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WHAT IS PEPTIDE THERAPY?

A peptide is a short chain of amino acids that are linked together and can be thought of as a small protein. In our bodies, these proteins typically act as signaling molecules. They bind to receptors on cell surfaces and tell other cells and molecules how to function.

The use of peptides as part of a standard medication regimen, has recently gained attention because peptides are safe, effective and have targeted functions in the body resulting in minimal to no side effects. In the past, peptides have only been available through injection therapy. However, at Physicians Preference Pharmacy we compound our peptides into sublingual tablets, which dissolve under the tongue, oral capsules, and intranasal sprays (depending on the peptide). These dosage forms are non-invasive and allow for an easier dosing schedule.

WHAT CONDITIONS ARE PEPTIDES USED TO TREAT?

Peptides are numerous and variable in chemical structure, therefore their uses are wide-ranging. Peptide therapy addresses numerous conditions including immunosuppression, Hashimoto's thyroiditis, Lyme disease, fibromyalgia, Chronic fatigue syndrome, Irritable bowel syndrome, sexual dysfunction, anxiety, and brain fog. At Physicians Preference Pharmacy we name our peptides based on what they treat, however the scientific peptide names are also included below.

PEPTIDES OFFERED AT PHYSICIANS PREFERENCE PHARMACY:

KPV – 0.25mg and 0.5mg oral capsule
KPV is a tripeptide (lysine-proline-valine) which functions as a potent anti-inflammatory, helps to stabilize mast cells, it functions as an anti-microbial and is selectively effective in the wound healing process.

Common primary uses for KPV include: SIBO, Ulcerative Colitis, IBD, mast cell stabilization, eczema, and psoriasis.

Ulcerative Colitis, Inflammatory Bowel Diseases and Mast Cell Stabilization
KPV is an alpha-melanocyte-stimulating hormone (alpha-MSH) derivative which reduces inflammation primarily in the intestines by inhibiting proinflammatory cytokine synthesis and secretion.

In general, alpha-MSH and its derivatives are highly effective anti-inflammatories, however alpha-MSH itself elicits the major side-effect of skin pigmentation. KPV, however does not carry this side-effect.

KPV may be a more effective and targeted means of reducing inflammation in IBD via its effects on TNF-alpha, but without affecting TNF-alpha in other locations of the body. KPV also reduces NF-kappaB and mitogen-activated protein kinase activity. These effects work together with TNF-alpha inhibition to reduce inflammatory changes in the intestine and reduce colonic infiltration.

The American Academy of Anti-Aging Medicine suggest a protocol for SIBO which includes BPC-157 and KPV (among others). KPV is suggested at 0.5mg cap BID x 2 weeks then may reduce the dose going forward, and it also fights to eradicate candida.

KPV appears to be effective only on excessively-inflamed tissues, appearing to have little to no effect on normal tissues – part of the reason being that KPV enters through colonic cells via PepT1 channels, which are expressed in the intestine, in noticeable amounts in the gut only during inflammatory states.

Anti-inflammatory/anti-microbial:
KPV exhibits anti-inflammatory benefits partially through innate immunity, fighting two common pathogens, Staphylococcus aureus and Candida albicans.

Note: KPV works synergistically with thymosin alpha-1 for chronic pain, inflammation, gut, and immune dysregulation.

Wound Healing:
Each stage of the wound healing process exhibits different characteristics, but most cells express melanocortin 1 receptors (MC1R) which bind alpha-MSH hormone, therefore alpha-MSH analogues such as KPV also bind. Because KPV offers the anti-inflammatory properties of alpha-MSH without being pigment inducing, it is a good candidate for wound healing without changing the characteristics of the skin.

VIP (Vasoactive Intestinal Polypeptide) – 50mcg/spray
VIP is a peptide naturally produced by tissues of the gut, pancreas, gallbladder, and the hypothalamus.

Actions of VIP in the body include: Vasodilation to assist in blood pressure regulation, GI tract epithelial cell secretion and blood flow - increasing water and electrolytes in GI tract, relaxation of intestinal smooth muscle, exerting a positive

effect on hypothalamic kisspeptin neurons, hormone balancing and aromatase inhibiting effect - corrects estradiol, 25-OH Vitamin D and testosterone in males, down regulation of th1 responses and controlling cytokine responses to restore immunoregulation, especially following infections by intracellular bacteria and viruses.

Benefits:

- Improvement of symptoms associated with mold toxicity, biotoxin illness and exposure to water-damaged buildings
- Decrease in symptoms related to chronic inflammation and Chronic Inflammatory Response Syndrome (CIRS)
- Improvement during respiratory failure related to Severe Acute Respiratory Syndrome (SARS) by binding to lung epithelial cells critical for oxygen transfer and surfactant production
- Reduction in mast cell activation
- Improved function of gut immune cells in Inflammatory Bowel Disease (IBD)

Side-Effects: Well-tolerated with few side-effects. Side-effects are reported following the IV infusion of VIP (aviptadil) - alterations in blood pressure, heart rate, or ECG, diarrhea. These side-effects are minimal with intranasal administration.

Dosage and Route:
Compounded as VIP 50mcg/spray intranasal spray
Typical instructions are to instill 50mcg (1 spray) intranasally in alternating nostrils, up to 4 times daily. The duration of therapy for intranasal treatment is tested, commonly used, and deemed safe for at least 18 months.

DSIP – 0.2mg, 0.4mg sublingual tablet

DSIP (Delta sleep-inducing peptide) is a neuromodulator peptide which has been shown to promote sleep at low doses. DSIP freely crosses the blood-brain barrier and is readily absorbed from the gut without being denatured by enzymes. Administration of DSIP does not induce tolerance and is not a sedative. DSIP in normal physiological concentrations exhibits a marked diurnal variation and correlates with the circadian rhythm. DSIP concentrations are generally low in the mornings and higher in the afternoons.

DSIP also exhibits a pronounced stress protective action and decreases stress-induced metabolic and functional disorders. DSIP promotes modulation of central regulatory processes, working as a systemic antioxidant and modulating GABA, glutamate and other neuronal systems. DSIP may be the principal endogenous sleep factor and specifically promotes the delta rhythm of sleep as indicated on an EEG.

Benefits:

- Improves circadian rhythm by promoting the delta rhythm, achieved in Stage 4 of sleep (stage when Growth Hormone is made)
- Antioxidant effect in the brain via increases in glutathione peroxidase and superoxide dismutase
- Increased alertness, improved stress tolerance and coping behavior during awake cycles
- Restoration of slow-wave sleep in Cushing's Syndrome
- Possible anticonvulsant action by increasing threshold to NMDA- and picrotoxin-induced convulsions
- Increase in testosterone levels when treating with DSIP alone (100-200 point increases have been observed)

Side Effects: Potential to disrupt sleep. If this occurs, dosing should be moved up earlier in the day until sleep disruption is no longer experienced.

Considerations: Potential drug interaction between DSIP and drugs which inhibit or are themselves metabolized by peptidases (ie: ACEs such as Captopril). Variations in the literature report that ACTH concentrations may or may not be affected. DSIP may increase Growth Hormone and stimulate the release of LH.

Dosage and Route: Sublingual tablets are dissolved under the tongue roughly 2-3 hours prior to bedtime, on an empty stomach, depending on individual patient response.

Additional Information: DSIP produced by a nursing mother naturally passes through her breast milk to encourage the nursing infant to sleep following feeding. Therefore, a nursing mother who currently takes compounded DSIP should expect that sleep will be induced in her nursing infant.

GHK-Cu – 2.5mg, 5mg sublingual tablet

GHK-Cu is a naturally occurring copper complex peptide that works by promoting activation of wound healing, attracting immune cells, exhibiting antioxidant and anti-inflammatory effects, stimulating collagen and synthesis of skin fibroblasts following tissue injury, and promoting blood vessel growth and synthesis of neurotrophic factors. GHK-Cu plays a role in appropriate gene functioning and in preventing age-associated cognitive decline and neurodegenerative conditions.

As bodily concentration of GHK-Cu declines with age, there is a consequential increase in inflammation, cancerous activity, and tissue destruction. Clinically, GHK-Cu is most widely used to improve hair growth, decrease fine lines and wrinkles, and promote wound healing through increased circulation and collagen production. GHK-Cu may also be used to down-regulate over-expressed genes linked to various cancers.

Benefits:

- Wound healing via increased angiogenesis, anticoagulation and vasodilation
- Antioxidant, anti-inflammatory
- Hair follicle restoration and nail re-growth
- Skin elasticity restoration and scar tissue repair
- Healing of intestinal ulcerations in Crohn's
- Increased healing in stress fractures
- Stomach and intestinal lining repair
- Protection against Pulmonary Fibrosis, Acute Lung Injury and Respiratory Distress Syndrome
- Nerve regeneration, nerve growth factor production supporting cognitive health
- Protection against neurodegenerative decline via inhibition of beta-amyloid peptide production
- Down-regulation of over-expressed genes linked to various cancers (ie: metastatic colon)
- Promotes osteoblasts and marrow stromal cells for increased bone growth
- Increased improvement of brain fog and energy in elderly patients with anemia (as opposed to replacing with iron)

Side Effects: None reported with sublingual delivery.

Considerations: Assess reasonable copper levels based on patient status. Although GHK-Cu has notably suppressed various metastatic cancers, consider increased angiogenesis in patients with tumors present. Due to anticoagulation properties, consider interaction with other anticoagulation medications.

Dosage and Route: GHK-Cu is compounded into sublingual tablets to be dissolved under the tongue. It is recommended that GHK-Cu be taken on an empty stomach.

Additional Information: GHK-Cu tablets are faint purple in color.

Dihexa – 1mg, 2mg, 5mg oral capsule

Dihexa is an orally active peptide and nootropic drug that crosses the blood-brain barrier and may be used to improve cognitive functions related to neurodegenerative conditions such as Alzheimer's Disease and Parkinson's Disease, as well as trauma-based brain disorders. Unlike other drugs used to treat such conditions which only slow their progression, Dihexa offers new synapse formation, helping to overcome memory and motor dysfunction. Dihexa is often used to increase mental stamina, creative thinking, social intuition and conversational skills. Dihexa may also be used to manage depression and to improve short and long-term memory.

Benefits:

- Alzheimer's Disease and Parkinson's Disease treatment via reparative synaptogenesis, including associated tremors
- Enhanced creative thinking, social intuition, conversational skills, and focus
- Depression management
- Improvement in long and short-term memory and mental stamina
- Seven orders of magnitude more potent than BDNF

Side Effects: Possible jitters and irritability upon discontinuation. Therefore, dosing schedule should be discussed with your physician. Potential increase in hepatocyte growth factor (HGF), which is naturally released by the body at increased levels to facilitate recovery from synapse damage.

Dosage and Route: Take oral capsule(s) by mouth on an empty stomach and as directed by your prescriber. Most common doses are 1mg, 2mg and 5mg capsules once daily.

Optimizer (CJC-1295 0.5mg/Ipamorelin 1mg)– combination sublingual tablet

The Optimizer combination peptide, which contains both CJC-1295 and Ipamorelin, has been found to be more effective than using either ingredient alone.

CJC-1295: As a growth hormone releasing hormone (GHRH) analog, CJC-1295 has been shown to steadily increase growth hormone and insulin-like growth factor 1 (IGF-1). CJC-1295 stimulates growth hormone secretion with no increase in prolactin, leading to fat loss and increased lean muscle mass, as well as increased protein synthesis. A benefit of using CJC-1295 in a daily sublingual tablet versus weekly injection is that daily dosing provides GHRH around the clock, promoting growth hormone release in the early morning hours, mimicking the body's natural rhythm. CJC-1295 also promotes slow wave sleep, or deep sleep, which is important for muscle growth and memory retention. Studies have shown that since slow wave sleep decreases significantly with age, the use of CJC-1295 promotes the GHRH response, which induces deeper sleep especially in adults middle-aged and older.

Ipamorelin: A growth hormone releasing peptide which stimulates the body's own natural production of growth hormone, ipamorelin promotes strength, anti-aging processes and healing. Benefits of Ipamorelin include an increase in lean muscle mass, decrease in body fat, regulation of blood pressure, increased testosterone production, smoothing of wrinkles, healthier skin, increased bone strength, and improved quality of sleep.

Unlike similar peptides which stimulate the release of growth hormone, Ipamorelin does not produce unwanted side effects such as intense hunger or spikes in cortisol and prolactin.

Side Effects: Occasional irritation under the tongue (we can re-formulate into a sublingual drop if patient experiences this)

Contraindications: Recent cancer due to increase in growth factors

Dosage and Route: *Optimizer* is compounded into sublingual tablets, which dissolve under the tongue. This combination peptide is most beneficial when dosed at bedtime, at least 90 minutes after the last meal of the day, as it prompts the body to mimic the natural release of growth hormone. It is recommended that *Optimizer* be taken once daily on an empty stomach.

Additional Information: Your provider may order a blood test prior to prescribing this peptide.

Function (PT-141) – 0.5mg or 1mg sublingual tablet

The *Function* peptide, which contains PT-141 or Bremelanotide, is used to help improve sexual dysfunction in both men (erectile dysfunction or impotence) and women (sexual arousal disorder). PT-141 was developed from the tanning peptide, Melanotan 2, which is a synthetically produced variant of a peptide hormone naturally produced in the body that stimulates melanogenesis or an alpha-Melanocyte stimulating hormone (MSH). MSH activates certain melanocortin receptors in the process of exerting its effects. MSH exerts potent influence over lipid metabolism, appetite, and sexual libido. PT-141 has been shown to exhibit libido-enhancing effects by activating the melanocortin receptors MC1R and MC4R, but not skin tanning. Unlike Viagra® and other related medications, it does not act upon the vascular system, but instead directly increases sexual desire via the nervous system.

Side Effects: Occasional headaches, nausea and flushing. Men have reported that headaches experienced from popular erectile dysfunction medications like Viagra® and Cialis were more intense and lasted longer than those experienced with PT-141.

Dosage and Route: *Function* is compounded into sublingual tablets, which dissolve under the tongue. A standard starting dose in both men and women is 1mg daily. Many patients, both men and women, work up to 2mg daily finding it to be an optimal dose. It is recommended that PT-141 be taken on an empty stomach.

Additional Information: Most men who have used *Function*, report that they were able to more easily achieve an erection within 30 minutes to 1 hour after taking this peptide and that the effects of increased libido may last up to 24hrs. Women often experience a quicker onset of action, dosing only 15 to 20 minutes prior to sex, and therefore the effects also dissipate quicker than in men.

Repair (BPC-157) - 0.5mg and 1mg sublingual tablet or oral capsule

BPC-157, also known as Body Protecting Compound, is made by the body in very small amounts within gastric juices, where its function is to protect and heal both the upper and lower portions of the gastrointestinal (GI) tract. For this reason, BPC-157 is useful in the treatment of ulcers, esophageal irritation and symptoms of inflammatory bowel disease. BPC-157 hastens the recovery of torn muscles, detached tendons, and damaged ligaments. BPC-157 has been shown to protect against the insult of injury associated with traumatic events (less hemorrhage, laceration and edema in injuries like TBI or concussion).

Side Effects: None reported with sublingual delivery

Dosage and Route: *Repair* is compounded both as a capsule and sublingual tablet. The capsule is specific to repairing the GI tract whereas the sublingual tablet has been shown to repair gut function but is primarily used to repair tendons and muscle tissue following injury or surgery.

It is recommended that *Repair*, in both capsule and sublingual tablet form be taken on an empty stomach.

Brain (Semax) – 0.5mg sublingual tablet

Semax is frequently used for its neurogenic, neurorestorative, nootropic (cognitive enhancing) and neuroprotective effects.

Benefits:

- Activation of the serotonergic and dopaminergic centers in the brain by increasing brain-derived neurotrophic factor (BDNF), which supports the survival of existing neurons as well as the growth of new neurons and synapses
- Antidepressant-like and anxiolytic-like properties without addictive side-effect profile
- Improvement of depression and ADHD associated symptoms
- Improved sleep patterns and calming of "racing thoughts"
- Improves circulation – helps protect the heart from damage after a stroke or heart attack
- Improvement of both long and short-term memory
- May help alleviate pain by preventing the breakdown of enkephalins, which regulate the pain response

Side Effects: Transient headache or feeling of 'heartbeat in the ear'

Dosage and Route: *Brain* is compounded into sublingual tablets, which dissolve under the tongue. It is recommended that *Brain* be taken on an empty stomach, at a starting dose of one 0.5mg sublingual tablet in the morning and add an additional tablet in the afternoon if symptoms persist.

Rejuvenation (Epitalon) – 0.5mg sublingual tablet

Epitalon is used for its anti-aging and anti-carcinogenic properties. Epitalon has been shown in animal studies to effect melatonin secretion as well as telomerase activity. Epitalon may also be referred to as epithalone, epithalon, LS-72251, or CID2192042.

- **Anti-carcinogenic:**
  Epitalon has been shown to inhibit the growth of cancerous tumors by preventing the occurrence of early-stage tumors via the pineal gland. With an inverse relationship occurring between melatonin secretion and malignant tumor growth, epitalon has been found to activate melatonin secretion and therefore decrease the incidence of tumor growth.

- **Promotes normal deep sleep patterns:**
  The pineal gland, which secretes melatonin, is responsible for sleep patterns. Epitalon stimulates production of melatonin through its action on the pineal gland, increasing the ability to achieve deep sleep, which supports a healthy immune system.

- **Anti-aging:**
  The aging process is largely dictated by the long-term maintenance of our DNA, specifically related to chromosome preservation. Chromosomes, which are responsible for our genetic makeup, have telomeres on their ends, which shorten each time that cell division takes place. However, with aging, telomeres shorten extensively, and eventually cell division stops. Studies have indicated that the shortening of telomeres is linked to age-related diseases which may lead to deterioration and early death. Telomerase, an enzyme produced naturally in the body, helps to decrease the progressive shortening of telomeres which may lead to age-related diseases. Telomerase production does decline with age. Epitalon helps to reactivate telomerase production, strengthen and lengthen telomeres and promote longevity. Ultimately this production of telomerase decreases cell death and degeneration, while extending the lifespan of our cells and protecting against many age-related diseases.

Side Effects: None reported

Dosage and Route: *Rejuvenation* is compounded into sublingual tablets, which dissolve under the tongue. It is recommended that *Rejuvenation* be taken on an empty stomach, at a starting dose of one 0.5mg sublingual tablet daily.

Immune (Thymosin alpha-1) – 0.5mg sublingual tablet

Thymosin alpha-1 (Tα-1) is a powerful modulator of immunity and inflammation. Studies have shown that Tα-1 plays a role in decreasing the

pathogenesis of chronic inflammatory autoimmune diseases by decreasing continual inflammation and supporting immunity. Tα-1 levels in the blood are found to be significantly lower in those with chronic inflammation or autoimmune diseases, therefore, with the replacement of Tα-1 the immune response becomes better regulated. Tα-1 regulates the immune response by primarily acting on cells of the innate immune system, therefore acting as an endogenous regulator of both inflammatory and adaptive immune responses. In mice studies, giving Tα-1 has been shown to increase natural killer (NK) cell activity in mice with cancer, but not healthy mice, proving the selective action on those who may benefit from Tα-1 therapy.

Benefits:

- Improved tissue repair and healing
- Improved host defense to infection
- Prophylaxis and treatment of symptoms in Herpes Zoster
- Reverses immunosuppression due to chronic infection
- Increases antioxidant and glutathione production
- Boosts Natural Killer cell function
- Binds neurotoxins and endotoxins
- Decreases respiratory complications associated with asthma, allergies and COPD
- Cardiac regeneration and protection post-myocardial infarction, congestive heart failure, etc.
- Neurologic regeneration and protection in post-stroke, traumatic brain injury, Lyme, Alzheimer's, neuropathy, Parkinson's, etc.
- Stimulates stem cell activity and proliferation
- Increases longevity

Side Effects: None reported

Dosage and Route: *Immune* is compounded into sublingual tablets, which dissolve under the tongue. It is recommended that *Immune* be taken on an empty stomach, at a starting dose of one 0.5mg sublingual tablet daily.

Note on all peptides listed here: In many cases, peptides may be taken concurrently, as they exhibit different mechanism of action. Use of these peptides has not been studied in women who are pregnant or lactating.