

Hormone therapy for combatting cognitive decline and other neuropathologies

Published date: Aug. 25, 2015

Technology description

Summary

Cognitive decline is one of the most debilitating symptoms of aging. As the size of the elderly population increases in the coming decades, there is a pressing need to develop therapies that slow or halt age-related neural atrophy. Current treatments for cognitive decline aim only to boost the function of remaining cell populations, but do not work to prevent neuronal loss. Osteocalcin is a hormone derived from osteoblasts (bone stem cells) that has been shown to influence a diverse range of bodily systems including glucose metabolism, reproduction, and, most recently, brain development and function. This technology utilizes osteocalcin to treat a number of brain disorders including age-related cognitive decline, as well as anxiety and depression.

Abundant bone-derived protein osteocalcin can cross the blood-brain barrier and stimulate neural activity

Osteocalcin is the most abundant non-collagenous protein found in mineralized bone matrix. It is comprised of 46-50 amino acid residues, including three gamma carboxylated glutamic acid residues, which aid in its ability to bind calcium. It has previously been suggested as a treatment for metabolic disorders and male infertility. Osteocalcin is capable of crossing the blood-brain barrier, as well as the placenta, and has also been shown to influence a number of neurological pathways. This technology aims to use osteocalcin to prevent neuronal apoptosis, and in doing so, preserve brain function.

Osteocalcin has been shown to treat depression and anxiety, improve memory, stimulate postnatal neurogenesis, and improve prenatal neural development in a mouse model.

Publications

Wei J, Karsenty G. "An overview of the metabolic functions of osteocalcin." Curr Osteoporos Rep. 2015 Jun;13(3):180-5.

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Karsenty G, Ferron M. "The contribution of bone to whole-organism physiology." Nature. 2012 Jan 18;481(7381):314-20.

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Application area

Treatment for anxiety and depression

Treatment for age-related cognitive decline

Treatment for improving memory

Treatment for developmentally-related neurological disorders including behavioral disorders and learning disabilities

Prevention of developmentally-related neurological disorders

Advantages

Prevents neural atrophy and neuron loss instead of only boosting function of remaining cell populations

Crosses blood-brain barrier

Crosses the placenta

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