Subject: Acell/Dr. Jones
Posted by tryout on Tue, 02 Sep 2008 19:18:03 GMT
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Aloha,
wie einige von Euch sicher wissen, hat Dr. Jones (Toronto) einige Testkandidaten gesucht, um den Acell-Puder in HT-Narben zu testen. Ich verstehe zwar nach wie vor nicht ganz, wie das Zeug funktionieren soll, aber im Wall Street Journal habe ich einen interessanten Text zu dem Thema gefunden. Acells Wunderwaffe scheint ja in der Tat wahre Wunder zu wirken. Gerade das Militär ist interessiert daran, es wirken zu sehen. Macht Euch selbst ein Bild. Und wenn mir dann jemand erklären könnte, wie genau das Mittel wirken soll...

Doctors Try New Techniques To Regrow Human Tissue MATRIX RELOADED Researchers Plan Test On Iraq War Wounded; A Model-Plane Mishap RON WINSLOW

Five soldiers at a military base in Texas are about to participate in a remarkable test to see if they can regrow portions of fingers they lost in the war in Iraq.

Doctors plan to treat them with a fine powder called extracellular matrix, harvested from pig bladders. The material, found in all animals, is the scaffolding that cells latch onto as they divide and grow into tissue and body parts. In the human body, it was long thought to be inert. But scientists have discovered that it appears to activate latent biological processes that spur healing and regenerate tissue.

Medical re searchers have been making intriguing progress in the field of regenerative medicine. The pilot test in Texas shows how doctors are trying to apply their recent discoveries to a pressing challenge: helping thousands of Americans returning from Iraq to recover from wounds that would have killed soldiers a generation ago.

Scientists have long been enthralled by the ability of animals such as salamanders, starfish and deer to regrow body parts lost due to injury or other causes. Cut off a salamander's leg and a new one grows back within weeks. A deer sheds its antlers annually, then regenerates another setadding a new "point" each year.

But in humans and most other complex life forms, healing is primarily about survival, not regeneration. Serious wounds produce scar tissue, which besides being unsightly, doesn't function as well as normal tissue.

In the womb, though, humans have a remarkable ability to develop and grow new parts-and to recover from injury or fetal surgery. A prevailing theory is that this ability begins to wane in humans about 16 weeks into gestation, when the immune system and its infection-fighting apparatus kick in, and that it eventually goes dormant after birth. Advances in stem-cell research, genetics and tissue engineering are convincing scientists that it may be possible to reignite this capacity.

"Fetuses can regenerate just about everything," says Stephen Badylak, a researcher at University of Pittsburgh's McGowan Institute for Regenerative Medicine. "If those signals are there, how can we turn them back on?"

Importance of Matrix

Extracellular matrix, which scientists say harbors signaling molecules that help direct the development of cells into tissue, may hold part of the answer. In the 1980s, while working as a researcher at Purdue University, Dr. Badylak stumbled onto the importance of matrix during an experiment in which he used a portion of a dog's intestine to fashion a makeshift aorta for its heart. Not only was the dog's tail wagging the morning after the surgery, but months later, an examination revealed that the transplanted intestine part had morphed into a vessel that looked much like an aorta. Somehow, it had sensed where it was in the body and had remodeled itself to take on the structural traits of an aorta. There was hardly any scarring.

"We've been spending the last 20 years trying to understand how that happened," Dr. Badylak says.

The quest led initially to a layer of intestinal lining called the submucosa, a form of extracellular matrix. Dr. Badylak's team found that extracting the submucosa from the intestine and putting patches of it at injury sites triggered a novel healing response: As the implanted matrix material broke down, healthy living tissue, not scar tissue, repaired the damage. Matrix from bladders, liver and other organs induced a similar reaction.

"When cells die, they release their contents [into surrounding tissue], and the body responds with inflammation and scar tissue," Dr. Badylak explains. By contrast, as matrix degrades, it "instructs cells to divide, migrate and organize, the way they do in a developing fetus." In the process, stem cells move to the site of the injury-the same type of cells responsible for structural development of the fetus; the inflammatory response retreats.

The research revealed an added benefit: Wounds healed with the help of matrix almost never got infected. And instead of rejecting matrix as foreign, the immune systems of animals accommodated the treatment-a phenomenon Dr. Badylak attributes to the lack of cells in the material.

The work has resulted in some 100 peer-reviewed journal articles and more than 40 patents in which Dr. Badylak is a primary or co-inventor. Most of the patents are held by Purdue. In the early 19905, DePuy Inc., now a unit of Johnson & Johnson, licensed the technology from Purdue for orthopedic uses. In 1999, a Stanford University surgeon implanted the first matrix patch in a patient-to help repair a torn rotator cuff in the shoulder.

The material, considered a medical device by the Food and Drug Administration, is now commonly used in rotator-cuff procedures and Achilles-tendon repairs. Other orthopedic-products companies have developed similar technology that they market as an alternative or adjunct to conventional orthopedic procedures.

In 1995, closely held Cook Group Inc. of Bloomington, Ind., formed a biotech unit to pursue other uses of intestinal matrix. Using licenses under Dr. Badylak's patents, the unit now markets more

than 100 products to treat problems ranging from urinary incontinence to chronic wounds. To repair hernias, for example, patches of matrix can be placed internally against a torn muscle wall to promote the formation of new tissue.

More than 500,000 people world-wide have had matrix-based treatments since 1999, according to Johnson & Johnson and Cook. Other potential uses are in development. No significant side effects have been linked to the treatment. Dr. Badylak says.

That a single substance can be used to treat such different conditions reflects matrix's capacity to adapt to its environment. In the shoulder, for example, it promotes the formation of tendon tissue, in the lower urinary tract, the formation of bladder or urine-channel tissue, and in a diabetic ulcer, of normal skin.

"People used to think it was Buck Rogers science to talk about regenerating tissues," says Scott Bruder, world-wide vice president of a newly formed Johnson & Johnson unit. Regenerative Therapeutics LLC. "This is the new wave."

How did fingers come into the picture? As an undergraduate at Kenyon College in the 19505, Alan Spievack did a research project on the salamander's regenerative powers that helped him win a Fulbright scholarship and admission to Harvard Medical School. He didn't realize until many years later, when he heard Dr. Badylak give a lecture on tissue engineering in 1996, that what he'd learned might apply to other animals.

That insight spurred him to look in the bladders of mammals for a form of extracellular matrix called epithelial basement membranes. He found it, just a couple of layers above the submucosa. In his first human test of the membrane, he spread it on a poison-ivy rash on his own leg. He says it quickly healed.

The experience led to an informal research collaboration with Dr. Badylak. Dr. Spievack was more interested in commercializing the technology than in doing academic research on it, and in 1999, he launched a company called ACell Inc. With so much science already behind Dr. Badylak's inventions, he talked to Purdue about licensing some of the Badylak patents related to matrix from sources other than the intestine.

Initially, he says, Purdue encouraged his interest. But no agreement was reached. Dr. Spievack then filed a patent on his basement-membrane matrix. By late 2002, his closely held company was making matrix patches and powder from pig bladders. Veterinarians began using it to treat problems such as tendon injuries in horses and urinary incontinence in dogs. The following year, the FDA cleared a humangrade version.

Patent Fight

When Purdue learned about Dr. Spievack's patent application, it argued that Dr. Badylak and his laboratory had had a role in the invention and that the patent should be assigned to the university. That kicked off a complex dispute in which Purdue faulted Dr. Badylak for his handling of the work with Dr. Spievack. Purdue fired Dr. Badylak, ending his 25-year career there and disbanding his 29-person lab. Dr. Badylak subsequently accepted a post at Pittsburgh's regenerative-medicine program.

Purdue and Cook sued the two doctors and ACell for patent infringement in U.S. District Court in Lafayette, Ind. A jury ruled in favor of Purdue and Cook, but last August, a federal appellate court overturned the verdict and upheld the validity of Dr. Spievack's patent. Mark Bleyer, president of Cook's biotech unit, declines to discuss the matter, except to say details about what happened remain in dispute and that some litigation is ongoing.

Joseph L. Bennett, vice president for university relations at Purdue, says Dr. Badylak was terminated "for multiple causes that had accumulated over an extended period." He wouldn't elaborate. He says Purdue's tissue-engineering researchers remain productive. And he says Purdue is pursuing a case with the U.S. Patent Office claiming that Dr. Spievack's patent should include inventors from Dr. Badylak's laboratory.

In 2005, Dr. Spievack's brother. Lee, who runs a hobby shop in Cincinnati, accidentally lopped about threeeighths of an inch off the top of his middle finger on the propeller of a model airplane. He decided against the skin graft recommended by a hand surgeon and consulted his brother. Dr. Spievack sent him a vial of matrix powder.

Lee Spievack applied it every other day for 10 days, until he ran out. By that time, he recalls, "I could already see the finger was starting to regenerate itself." In four weeks, the wound was healed. In four months, he says, except for a tiny scar, "it was like the finger I always had." Winter, he says, has revealed one difference: "The finger is only about 2 years old, whereas the rest of me is 68. In the cold weather, all my finger tips have cracked except this one."

Back at the McGowan Institute in Pittsburgh, Dr. Badylak and others are collaborating with the military on a variety of tissue-engineering projects. One of them, funded by a multimillion-dollar grant from the Pentagon's Defense Advanced Research Projects Agency, or Darpa, has a long-term goal of enabling soldiers to regenerate lost limbs.

As a first step, Dr. Badylak has assembled a team of five other scientists from around the U.S. to attempt to induce a mouse to form the same kind of stem-cell-rich structure that forms when a salamander loses its leg. In the salamander, that structure, called a blastema, forms at the site of the missing leg and orchestrates the formation of a new one. One aim is to understand the role of extracellular matrix in the process.

Early Stages

The project reflects growing interest by labs around the world in seeing if humans can be induced to form blastemas that would lead to regrowth of lost limbs. The research is in its early stages, with a host of unanswered questions, and any success could be many years away. Dr. Badylak says.

Military officials learned of the episode involving Mr. Spievack's finger and saw before and after pictures of the digit. That, coupled with Dr. Badylak's matrix research, led to the upcoming pilot test, which will use ACell's product.

"This isn't fly-by-night," says Col. John B. Holcomb, commander of the U.S. Army Institute of Surgical Research at Fort Sam Houston in San Antonio, where the test will take place.

The Army institute is both a research enterprise and the principal burn-treatment unit for the entire Defense Department. Part of its mission is to improve battlefield medicine to enhance soldiers' chances of surviving serious wounds. Surgeons from Col. Holcomb's unit rotate in and out of Iraq to help provide emergency treatment and to speed the transfer of badly injured soldiers back to the 450-bed Brooke Army Medical Center in San Antonio.

During the Vietnam War, it often took a few weeks for a wounded soldier to make it from the battlefield to that hospital, says Col. Holcomb. From Iraq, it typically takes three days.

Many of the gravest wounds involve severe burns caused by booby traps, grenades and other so-called improvised explosive devices. Doctors are also starting a test of whether ACell's matrix will speed the healing of parts of the body from which healthy skin is removed for grafting onto burn wounds.

Severe hand burns often cost soldiers parts of their fingers. While losing fingers might not seem as debilitating as losing an arm or a leg, "if you can't grab anything, if you can't pick up a pen or a toothbrush, the world is a pretty difficult place," says David Baer, manager of the Army unit's bone and soft-tissue program.

Mr. Baer says the research unit hasn't yet told potential candidates for the finger test about the project, in part for fear of raising false hopes among soldiers desperate for good news.

In the test, which is expected to begin late this spring, surgeons will reopen the skin around what's left of the soldiers' fingers. Matrix will be applied three times a week for at least two weeks. During each application, researchers will look for new tissue and for complications. If any fingers get longer, researchers will measure them for sensitivity, test hand function, and X-ray them to check for bone growth. If no problems arise in the first five soldiers, the doctors will treat five more, then assess the procedure thoroughly. They hope to know within a couple of months after treatment begins whether it works.

No one expects the treatment will regrow complete fingers, with joints, knuckles and fingernails. "We'd love to see bone," says Mr. Baer, "but we don't know." The hope is for maybe an inch of soft tissue, with blood vessels and nerves, that soldiers can pinch their thumbs against and restore some function.

Mr. Spievack's experience is one anecdote. Injuries to the soldiers' fingers are much more severe. There is no guarantee it will work. Dr. Badylak says. But without any new tissue, the hands of some injured soldiers are like paddles-they can't write with a pencil, zip their pants or eat with a fork.

"The opposable thumb is what makes us human," says Col. Holcomb. "To an 18-year-old with no fingers, this would be a life-changing event."

Tissue Repair

– What's Happening: In a planned test, Army doctors will try to regrow tissue on the amputated fingers of Wounded soldiers.

– The Background: Extracellular matrix, derived from animals, has been shown to promote skin growth on wounds.

– What's Next; Scientists hope to one day figure out how to regrow entire fingers, including bone and joints.

Subject: Re: Acell/Dr. Jones
Posted by NW5a on Tue, 02 Sep 2008 19:31:11 GMT
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Unter Forschung !
