UNIVERSITY OF TEXAS ARLINGTON | OFFICE OF TECHNOLOGY MANAGEMENT

Silicon-based Thin films as Antioxidants for Use in Bone Healing

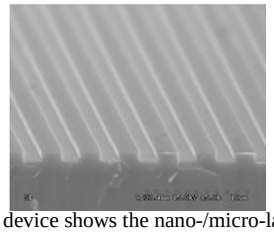
(UTA 14-30)

Technology Need:

The healing of bone injuries requires three overlapping stages: i) the early inflammatory stage, ii) the repair stage, and iii) remodeling stage. The inflammatory stage and the concomitant need for structural support are of primary concern. Inflammation after a bone injury is accompanied by an increase in highly reactive oxygen species (ROS) which inhibit the healing process by damaging osteoblasts and affecting collagen synthesis. Inadequate structural support for the bone results in continued inflammation and thus continued presence of ROS. Studies show that antioxidant expression, osteogenic transcription, collagen matrix synthesis and structural support are central to combatting inflammation and forming strong bone. Therefore, there is a clinical need for novel biomedical device materials that provide these vital mechanisms for rapid bone regeneration.

Solution/ Offering:

In a collaborative effort, researchers at UT Arlington, Texas A&M University and Oak Ridge National Laboratory have developed novel silicon-based thin films that act as antioxidants, combatting inflammation and aiding in bone repair and regeneration. The thin films also react with the ROS and nullify their effect. Additionally, the thin films can be placed on titanium structural supports that are currently used in bone healing, but do not have any effect on ROS, to provide dual antioxidant and structural support for rapid bone regeneration and fracture healing.



The fabricated device shows the nano-/micro-layers that will deliver the antimicrobial agents.

Value Proposition:

- ✓ Provides antioxidant and structural properties for bone regeneration
- ✓ Incorporation into existing medical implants

Industrial application:

- ✓ Orthopedics
- ✓ Dental

Patent Status:

- ✓ Provisional

Current Stage:

- ✓ Lab Tested

Meet the Inventor

Dr. Pranesh Aswath is an Associate Dean at the UTA College of Engineering. Dr. Aswath has over twenty five years of experience in the area of processing of advanced materials that include monolithic and composite materials. In addition he has over 20 years of experience in the area of deformation, fatigue and fracture of specialty engineering materials. His work in the area of synthesis of materials involves the design of new materials using fundamental concepts in chemistry, thermodynamics and material science.

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