support and treatment, it can be managed. That is why it is important to have regular conversations with your doctor about your weight, just as you would about other conditions or concerns that you may have about your health.

Want to learn more?

For additional information and additional resources about the factors that contribute to obesity, and how it may affect you or someone you care about:



Visit Obesity Canada



Speak with your healthcare professional



Contact your human resources department



We want to hear from you!
Email us at NNCICustomerCare@novonordisk.com to share your ideas and comments.

In the next newsletter, we will discuss complications related to obesity and the benefits of 5–10% weight loss.

References: 1. Obesity Education Initiative, et al. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. Bethesda, MD: National Institutes of Health. 1998. 2. Badman MK, et al. The gut and energy balance: visceral allies in the obesity wars. *Science*. 2005;307(5717):1909-1914. 3. Torekov S, et al. Obesity—an indication for GLP-1 treatment? Obesity pathophysiology and GLP-11 treatment potential. *Obesity Reviews*. 2011;12(8):593-601. 4. Lev-Ran A. Human obesity: an evolutionary approach to understanding our bulging waistline. *Diabetes/metabolism research and reviews*. 2001;17(5):347-362. 5. Sumithran P, et al. Long-term persistence of hormonal adaptations to weight loss. *New England Journal of Medicine*. 2011;365(17):1597-1604. 6. Freedhoff Y, et al. *Best weight: a practical guide to office-based obesity management*: Obesity Canada. 2010. 7. Lau DC, et al. 2006 Canadian clinical practice guidelines on the management and prevention of obesity in adults and children *CMAJ*. 2007. 176(8):1-117.

