# Peptides: The tiny powerhouses of biochemistry.

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Combining natural α-amino acid residues and unnatural β-amino acid residues in a single chain leads to heterogeneous-backbone oligomers called α/β-peptides. Despite their unnatural backbones, α/β-peptides can manifest a variety of folding patterns and biological functions reminiscent of natural peptides and proteins. Moreover, incorporation of β-residues can impart useful properties to the oligomer such as improved stability to degradation by protease enzymes. α/β-Peptides have been developed that engage diverse biological targets, including proteins involved in apoptotic signaling, HIV-cell fusion, hormone signaling, and angiogenesis. For some systems, promising results obtained in vitro have paved the way for demonstrated activity in vivo, where α/β-peptides show equal potency and improved duration of effect compared to α-peptide counterparts [1].

Peptides, small chains of amino acids, are the unsung heroes of the biological world. They play a crucial role in numerous biological functions, acting as the building blocks of proteins, and serving as signaling molecules that regulate bodily functions. Peptides are formed when two or more amino acids link together in a chain. This linkage occurs through a process called peptide bond formation, which involves a reaction between the amino group of one amino acid and the carboxyl group of another. The result is a peptide bond, and the resulting chain of amino acids is a peptide [2].

The length of a peptide chain can vary. Short chains of just two amino acids are called dipeptides, while chains of three are tripeptides. Longer chains, with up to fifty amino acids, are simply referred to as peptides. When a chain extends beyond fifty amino acids, it is typically referred to as a protein. Peptides are integral to life as we know it. They form the structure of proteins, which are essential to every cell in our bodies. Proteins carry out a vast array of functions, from catalyzing metabolic reactions to DNA replication. Without peptides, these proteins could not exist [3].

Beyond their role in protein formation, peptides also function as signaling molecules. They can bind to receptors on the surface of cells and trigger specific responses. This is how many hormones work. For example, insulin is a peptide hormone that regulates glucose levels in the blood. When insulin binds to its receptor on a cell, it triggers the cell to take in glucose, reducing blood sugar levels. Peptides also have significant potential in therapeutics. Due to their small size and specific actions, peptides can be designed to target specific cellular pathways, making them attractive candidates for drug development. For instance, some cancer treatments are being developed based on peptide therapeutics, aiming to target cancer cells specifically without harming healthy cells [4].

In recent years, peptides have also found their way into skincare products. Certain peptides are believed to stimulate collagen production in the skin, promoting skin health and potentially reducing the signs of aging. Despite their small size, peptides have a big impact. They are fundamental to life, playing a role in everything from our metabolism to our immune response. As we continue to learn more about these tiny powerhouses, we can expect to see even more applications for peptides in medicine, skincare, and beyond. Peptides, though often overlooked, are integral to many biological processes. They form the backbone of proteins, regulate bodily functions, and hold promise for future therapeutic applications. As our understanding of peptides continues to grow, so too will their potential for improving human health and wellbeing [5].

## References

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