Biocidin Botanicals®

Peptides Produced in the Healthy Human Gut		
PEPTIDE	**PRIMARY FUNCTION**	**THERAPEUTIC APPLICATIONS**
Gastrin	Stimulates secretion of gastric acid (HCl) and growth of the gastric mucosa.	
Cholecystokinin (CCK)	Stimulates gallbladder contraction and pancreatic enzyme secretion; slows gastric emptying.	CCK analogs: **Examples**: CCK-8 (experimental use) **Uses**: Potential treatments for obesity and gastrointestinal disorders due to their ability to stimulate gallbladder contraction and pancreatic enzyme secretion while reducing appetite.
Secretin	Stimulates secretion of bicarbonate-rich pancreatic juice and bile; inhibits gastric acid secretion.	
Ghrelin	Stimulates appetite and growth hormone release; increases gastric motility and gastric acid secretion.	Ghrelin agonists and antagonists: **Examples**: Anamorelin (agonist), Relamorelin (agonist) **Uses**: Ghrelin agonists are investigated for conditions like cachexia (muscle wasting) associated with chronic diseases such as cancer. They stimulate appetite and increase food intake. Ghrelin antagonists are being studied for obesity treatment due to their potential to reduce appetite.
Motilin	Regulates interdigestive migrating contractions (motility) in the gastrointestinal tract.	Motilin receptor agonists: **Examples**: Erythromycin (acts as a motilin agonist) **Uses**: Erythromycin is sometimes used off-label to treat gastroparesis by stimulating gastrointestinal motility.
Gastric Inhibitory Peptide (GIP)	Inhibits gastric acid secretion and motility; stimulates insulin release.	
Peptide YY (PYY)	Reduces appetite and inhibits gastric motility; slows gastric emptying and intestinal transit.	Peptide YY (PYY) analogues: **Examples**: PYY3-36 (experimental use) **Uses**: Investigated for obesity treatment as it reduces appetite and food intake.
Vasoactive Intestinal Peptide (VIP)	Relaxes smooth muscle of the gut, increases water and electrolyte secretion into the intestine.	VIP analogs: **Examples**: Synthetic VIP **Uses**: Potential treatments for inflammatory bowel disease (IBD) and other inflammatory conditions (CIRS) due to its anti-inflammatory properties and ability to relax smooth muscle. Helps restore the Melanocortin System.

Chart continued on next page

Peptides Produced in the Healthy Human Gut *(Continued)*		
PEPTIDE	**PRIMARY FUNCTION**	**THERAPEUTIC APPLICATIONS**
Glucagon-like Peptide-1 (GLP-1)	Enhances insulin secretion, inhibits glucagon release, slows gastric emptying, and reduces appetite, neuroprotective, anti-inflammatory.	GLP-1 receptor agonists: **Examples**: Exenatide, Liraglutide, Semaglutide, Tirzepatide, Retatrutide **Uses**: These drugs are used primarily to treat type 2 diabetes mellitus and obesity. They enhance insulin secretion, inhibit glucagon release, slow gastric emptying, and promote satiety. They are in phase 3 clinical trials for kidney disease, cardiovascular disease, Alzheimer's, Parkinson's, obstructive sleep apnea, MASH/NASH, cancer, and skeletal muscle wasting.
Somatostatin	Inhibits secretion of various hormones (including gastrin, CCK, and secretin) and reduces gastric acid secretion.	Somatostatin analogues: **Examples**: Octreotide, Lanreotide **Uses**: These drugs treat conditions such as acromegaly, neuroendocrine tumors, and severe diarrhea associated with certain gastrointestinal disorders. They inhibit the release of various hormones and decrease gastrointestinal motility and secretion.
Neuropeptide Y (NPY)	Stimulates food intake and energy storage; inhibits gastric acid secretion and intestinal motility.	
Bombesin	Stimulates release of gastrin and pancreatic enzymes; influences satiety and thermoregulation.	
Enteroglucagon	Inhibits gastric and pancreatic secretion; slows gastric emptying and intestinal transit.	

Additional Peptide Therapies

BPC-157 - Body Protection Compound-157 is a synthetic peptide derived from a protein found in the human stomach. It consists of a 15-amino acid sequence and has been studied for its potential regenerative and healing properties. Although not yet approved by regulatory agencies like the FDA for medical use, BPC-157 has garnered interest for its various biological effects, particularly in animal studies.

Key Properties and Potential Benefits of BPC-157:

1. Tissue Healing and Regeneration
    - Wound healing: BPC-157 has been shown to accelerate the healing of various wounds, including skin burns, muscle tears, and tendon injuries.
    - Gastrointestinal protection: It may promote healing in the gastrointestinal tract, aiding recovery from conditions like inflammatory bowel disease (IBD), ulcers, and other gut-related issues.

2. Anti-Inflammatory Effects
    - BPC-157 exhibits anti-inflammatory properties, which could be beneficial in treating chronic inflammatory conditions and reducing inflammation at injury sites.
3. Angiogenesis
    - This peptide promotes the formation of new blood vessels (angiogenesis), which can enhance blood supply to damaged tissues and facilitate their repair.
4. Neuroprotective Effects
    - Some studies suggest that BPC-157 may have neuroprotective effects, potentially aiding in the recovery from nerve injuries and neurodegenerative conditions.
5. Cardiovascular Protection
    - Evidence shows that BPC-157 might protect cardiovascular tissues, potentially offering benefits in conditions like heart damage or hypertension.

GHK-CU - Glycyl-L-histidyl-L-lysine copper is a naturally occurring tripeptide that plays a significant role in various biological processes, particularly in skin and tissue regeneration. This peptide consists of three amino acids (glycine, histidine, and lysine) and binds to copper ions, which enhances its biological activity.

Key Properties and Benefits of GHK-Cu:

1. Wound Healing and Tissue Repair
    - Collagen production: GHK-Cu stimulates the production of collagen, a vital protein for skin and connective tissue integrity.
    - Cellular regeneration: It promotes the regeneration of skin cells and accelerates wound healing by attracting immune cells to the wound site and enhancing their activity.
2. Anti-Aging Effects
    - Skin elasticity and firmness: GHK-Cu helps improve skin elasticity and firmness by promoting the synthesis of extracellular matrix components.
    - Reduction of wrinkles: It reduces the appearance of fine lines and wrinkles by enhancing collagen and elastin production.
3. Anti-Inflammatory Properties
    - GHK-Cu exhibits anti-inflammatory effects, which can help reduce inflammation and oxidative stress in tissues.
4. Antioxidant Activity
    - This peptide has antioxidant properties, protecting cells from damage caused by free radicals.
5. Hair Growth
    - Stimulation of hair follicles: GHK-Cu stimulates hair follicles, promoting hair growth and reducing hair loss.
6. Protective Effects Against UV Radiation
    - GHK-Cu can protect the skin from the harmful effects of UV radiation, potentially preventing UV-induced damage and skin aging.

KPV - a tripeptide composed of the amino acids lysine (K), proline (P), and valine (V). It is derived from the larger protein alpha-melanocyte-stimulating hormone (α-MSH) and has garnered interest for its potential anti-inflammatory and therapeutic properties.

Key Properties and Benefits of KPV:

1. Anti-Inflammatory Effects
    - Reduction of inflammation: KPV is known for its potent anti-inflammatory properties. It can inhibit the production of pro-inflammatory cytokines and reduce inflammation in various tissues.
    - Applications in inflammatory diseases: It has potential therapeutic applications for conditions characterized by excessive inflammation, such as inflammatory bowel disease (IBD), arthritis, and dermatitis.
2. Antimicrobial Activity
    - Inhibition of pathogens: KPV exhibits antimicrobial effects, helping to combat bacterial and fungal infections. This property makes it useful in treating skin infections and other microbial-related conditions.
3. Wound Healing
    - Promotion of tissue repair: KPV can accelerate the healing of wounds by reducing inflammation and promoting tissue regeneration.
4. Skin Health
    - Treatment of skin conditions: KPV has been explored for treating various skin conditions, including psoriasis, eczema, and acne, due to its anti-inflammatory and antimicrobial properties.

Larazotide - also known as larazotide acetate and formerly referred to as AT-1001, is an investigational peptide drug being developed for the treatment of conditions related to increased intestinal permeability, such as celiac disease. It is a synthetic octapeptide that acts as a tight junction regulator in the intestinal epithelium.

Key Properties and Mechanism of Action of Larazotide:

1. Tight Junction Modulation
    - Restoration of tight junction integrity: Larazotide modulates the tight junctions between epithelial cells in the gut. Tight junctions are crucial for maintaining the intestinal barrier function, preventing the leakage of undigested food particles, toxins, and pathogens into the bloodstream.
2. Reduction of Intestinal Permeability
    - Decreasing "leaky gut": By restoring tight junction integrity, larazotide helps reduce intestinal permeability, often referred to as "leaky gut." This is particularly important in conditions like celiac disease, where gluten exposure can lead to increased gut permeability and subsequent immune reactions.
3. Inflammatory Response Mitigation
    - Lowering inflammatory cytokines: By preventing the passage of harmful substances through the intestinal barrier, larazotide can reduce the inflammatory response that occurs when these substances interact with the immune system.