Promoting Bone Formation by Enhancing Skeletal Angiogenesis with the SLIT/ROBO Pathway

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Technology description

Invention Summary

The inventors have disclosed a new approach for the treatment of bone loss, by targeting the SLIT/ROBO pathway for blood vessel formation in bones.

Technology Overview

Methods to promote bone formation are needed for a wide range of disorders, including osteoporosis, tumor induced bone destruction, spine fusion, integration of orthopedic hardware, inflammatory bowel disease, and glucocorticoid-induced bone loss. Osteoporosis alone is a disease affecting almost 200 million women worldwide, and leads to over 9 million fractures each year. The fractures are often debilitating, and at times fatal, killing as many women as breast cancer each year.

The inventors have disclosed a new approach that could be useful for treating bone fractures. Their technology involves the use of blood vessel-directed therapy for the treatment of bone loss, osteoporotic fractures and fragile bones. The inventors found that mice that were genetically engineered to lack an adaptor protein, called SHN3 (Schnurri-3) and are known to have high bone mass, also contained osteoblasts that secreted high levels of the axon guidance cue SLIT3 (slit guidance ligand 3) protein. Conversely, when mice were genetically altered to lack SLIT3, they exhibited low bone mass. When these mice were administered recombinant SLIT3, their osteoporosis was reversed and their fractures healed more strongly and quickly. SLIT3 was found to increase bone formation by acting indirectly as an angiogenic factor to promote the growth of a specific subtype of vascular endothelium.

Application area

This technology could provide much needed relief to osteoporosis patients, especially since current treatment options are not robust.

This invention could also help patients with bone injuries that do not heal properly, such as those who have undergone orthopedic surgery, have diabetes or are smokers, or have fragile bones due to genetic disorders.

Institution

Cornell University

Inventors

Matthew Greenblatt
Laurie Glimcher
Ren Xu