OAK RIDGE NATIONAL LABORATORY
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Silicon Antioxidants in Bone Healing

Disclosure Number

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Technology Summary

This disclosure describes the use of novel Silicon-based antioxidants for aiding in the repair and regeneration of bone. Bone injuries are problematic to heal because they heal in three steps. First there is an early inflammatory stage, then a repair stage, then a remodeling stage. These stages overlap and are affected by several factors. Of primary concern in this disclosure are the inflammatory stage and the concomitant need for structural support. The inflammation after a bone injury is accompanied by an increase in highly reactive oxygen species (ROS). ROS inhibit the healing process by damaging osteoblasts and affecting collagen synthesis. Inadequate structural support for bone healing results in continued inflammation and thus continued presence of ROS. This disclosure uses Silicon as an antioxidant to react with the ROS and nullify their effect. In addition, the Silicon can be placed on titanium structural supports that are currently used in bone healing, but do not have any effect on ROS. The invention is of great interest based on its potential to be incorporated into current treatment methods, and the clear benefits that such a treatment could provide to patients with bone loss.

Inventor

LAVRIK, NICKOLAY V

Center for Nanophase Matls Sciences

Licensing Contact

SIMS, DAVID L
UT-Battelle, LLC
Oak Ridge National Laboratory
Rm 124C, Bldg 4500N, 6196
1 Bethel Valley Road
Oak Ridge, TN 37831

Office Phone: (865) 241-3808
E-mail: SIMSDL@ORNL.GOV