

## ***Endocrine Regulation***

### **Epithalon**

**Epithalon** (also known as Epitalon or Epithalone) is the synthetic version of the polypeptide Epithalamin which is naturally produced in the pineal gland.

It was discovered by the Russian scientist Professor Vladimir Khavinson, who then conducted epithalon-related research for the next 35 years in both animal and human clinical trials.

Epitalon's primary role is to increase the natural production of telomerase, a natural enzyme that helps cells reproduce telomeres, which are the protective parts of our DNA. This allows the replication of our DNA so the body can grow new cells and rejuvenate old ones. Younger people produce a relatively large amount of telomerase and longer telomeres. The longer the telomere strands are, the better cell health and replication they provide. However, as people age, the production of telomerase falls and consequently cell replication and health decline. This is the main reason that people age.

It also plays a role in regulating metabolism, increasing the sensitivity of hypothalamus to its natural hormonal influences, normalizing the function of the anterior pituitary and regulating the levels of gonadotropins and melatonin in the body.

### **Benefits of Epitalon:**

As a result of Epitalon's effect on telomerase production, the benefits are unique and far-reaching and include:

- An increase of human lifespan by lengthening telomeres in human cells
- Promotion of deeper sleep
- Delay and prevention of age-related diseases such as cancer, heart disease, and dementia
- Acts as an anti-oxidant by reducing lipid oxidation and ROS (Reactive oxygen species) along with normalizing T cell function.
- Improvement of skin health and appearance
- Healing of injured and deteriorating muscle cells
- Restores and normalizes melatonin levels in older people who have lost some pineal function due to aging
- Can increase resistance to emotional stress

**Conclusion:**

Numerous studies have shown the importance of telomerase production and telomere rejuvenation in fighting the symptoms of aging. As Epitalon has been shown to increase the production of telomerase which in turn strengthens and lengthens telomeres, this means that Epitalon can play a vital role in decreasing the aging process and thus extend human longevity.

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## DSIP

**DSIP** (Delta sleep-inducing peptide) is a well-known neuromodulator and natural sleep-promoting nonapeptide with many other physiologic functions. It is typically found in the brain and easily passes the blood-brain barrier. It has been discovered and heavily studied for over 40 years.

It has been used for the treatment of poor sleep, pain conditions, stress-related symptoms, low testosterone (via stimulation of LH), and even sometimes as an antioxidant and anti-cancer protein. It exhibits a pronounced stress protective action and decreases stress-induced metabolic and functional disorders in human and animal organisms exposed to a variety of stresses. It has also been shown in research to improve hormone levels and physical performance.

### **Benefits of DSIP:**

- Can restore disturbed sleep patterns
- Can promote LH and GH release
- Can reduce persistent/chronic pain
- Can modulate cortisol production

### **Sleep:**

DSIP has been described as a sleep-promoting substance rather than a sedative. There is a modulating effect on sleep and wake functions with greater activity in circumstances where sleep is disturbed. There are essentially 5 stages of sleep, these can be broken down into 2 categories REM and NREM sleep. These translate to Random Eye Movement and Non-Random Eye movement sleep. The problem with many sleep aids is that they change the time or duration of these sleep cycles. The problem with this is these cycles are ALL associated with important physiological processes and anabolic hormone production. DSIP does not change these sleep stages. It increases the ability to go to sleep and offers a more restful sleep.

### **Hormones:**

It is involved in neuroendocrine regulation and release of anterior pituitary hormones. In humans, DSIP influences the secretion of adrenocorticotrophic hormone (ACTH), luteinizing hormone (LH) and growth hormone (GH). It also plays a role in the regulation of circadian rhythms. Administration of DSIP seems to improve the hormone production/regulation in these glands. For example, it increases LH and growth hormone production while decreasing somatostatin. This results in increased production of desirable hormones (LH, GH), and decreased the production of undesirable ones (cortisol and somatostatin).

# Kisspeptin

**Kisspeptin** is produced in the hypothalamus, is an important hormone that starts the release of several other hormones. It stimulates the release of gonadotropin-releasing hormone (GnRH) which then causes luteinizing hormone (LH) and follicle stimulating hormone (FSH) to be released from the pituitary gland. These hormones have a direct role in the production of testosterone and estradiol.

It has a non-hormonal role too and was originally named metastatin after its ability to prevent the spread of cancer (metastasis). Recent data has also described its action in the control of metabolism. Recent data suggests that kisspeptin may play a role in food intake, glucose homeostasis and mediating the effect of energy balance on reproductive function. Thus, kisspeptin may have a direct role in regulating energy balance and may also be a direct regulator of metabolism.

Improper kisspeptin function or low kisspeptin levels can cause problems. Specifically, inadequate function of this hormone can cause male and female infertility. In females it can prevent menstruation which leads to other hormones dysfunction and absence of ovulation. Sometimes, just one injection of kisspeptin can trigger ovulation, which can allow for artificial insemination and in vitro fertilization using the woman's eggs.

A study from 2017 showed a significant decrease in serum kisspeptin for men with a low sperm count as well as infertile men. The serum kisspeptin levels were significantly higher in fertile men as compared to infertile males. The study provides a link between the kisspeptin levels and male reproductive fertility status. It can be considered a contributory factor in the control of testosterone, FSH and LH levels in males.

Having high levels of kisspeptin is not related to any conditions or symptoms, although preliminary research indicates that high kisspeptin levels in childhood can lead to early puberty, but this has not yet been proven.

## **Mechanism of action**

Kisspeptins would appear to act directly on the nerve endings of GnRH neurons to control GnRH release, pulsatility, or discharge. Other studies show that Kisspeptins increase GnRH secretion as well as the level of mRNA. Kisspeptin is released in conjunction with two other hormones: dynorphin and neurokinin B, also called the KNDy neurons. The KNDy neurons are a fundamental element in regulating gonadotropin-releasing hormone (GnRH) pulses. These two hormones are not understood well, but early research indicates they may have a role in causing the release of kisspeptin.

**Conclusions:**

Gonadotropin injections (LH and FSH) constitute the classical treatment for infertility in females. Kisspeptin injections, which stimulate secretion of endogenous gonadotropin-releasing hormone (GnRH) inducing increased secretion of LH and FSH from the pituitary gland, could be a new treatment for medically assisted reproduction in women and increasing fertility and natural production of testosterone in men. This more physiological stimulation of might reduce the risk of overstimulation of the ovaries often associated with excessive injections of LH and FSH. Kisspeptin has now been safely and successfully used in both men and women, it is possible that in the future the manipulation of kisspeptin signaling may be used in the treatment of reproductive disorders.

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