

Body chemistry

The word hormones is often used to explain anything—from food cravings to bad hair days. Here is a low down on the functions of these chemicals to know them better

BY POOJA PILLAI

Hormones are often at the receiving end of almost everything that goes wrong in our bodies. If it is weight gain, we blame it on hormones. If it is acne-prone skin or dry, brittle hair, we assume it is because of hormones. In reality, hormones are imperative for the smooth functioning of the body and there is a lot more to them than the few imbalances they manifest as.

What are hormones?

In simple terms, hormones can be defined as chemicals secreted within the body which act as communicators between different organs and tissues to regulate every body function. So, there are hormones that regulate growth, digestion, movement, reproduction, sleep, sensory perceptions and even moods. These hormones are produced in different parts of the body, such as thyroid, pituitary gland, pineal gland, ovaries and testes, pancreas, liver and the adrenal glands.

Mumbai-based metabolic physician and endocrinologist Dr Deepak

Chaturvedi says, "People often wrongly blame hormones for all their health problems. We need to understand the fact that hormones maintain harmony within the body, they play a strong role in harmonising all the functions. But other factors such as environment, stress, diet, sleep deprivation, infections and diseases can create imbalances in these hormones and this leads to complications." He gives the example of an orchestra to explain further. "If one musician in an orchestra goes haywire, the music changes to noise. In the same way, if any hormones alter within the body, it may bring about changes in other hormones and could affect other systems of the body."

Fluctuations in hormone levels

Dr Varsha Jagtap, consultant, endocrinology at the Columbia Asia Hospital in Pune, says that fluctuations in hormone levels could happen in two cases. "In the first case, a tumour, autoimmune disorder or infection could affect the production of hormones and could lead to the drop or rise in

the levels of certain hormones. In the second case, lifestyle changes like insufficient sleep or eating at irregular hours could cause fluctuations in certain hormones." In the former scenario, the problem could be irreversible and could require the hormones to be replaced. For example, insulin is often administered to diabetics via pills or injections. Another example is hormone replacement therapy which is often used to treat women undergoing menopause, or for the treatment and prevention of osteoporosis.

When it comes to lifestyle changes to control fluctuations in hormone production, Dr Deepak says, "Eat a balanced diet with the optimum proportion of proteins, carbohydrates, fats, vitamins, minerals, antioxidants and fibre. Exercise daily and get about seven to eight hours of restful sleep every night. Indulge in some recreational activities and relax with yoga and meditation. Also, stay sexually active."

Here is a list of some of the most important hormones in the body and their functions:



The protective effect of hormone replacement therapy lasts as long as the treatment is continued. The therapy is also associated with a reduction in the risk of heart diseases.

Melatonin

Produced in the pineal gland, this hormone is essential for regulating the circadian rhythms or the daily day-night cycle of the body. It regulates when we sleep and when we wake up, besides also performing some antioxidant functions. In a healthy person, the secretion of melatonin begins as it starts getting dark. This prepares the body for sleep.

The production of melatonin can get disrupted if the sleep and wake cycles are irregular, as this confuses the signal sent to the pineal glands to release melatonin. Too much exposure to artificial light after dark

and travelling across different time zones can also cause disruption in the production of melatonin. Too much melatonin can also be a problem as it can cause sluggishness and fatigue.

Thyroid hormones

The thyroid hormones—T4 and T3—control our metabolic functions. They determine how fast our body burns calories, besides regulating our heart rate and body temperature. These hormones also determine how quickly our body replaces dying cells.

Over-production of thyroid hormones can cause irregular heart

The obesity factor

Endocrinology is a field of study that helps us understand how hormones affect our body. One of the key findings is that obesity and the lifestyle practices leading to it are linked to hormone imbalances. Mumbai-based endocrinologist Dr Deepak Chaturvedi explains, "Obesity has emerged as an epidemic in the past few decades. Altered lifestyles, dietary habits and stress are considered to be the culprits. But all these factors work through an array of hormonal imbalances. While ghrelin is a hormone which acts as a feeding signal for the body, leptin works as a satiety hormone. The imbalance between the two is a key factor in obesity. The mediation of this process is done by other hormones like insulin, growth hormone, corticosteroids, GLP-1 and more. The more we study the impact of hormones on the overall health of an individual, the more we find out."

beat, diarrhoea, chills, stomach cramps and sleep difficulties, while under-production can cause fatigue, weakness, high blood pressure, high cholesterol and impaired memory and concentration. Additionally, since thyroid hormones control metabolism, excess production can cause weight loss, while low production can cause weight gain.

Since thyroid needs iodine to produce the hormones, lack of it can cause a drop in production. The production of thyroid hormones can also be affected by inflammation or the presence of tumour.

Insulin

Produced in the pancreas, insulin is an essential hormone that regulates the metabolism of carbohydrates and fats. It converts them into glucose which can easily be absorbed into the blood stream and be used to fuel the body. Insufficient production of insulin or insensitivity to insulin can result from diabetes mellitus. Unless steps are taken immediately, this can prove fatal as excess glucose in the blood is toxic. Too much insulin is also a problem as it quickly lowers blood glucose levels and this can cause diabetic shock, which is characterised by dizziness, rapid heart beat, excessive sweating and in extreme cases can lead to seizures and coma.

Testosterone

Testosterone is the main male sexual hormone and is produced in the testes. It plays a key role in the development of male reproductive organs and promotes secondary sexual characteristics such as greater bone and muscle mass. Testosterone levels are an indicator of male sexual health as it promotes libido and heightens and stimulates desire and arousal. It is also linked to display of behaviours such as aggression and competitiveness. Interestingly, testosterone is present in women, too, albeit in lower amounts. However, if a woman has insufficient levels of testosterone



All about hormone replacement therapy

While menopause is a natural phenomenon that signifies the end of childbearing years, sometimes when younger women have their ovaries and uterus removed for medical reasons, they may undergo this process. This could lead to extreme discomfort and symptoms like hot flushes, mood changes and memory loss. In such cases, hormone replacement therapy (HRT) can be of help. Also, since deficiency of female hormones like progesterone and oestrogen can lead to loss of bone density, HRT can help in warding off osteoporosis. Says Dr Nandita Palshetkar, gynaecologist and infertility expert who works with Lilavati Hospital in Mumbai and Fortis La Femme in Delhi and Chandigarh, "HRT reduces the risk of hip fracture by about 50 per cent. The risk of vertebral fractures may be decreased by as much as 90 per cent, depending upon

when HRT was initiated. The protective effect of HRT lasts as long as the treatment is continued. The therapy is also associated with a reduction in the risk of heart diseases. The incidence of heart attacks is reduced by up to 50 per cent in women who take the therapy for three or more years. HRT also prevents blockage in the blood vessels and increases the blood flow."

However, she adds a note of warning. "Despite its known benefits, a number of women choose not to go in for HRT because of certain risks and possible side-effects. These include increased risk of endometrial cancer, breast cancer (after four or more years of HRT), ovarian cancer, blood clots and gall bladder disease." Also, despite its general protective benefits for the heart, there is a slightly increased risk of heart attack or stroke, both in healthy women and those with cardiovascular disease.

she could experience symptoms like fatigue and decreased libido.

Progesterone

Progesterone is a female sexual hormone that regulates menstruation and ovulation. It is produced in the ovaries when a mature egg is released, and it

helps to prepare the lining of the uterus to receive the egg if it is fertilised by a sperm. A natural drop in progesterone level occurs as a woman ages, leading to the onset of menopause. However, in a healthy young woman, low levels can be a cause of worry as this could affect fertility. □