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Brief Note

Peptide Therapy Update

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Abstract

Peptides are short chains of amino acids which are versatile and specific. Their specificity, ability to mimic natural functions, and reduced side effects compared to traditional drugs make them attractive for treating various diseases. Already, 15 peptide drugs have been approved by the FDA, with hundreds more in clinical trials for applications like cancer, autoimmune disorders, and infections. Peptides can have a few drawbacks which can include: the delivery of the peptides, which increases the cost, and further reducing the accessibility of the treatment. However, the future is promising as personalized peptides can be created which are made from specific genetic profiles, being able to be synergized with conventional drugs to enhance effects, and utilizing advanced deliver systems which can release controlled and targeted peptides. This review highlights the versatility of peptides, exploring their mechanisms and current roles in diverse medical fields.

Keywords: Peptides; Cancer; Autoimmune diseases; Neurological diseases; Human growth hormone.

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Introduction

Peptides are short chains of amino acids which are versatile and specific [1]. In our bodies there are 7000 identified natural peptides which complete roles including neurotransmission and immunity [2]. Between 2015 – 2019 alone there were 15 peptide drugs approved by the FDA, which is 7% of the total drugs approved [3]. Clinical trials of 400+ peptide drugs are undergoing with applications which include applications for cancer, auto-immune disorders, infections, and many others. In 2019, the global market for peptides exceeds $70+ billion and is projected to grow to $95 billion by 2028 [4]. Peptides can target specific proteins and receptors, reducing side effects compared to other drugs [1]. They can also mimic natural biological functions, being attractive for hormone replacement and immune modulation [1].

Uses of peptide therapy

Peptides are currently used in cancer by targeting tumor-specific markers, delivering payloads, and modulating immune response.

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This can be attributed to the advantages of peptides including deep tissue penetration, efficient internalization into cells, lower immunogenicity and toxicity to the bone marrow and liver, and easy modification using chemicals compared to antibodies [5]. In autoimmune diseases they regulate inflammation, restore immune tolerance, and prevent tissue damage [6]. This is completed inducing and directing regulatory cells of the immune system to their required destinations. In neurological diseases peptides target neurotransmitters, promote nerve regeneration, and treat neurodegenerative diseases [7]. In antimicrobial therapy they develop novel antibiotics with reduced resistance and higher specificity [8]. HGH peptides are a prime example that can be used for to increase growth hormones, especially individuals with growth hormone deficiency [9]. HGH also has an anabolic effect on muscle growth, hence being banned in sports due to the advantage it may give to competitors [10]. However, growth hormones have potential within the age management/anti-aging area [11], hence possibly using HGH peptides as an anti-aging procedure.

Conclusion

Peptide therapy can be seen as an alternative to current medicines such as antibiotics as the nature of current diseases consist of antibiotic-resistant strands [12]. However, there are some drawbacks with peptides. Stability is a current issue where natural peptides can degrade quickly in the body [13]. The delivery of the peptides can be tricky, where a vehicle such as a nanocarrier needs to be used [14]. This can increase the cost of the peptides, where it can be expensive hence reducing accessibility to everyone. But the future of peptides can be promising as it can create personalized medicines for patients using their genetic profiles adding to its specificity [1]. Due to its specificity, peptide therapy could be paired with conventional drugs for effects that can synergize together [15]. Then advanced delivery systems can be utilized for controlled and targeted release [16].

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