Liver transplant transfers peanut allergy

After eating a meal with satay sauce in a Paris restaurant, a 22-year-old man who is allergic to peanuts suffers cardiac arrest, falls into a coma, and is diagnosed as brain dead.

Being an organ donor, his liver and one kidney are transplanted into a 35-year-old man, who then recovers. The donor's pancreas and other kidney go to a 27-year-old woman, who also rebounds.

Three months later, however, the male recipient—who has no previous allergy to peanuts—breaks out in a rash after eating some of these legumes. Doctors treat him and then contact the woman, who reports no such episodes. Under close medical supervision, she eats some peanuts. Nothing happens.

This strange case, reported in the Sept. 18 NEW ENGLAND JOURNAL OF MEDICINE, appears to be the first documented instance of a transplanted organ that imparted an allergy to its recipient. In earlier studies, transplanted bone marrow has been shown to transfer some allergies, apparently because bone marrow is rich in hematopoietic stem cells—immature cells whose daughters grow into red and white blood cells.

The new case draws attention to the liver, another source of these stem cells. The allergic reaction indicates a blending of the donor and recipient immune systems, the researchers suggest. Tests showed that donor-derived cells migrated from the liver to the recipient's skin and were working in league with his own immune system to form the rash.

Other tests solidified the immune system connection. Peanut-specific antibodies, which were plentiful in the blood of the dead man and absent from the recipient at the time of the operation, turned up in the recipient later, says study coauthor Christophe Legendre of St. Louis Hospital in Paris.

Some of the donor's lymphocytes, white blood cells that defend against intruders in the body, had been activated by peanuts, Legendre says. Among the lymphocytes are two types of B cells, plasma cells and memory cells. Plasma cells produce antibodies to fight the perceived enemy, while memory cells mainly take note of the situation. When later exposed to the same antigen—in this case, peanuts—the memory cells create more plasma cells to do battle.

The donor's peanut-specific memory cells may have induced the recipient's plasma cells to produce antibodies that react to peanuts, Legendre says. An antibody called immunoglobulin E causes allergic reactions by stimulating cells to churn out histamines and other inflammatory agents.

Despite the new finding, transplant recipients need not worry about dangerous allergies, says J. Harold Helderman, an immunologist at Vanderbilt University Medical Center in Nashville and president of the American Society of Transplant Physicians. The result in this case, he notes, was a skin rash, not a systemic, life-threatening reaction. Thousands of patients have received livers without developing allergies.

More important, he says, the study sheds light on the debate over microchimerism, the theory that immune cells from a donor eventually work alongside those of the recipient and perhaps mitigate rejection. Doctors disagree on how much immune system suppression is needed after a transplant. In rare cases, recipients have been taken off suppressant drugs and done fine, Legendre says. "This happens to be another piece of evidence that the concept of microchimerism is valid," Helderman says.

The finding also highlights the peculiarity of the peanut allergy (SN: 5/4/96, p. 279), which is associated with a high risk of death, says Marshall Plaut of the National Institute of Allergy and Infectious Diseases in Bethesda, Md. —*N. Seppa*

Signs of ancient life in deep, dark rock

A team of Scandinavian scientists has discovered the fossilized remains of microbes deep below Earth's surface, a finding that has broad implications for studies of early life on Earth and other planets.

Although biologists once thought life could not survive far underground, investigators in the last decade have pulled up evidence of microorganisms living 3 kilometers down (SN: 3/29/97, p. 192). It is difficult, however, to prove that such bacteria are actually indigenous residents of the subsurface, not contaminants introduced into the rock by the drilling process.

The discovery of fossils far below the surface bolsters the contention that bacteria live deep underground. "This is a much stronger indication that the microbes existed there before the drilling started," says Karsten Pedersen of Göteborg University in Sweden. His team reports on its work in the September GEOLOGY.

While drilling into granite rocks on the coast of the Baltic Sea, Pedersen and his colleagues uncovered the fossils inside fissures located 207 meters below the surface. The objects are rod-shaped, and they measure about 1 micrometer across—similar in shape and size to living bacteria.

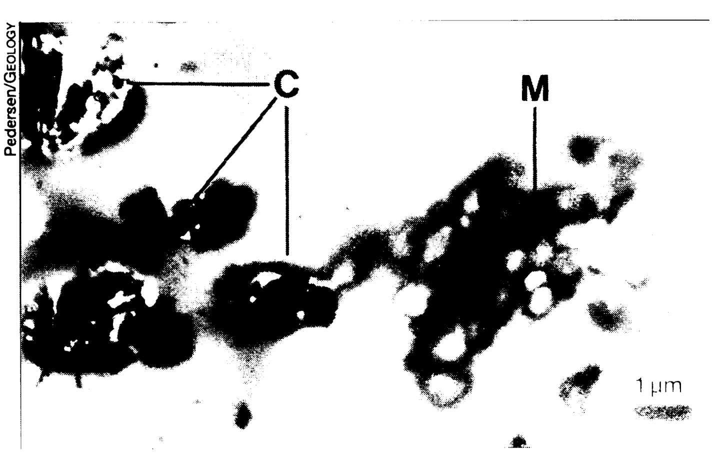
The group cites several lines of evidence to support the idea that these rounded forms represent fossilized microorganisms rather than inorganic mineral deposits. X-ray analyses show that the shapes contain primarily carbon and no appreciable amounts of several other elements common to mineral encrustations. Furthermore, the objects have a surplus of light isotopes of carbon, a signature of living organisms.

When viewed under a transmission electron microscope, the fossils appear as a film coating the inside of cracks, a typical way for bacteria to grow.

Granite is a dense rock formed from molten magma. The bacteria and other microbes apparently formed colonies in the rock after it had cooled and fractured, allowing water to flow through the fissures, says Pedersen. The age of the fossils remains uncertain. They could be millions of years old or just a few hundred, he says.

The study of subsurface microbes took on new significance last year, when NASA scientists reported finding bacterialike shapes inside a meteorite from Mars (SN: 3/29/97, p. 190). That report launched a heated debate.

"All this furor over the Martian meteorite is because we really don't know what a fossilized microbial system looks like in hard rock," says Todd O. Stevens of the Battelle Pacific Northwest National Laboratory in Richland, Wash. "We need to learn to recognize them if we're going to look for them here or on other planets." —*R. Monastersky*



Pedersen/GEOLOGY

Calcite grains (C) and fossil microbes (M).