Biochemistry

Peptide Chemistry & Design

Peptides: Improving Drug Half-Life & Targeting

The usefulness of any therapeutic is significantly influenced by its half-life and ability to be targeted to the correct tissue. Additionally, many potentially therapeutically-useful compounds have limited clinical utility because of their high hydrophobic character.

David Coy leverages his labs extensive expertise in peptide chemistry to improve drug half-life and target therapeutics to areas of inflammation while simultaneously making therapeutic compounds more hydrophilic and thus more bioavailable.

Building on early scientific and commercial successes with radiolabeling and somatostatin-conjugated molecules, the lab has shifted to focus on Human Serum Albumin (HSA) as a carrier molecule for assorted clinically-useful payloads.

HSA-Conjugated Therapeutics

HSA has an incredibly long half-life within the body, on the order of weeks (*vs*. the hours that potentially useful peptide drugs can last). Additionally, it is known to preferentially accumulate in areas that have vascular leakiness or are inflamed.

These two properties make it an attractive carrier molecule, furthering the Coy lab's efforts to broaden the utility of potentially potent anti-inflammatory molecules with shorter half-lives. By leveraging their high level of expertise in peptide chemistry, the lab has been able to design and create a variety of HAS conjugates that 1) have an extended *in vivo* half-life, 2) preferentially accumulate in inflamed tissues, and 3) can improve the hydrophilic profile of useful cargo molecules.

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HSA-Conjugated Therapeutics (continued)

These HSA conjugates have a wide array of potential clinical applications, notably in the area of rheumatoid arthritis. In particular, the HAS-tacrolimus conjugates hold special promise for treating this disease, as only 40% of RA cases respond to biologic/antibody-based treatments.

By conjugating the broadly-effective but poorly bioavailable tacromilus to HSA, the lab significantly improved its potential clinical utility. This is but one example of the utility of using peptide chemistry to tether treatments to HAS, and the Coy lab is exploring additional opportunities in pain and inflammatory diseases, among other potential applications.

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