

Researcher develops new coating to help bone implants last

September 20 2012

(Medical Xpress)—Two Colorado State University professors have developed a nanostructured surface coating for bone that is expected to help improve the lifetime of bone implants.

The research, if proven, could someday help someone replace injured or diseased bone segments without losing a limb.

Matt Kipper, associate professor of chemical and biological engineering and biomedical engineering, has received a three-year, \$300,000 grant from the Musculoskeletal Transplant Foundation to take his discovery to the next level and test it using bone allografts. Allografts are bones that are donated through tissue banks and used to replace large segments of missing bone following massive limb trauma or tumor surgery. Kipper, who is in the College of Engineering, will work with Dr. Nicole Ehrhart in the Animal Cancer Center, part of the College of Veterinary Medicine and Biomedical Sciences, on the research.

"These types of implants have a high incidence of failure, related to healing where that implant was put in. Sometimes failures occur years after the implant procedure," Kipper said.

Kipper developed a tiny or nanostructured material that can coat a large, dead piece of bone like a femur [thigh bone](#). His new coating stabilizes important proteins that drive bone [cell differentiation](#) and cell activities associated with the creation of new healthy bone. He uses [adult stem cells](#) derived from bone marrow or fat to help healthy cells grow in the

place of [dead cells](#) in existing bone implants.

"We control the structure of these coatings at the molecular scale," Kipper said, noting that scientists must use a special microscope to study nanoscale features that are smaller than [wavelengths of light](#). "We've proven this by growing cells on other types of surfaces – glass, titanium and plastic. "Now we're translating those materials to bone.

"I couldn't do this if I weren't at an institution that had a top research veterinary school."

Ehrhart is a professor in [Surgical Oncology](#) and a specialist in cancer surgery at Colorado State's Animal Cancer Center. She developed a method to perform limb salvage surgeries in small animals using bone allografts and is working with Kipper to test the healing of coated bones versus noncoated bones. Together they hope to demonstrate that they can safely stabilize the proteins they want and cause stem cells to grow. This research will benefit both humans and animals at risk for losing a limb due to massive bone trauma or bone cancer.

Provided by Colorado State University

Citation: Researcher develops new coating to help bone implants last (2012, September 20) retrieved 24 April 2024 from <https://medicalxpress.com/news/2012-09-coating-bone-implants.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--