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Phosphate Esters of Human Calcitonin

A modified prodrug form of human calcitonin provides a stable, more potent, and less toxic therapeutic option for osteoporosis and hypercalcemia treatment, overcoming the limitations of current salmon calcitonin treatments.

Researchers at Purdue University have developed a prodrug form of the peptide hormone, human calcitonin, to increase its effectiveness as an osteoporosis treatment. In humans, calcitonin is the hormone responsible for normal calcium homeostasis. When prescribed to osteoporosis patients, calcitonin inhibits bone resorption resulting in increased bone mass. Unfortunately, human calcitonin undergoes fibrillation in aqueous solution leading to reduced efficacy when used as a therapeutic. As a substitute, osteoporosis patients are prescribed salmon calcitonin which does not fibrillate as rapidly but suffers from low potency and immunotoxicity. To decrease the fibrillation propensity and increase the therapeutic benefit of human calcitonin, Purdue researchers phosphorylated specific amino acid residues. This modification's ability to inhibit fibril formation was validated in comparison to the unphosphorylated calcitonin through thioflavin T-fluorescence, hydrogen-deuterium exchange mass spectrometry, and circular dichroism. This prodrug approach will increase the therapeutic potential of human calcitonin, promising a more effective option to replace salmon calcitonin for osteoporosis and related disorders.

Advantages:

-Stable solution of human calcitonin

-Higher potency than salmon calcitonin

-Less toxicity than salmon calcitonin

Potential Applications:

-Drug Development

-Osteoporosis Treatment

-Hypercalcemia Treatment

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Category

Pharmaceuticals/Drug Delivery & Formulations

Pharmaceuticals/Other

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