Synthetic parathyroid hormone analogues as a potential osteoporosis treatment

Technology #cu13330

Osteoporosis, a disease characterized by a loss in bone mass and strength, affects more than half of Americans over the age of 50. Most osteoporosis treatments prevent bone loss but do not promote bone growth. Synthetic parathyroid hormones (PTH) show promise as an osteoporosis treatment that increases bone mass, but can also promote bone resorption. The only currently FDA-approved drug based on PTH – Forteo or PTH (1-34) – requires twice daily injections and loses efficacy after two years. This technology is a series of truncated PTH analogues, as well as methods for evaluating their potential use as an osteoporosis treatment and for determining their efficacy in humans. These peptides include the first synthetic PTH-like peptides with a demonstrated lack of catabolic activity in vitro.

In vitro studies demonstrate potential of PTH analogues to promote bone formation without also promoting bone loss

Osteoblasts are the cells responsible for bone growth. Osteoclasts are macrophage cells responsible for the breakdown of bone, known as bone resorption. PTH (1-34), the PTH receptor agonist currently used to treat osteoporosis, increases both osteoblast and osteoclast formation. Some peptides described in this technology have been shown to increase bone formation in vivo, with similar efficacy to PTH (1-34). In vitro studies also demonstrate that, unlike PTH (1-34), these peptides do not promote osteoclast formation. They therefore have potential as a superior treatment for osteoporosis, or as a research tool for drug discovery.

PTH (2-34) and PTH (2-32) described by this technology has been demonstrated to increase bone mass in a murine model at similar efficacies to PTH (1-34). In vitro cell culture and enzyme assays show that these peptides do not promote osteoclast growth, and do not stimulate the B-arrestin/PTHR1 interaction responsible for osteoclastogenesis.
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Applications:

- Potential treatment for osteoporosis
- Potential treatment for other diseases characterized by bone loss
- Research tool for the study of osteoclast formation
- Research tool for discovery of pharmaceuticals to treat osteoporosis
- Potential tool for growth of artificial bones

Advantages:

- Can potentially promote bone growth without promoting bone resorption

Patent Information:

Patent Pending (WO/2015/057836)

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Related Publications:


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