Biomedicine

Thymus tissue heals DiGeorge syndrome

The rare baby born without a thymus gland can't defend itself. In the thymus, which sits atop the heart, the body's T cells learn the most important lessons of immunology: which cells to attack and which to let live. Without a thymus, a baby had no chance to live beyond a few years, until now.

Infants missing all or part of a thymus have DiGeorge syndrome. Babies with even a small thymus usually survive.

Researchers at Duke University Medical Center in Durham, N.C., have implanted thin slices of thymus tissue into the thigh muscles of 2-to-4-month-old babies with DiGeorge syndrome. The tissue had been removed from other babies during heart surgery and would otherwise have been discarded. Because the transplant recipients had no thymus to instruct T cells to attack the foreign tissue, it wasn't rejected.

T cells proliferated in four of the five recipients. Two of these patients survived and are now 1 1/2 and 6 years old. The other three died before their first birthday of infections or abnormalities associated with DiGeorge syndrome but unrelated to the transplant operation, the researchers report in the Oct. 14 NEW ENGLAND JOURNAL OF MEDICINE.

With DeGeorge syndrome, all the children were destined to get "one infection after another," particularly pneumonia, says study coauthor M. Louise Markert, a pediatric immunologist at Duke. The transplant recipients who survived are now essentially cured.

Getting the operation to work was difficult. One key to success had to do with the condition of the donated tissue. In previous thymus transplants, which had failed, researchers apparently didn't prepare the donor tissue properly, Markert says. Only extremely thin slices would stay alive in the recipients. "It took me a month just to get the tissue viable," she says.

One mystery remains: The scientists had expected the transplant recipients to be susceptible to graft-versus-host disease, a dangerous ailment in which immune cells in transplanted tissue attack their new host. Yet this didn't happen in the babies who received thymus slices.

"It's a miracle," Markert says. "It's something we don't understand." She and her colleagues speculate that the immaturity of T cells in the transplant keeps them from attacking cells in the children with DiGeorge syndrome. —*N.S.*

Large aneurysms may benefit from coil

Sizable brain aneurysms can make for high-risk surgery in some people with these dangerous blood-vessel bulges. Elderly or frail patients with aneurysms 2 centimeters or more in diameter often respond well to a less invasive technique, doctors in Austria report in the October NEUROSURGERY.

By threading a tube called a catheter through a patient's bloodstream, doctors can deliver tiny platinum coils to the aneurysm. Released at the trouble site, the coils fill the bulge and trigger formation of blood clots, which seal off the aneurysm. When successful, this prevents the artery or vein from rupturing.

Andreas Gruber and his colleagues at the University of Vienna Medical School attempted the technique in 30 patients with large aneurysms who were deemed poor surgery candidates. Untreated, such patients usually die within 2 years. However, 40 months after the platinum-coil procedure, only five patients had died, one from an unrelated cause. The researchers found that the aneurysm had subsided in 22 of the remaining patients and was unchanged in the other three.

This success rate is similar to that seen with traditional surgery, in which physicians pinch off the aneurysm with metal clips.

Gruber says that while the coil approach may be safer, surgically placed clips remain a more permanent fix. The coil procedure should be reserved for people with large aneurysms and for whom surgery poses high risk, he says. —*N.S.*

Paleontology

Smuggled Chinese dinosaur to fly home

On a tip from a colleague, paleontologist and artist Stephen Czerkas visited a Utah fossil sale earlier this year. What he found there made his heart jump: an impression of a tiny animal that appeared to have the feathers of a bird but the long, bony tail of a dinosaur.

To Czerkas, this fossil, taken illegally from China, documented a crucial, hitherto unknown stage in the evolution of birds. "It's a missing link that has the advanced characters of birds and undeniable dinosaurian characters as well," he says.

His excitement, however, mixed with fear that a collector would purchase the fossil and squirrel it away. Czerkas quickly located a benefactor, who donated money to buy the fossil for the Dinosaur Museum, which Czerkas and his wife run in Blanding, Utah.

At a press conference last month at the National Geographic Society in Washington, D.C., Czerkas and his colleagues announced that they would return the fossil to China after its scientific evaluation. They also revealed the first details about the feathered dinosaur, which they have named *Archaeoraptor liaoningensis.*

The newfound fossil comes from the northwest Chinese city of Liaoning, the fabulously fossil-rich locale that has yielded several new species of birds and dinosaurs with feathers. *Archaeoraptor* differs from these other dinosaurs because its skeleton indicates it could fly yet it retained features characteristic of dinosaurs like *Velociraptor.* For instance, the tail vertebrae had bony extensions that stiffened the tail and kept it off the ground.

Archaeoraptor bolsters the hypothesis that birds evolved from bipedal carnivorous dinosaurs known as theropods (SN: 9/18/99, p.183), says Philip J. Currie of the Royal Tyrrell Museum of Palaeontology in Drumheller, Alberta.

"Our whole idea of what dinosaurs looked like is changing pretty drastically," says Currie, who is participating in the study of the specimen. The feathers on *Archaeoraptor* and other Chinese dinosaurs suggest that many theropod species could have sported feathers, including *Tyrannosaurus rex* when it was young. Feathers, however, would have hindered adult versions of such large theropods by causing them to overheat, says Currie.

Not surprisingly, these ideas get a poor reception among the small group of paleontologists that discounts the connection between birds and dinosaurs. "*Archaeoraptor* is one of the worst preserved specimens in a long line of poorly preserved specimens," says Larry D. Martin of the University of Kansas in Lawrence.

Martin, who has seen photos but not the actual specimen, says he couldn't identify feather impressions surrounding the fossil, nor could a Kansas colleague who traveled to Washington to see the fossil on display at National Geographic. Martin also says that the fossil appears to be a composite made by putting together pieces of two facing sides of a split slab—called part and counterpart by paleontologists. He wonders whether elements from other specimens have gotten mixed in. "We should look at this and make sure it's all one animal," he says.

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Czerkas' model of Archaeoraptor.

Czerkas confirms that the Chinese fossil hunters who found the specimen did glue together sections of the part and counterpart, but he argues that the fossil is from one individual. —*R.M.*