Osteoporosis Treatment Uses Brain-Derived Serotonin

Technology #2269

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Bone Loss and Bone Regeneration Treatments Needed for Osteoporosis:
The effective treatment of diseases involving loss of bone mass (e.g. osteoporosis) comprises the prevention of continued loss of bone tissue and the restoration of lost bone mass. Existing drugs for preventing bone loss can cause side effects that discourage patient compliance or increase the risk of cancer and stroke. There are currently only a few expensive drugs that actively promote bone regeneration. There is therefore a need for bone loss treatments that are effective, affordable, and have fewer side effects or risks than existing treatments.

Brain-Derived Serotonin Improves Bone Tissue Regeneration:
This technology is a method of treating diseases associated with low bone mass by targeting serotonin production in the brain and/or gut. Serotonin is a neurotransmitter and hormone synthesized by neurons in the brain and by the duodenum. Brain-derived serotonin (BDS) has a different effect upon bone mass than that produced by the gut; while production of the former causes an increase in bone mass accrual, production of the latter inhibits the formation of new bone tissue. Bone mass accrual can be increased by activating the tryptophan hydroxylase 2 (TPH2) enzyme necessary to the production of BDS, providing an agonist of the HT2C receptor to which serotonin binds in the hypothalamus, reducing the production of serotonin in the gut, or blocking the HT1B receptors to which serotonin binds on osteoblasts (which are responsible for bone formation).

Applications:
– Can be used to reduce the loss of bone mass that characterizes osteopenia and osteoporosis.
– The serotonin mechanism targeted by the technology can also be exploited to treat conditions involving abnormally rapid production of bone tissue such as Paget’s disease by reducing the production or action of BDS and/or increasing serotonin production or action in the gut.

Advantages:
– Use of the technology to prevent bone loss may avoid the increased risk of cancer and stroke that attends estrogen hormone therapy and may avoid the gastric irritation that can be caused by oral bisphosphonates.


Licensing Status: Available for Licensing and Sponsored Research Support

Inventors

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