Gene Therapy to Enhance Bone Density and Bone Formation

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Technology description

Inventions:
Adenoviral vectors encoding two growth factors (VEGF and at least one other osteogenic protein)
A method to promote bone growth or bone density by administering two growth factors (VEGF and at least one other osteogenic gene) either directly to the patient, or to material that is subsequently administered to the patient
Investigators at Weill Cornell Medical College and Hospital for Special Surgery have cooperated to develop novel approaches to facilitate bone growth and increase bone density. The Weill Cornell investigators have expertise in all aspects of developing, producing, and administering gene therapy; the HSS investigators brought their orthopedic clinical and biological prowess to the project.
They have very promisingin vivoexperimental results using VEGF alone; the additional osteogenic proteins that can be used in the invention are any of the following: latent TGF binding protein, latent membrane protein-1, a heparin-binding neurotrophic factor, a parathyroid hormone, a growth factor receptor, a LIM mineralization protein, a hedgehog protein, and midkine.
Bone grafts can be used to heal difficult fractures and to help overcome defects that patients are born with, or that develop with time. For example, an estimated half-million people undergo spinal-fusion procedures to repair and stabilize damaged discs, and to correct conditions like scoliosis, a curvature of the spine. Infuse Bone Graft, a product containing a different growth factor, has become a best seller for Medtronic; the product was estimated to have had sales of about $815 million in the year ending in April 2008.

Institution

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