Scientists regrow section of bone

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Scientist Paul Wooley has regrown a section of bone in a mammal's leg, a breakthrough he and collaborators say will revolutionize bone medicine worldwide. It will dramatically improve treatment for wounded soldiers and many of the tens of thousands of people seriously injured in traffic accidents every year, he said; it could make many future amputations unnecessary.

"We've grown bone, and we can prove it," Wooley said on Monday.

The breakthrough will also become the first new invention planned as part of an effort by Wichita scientists to create an industry worth millions, and thousands of research and manufacturing jobs in Wichita and Kansas.

The news comes after a year of operation by the Center of Innovation for Biomaterials in Orthopaedic Research, or CIBOR. Wooley, the center's chief scientist, and other scientists at CIBOR say the bone growing project is only the first big breakthrough of many. He says they are within weeks of signing a number of important contracts with businesses and with customers.

Among their targets, for the many inventions Wooley plans to make, are certain markets the CIBOR scientists say they have researched: composite medical battlefield stretchers ($1.17 billion annual market); operating tables made from composites ($625 million annual market); surgical instruments made of composites ($1.1 billion); and "fracture fixation devices," which hold broken bones in place ($2.3 billion).

They hope to make medical devices, including artificial hips, from composite materials used in the aviation industry.

The big first breakthrough, Wooley said, involved cutting a centimeter-wide section out of a research rat's femur (the upper leg bone).

"We cut a centimeter instead of an inch because all our rats are on the metric system," Wooley said.

Wooley's team inserted a rod to hold the separated pieces together, then wrapped the rod in a porous scaffolding of composite material suggested to them by a local composites manufacturer affiliated with the aviation industry in Wichita.

Wooley's theory, as an expert in orthopedics, microbiology and immunology, was that bone and blood vessels would grow and creep through the matrix and rejoin the severed sections, without being rejected by the rat's body. Wooley in the past has likened this to what some lizards do when they regrow their tails after the tails are torn off by predators.

Something like this project had been mentioned as theory, and had been the subject of some experiments by others.

But it had never been done successfully with aviation composites, Wooley said.

Until now.

In only six weeks, bone and even blood vessels grew through the matrix of material and reconnected the two separated cuts, Wooley said.

"This is a major step forward in growing new tissue in bone voids, and the results are seriously surprising," he said.

Wooley believes the medical profession and government regulators will fast-track testing of this work, in part because he said it will prevent many future amputations. If all goes well, he estimated he could take this project from the research lab to clinical development in as soon as two years.

It could create a medical practice worth millions in annual revenue, he said.

It has big potential to bring relief and better

treatment to tens of thousands of people who now lose limbs, or sections of their skulls, to such afflictions as traffic accidents, bombs and bullets in war, shotgun wounds in domestic shootings, and cancer or other traumas to the head that require removal of sections of skull.

For his purposes, Wooley said, it will likely provide much more access to grant money to continue and speed his work.

Wooley and collaborators in CIBOR said none of this would have been possible this soon without the big grant they got from the Kansas Bioscience Authority, a state government entity created by the Legislature several years ago to invest in and foster practical scientific innovation in the state.

The KBA has so far given them about $3.24 million to buy equipment, create labs and hire staff. The KBA did this at a time when the state government has been cutting tens of millions from schools, roads and other works, to make up for deficits caused by the weakened economy.

"We would not be here as big as we are were it not for the KBA," said Michael Good, chief financial officer for CIBOR.

CIBOR has tried to pay back the state by producing more than mere academic theories, Wooley said.

"We are actually out to make things," he said. "And we are out to prove that Kansas is now where you come to do your science."