Peptide Review Table

Peptide	Meets 503A Bulk Requirements	Studied in Humans	Route/Dosing	Noates on Uses/Studies
Anti-Obesity Drug (AOD-9604)[1,2,3] peptide fragment of human growth hormone 16 amino acids	Not permitted for compounding	Yes, limited data on oral use	Limited data on 1mg per day oral for weight loss No studies on efficacy in humans for IV use	Reported use for weight loss 12 week randomized controlled trial on 1mg/day oral AOD-9604 found patients lost an average of 2.6kg vs 0.8kg in the placebo group, but a 24 week trial later in 2007 didn't find significant weight loss vs placebo. 1mg dose demonstrated better weight loss than 10mg dose in one trial. Dosing between 25-400mcg/kg bodyweight for IV administration (evaluation of single doses) has been found to produce limited adverse effects, with headache being most commonly reported. A few subjects did report mild or moderate euphoria that could be related to treatment
Body Protection Compound BPC-157)[4-7] derived from a much larger molecule isolated from human gastric juice 15 amino acids in length	May be relevant for compounding via the SC, IM, oral, or topical routes, see the Enforcement Discretion Policy Regarding 503A Compounding Using Certain Bulk Peptide Drug Substances from HHS for more information	Yes, limited data on intraarticular dosing	Not studied in humans via the oral, IV, IM, or SC routes Intraarticular dosing at 1-4mg studied in a small-scale trial	Reported use **for injury recovery, accelerated healing, tissue repair** One study evaluated the impact of BPC-157 intra-articular injection on patients with knee pain of various causes including ligamentous and tendinous sprains. The study was small, with 12 patients receiving BPC-157 injections and four receiving combination BPC-157 and thymosin-beta 4 (TB4) injections. Of the 12 patients on BPC-157 alone, 11 reported improvement and of the 4 on combination therapy, three reported improvement. The studied doses were 4mg BPC-157 (2mg/mL with a 2mL injected volume) or 1-4mg BPC-157 (in 1-2mL) combined with 3-6mg (1-2mL) of TB4. Adverse effects were not noted in this study, though, the patient population was very small. Studies on BPC-157 in humans via the oral, intramuscular, subcutaneous, or intravenous routes are not currently

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				available. Studies in rats for injury have looked at 10ng/kg up to 10mcg/kg both orally and via injection. The human equivalent dose of 10mcg/kg in rats per FDA provided calculations would be 1.89mcg/kg, corresponding to approximately 110 – 130mcg doses in a 60 to 70kg human. Though appropriate dosing for humans remains unclear given the lack of studies, animal data suggests a very favorable safety profile BPC-157 is currently banned by various sport regulatory authorities including the World Anti-Doping Agency (WADA), the Ultimate Fighting Championship (UFC), and the National Football League (NFL). Information submitted to the FDA regarding BPC-157 for the July 2026 PCAC meeting included oral capsules at 250. 500, and 1000mcg, injections at 2mg/mL for SC use, nasal spray solution at 50mcg/spray, suppositories at 1mg per supp, and transdermal creams of an unspecified strength
Bremelanotide (PT-141)[8-12] Analog of α-melanocyte-stimulating hormone (α-MSH) 7 amino acids	Yes, FDA approved product	Yes, data on subcutaneous and intranasal administration	1.75mg per SC injection at least 45 minutes prior to sexual activity (no more than 8 doses per month and no more than once in 24 hours) 7-20mg nasally 30min prior to intercourse	Commercially available as a SC injection for use for **hypoactive sexual desire disorder** (HSDD) in women. For FDA approved indication SC dosing is 1.75mg per injection at least 45 minutes prior to sexual activity (no more than 8 doses per month and no more than once in 24 hours) Nasal bioavailability appears to be variable compared to the SC route, but studies on 7.5mg nasally in combination with sildenafil in men with **erectile dysfunction** and doses up to 20mg nasally in women have noted benefit. Dosing at below 7mg nasally may not result in significant clinical impact based on limited data. Adverse effects include nausea, headache, and blood pressure increases (the latter potentially related to variable bioavailability via the nasal route).

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Cathelicidin LL-37 [13-17](ropocamptide) 37 amino acids	Not currently permitted for compounding – up for evaluation February 2027 by the FDA	Yes, data on topical use	Studies available on 0.5-3.2mg/mL topical application twice weekly Limited data on intratumoral use	An endogenous protein that plays an essential role in the inflammatory process in the innate immune system. Cathelicidin is being studied for a potential role in treating **melanoma, acne, and diabetic foot ulcers** One study evaluating the efficacy of LL-37 on venous leg ulcers at 0.5, 1.6, and 3.2mg/mL doses applied twice weekly vs placebo over a period of four weeks found significant reduction in ulcer size in the 0.5 and 1.6mg/mL groups (with the 0.5mg/mL group performing the best) as compared to higher doses and placebo. The study did not note systemic or local adverse events. Larger studies on 0.5mg/mL vs 1.6mg/mL twice weekly vs placebo over three months did not note benefit of treatment vs placebo with pooled results, though numerically the 0.5mg/mL group did have faster mean times to wound closure and faster mean times to 50% and 70% ulcer reduction compared with the placebo and 1.6mg/mL groups. The rate of adverse events was similar to placebo in the 0.5 and 1.6mg/mL groups. A small-scale study aimed at evaluating safety looked at 250-500mcg per injection once weekly for 8 weeks into metastatic melanoma suggested there may be a potential role for intratumoral injection. This study was too small to draw conclusions on adverse events
CJC-1295[18-22] Growth hormone releasing hormone analogue 30 amino acids	Not permitted for compounding	Yes, data on SC use in humans	CJC-1295 with DAC* studied at 30-60mcg/kg SC once weekly or every other week in a small scale trial	Reported use to increase levels of growth hormone, typically with the goal **of improving body composition (increased lean mass, decreased adiposity)**, and managing symptoms of **hypogonadism** Evaluations of the safety and tolerability of once-weekly or every other week repeated dosing tested doses between 30 and 60mcg/kg and found no significant increases in prolactin,

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				TSH, or LH levels associated with treatment. No serious adverse events were noted as part of treatment. **Note, CJC-1295 may be listed as "DAC" or "without DAC". DAC is short for "drug affinity complex" and refers to a modification of the lysine side chain of the C-terminus that allows CJC-1295 to bind to serum albumin resulting in an increased half life*
Dihexa[23,24] (N-hexanoic-tyrosine-isoleucine-(6) aminohexanoic amide) Analog of angiotensin IV 6 amino acids	Not currently permitted for compounding – up for evaluation February 2027	No	No studies are currently available on human use	Reported use to **improve cognition, memory**, and assist with age related cognitive decline. Data in humans is lacking, but data in mice suggests that oral use may reduce levels of inflammatory cytokines, decrease activation of astrocytes and microglia, and restore spatial learning and cognitive function. This study in mice evaluated 1.44-2.88mg/kg, which corresponds to approximately 0.115 – 0.23mg/kg in humans per recommended conversions from the FDA Most human dosing protocols evaluate 2-20mg daily oral dosing, though, data is not currently available in humans to corroborate the safety and efficacy of this dosage range.
Elamipretide (SS-31)[90,91,92] Mitochondrial-targeted peptide 4 amino acids	Yes – currently an FDA approved product	Yes	Dosing is dependent on kidney function: • NLT 30mL/min = 40mg SC qd • LT 30mL/min and NOT on dialysis = 20mg SC qd IV dosing	Currently FDA approved for improvement of muscle strength in patients with Barth syndrome Studies are underway evaluating IV use for the treatment of mitochondrial myopathy. Dose finding studies looking at 0.01, 0.1, and 0.25mg/kg/hr vs placebo noted increased exercise performance after 5 days of treatment without major safety concerns. Mouse studies evaluating the impact of intermittent twice weekly elamipretide dosing on preserving exercise tolerance in aged mouse and found benefit, though, not as significant as reported benefits with daily dosing

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Emideltide (DSIP)[25-27] delta sleep-inducing peptide analog 9 amino acids	Not currently permitted for compounding – PCAC voted to omit at the July 2026 meeting	Yes	Studied IV in some small-scale studies, one study on human sleep behavior evaluated 25nmol/kg (this would correspond to ~21mcg/kg) dosing IV	Studied for **sleep** and management of **pain** in patients with chronic pronounced pain episodes. A study that evaluated the effect in seven patients with migraine episodes, vasomotor headaches, chronic tinnitus, and psychogenic attacks found that IV administration daily for five days followed by dosing every two to three days for five injections significantly improved pain in six out of seven patients. Exact dosing was not provided by the abstract, full study unavailable (from 1984). Adverse effects noted in some studies include headache, nausea, and vertigo, though studies are too small to determine rate of adverse event. A study on the impact of DSIP on sleep evaluated 25nmol/kg IV infusion in six patients and found significant increases in sleep pressure with administration of DSIP
Epitalon[28-32] (also referred to as epithalon) Epithalamin analog 4 amino acids	May be relevant for compounding via the SC or IM routes, see the Enforcement Discretion Policy Regarding 503A Compounding Using Certain Bulk Peptide Drug Substances from HHS for more information	Yes, data on IM use	One study on 10mg epitalon IM injected 5 times with 3-day intervals	Currently being explored as a potential treatment for **anti-aging and sleep regulation** Animal studies have noted epitalon can extend the lifespan of mice and fruit flies and restore circadian rhythms of melatonin and cortisol production in monkeys Ex vivo studies on human cell lines note that epitalon can extend telomere length in normal healthy mammalian cells One study in humans evaluated epitalon in older adults. Patients were treated with five injections of 10mg epithalamin IM or saline (placebo) over 3 day intervals. Patients were treated every 6 months for 3 years and then followed for a total of 9 years. Patients in the treatment group observed a 28% decreased mortality rate and a 2 fold lower rate of cardiovascular disease-specific mortality. No serious adverse events were reported.

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				Information submitted to the FDA regarding Epitalon for the July 2026 PCAC meeting submitted it for the injectable route at 3mg/mL and 10mg/mL SC concentrations
GHK-Cu[33-36] Complex of copper and endogenous glycl-l-histudyl-l-lysine 3 amino acids	Not currently permitted for compounding – up for evaluation February 2027	Yes, data on topical use	Most commonly dosed topically for cosmetic use at 0.2-2% (0.5% being the most commonly requested strength) once to twice daily No human data on SC or intranasal use	Used topically for **aging skin, wound care, and alopecia**. Limited data on systemic use (nasal administration) for **cognitive decline** and injectable use for **recovery**. Much of the human data on topical GHK-Cu is from studies that do not specify the concentration used, however, generally products have been used in cosmetic preparations at concentrations between 0.2-2%. Local irritation or redness has occasionally been reported as an adverse effect.
Gonadorelin[37,38] Analog of gonadotropin releasing hormone 10 amino acids	Yes – previously FDA approved for induction of ovulation in women with primary hypothalamic amenorrhea	Yes, data on parenteral use	Lutrepulse (gonadorelin acetate) dosing per package insert is 5-20mcg/pulse every 90 minutes	Studied off label for **spermatogenesis**, pulsatile therapy: 10mcg every 90 minutes subcutaneously (range was 3mcg to 15mcg every 90 minutes). Though injection site reactions may occur, the package insert previously available reported the drug to have no known other adverse effects.
Ibutamoren (MK-677)[39-41] Growth hormone (GH) secretagogue Not a peptide	Not permitted for compounding	Yes, data on oral use	10-25mg daily orally has been found to increase GH levels	Though not a peptide drug, ibutamoren (also known as MK-677) is also used to **increase levels of growth hormone (GH)**. Unlike many of the other GH increasing substances, ibutamoren has significant oral bioavailability, estimated to be greater than 60%, making it a good candidate for those unable to tolerate injectable therapies.[7] One study of 32 elderly adult male and female patients compared ibutamoren 2, 10, or 25mg orally once daily to placebo, measuring serum GH, IGF-1, cortisol, fasting glucose, and insulin among other parameters. The higher doses of ibutamoren (10 and 25mg) were found to increase GH concentration by 57% and 97% respectively and

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				the higher 25mg dose was also found to increase IGF-1 levels by 55% at 2 weeks and 88% at the 4-week marker. Available data on human use is limited, but increased appetite was the only adverse effected significantly higher in the treatment group as compared to placebo.
Ipamorelin[42-44] Ghrelin analog (growth hormone secretagogue) 5 amino acids	Not permitted for compounding	Yes, data on IV use	0.03mg/kg IV twice daily in one study No data in humans on SC or buccal administration	Ipamorelin is a pentapeptide (5 amino acid peptide) and a **GH secretagogue**. Among peptides studied for increasing levels of GH, ipamorelin is of particular interest as it is thought to increase GH without significant impact on adrenocorticotrophin and therefore to have a minimal impact on prolactin and cortisol. By comparison, sermorelin, a GHRH analogue, has been noted to increase prolactin levels to a limited extent. Serious treatment related adverse events were not noted in the small human trial on IV use.
Kisspeptin-10[45-47] Kisspeptin is an endogenous neuropeptide – stimulates gonadotropin-releasing hormone 10 amino acids	No, currently on 503A bulks list category 2	Yes, data on IV and SC use	Studied IV and SC at up to 10nmol/kg (13mcg/kg) and 32nmol/kg (42mcg/kg) respectively	Stimulates gonadotropin release, a potential treatment for **infertility and hypogonadism** as well as a potential treatment for **hypoactive sexual desire disorder** (HSDD) Studies thus far have mainly evaluated safety and general impact on circulating reproductive hormones in men and women. IV dosing up to 10nmol/kg (approximately 13mcg/kg) and SC dosing up to 32nmol/kg (approximately 42mcg/kg) Studies on kisspeptin-10 IV administration have found elevations in LH and FSH as a result of therapy. One study in humans found similar impact on gonadotropin releasing hormone (GnRH) at 0.3 and 1nnmol/kg/hr dosing (1.3mcg/kg/hr). Human data is limited, though significant acute or chronic adverse effects have not yet been noted associated with therapy.

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KPV[48,49] Segment of alpha-melanocyte-stimulating hormone 3 amino acids	May be relevant for compounding via the topical and oral routes, see the Enforcement Discretion Policy Regarding 503A Compounding Using Certain Bulk Peptide Drug Substances from HHS for more information	No	Not currently studied in humans	May potentially play a roll in inflammatory conditions such as **ulcerative colitis** by **decreasing inflammation** and regulating inflammatory mediators. KPV has been studied at 1mg/kg orally, but benefit as compared to proKPV (altered to improve oral bioavailability) may be reduced per some studies (Juan et al) which suggest that proKPV can achieve a 3.8x greater colonic accumulation than free KPV Information submitted to the FDA regarding KPV for the July 2026 PCAC meeting included nominations regarding 0.1% products for topical use for wound healing and inflammation
Mechano Growth Factor, Pegylated[50,51] (PEG-MGF) Pegylated isoform of insulin-like growth factor-1 24 amino acids	Not currently permitted for compounding – up for evaluation February 2027	No	Not currently studied in humans	Studied for **muscle recovery, regeneration, and tissue repair**. The pegylated form increases the half life of MGF IGF-1 plays an essential role in a variety of conditions such as ALS, cancer, and heart failure among others due to its essential role in muscle repair and management of inflammatory processes, however, bioidentical IGF-1 faces significant challenges regarding half-life and administration. PEG-MGF was designed to overcome some of these challenges, but robust data on its use and efficacy has yet to be published.
Melanotan I[52-55] Analog of alpha melanocyte stimulating hormone 13 amino acids	Yes – currently FDA approved product (afamelanotide)	Yes, data on SC use	Commercially available as a 16mg implant given SC every 2 months	FDA approved as a SC implant for **erythropoietic protoporphyria to improve pain-free light tolerance** Some literature has evaluated the potential of melanotan I and melanotan II as **sunless tanning** agents, increasing the production of eumelanin Melanotan I (20mg/mL strength) has been studied at 0.16mg/kg daily for 5 days per week for four weeks for sunless tanning

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				One small study comparing 0.16, 0.26, and 0.4mg/kg subcutaneous dosing over 10 days did not note evidence of improved tanning above 0.16mg/kg The FDA approved subcutaneous implant is associated with a variety of adverse effects including nausea, local reaction, fatigue, skin hyperpigmentation, and skin irritation among others.
Melanotan II[56] Analog of alpha-melanocyte stimulating hormone 7 amino acids	Not currently permitted for compounding – up for evaluation February 2027	Yes, limited data on SC use	Dosing information on humans is extremely limited. One small scale trial recommended 0.025mg/kg SC every other day	A synthetic analogue of alpha MSH (alpha melanocyte stimulating hormone) that has been studied **for sunless tanning and arousal**. Small trials evaluating dosing between 0.005-0.03mg/kg have suggested 0.025mg/kg every other day as a reasonable dose for future study. Studies are too small to draw conclusions, but somnolence and fatigue have been noted with treatment as well as spontaneous erection lasting 1-5 hours and mild nausea
MOTs-C[57-59] (mitochondrial open reading frame (ORF) of the 12S rRNA Type-c) Endogenous mitochondrial derived peptide 16 amino acids	May be relevant for compounding via the SC or IM routes, see the Enforcement Discretion Policy Regarding 503A Compounding Using Certain Bulk Peptide Drug Substances from HHS for more information	No	Not currently studied in humans	Theorized to play a role in regulation of **obesity, diabetes**, and potentially play a role in **longevity**. Data is not yet available in humans, but in mice MOTs-C has been studied for improving exercise tolerance, restoring insulin sensitivity Studies in mice have evaluated 5-15mg/kg/day intraperitoneal dosing for improving physical performance and have noted benefits in running time in mice that increase with increasing dosage. These results have not been replicated in humans, but this dosing would correspond to 0.4 to 1.2mg/kg in humans per available FDA dosage conversion information Some studies in mice have evaluated intermittent dosing (3x per week) for long term improvement of physical capacity and healthspan in mice

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				Information submitted to the FDA regarding MOTS-c for the July 2026 PCAC meeting evaluated 5 and 10mg vials for SC injection
Oxytocin[60-63] Endogenous neuropeptide 9 amino acids	Yes - currently an FDA approved product	Yes, data on a wide range of routes of administration including parenteral, nasal, buccal, and lingual routes	Doses vary, studied between 8-40IU per dose intranasally for social cognition, libido, and anorgasmia Studies on weight loss generally evaluate nasal use, one study found clinically significant weight loss with 24IU administered four times daily (once before each of 3 meals and again before bed)	Studied for a wide range of conditions including **social cognition, libido, anorgasmia, weight loss** etc. Most data (outside of commercial parenteral indications) is on the nasal route of administration at doses between 8-40IU per dose Studies on weight loss generally evaluate nasal use, one study found clinically significant weight loss with 24IU administered four times daily (once before each of 3 meals and again before bed) Oxytocin via nasal routes of administration has not been associated with an increased risk of adverse events over placebo.
Retatrutide[64-67] GLP-1 analog (targets GLP-1, GIP and Glucagon receptors) 39 amino acids	Not permitted for compounding (no FDA approved product as of June 2026)	Yes, data on SC use	Phase 3 trials are evaluating 2mg dosing that increases each month (every 4 weeks) up to a maintenance dose of 9 or 12mg every week	Studied for **weight loss (obesity), obstructive sleep apnea, and knee osteoarthritis.** Studied dosing is similar to other GLP-1s in that there is a titration schedule with 2mg dosing that increases each month (every 4 weeks) up to a maintenance dose of 9 or 12mg every week A meta-analysis of clinical trials suggests superior weight loss with retatrutide as compared to tirzepatide. The phase 3 trial for retatrutide noted patients on the 12mg dose reported 28.7% body weight reduction on average at 68 weeks, by comparison tirzepatide showed 20.9% weight loss at 72 weeks (15mg dose) and semaglutide showed 14.9% weight loss at 68 weeks (2.4mg dose). Most common adverse effects are GI related and include diarrhea, vomiting, and constipation. Comparative studies have found adverse events to be more common with retatrutide as compared to tirzepatide.

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Selank[68-71] Analog of endogenous tuftsin 7 amino acids	Not permitted for compounding	No	Not currently studied in humans	Thought to have an **anxiolytic** effect via an impact on the GABAergic system. One exploratory study on rats 300mcg/kg nasally, which would correspond to 48mcg/kg in humans. Another study evaluated 250-500mcg/kg dosing in rats, corresponding to 40-80mcg/kg in humans though data on nasal dosing in human patients is not available
Semaglutide[72-76] GLP-1 analog 31 amino acids	Yes – currently an FDA approved product	Yes, data on oral and SC use	SC dosing starting at 0.25mg weekly and escalating every 4 weeks (to 0.5mg, 1mg etc.) up to 1.7-2.4mg weekly as tolerated Oral dosing starts at 1.5mg for 30 days and escalates every 30 days to 4mg, 9mg, up to 25mg as a maintenance dose	Placebo-corrected **weight loss** reports from clinical trials suggest approximately 5% weight loss with liraglutide, 12% with semaglutide, and 18% with tirzepatide. The STEP trial (Semaglutide Treatment Effect in People with Obesity) found semaglutide 2.4mg to produce mean weight loss of 14.9% as compared to 2.4% with the placebo group over a treatment period of 68 weeks. Semaglutide oral therapy has also been evaluated for weight loss. The OASIS-1 trial evaluated semaglutide oral tablets over 68 weeks. The dose was escalated starting with 3mg daily for 4 weeks and escalating to 7mg, 14mg, 25mg and then eventually 50mg daily in 4-week intervals. The study found 15.1% weight loss compared to just 2.4% with placebo.[61] Though the study did not include an injectable treatment arm, it should be noted that this weight loss is comparable to that reported with 2.4mg semaglutide subcutaneous injection. GI adverse events are the most commonly reported including nausea, vomiting, diarrhea, constipation. Gallbladder related adverse events have also been noted associated with semaglutide. Human trials are not yet available on buccal or sublingual dosing, however, animal studies have found semaglutide to be bioavailable sublingually especially when in combination with permeation enhancers.

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Semax[77] Analog of adrenocorticotropin 7 amino acids	May be relevant for compounding via the nasal route, see the Enforcement Discretion Policy Regarding 503A Compounding Using Certain Bulk Peptide Drug Substances from HHS for more information	Yes, data on intranasal use	Typically 200-300mcg per dose but varies depending on the indication. Pediatric dosing is typically 200-400mcg per day divided into twice daily dosing	Commercially available as a 1% nasal product in other countries and indicated for **ischemic stroke** and as a **nootropic agent**. Dosing is typically 200-300mcg per dose but varies depending on the indication. Pediatric dosing is typically 200-400mcg per day divided into twice daily dosing. Adverse effects include potential discoloration of the nasal cavity and increases in blood glucose levels in diabetic patients.
Sermorelin[78] Growth hormone releasing hormone (GHRH) analogue 29 amino acids	Yes – previously FDA approved product, not discontinued for safety or efficacy reasons	Yes, data on SC use	0.5-1mg SC twice daily or up to 2mg SC once nightly has been studied for hypogonadism	Sermorelin, a large 29 amino acid sequence peptide and a **GHRH analogue** like CJC-1295, has the shortest half-life of the three peptides. Despite this, as a previously FDA approved product, sermorelin has the most human data for management of hypogonadism between the three peptides. Studies in men looking at injections between 0.5-1mg twice daily or up to 2mg once nightly have found increases in GH associated with treatment. While total weight was not noted to significantly change throughout the course of the studies, waist to hip ratio did show an age independent inverse correlation with sermorelin administration and, in elderly men, serum testosterone levels were increased with sermorelin administration, though, the difference did not reach the level of statistical significance. Sermorelin is generally well tolerated, though nausea, facial flushing, and injection site reactions have been noted.
Tesamorelin[79] 44 amino acids in length Growth hormone-releasing factor (GHPF) analog	No, this is an FDA approved product, but it qualifies as a biologic	Yes, data on SC use	Commercial product is dosed at 1.4mg SC once daily	FDA approved for **reduction of excessive abdominal fat in HIV-infected adult patients with lipodystrophy** and dosed at 1.4mg SC once daily. Adverse effects include hypersensitivity, edema-related reactions, hyperglycemia, and injection site reactions.

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Thymosin Alpha-1[80,81] Fragment of thymosin fraction 5 28 amino acids	Not permitted for compounding	Yes, data on SC use	Most studies have evaluated 1.6mg SC twice weekly dosing	Thymosin α_1 is thought to play an important role in the regulation, differentiation and function of thymocyte lymphocytes (T cells). It is thought to enhance immune properties including T-cell maturation, antigen recognition, cytokine modulation, and chemokine production as well as enhancing natural killer (NK) cell mediated cytotoxicity.[2] Given its impact on the immune system, thymosin α_1 has been studied for a variety of conditions including for viruses such as **Hepatitis B and C as well as COVID-19**. Some studies have also evaluated its potential as an adjuvant in **cancer treatment.** Adverse effects are limited with injection site reactions being most common. One study evaluating combination thymosin alpha 1 with interferon alpha 2b did note fever, fatigue, muscle aches, nausea, vomiting, and neutropenia as rare adverse effects.
Thymosin Beta-4[82-85] Endogenous peptide 43 amino acids	Not permitted for compounding, also this peptide is 43 amino acids in length and would qualify as a protein and be subject to FDA biologic restrictions	Yes, studied IV and ophthalmic use	Data on IV use is mainly for safety rather than efficacy. An ophthalmic 0.1% product dosed at 1-2 drops per eye twice daily have noted benefit for dry eye	Thymosin beta 4 is an endogenous peptide thought to play an important role in **tissue repair, regeneration, and cellular protection**. Thymosin Beta4 is thought to be potentially beneficial in promoting myocardial cell survival during acute myocardial infarction. One dose finding study on IV thymosin beta4 evaluated the safety of 42, 140, 420, or 1260mg doses daily for 14 days. Toxicity was not noted at any dose. Another placebo-controlled study evaluating the safety of 0.5, 2 and 5mcg/kg IV daily for 10 days found all doses studied to be well tolerated with only minor and transient adverse events noted. Phase II clinical trials have evaluated thymosin beta4 0.1% vs placebo (1-2 drops into each eye twice daily over 28 days) and found the treatment superior to placebo for managing dry eye.

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Peptide Review Table

				Further data on IV use at 1200mg or 450mg IV push doses dosed daily for 3 days followed by once weekly dosing for 4 weeks were planned but have not been stared.
Thymosin Beta-4 Fragment (TB-500)[86-88] 7 amino acids	May be relevant for compounding via the SC or IM routes, see the Enforcement Discretion Policy Regarding 503A Compounding Using Certain Bulk Peptide Drug Substances from HHS for more information	No, though, a clinical trial is planned to start in 2026 on TB4 fragment in atherosclerotic cardiovascular disease (NCT07487363)	No data on human use at this time	A fragment of Thymosin Beta 4 active region, it has been used anecdotally for **muscle growth and tissue repair**. Data is only in vitro or in animals at this time.
Tirzepatide[89,90] GLP-1and GIP receptor agonist 39 amino acids	Yes, FDA approved product currently available	Yes, studied via the SC route	2.5mg SC once weekly with dosages increasing every 4 weeks (5mg, 7.5mg, 10mg etc.) up to 10mg weekly in pediatric patients or 15mg in adults	The SURMOUNT-1 Trial found **weight loss** at all three doses of tirzepatide (5, 10, 15mg) with the most significant weight loss in the 15mg group with a reported 20.9% mean weight loss as compared to 3.1% for placebo over a 72-week trial. GI adverse events are the most commonly reported including nausea, vomiting, diarrhea, constipation.
Vasoactive Intestinal Peptide (VIP)[91] VIP is an endogenous neuropeptide 28 amino acids	Yes – currently category 1 on the 503A bulks list	Yes, data on intranasal use	50mcg/0.1mL – one spray four times daily for one month, then two sprays four times daily if symptoms were uncontrolled	Studied for **chronic inflammatory response syndrome** at 50mcg/0.1ml nasal spray. Patients were started on one spray four times daily for one month, then increased to two sprays four times daily if the symptoms were not resolved at the end of the first month of VIP treatment. No serious adverse events were noted as part of the study, though the study was small (just 35 patients on the VIP product).

References:

1. Misra M. Obesity pharmacotherapy: current perspectives and future directions. Curr Cardiol Rev. 2013;9(1):33-54. doi:10.2174/157340313805076322
2. Valentino MA, Lin JE, Waldman SA. Central and peripheral molecular targets for antiobesity pharmacotherapy. Clin Pharmacol Ther. 2010;87(6):652-662. doi:10.1038/clpt.2010.57

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3. Stier H, Vos E, Kenley D. Safety and Tolerability of the Hexadecapeptide AOD9604 in Humans. J Endocrinol Metab. 2013;3(1-2):7-15.
4. Lee E, Padgett B. Intra-articular injection of BPC 157 for multiple types of knee pain. Alternative Therapies. 2021; 27(4): 8-13.
5. Seiwerth S, Milavic M, Vukojevic J, Gojkovic S, Krezic I, Vuletic LB, Pavlov KH, Petrovic A, Sikiric S, Vranes H, Prtoric A, Zizek H, Durasin T, Dobric I, Staresinic M, Strbe S, Knezevic M, Sola M, Kokot A, Sever M, Lovric E, Skrtic A, Blagaic AB and Sikiric P (2021) Stable Gastric Pentadecapeptide BPC 157 and Wound Healing. Front. Pharmacol. 12:627533. doi: 10.3389/fphar.2021.627533
6. Nair AB, Jacob S. A simple practice guide for dose conversion between animals and human. J Basic Clin Pharm. 2016;7(2):27-31. doi:10.4103/0976-0105.177703
7. Seiwerth S, Milavic M, Vukojevic J, Gojkovic S, Krezic I, Vuletic LB, Pavlov KH, Petrovic A, Sikiric S, Vranes H, Prtoric A, Zizek H, Durasin T, Dobric I, Staresinic M, Strbe S, Knezevic M, Sola M, Kokot A, Sever M, Lovric E, Skrtic A, Blagaic AB and Sikiric P (2021) Stable Gastric Pentadecapeptide BPC 157 and Wound Healing. Front. Pharmacol. 12:627533. doi: 10.3389/fphar.2021.627533
8. Vyleesi (bremelanotide) [package insert]. Palatin Technologies. Cranbury, NJ. Updated January 2025.
9. Diamond LE, Earle DC, Garcia WD, Spana C. Co-administration of low doses of intranasal PT-141, a melanocortin receptor agonist, and sildenafil to men with erectile dysfunction results in an enhanced erectile response. Urology. 2005 Apr;65(4):755-9. doi: 10.1016/j.urology.2004.10.060. PMID: 15833522.
10. Diamond, L., Earle, D., Rosen, R. et al. Double-blind, placebo-controlled evaluation of the safety, pharmacokinetic properties and pharmacodynamic effects of intranasal PT-141, a melanocortin receptor agonist, in healthy males and patients with mild-to-moderate erectile dysfunction. Int J Impot Res 16, 51–59 (2004). https://doi.org/10.1038/sj.ijir.3901139
11. Diamond LE, Earle DC, Heiman JR, Rosen RC, Perelman MA, Harning R. An effect on the subjective sexual response in premenopausal women with sexual arousal disorder by bremelanotide (PT-141), a melanocortin receptor agonist. J Sex Med. 2006 Jul;3(4):628-638. doi: 10.1111/j.1743-6109.2006.00268.x. PMID: 16839319.
12. BioSpace. Palatin Technologies Reports Positive Bremelanotide Study; Improved Safety Profile with Subcutaneous Administration. August 2009. Palatin Technologies Reports Positive Bremelanotide Study; Improved Safety Profile with Subcutaneous Administration - BioSpace Accessed May 2026.
13. Moreno-Angarita A, Aragón CC, Tobón GJ. Cathelicidin LL-37: A new important molecule in the pathophysiology of systemic lupus erythematosus. *J Transl Autoimmun*. 2019;3:100029. Published 2019 Dec 17. doi:10.1016/j.jtauto.2019.100029
14. Dzurová L, Holásková E, Pospíšilová H, Schneider Rauber G, Frébortová J. Cathelicidins: Opportunities and Challenges in Skin Therapeutics and Clinical Translation. *Antibiotics (Basel)*. 2024;14(1):1. Published 2024 Dec 24. doi:10.3390/antibiotics14010001
15. Grönberg A, Mahlapuu M, Ståhle M, Whately-Smith C, Rollman O. Treatment with LL-37 is safe and effective in enhancing healing of hard-to-heal venous leg ulcers: a randomized, placebo-controlled clinical trial. Wound Repair Regen. 2014 Sep-Oct;22(5):613-21. doi: 10.1111/wrr.12211. PMID: 25041740.
16. Mahlapuu M, Sidorowicz A, Mikosinski J, et al. Evaluation of LL-37 in healing of hard-to-heal venous leg ulcers: A multicentric prospective randomized placebo-controlled clinical trial. *Wound Repair Regen*. 2021;29(6):938-950. doi:10.1111/wrr.12977
17. Katz T, Javed A, Powers J. Needle before scalpel: considering the role of intratumoral therapy in melanoma. Dermatologic Therapy. 2024; https://doi.org/10.1155/2024/8820105
18. Friedrich N, Thuesen B, Jørgensen T, et al. The association between IGF-I and insulin resistance: a general population study in Danish adults. *Diabetes Care*. 2012;35(4):768-773. doi:10.2337/dc11-1833
19. Nijenhuis-Noort EC, Berk KA, Neggers SJCMM, Lely AJvd. The Fascinating Interplay between Growth Hormone, Insulin-Like Growth Factor-1, and Insulin. Endocrinol Metab. 2024;39(1):83-89.
20. Teichman SL, Neale A, Lawrence B, Gagnon C, Castaigne JP, Frohman LA. Prolonged stimulation of growth hormone (GH) and insulin-like growth factor I secretion by CJC-1295, a long-acting analog of GH-releasing hormone, in healthy adults. J Clin Endocrinol Metab. 2006 Mar;91(3):799-805. doi: 10.1210/jc.2005-1536. Epub 2005 Dec 13. PMID: 16352683.
21. Timms M, Ganio K, Steel R. A method for confirming CJC-1295 abuse in equine plasma samples by LC-MS/MS. Drug Testing and Analysis. 2019. https://doi.org/10.1002/dta.2599
22. Jette L, Leger R, Thibaudeau K. hGRF1-29-Albumin Bioconjugates Activate the GRF Receptor on the Anterior Pituitary in Rats: Identification of CJC-1295 as a Long Lasting GRF Analog. Endocrinology. 2005; doi:10.1210/en.2004-1286
23. Sun X, Deng Y, Fu X, Wang S, Duan R, Zhang Y. AngIV-Analog Dihexa Rescues Cognitive Impairment and Recovers Memory in the APP/PS1 Mouse via the PI3K/AKT Signaling Pathway. *Brain Sci*. 2021;11(11):1487. Published 2021 Nov 11. doi:10.3390/brainsci11111487
24. Borchenko B. Dihexa- peptide for neurological enhancement and repair. Roberston Wellness Aesthetics. Dihexa Peptide: Complete Guide to Synaptogenesis (2026). Accessed 5/27/2026
25. Larbig W, Gerber WD, Kluck M, Schoenenberger GA. Therapeutic effects of delta-sleep-inducing peptide (DSIP) in patients with chronic, pronounced pain episodes. A clinical pilot study. Eur Neurol. 1984;23(5):372-85. doi: 10.1159/000115716. PMID: 6548970.
26. Schneider-Helmert, D., et al. (1981). Acute and delayed effects of DSIP (Delta sleep-inducing peptide) on human sleep behavior. International Journal of Clinical Pharmacology, Therapy, and Toxicology, 19(8), 341-345.
27. Schneider-Helmert, D. (1984). DSIP in insomnia. European Neurology, 23(5), 358-363.
28. Araj SK, Brzezik J, Mądra-Gackowska K, Szeleszczuk Ł. Overview of Epitalon-Highly Bioactive Pineal Tetrapeptide with Promising Properties. *Int J Mol Sci*. 2025;26(6):2691. Published 2025 Mar 17. doi:10.3390/ijms26062691
29. Khavinson VKh. Peptides and Ageing. Neuro Endocrinol Lett. 2002;23 Suppl 3:11-144. PMID: 12374906.

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30. Al-dulaimi, S., Thomas, R., Matta, S. *et al.* Epitalon increases telomere length in human cell lines through telomerase upregulation or ALT activity. *Biogerontology* **26**, 178 (2025). https://doi.org/10.1007/s10522-025-10315-x
31. Korkushko OV, Khavinson VKh, Shatilo VB, Antonyuk-Shcheglova IA. Geroprotective effect of epithalamine (pineal gland peptide preparation) in elderly subjects with accelerated aging. Bull Exp Biol Med. 2006 Sep;142(3):356-9. English, Russian. doi: 10.1007/s10517-006-0365-z. PMID: 17426848.
32. Alzheimer's Drug Discovery Foundation. Epithalamin/Epithalon. Epithalamin-and-Epithalon-Cognitive-Vitality-For-Researchers.pdf Updated July 2015. Accessed May 2026.
33. Pickart L, Margolina A. Skin Regenerative and Anti-Cancer Actions of Copper Peptides. Cosmetics. 2018; 5(2):29. https://doi.org/10.3390/cosmetics5020029
34. Sadgrove NJ, Simmonds MSJ. Topical and nutricosmetic products for healthy hair and dermal antiaging using "dual-acting" (2 for 1) plant-based peptides, hormones, and cannabinoids. FASEB Bioadv. 2021;3(8):601-610. Published 2021 Jun 6. doi:10.1096/fba.2021-00022
35. Pickart L, Vasquez-Soltero JM, Margolina A. The Effect of the Human Peptide GHK on Gene Expression Relevant to Nervous System Function and Cognitive Decline. *Brain Sci*. 2017;7(2):20. Published 2017 Feb 15. doi:10.3390/brainsci7020020
36. Pickart L, Margolina A. Skin Regenerative and Anti-Cancer Actions of Copper Peptides. Cosmetics. 2018; 5(2):29. https://doi.org/10.3390/cosmetics5020029
37. Zhang L, Cai K, Wang Y et al. The pulsatile gonadorelin pump induces earlier spermatogenesis than cyclical gonadotropin therapy in congenital hypogonadotropic hypogonadism men. Am J Mens Health. 2019. 13(1): doi: 10.1177/1557988318818280
38. Jianli L, Mao J, Wang X et al. Optimal treatment for spermatogenesis in male patients with hypogonadotropic hypogonadism. Medicine. 2019; 98(31). doi: 10.1097/MD.0000000000016616
39. Sinha D, Balasubramanian A, Tatem A et al. Beyond the androgen receptor: the role of growth hormone secretagogues in the modern management of body composition in hypogonadal males. Translational Andrology and Urology. 2020; 9(2): doi: 10.21037/tau.2019.11.30
40. Chapman IM, Bach MA, Van Cauter E, et al. Stimulation of the growth hormone (GH)-insulin-like growth factor I axis by daily oral administration of a GH secretogogue (MK-677) in healthy elderly subjects. J Clin Endocrinol Metab 1996;81:4249-57.
41. Sigalos JT, Pastuszak AW. The Safety and Efficacy of Growth Hormone Secretagogues. Sex Med Rev. 2018 Jan;6(1):45-53. doi: 10.1016/j.sxmr.2017.02.004. Epub 2017 Apr 8. PMID: 28400207; PMCID: PMC5632578.
42. Raun K, Hansen BS, Johansen NL, et al. Ipamorelin, the first selective growth hormone secretagogue. *Eur J Endocrinol*. 1998;139(5):552-561. doi:10.1530/eje.0.1390552
43. Sinha D, Balasubramanian A, Tatem A et al. Beyond the androgen receptor: the role of growth hormone secretagogues in the modern management of body composition in hypogonadal males. Translational Andrology and Urology. 2020; 9(2): doi: 10.21037/tau.2019.11.30
44. Beck DE, Sweeney WB, McCarter MD; Ipamorelin 201 Study Group. Prospective, randomized, controlled, proof-of-concept study of the Ghrelin mimetic ipamorelin for the management of postoperative ileus in bowel resection patients. Int J Colorectal Dis. 2014 Dec;29(12):1527-34. doi: 10.1007/s00384-014-2030-8. Epub 2014 Oct 21. PMID: 25331030.
45. Jayasena C, Nijher G, Comninos A et al. The effects of kisspeptin-10 on reproductive hormone release show sexual dimorphism in humans. JCEM. 2011; 96(12): E1963–E1972, https://doi.org/10.1210/jc.2011-1408
46. Jayasena CN, Nijher GM, Comninos AN, et al. The effects of kisspeptin-10 on reproductive hormone release show sexual dimorphism in humans. *J Clin Endocrinol Metab*. 2011;96(12):E1963-E1972. doi:10.1210/jc.2011-1408
47. Jayasena CN, Abbara A, Narayanaswamy S, et al. Direct comparison of the effects of intravenous kisspeptin-10, kisspeptin-54 and GnRH on gonadotrophin secretion in healthy men. *Hum Reprod*. 2015;30(8):1934-1941. doi:10.1093/humrep/dev143
48. Dalmasso G, Charrier-Hisamuddin L, Nguyen HT, Yan Y, Sitaraman S, Merlin D. PepT1-mediated tripeptide KPV uptake reduces intestinal inflammation. *Gastroenterology*. 2008;134(1):166-178. doi:10.1053/j.gastro.2007.10.026
49. Juan Cheng *et al.* Inflammation-triggered self-immolative conjugates enable oral peptide delivery by overcoming gastrointestinal barriers.Sci. Adv.12,eaea2989(2026).DOI:10.1126/sciadv.aea2989
50. Zabłocka B, Goldspink PH, Goldspink G, Górecki DC. Mechano-Growth Factor: an important cog or a loose screw in the repair machinery?. *Front Endocrinol (Lausanne)*. 2012;3:131. Published 2012 Nov 1. doi:10.3389/fendo.2012.00131
51. Song YH, Song J, Delafontaine P, Godard M. The therapeutic potential of IGF-1 in skeletal muscle repair. Trends Endocrinol Metab. 2013; 24(6): 310-319.
52. Scenesse (afamelanotide) [package insert]. Evonik Corporation. Updated May 2026
53. Brennan R, Wells J, Hout M. An unhealthy glow? A review of melanotan use and associated clinical outcomes. Performance Enhancement and Health. 2014;3(2): 78-92.
54. Dorr RT, Ertl G, Levine N, et al. Effects of a Superpotent Melanotropic Peptide in Combination With Solar UV Radiation on Tanning of the Skin in Human Volunteers. Arch Dermatol. 2004;140(7):827–835. doi:10.1001/archderm.140.7.827
55. Levine, N., Dorr, R., Ertl, G., Brooks, C., & Alberts, D. (1999). Effects of a potent synthetic melanotropin, Nle^4-D-Phe^7-α-MSH (Melanotan-I) on tanning: a dose-ranging study. *Journal of Dermatological Treatment*, *10*(2), 127–132. https://doi.org/10.3109/09546639909056014

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56. Dorr RT, Lines R, Levine N, Brooks C, Xiang L, Hruby VJ, Hadley ME. Evaluation of melanotan-II, a superpotent cyclic melanotropic peptide in a pilot phase-I clinical study. Life Sci. 1996;58(20):1777-84. doi: 10.1016/0024-3205(96)00160-9. PMID: 8637402.
57. Lee C, Kim K, Cohen P. MOTS-c: a novel mitocondrial-derived peptide regulating muscle and fat metabolism. Free Radical Biology and Medicine. 2016; 100: 182-187.
58. Reynolds, J.C., Lai, R.W., Woodhead, J.S.T. *et al.* MOTS-c is an exercise-induced mitochondrial-encoded regulator of age-dependent physical decline and muscle homeostasis. *Nat Commun* **12**, 470 (2021). https://doi.org/10.1038/s41467-020-20790-0
59. Reynolds JC, Lai RW, Woodhead JST, et al. MOTS-c is an exercise-induced mitochondrial-encoded regulator of age-dependent physical decline and muscle homeostasis. *Nat Commun*. 2021;12(1):470. Published 2021 Jan 20. doi:10.1038/s41467-020-20790-0
60. Wudarczyk OA, Earp BD, Guastella A, Savulescu J. Could intranasal oxytocin be used to enhance relationships? Research imperatives, clinical policy, and ethical considerations. Curr Opin Psychiatry. 2013;26(5):474-484. doi:10.1097/YCO.0b013e3283642e10
61. Muin D, Wolzt M, Marculescu R et al. Effect of long-term intranasal oxytocin on secual dysfunction in premenopausal and postmenopausal women: a randomized trial. Fert Stert. 2015; 104(3): 715-723.
62. IsHak W, Berman D, Peters A. Male anorgasmia treated with oxytocin. The Journal of Sexual Medicine. 2008; 5(4): 1022-1024.
63. Lawson, E. The effects of oxytocin on eating behaviour and metabolism in humans. Nat Rev Endocrinol 13, 700–709 (2017). https://doi.org/10.1038/nrendo.2017.115
64. Giblin K, Kaplan LM, Somers VK, Le Roux CW, Hunter DJ, Wu Q, Lalonde A, Ahmad N, Bethel MA. Retatrutide for the treatment of obesity, obstructive sleep apnea and knee osteoarthritis: Rationale and design of the TRIUMPH registrational clinical trials. Diabetes Obes Metab. 2026 Jan;28(1):83-93. doi: 10.1111/dom.70209. Epub 2025 Oct 15. PMID: 41090431; PMCID: PMC12673447.
65. Salhab A, Maraqah H, Habes Y, Abusabha M, Ayesh H. SUN-659 Comparative Efficacy and Safety of Tirzepatide vs Retatrutide in Weight Loss: A Network Meta-Analysis of Clinical Trials. *J Endocr Soc*. 2025;9(Suppl 1):bvaf149.169. Published 2025 Oct 22. doi:10.1210/jendso/bvaf149.169
66. Wilding J, Batterham R, Calanna S et al. Once-weekly semaglutide in adults with overweight or obesity. N Engl J Med. 2021; 384 (11): 989-1002.
67. Jastreboff A, Aronne L, Ahmad N et al. Tirzepatide once weekly for the treatment of obesity. N Engl J Med. 2022; 387(3): 205-216.
68. Filatova E, Kasian A, Kolomin T, et al. GABA, Selank, and Olanzapine Affect the Expression of Genes Involved in GABAergic Neurotransmission in IMR-32 Cells. *Front Pharmacol*. 2017;8:89. Published 2017 Feb 28. doi:10.3389/fphar.2017.00089
69. Volkova A, Shadrina M, Kolomin T, Andreeva L, Limborska S, Myasoedov N, Slominsky P. Selank Administration Affects the Expression of Some Genes Involved in GABAergic Neurotransmission. Front Pharmacol. 2016 Feb 18;7:31. doi: 10.3389/fphar.2016.00031. PMID: 26924987; PMCID: PMC4757669.
70. L. S. Inozemtseva, E. A. Karpenko, O. V. Dolotov, N. G. Levitskaya, A. A. Kamensky, L. A. Andreeva and I. A. Grivennikov, "Intranasal Administration of the Peptide Selank Regulates BDNF Expression in the Rat Hippo- campus in Vivo," Doklady Biological Sciences, Vol. 421, No. 1, 2008, pp. 241-243. http://dx.doi.org/10.1134/S0012496608040066
71. Kolomin T, Shadrina M, Slominsky P et al. A new generation of drugs: synthetic peptides based on natural regulatory peptides. Neurosciene and Medicine. 2013; 4(223-252).
72. Wilding J, Batterham R, Calanna S et al. Once-weekly semaglutide in adults with overweight or obesity. N Engl J Med. 2021; 384 (11): 989-1002.
73. Jastreboff A, Aronne L, Ahmad N et al. Tirzepatide once weekly for the treatment of obesity. N Engl J Med. 2022; 387(3): 205-216.
74. Knop FK, Aroda VR, do Vale RD, et al. Oral semaglutide 50 mg taken once per day in adults with overweight or obesity (OASIS 1): a randomised, double-blind, placebo-controlled, phase 3 trial. Lancet. 2023;402(10403):705-719. doi:10.1016/S0140-6736(23)01185-6
75. Krupke H, Zoratto N, Rabut L et al. A biodegradable suction patch for sustainable transbuccal peptide delivery. Journal of Controlled Release. 2025; 384: 113947
76. Cerrejon D, Krupke H, Gao D et al. Optimized suction patch design for enhanced transbuccal macromolecular drug delivery. 2025; 380(10): 875-891.
77. Semax (Methionyl-glutamyl-histidyl-phenylalanyl-prolyl-glycyl-proline) [package insert] semax.pdf. Accessed May 2026
78. Sinha D, Balasubramanian A, Tatem A et al. Beyond the androgen receptor: the role of growth hormone secretagogues in the modern management of body composition in hypogonadal males. Translational Andrology and Urology. 2020; 9(2): doi: 10.21037/tau.2019.11.30
79. Egrifta SV (tesamorelin) [package insert] Theratechnologies Inc. Updated Dec 2025.
80. Goldstein A, Low T, McAdoo M et al. Thymosin α_1: Isolation and sequence analysis of an immunologically active thymic polypeptide. Proc Natl Acad Scie. 1977; 74(2): 725-729.
81. Dominari A, Hathaway Iii D, Pandav K, Matos W, Biswas S, Reddy G, Thevuthasan S, Khan MA, Mathew A, Makkar SS, Zaidi M, Fahem MMM, Beas R, Castaneda V, Paul T, Halpern J, Baralt D. Thymosin alpha 1: A comprehensive review of the literature. World J Virol. 2020 Dec 15;9(5):67-78. doi: 10.5501/wjv.v9.i5.67. PMID: 33362999; PMCID: PMC7747025.
82. Ruff D, Crockford D, Girardi G, Zhang Y. A randomized, placebo-controlled, single and multiple dose study of intravenous thymosin beta4 in healthy volunteers. Ann N Y Acad Sci. 2010 Apr;1194:223-9. doi: 10.1111/j.1749-6632.2010.05474.x. PMID: 20536472.
83. Wang X, Liu L, Qi L, Lei C, Li P, Wang Y, Liu C, Bai H, Han C, Sun Y, Liu J. A first-in-human, randomized, double-blind, single- and multiple-dose, phase I study of recombinant human thymosin β4 in healthy Chinese volunteers. J Cell Mol Med. 2021 Sep;25(17):8222-8228. doi: 10.1111/jcmm.16693. Epub 2021 Aug 4. PMID: 34346165; PMCID: PMC8419156.
84. Wang X, Liu L, Qi L, Lei C, Li P, Wang Y, Liu C, Bai H, Han C, Sun Y, Liu J. A first-in-human, randomized, double-blind, single- and multiple-dose, phase I study of recombinant human thymosin β4 in healthy Chinese volunteers. J Cell Mol Med. 2021 Sep;25(17):8222-8228. doi: 10.1111/jcmm.16693. Epub 2021 Aug 4. PMID: 34346165; PMCID: PMC8419156.

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85. NCT01311518. RegeneRx Biopharmaceuticals, Inc. A Randomized, Double-blind, Placebo-Controlled, Study of the Safety and Efficacy of RGN-352 in Subjects With an Acute ST Elevation Myocardial Infarction (STEMI) After Occlusion of the Proximal Left Anterior Descending Coronary Artery
86. Esposito S, Deventer K, Goeman J et al. Synthesis and characterization of the N-terminal acetylated 17-23 fragment of thymosin beta 4 identified in TB-500, a product suspected to possess doping potential.
87. McGuire R, Hughes E, Maak T, Cushman D. Thymosin Beta-4 and TB-500 in tissue healing, regeneration, and musculoskeletal repair: a scoping review. download_pub. Accessed June 2026
88. Khandoker Asiqur Rahaman. Simultaneous quantification of TB-500 and its metabolites in in-vitro experiments and rats by UHPLC-Q-Exactive orbitrap MS/MS and their screening by wound healing activities in-vitro. Journal of Chromatography B 2024, 1235, 124033, https://doi.org/10.1016/j.jchromb.2024.124033.
89. Jastreboff A, Aronne L, Ahmad N et al. Tirzepatide once weekly for the treatment of obesity. N Engl J Med. 2022; 387(3): 205-216.
90. Mounjaro (Tirzepatide) [package insert]. Eli Lilly and Company. Updated April 2026. Accessed June 2026.
91. Shoemaker R, Katz D, Ackerley M, et al. Intranasal VIP safely restores volume to multiple grey matter nuclei in patients with CIRS. Internal Medicine Review. 2017;3(4):1-14.

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