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Peptide Therapy

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What are peptides?

Introduction

There are many ways to heal the body. Modern medicine is one of the greatest innovations of all time, but it is important to also understand that there are also many alternative therapies available. The human body contains peptides, which are chains of amino acids that make up proteins, however, they can also be made artificially (Sunna, Care, & Bergquist, 2017). The idea of taking a component already found in the body and enhancing it is the idea behind using peptide therapy. Peptides can be used for so many different ailments and have the ability to help everyone in one way or another. Although there is a lack of knowledge on the subject matter, peptides are more commonly used than most would expect. Since peptides make up proteins, it is important to note that the first protein that was created for medicinal use was insulin (Usmani et al., 2017). The pathophysiology behind the idea of peptides is in depth, but also proves the bioavailability of the therapy. Medications can have so many side effects with the never-ending lists frightening to many consumers. Peptides offer a more natural approach to healing that provides many benefits. The purpose of this study will be focusing on two peptides and the many valuable capabilities they possess. Several studies regarding the effects of the following peptides were utilized to further explain the benefits of peptide therapy.

- ❖ **Thymosin Beta 4 (Tβ4)**
- ❖ **Body Protective Compound (BPC) 157**

There are many common medications that have been around for a long time and many people would be surprised to know that they are actually peptides (See Table 1). There is a long way to go before peptides are more widely used, but there are around 150 being tested for use and 60 that are already approved for use (Lau & Dunn, 2018).

Reason for Choosing Topic

- Personal association with person who suffered from a dog bite who used peptide therapy successfully.
- Dog bite created a large facial laceration that required facial and eye surgery.
- Healing was greatly improved with the use of injectable peptides Tβ4 and BPC 157.
- Alleviated the need for a skin graft that was recommended by surgeon.
- Personal association with person who had vitamin deficiencies due to abdominal malabsorption.
- Vitamin deficiencies were corrected with the use of injectable BPC 157 along with an elimination diet.
- Symptoms such as hair loss, skin disturbances, and fatigue were alleviated with this treatment.

Signs & Symptoms

Indications for peptide therapy are vast. Healing is required for all disease processes; therefore, the usage could be widely appreciated. Possible ailments that cause varying degrees of signs and symptoms could benefit from the usage of peptides. A few examples include:

- Wounds
- Peptic ulcers
- Fractures
- Muscle injuries
- Cancers
- Autoimmune diseases
- Cardiac injuries
- Anti-aging treatments

Presentation of Case

Background

- The case presented explains that both personal associations used peptide therapy to enhance healing which resulted in positive results.
- Further research was completed to investigate how the use of peptides could be beneficial for multiple aspects of healing.
- The ability to heal the body by introducing natural components expedited the healing process.
- This shows that there is an underlying pathophysiology that starts at a cellular level.
- Many studies were examined studying the usage of peptides for different ailments.

Study 1

- The purpose of this study was to research the effects of Tβ4 injections on the process of healing in bone fractures.
- The data was obtained by studying mice with fractures by comparing a control group and a treated group.
- The conclusion of this study implied that the use of Tβ4 does have the potential to promote the formation of bone and reduce the risk of deformed calluses.
- (Brady et al., 2015)

Study 2

- The purpose of this study was to research a peptide derived from stomach acid known as BPC 157.
- The peptide was tested for its effects on tendon fibroblasts from the Achilles tendon of rats using culture plates and microarray analysis.
- The peptide was tested in different levels and with the addition of growth hormone on some subjects.
- The conclusions were in agreement with previous studies that showed the peptide to promote healing in animals' tissue, bone, skin, and muscle.
- The use of the BPC 157 naturally increased the growth hormone and would be a cost-effective alternative to using growth hormone.
- (Chang, Tsai, Hsu, & Su Pang, 2014)

Study 3

- The purpose of this study was to examine the effects of BPC 157 on musculoskeletal injuries via intraperitoneal and topical administration.
- This study was done on small rodents with a variety of different tendon, ligament, and skeletal muscle injuries.
- The conclusion showed positive results for soft tissue injuries with the use of this peptide in recovery models.
- (Gwyer, Wrapp, & Wilson, 2019)

Study 4

- The purpose of this study was to test the topical use of BPC 157 on burn victims.
- The study was completed with the use of anesthetized alkali-burned rats.
- The conclusion of this study showed that the peptide accelerated wound closure.
- On day 18, the treated rats had 80% closure while the untreated group only 60%.
- These results were positively correlated with a previous study done on rats burned by open fire.
- (Huang et al., 2015)

Study 5

- The purpose of this study was to examine the many uses of Thymosin, including Tβ4.
- Research was completed on the many uses of this peptide, including angiogenesis, wound healing, and inflammation.
- Data was compiled on a variety of subjects including mice, dogs, and even humans.
- Conclusions displayed positive results that included inhibiting ischemia and atherosclerosis and also cancer growth.
- Discussion of future studies using this peptide for cardiac disease are in progress with the hypothesis of positive effects for all types of injuries.
- (Kuzan, 2016)

Pathophysiology

Underlying

- The human body contains over 100 peptides.
- Peptides are the reason for many biochemical processes. (See Figure 1)
- Peptides influence communication between cells and receptors.
- Involved processes:
 - Metabolism
 - Pain
 - Reproduction
 - Immune response
- Peptides are simply oligomers or polymers of amino acids.
- They are connected by peptide bonds between amino acids.
- A peptide is a protein when it contains over 100 amino acids.
- Peptides and proteins = encoded biochemicals.
- Highly specific functions are decided through genetics.
- (Sewald & Jakubke, 2015)

Significance

- Understanding peptides in the body has led to the creation of artificial peptides that mimic these effects.
- Synthetic peptides can be used as:
 - Antigens to raise antibodies
 - Enzyme substrates
 - Enzyme inhibitors
- Due to limited availability of human resources, the use of artificial peptides is needed, especially in the presence of disease.
- Peptide drugs can be developed by understanding the design of any naturally occurring peptide structure or sequence.
- Example of a breakthrough peptide for human immunodeficiency virus (HIV): 36-peptide enfuvirtide (T20 or Fuzeon) has ability to block the virus from moving into blood cells.
- (Sewald & Jakubke, 2015)

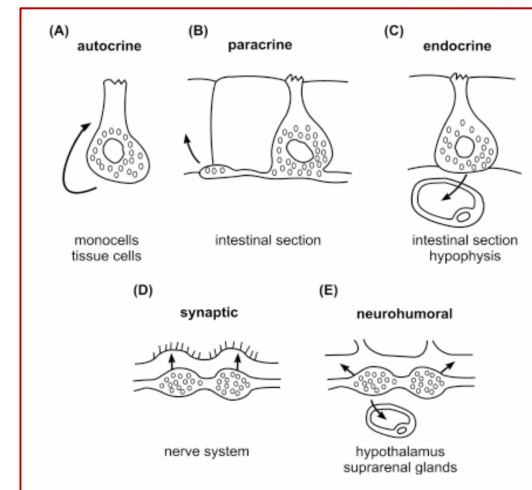
Implications for Nursing Care

Alternative medicine is important for all medical professionals. Peptides are considered drugs and must be prescribed. Therefore, nurse practitioners and doctors can benefit from considering the usage of peptides alongside traditional medicine to help promote healing. The understanding and continued research on the subject will continue throughout the years and staying up-to-date on the best treatment options will only help enhance patient outcomes. For example, Tβ4 has many properties beneficial for inflammation, tissue remodeling, angiogenesis, wound healing, and repair (Janarthini, Wang, Chen, Gao, & Zhao, 2016). Nursing implications include being a patient advocate because this type of approach to medicine is not as widely known and many patients may not be aware of these alternatives.

Conclusion

There are still many avenues that need to be explored in regard to the use of peptides. The need for traditional therapies will always continue, but the use of combination therapy could be a beneficial step. When considering how many patients suffer from chronic wounds and have difficulty healing due to comorbidities, the use of peptides could be a very interesting option to consider. Studies that have been completed have only shown positive results, therefore, there is definitely a place for peptide therapy. This could possibly be the future of medicine and with continued research may end up becoming a more popular option in the world of traditional medicine.

Figure 1. Biochemical communication exerted by peptides (Sewald & Jakubke, 2015)



References



Table 1. Source or chemical nature of early peptides (Lau & Dunn, 2018)

Peptide	Source	Introduction to the clinic	Sequence description
Insulin	Isolated from canine and bovine pancreata	1920s	Native
Adrenocorticotrophic hormone (ACTH)	Isolated from bovine and porcine pituitary glands	1950s	Native
Calcitonin	Isolated from salmon ultimobranchial gland	1971	Native
Oxytocin	Synthetic	1962	Native
Vasopressin	Synthetic	1962	Native
Octreotide	Synthetic analog of somatostatin	1988	Cyclic octapeptide analog of somatostatin-14
Leuporelin	Synthetic analog of gonadorelin	1984	Nonapeptide analog of decapeptide gonadorelin