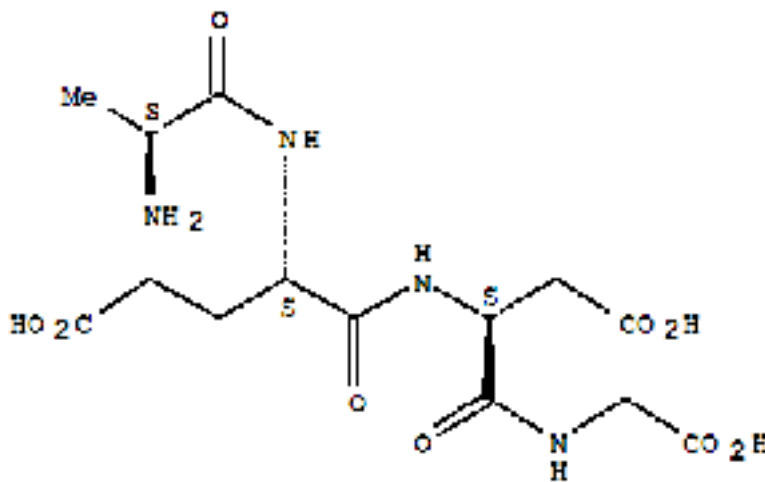


## Medical Professional Monograph

# Epithalon



**Sequence** - Alanine-Glutamate-Asparagine-Glycine

**Molecular Formula** – C<sub>14</sub>H<sub>22</sub>N<sub>4</sub>O<sub>9</sub>

**Molecular Weight** – 390.349 g/mol g/mol

### Indication and Usage Summary

- Upregulation of telomerase activity
- Complete normalization of anti-oxidant indices
- Reduction of peroxide lipid oxidation products
- Increased activity of glutathione peroxidase
- Improved melatonin and immunity (cellular and humoral)



- Improves insulin sensitivity
- Decreases LDL and VLDL
- Improves tissue repair
- Anti-tumor effects
- Decreases mortality and increases life expectancy

### **Description/Classification:**

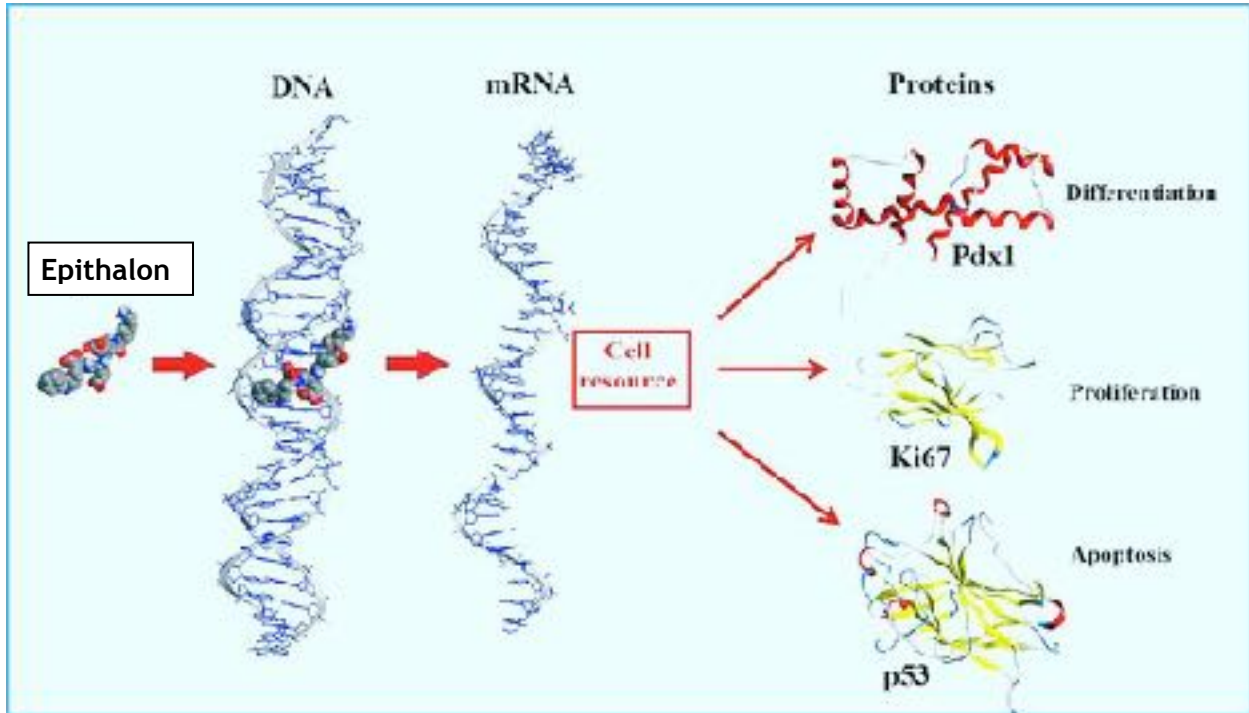
Epithalon is a short, 4 amino acid chain peptide used to regulate the cell cycle through upregulation of telomerase activity. It has been shown to have distinctive anti-aging and anti-tumor activity across many animal and human studies. Known as the synthetic version of the tetrapeptide epithalamin, which naturally occurs in the pineal gland in our body, Epithalon (also known as Epitalon or Epithalone) was first discovered in the late 1980's by Prof. Vladimir Khavinson from The Sankt Petersburg University, Russia. As the most prominent tasks of the pineal gland are to maintain different kind of processes in our body, such as to normalize the activity of anterior pituitary and to maintain the levels of calcium, gonadotropins, and melatonin, its activity is highly regulated by a series of feedback mechanisms. Epithalamin acts as an antioxidant and increases the resistance to stress and lowers the levels of corticosteroids. The life extension and anti-aging properties, amongst a variety of different clinical indications, of Epithalon are incredible.

### **Mechanism of Action**

Epithalon regulates the cell cycle through up-regulation of telomerase activity. Upregulating telomerase activity has a vast amount of effects on the body because it allows all the cells in the body to be maintained due to inhibiting the shortening of telomeres, which are fundamentally involved in the aging process.<sup>1</sup> Telomerase is a RNA-dependent polymerase that elongates and maintains the length of telomeres by adding tandem repeats on the 3' end of chromosomes. Telomere elongation promotes indefinite cellular proliferation and that can promote neoplastic cells. However, it has been shown that maintaining proper telomere length acts as a prominent effector of anti-aging and inhibitor of tumorigenesis; and, this is precisely what epithalon does.



Epithalon has also been shown to affect the aging process by exerting an antioxidant effect.<sup>2</sup> This is implicated in the slowing of the aging process because cytotoxicity due to reactive oxygen species can lead to damaging DNA, leading to cellular death and/or mutations leading to the formation of cancerous cells.<sup>3</sup> It has also been reported to show significant anti-tumor effects in breast and colorectal cancer by inhibiting carcinogenic receptor expression and attenuation of metastasis.<sup>4,5</sup> Further, epithalon has been reported to play a key role in the regulation of important biomolecules such as cytokines, C-reactive protein, and other acute phase reactants to attenuate the inflammatory response.<sup>6</sup> This regulation of the inflammation process is pivotal to human health because dysregulation and potentiation can cause a broad spectrum of disorders including, but not limited to, rheumatoid arthritis, ulcerative colitis, amongst others. Lastly, it has been found that epithalon plays a very important role in the regulation of the endocrine system in the body. The vast amount of effect different hormones has in the body is fundamental to different processes in the body. And, any loss in hormones can result in different aspects of disease. But, in the realm of aging, we tend to lose production of hormones due to shortening of telomeres. So, epithalon can increase endogenous levels of hormones that we lose. For example, a study was done on elderly patients to determine the effect of epithalon administration on levels of melatonin, a natural regulator of the sleep cycle.<sup>7</sup> This study showed that levels of melatonin increased and restoration of sleep was achieved. Other studies have reported that epithalon has effects on other hormones such as gonadotropic hormones (FSH, LH, prolactin) to improve sexual and reproductive functions.<sup>8</sup>



## Dosage

- IM General Dosing (Russian Protocol)
  - o 100mg total
  - o 10 mg IM daily for 10 days
  - o Twice a Year
- or IM General Dosing (Ukraine Protocol)
  - o 50 mg total
  - o Use 10 mg every third day times 2 weeks
  - o Twice a year

Note these Are IM protocols , this is a small peptide and Currently IPS protocol is a sub- q protocol

## Clinical Indications

**Aging Deceleration**



Epithalon induces telomerase activity and telomere elongation in human somatic cells. In a study it was shown to induce a 33% increase in telomere elongation which is directly involved in the aging process.<sup>9</sup> There was a human trial done over a 12-year period with patients treated with epithalon and a placebo group. The results of this study demonstrated a 28% decrease in overall mortality with those treated with epithalamin, and a 2-fold decrease in cardiovascular mortality by decreasing the functional age and degree of cardiovascular aging.<sup>10</sup> Another study was done to show that those treated with thymalin and epithalamin over a 6-year period had a mortality rate that was 4.1 times lower than the control group.<sup>11</sup>

### **Tumor Suppression**

There has been a lot of scientific research made and still is being made on the use of epithalon against cancer. It was found that epithalon has inhibitory effects on the development and growth of tumors with studies done on mammary tumors, colon carcinogenesis, prostate cancer just to name a few. Tumors exposed to epithalon have been shown to shrink in size. Treatment with epithalon stopped the metastases of tumors in mice and it has oncostatic properties, halting the spread of cancer. Due to its role in telomerase activity along with endocrine and immune function, epithalon has been implicated for its anti-tumor properties in hormone dependent cancer. A study was done on patients with uterus, cervix, and ovarian cancer and it was shown that treatment of epithalon restored cellular immunity, decreased recurrence and metastasis of the cancer, and decreased the size of tumors.<sup>12</sup>

### **Anti-Oxidant Effects**

Research has shown that epithalon is a powerful antioxidant that eliminates oxygen-free radicals responsible for damaging and killing cells. This process, known as oxidative stress, is the root cause of a wide variety of age-related diseases. It is important to note that the human lifespan is inversely related to the number of oxygen-free radicals in the human body, and epithalon is responsible for slowing down and killing these killer radicals. Since free radicals are the main source of degenerative diseases, eliminating them prevents diseases such as cancer, dementia, Alzheimer's, muscle and joint pain, heart disease, and more.



## **Restoring Normal Sleep Patterns**

As we age, melatonin content in our blood decreases considerably. Epithalon plays a key role in our bio-rhythm control and effects the endocrine, nervous and immune systems. In fact, reduced melatonin production leads to age-related neurodegenerative changes and certain diseases. Melatonin's importance is clear, however, supplementing melatonin, in some cases, can provoke considerable side-effects, such as neoplastic growth. Finding a suitable way to safely increase melatonin levels is an important endeavor. Epithalon stimulates production of melatonin through its action on the pineal gland, and this is why people taking epithalon have reported better sleep patterns and increased deep sleep, which is essential for the body to repair itself and strengthen the immune system.

## **Regulation of Inflammation**

There are countless disorders that arise due to dysregulation of the immune system and inflammatory process. Therefore, obtaining therapies that have the ability to help regulate the inflammatory pathway through control of different mediators in the process can help treat disorders. Epithalon has extensively been shown to help regulate the function of mediators such as cytokines, C-reactive protein, and other acute phase reactants.

## **Insulin and Cholesterol**

Due to epithalon's variety of activity amongst different cells in the endocrine system, amongst other systems, due to telomerase upregulation and pineal gland activation, it has been shown that epithalon significantly improves insulin sensitivity, glucose utilization, and overall cholesterol health.<sup>13</sup> In regard to cholesterol health, it has been shown to significantly decrease LDL and VLDL while significantly increasing levels of HDL.

## **Frequently Asked Questions (FAQs)**



## **Is it okay to increase telomerase activity and telomere length even though it naturally decreases in your body as you age?**

There have been studies that have shown that increasing telomerase activity and telomere length can result in over-proliferation of cells. However, there have been numerous studies that indicate there is a range of telomere activity that maintains healthy cells. This is critical to epithalon's unique activity because it restores telomerase activity and telomere length that is LOST in through the aging process; by that we mean it returns the telomere concentration and activity to NORMAL and HEALTHY levels.

<sup>1</sup> Khavinson VK, Bondarev IE, Butyugov AA. Epithalon peptide induces telomerase activity & telomere elongation in human somatic cells. *Bull Exp Biol Med.* 2003 Jun;135(6):590-2.

<sup>2</sup> Anisimov VN, Arutjunyan AV, Khavinson VK. Effects of pineal peptide preparation Epithalamin on free-radical processes in humans and animals. *Neuro Endocrinol Lett.* 2001;22(1):9-18.

<sup>3</sup> Hekimi S, Lapointe J, Wen Y. Taking a "good" look at free radicals in the aging process. *Trends In Cell Biology.* 2011;21(10) 569-76.

<sup>4</sup> Anisimov VN, Khavinson VK, Provinciali M, Alimova IN, Baturin DA, Popovich IG, et al. Inhibitory effect of the peptide epithalon on the development of spontaneous mammary tumours in HER-2/neu transgenic mice. *Int J Cancer.* 2002 Sep 1;101(1):7-10.

<sup>5</sup> Anisimov VN, Khavinson VK, Popovich IG, Zabezhinski MA. Inhibitory effect of peptide Epithalon on colon carcinogenesis induced by 1,2-dimethylhydrazine in rats. *Cancer Lett.* 2002 Sep 8;183(1):1-8.

<sup>6</sup> Labunets IF, Butenko GM, Korkushko OV, Shatilo VB. Effect of epithalamin on the rhythm of immune and endocrine systems functioning in patients with chronic coronary disease. *Bull Exp Biol Med.* 2007 Apr;143(4):472-5.

<sup>7</sup> Korkushko OV, Lapin BA, Goncharova ND, Khavinson VK, Shatilo VB, Vengerin AA, et al. Normalizing effect of the pineal gland peptides on the daily melatonin rhythm in old monkeys & elderly people. *Adv Gerontol.* 2007;20(1):74-85.

<sup>8</sup> Slepushkin VD, Mordovin VF, Zoloev GK, Iakovleva RA, Khavinson VK. Effect of the epiphysial preparation epithalamin on the gonadotropic function of the hypophysis. *Probl Endokrinol (Mosk).* 1983 Nov-Dec;29(6):51-4.

<sup>9</sup> Epithalon Peptide induces Telomerase activity and Telomere elongation in Human somatic cells, *Bulletin of Experimental Biology and Medicine*, Vol 135, No.5, pp 692-695, June 2003



<sup>10</sup> Bull Exp Biol Med. 2006 Sep;142(3):356-9, Geroprotective effect of epithalamine (pineal gland peptide preparation) in elderly subjects with accelerated aging., Korkushko OV1, Khavinson VKh, Shatilo VB, Antonyuk-Shcheglova IA.

<sup>11</sup> Neuro Endocrinol Lett. 2003 Jun-Aug;24(3-4):233-40.,Peptides of pineal gland and thymus prolong human life.,Khavinson VKh1, Morozov VG.

<sup>12</sup> Khavinson VKh, Bioregulating therapy as a new direction in Medicine,Proceedings of the National conference of Gerontology and Geriatrics;May 28-31, 1997 Bucharest, Romainia;1997 p205

<sup>13</sup> Peptide regulation of Aging.Proceedings of the 17th World Congress of the International Association of Gerontology,July 1-6 2001,Vancouver Canada, Gerontology 2001, 47(1) pg 545