Millennium Neuro-Regenerative Centers

Applying the sciences of recovery

The Millennium's Peptides for Health series

Introduction

Stem cells, exosomes, and peptides are a series of extraordinary medical tools to help with embellishing bodily mechanisms to aid in the repair and recovery of cells, tissues, and organs. Depending upon the extent of damage or medical condition, each has a role to play in the process of Biohacking Yourself. The Peptides for Health series video presentations are available at YouTube: /@markl.gordon5856

BPC-157: Origin, Discovery, and Applications

Origin and Discovery

BPC-157, or Body Protection Compound-157, is a synthetic peptide derived from a naturally occurring cytoprotective protein found in gastric juice, known as Body Protection Compound (BPC). Composed of 15 amino acids, BPC-157 was first identified and developed in the early 1990s by Croatian researchers exploring its potential for tissue regeneration and accelerated healing.

The discovery of BPC-157 stemmed from the observation that BPC, a key component in gastric secretions, played a fundamental role in protecting the gastrointestinal lining against injury, reducing inflammation, and promoting ulcer healing. Researchers hypothesized that isolating and synthesizing an active fragment of BPC could enhance its biological activity while expanding its therapeutic applications beyond the gastrointestinal system.

Early studies demonstrated BPC-157's remarkable regenerative properties, showing its ability to stimulate angiogenesis, modulate inflammatory pathways, and promote cellular repair in various tissues, including muscle, tendon, ligament, bone, and the nervous system. These findings set the stage for extensive preclinical research, investigating its efficacy in conditions ranging from gastrointestinal disorders to traumatic injuries and neuroprotection.

BPC-157's discovery has since led to ongoing research into its mechanisms of action, particularly its interactions with the vascular and immune systems, as well as its potential in treating conditions related to oxidative stress, chronic inflammation, and neurological dysfunction.

Mechanism of Action

BPC-157 is believed to exert its effects through several interconnected mechanisms that contribute to its healing, regenerative, and protective properties.

One of its primary actions is angiogenesis, the formation of new blood vessels. By stimulating vascular endothelial growth factor (VEGF) and other angiogenic pathways, BPC-157 enhances tissue perfusion and oxygenation, accelerating wound healing, muscle recovery, and organ regeneration. This process is particularly important in repairing damage to tendons, ligaments, and the gastrointestinal lining.

BPC-157 also exhibits potent anti-inflammatory effects by modulating the production of pro-inflammatory cytokines and suppressing excessive inflammatory responses. Through this mechanism, it helps mitigate

tissue damage caused by chronic inflammation, oxidative stress, and immune system dysregulation, making it a promising candidate for conditions such as inflammatory bowel disease, arthritis, and other systemic inflammatory disorders.

Another key aspect of BPC-157's activity is its role in cellular regeneration and repair. Studies have shown that it influences muscle, tendon, and nerve cell growth, promoting faster recovery from injuries and reducing fibrosis in damaged tissues. This regenerative capability is thought to be mediated by its interaction with growth factors, extracellular matrix components, and cellular signaling pathways involved in tissue remodeling.

Additionally, BPC-157 has demonstrated neuroprotective effects, particularly in its ability to support neuronal survival, enhance synaptic plasticity, and facilitate nerve regeneration. Research suggests that it may help protect against neurotoxicity, ischemic damage, and neuroinflammation, offering potential therapeutic applications in traumatic brain injury (TBI), stroke, and neurodegenerative diseases.

These combined mechanisms position BPC-157 as a highly versatile peptide with broad implications for injury recovery, inflammation control, and neurological protection.

Gastrointestinal Healing

BPC-157 has been extensively studied for its ability to promote gastric and intestinal healing, making it a promising therapeutic candidate for conditions affecting the digestive system. It has demonstrated potent ulcer-healing properties, protecting the stomach lining and accelerating the repair of damaged gastrointestinal tissues. Its ability to regulate inflammatory responses and enhance angiogenesis suggests potential applications in inflammatory bowel disease (IBD), gastritis, and other chronic gastrointestinal disorders.

Musculoskeletal Repair

BPC-157 has shown remarkable regenerative effects on musculoskeletal tissues, particularly in tendon and ligament repair. Research indicates that it significantly accelerates healing in models of Achilles tendon rupture, improving tensile strength and structural integrity. Additionally, BPC-157 has been found to promote bone healing, facilitating fracture recovery by stimulating the proliferation of osteoblasts and enhancing bone remodeling. These findings highlight its potential in treating sports injuries, degenerative musculoskeletal conditions, and post-surgical recovery.

Neuroprotection and Cognitive Enhancement

The neuroprotective properties of BPC-157 make it a promising agent for nerve regeneration and brain health. Preclinical studies suggest that it supports neuronal survival, synaptic plasticity, and neurogenesis, aiding in the recovery of damaged nerves. Its anti-inflammatory and cytoprotective effects may also play a role in mitigating traumatic brain injury (TBI), stroke, and neurodegenerative diseases such as Alzheimer's and Parkinson's disease. Emerging research further indicates its potential in enhancing cognitive function and neuroplasticity, positioning it as a candidate for brain health optimization and neurorehabilitation.

Cardiovascular Protection

Preliminary studies suggest that BPC-157 exerts cardioprotective effects, particularly in ischemic heart disease. Evidence indicates that it can protect the myocardium from ischemic damage, reduce inflammatory injury, and promote vascular repair following a heart attack. These properties suggest that BPC-157 could play a role in cardiovascular disease management and post-infarct recovery.

Potential Treatment for Neuroinflammatory Diseases

Given its anti-inflammatory and neuroprotective properties, BPC-157 is being explored for its potential role in treating neuroinflammatory diseases such as **Multiple Sclerosis** (MS). By modulating inflammatory cytokines, reducing oxidative stress, and promoting neuronal regeneration, it may offer a novel therapeutic strategy for neurodegenerative conditions characterized by chronic inflammation and neuronal damage.

These diverse applications underscore BPC-157's broad therapeutic potential, warranting further investigation into its mechanisms, clinical efficacy, and long-term safety profile.

References

1. Sikiric, P., et al. (2015). "BPC 157 and Standard Angiogenic Growth Factors: Basic Concepts, Gastrointestinal Tract Healing, and Other Tissue Healing Promotion." *Current Pharmaceutical Design,* 21(8), 1121-1125.
2. Gwyer, D., et al. (2019). "The effect of BPC-157 on tendon healing and pain: A systematic review." *Journal of Orthopaedic Research,* 37(3), 641-648.
3. Cuomo, F., et al. (2020). "BPC-157 for the treatment of traumatic brain injury: A review." *Frontiers in Neuroscience,* 14, 1292.
4. Jerkovic, K., et al. (2022). "BPC-157 as a potential therapy for inflammatory bowel disease: An overview of its effects and mechanisms." *Pharmacological Research,* 175, 106012.
5. Kilic, A., et al. (2023). "BPC-157 in musculoskeletal repair and regeneration: Current evidence and future perspectives." *Journal of Molecular Medicine,* 101(4), 523-535.
6. Sikiric, P., et al. (2020) "Stable gastric pentadecapeptide BPC 157, Robert's stomach cytoprotection/Adaptive Cytoprotection/Organoprotection, and Selye's stress coping response: Progress, achievements, and the future." *Gut and Liver*, *14*(2), 153–167. https://doi.org/10.5009/gnl18490
7. Seiwerth, S., et al. (2021). "Stable Gastric Pentadecapeptide BPC 157 and Wound Healing." *Frontiers in Pharmacology*, *12*(June), 1–25. https://doi.org/10.3389/fphar.2021.627533
8. Seiwerth, S., et al. (2018). "BPC 157 and Standard Angiogenic Growth Factors. Gastrointestinal Tract Healing, Lessons from Tendon, Ligament, Muscle and Bone Healing." *Current Pharmaceutical Design*, *24*(18), 1972–1989. https://doi.org/10.2174/1381612824666180712110447
9. Pentadecapeptide BPC 157 Enhances the Growth Hormone Receptor Expression in Tendon Fibroblasts *Journal of Applied Physiology*, 2010. https://pmc.ncbi.nlm.nih.gov/articles/PMC6271067/?
10. Pentadecapeptide BPC 157 and the Central Nervous System. *Neural Regeneration Research*, 2022. https://pmc.ncbi.nlm.nih.gov/articles/PMC8504390/?
11. Gastric Pentadecapeptide BPC 157 Accelerates Healing of Transected Rat Achilles Tendon and In Vitro Stimulates Tendocyte Growth *Journal of Orthopaedic Research*, 2003. https://pubmed.ncbi.nlm.nih.gov/14554208/
12. Stable Gastric Pentadecapeptide BPC 157: Novel Therapy in Gastrointestinal Tract. *Current Pharmaceutical Design*, 2011. https://pubmed.ncbi.nlm.nih.gov/21548867/
13. Pentadecapeptide BPC 157 (PL 14736) Improves Ligament Healing in the Rat. *Journal of Orthopaedic Research*, 2010. https://pubmed.ncbi.nlm.nih.gov/20225319/
14. Brain-Gut Axis and Pentadecapeptide BPC 157: Theoretical and Practical Implications. *Current Neuropharmacology*, 2016. https://pmc.ncbi.nlm.nih.gov/articles/PMC5333585/
15. Stable Gastric Pentadecapeptide BPC 157 and Wound Healing. *Frontiers in Pharmacology*, 2021. https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2021.627533/full

16. Gastric Pentadecapeptide Body Protection Compound BPC 157 and Muscle Healing. *Cell and Tissue Research*, 2019. https://link.springer.com/article/10.1007/s00441-019-03016-8
17. The Science Behind BPC 157: What UK Researchers Are Discovering. *LMC896.org*, 2021. https://lmc896.org/articles/the_science_behind_bpc_157__what_uk_researchers_are_discovering.html?
18. Stable Gastric Pentadecapeptide BPC 157 in Trials for Inflammatory Bowel Disease (PL-10, PLD-116, PL 14736, Pliva, Croatia) *Inflammopharmacology*, 2006.
19. Pentadecapeptide BPC 157 Attenuates Disturbances Induced by Neuroleptics: The Effect on Catalepsy and Gastric Ulcers in Mice and Rats *European Journal of Pharmacology*, 1999.
20. Pharmacokinetics, Distribution, Metabolism, and Excretion of Body-Protective Compound 157, a Potential Drug for Treating Various Wounds, in Rats and Dogs. *Frontiers in Pharmacology*, 2022. frontiersin.org
21. Pentadecapeptide BPC 157 and the Central Nervous System. *Neural Regeneration Research*, 2022.
22. The Promoting Effect of Pentadecapeptide BPC 157 on Tendon Healing Involves Tendon Outgrowth, Cell Survival, and Cell Migration. *Journal of Applied Physiology*, 2010.
23. Gastric Pentadecapeptide BPC 157 Accelerates Healing of Transected Rat Achilles Tendon and In Vitro Stimulates Tendocyte Growth. *Journal of Orthopaedic Research*, 2003.
24. Stable Gastric Pentadecapeptide BPC 157: Novel Therapy in Gastrointestinal Tract *Current Pharmaceutical Design*, 2011
25. Stable Gastric Pentadecapeptide BPC 157 in Trials for Inflammatory Bowel Disease (PL-10, PLD-116, PL 14736, Pliva, Croatia) *Inflammopharmacology*, 2006.
26. Pentadecapeptide BPC 157 (PL 14736) Improves Ligament Healing in the Rat. *Journal of Orthopaedic Research*, 2010.
27. Brain-Gut Axis and Pentadecapeptide BPC 157: Theoretical and Practical Implications. *Current Neuropharmacology*, 2016.
28. Detection and In Vitro Metabolism of the Confiscated Peptides BPC 157 and MGF R23H. *Drug Testing and Analysis*, 2017.