

Living on borrowed legs

Entire legs — skin, muscle, bone, blood vessels and nerves — have been successfully transplanted between laboratory rats with the aid of the immunosuppressant drug cyclosporine, researchers report. While the rats showed no coordinated leg movements, such as walking, with a newly acquired leg, they did demonstrate some simpler actions, such as withdrawing a leg from a stimulus. Some transplanted legs remained viable for more than a year, until the recipients died of old age.

"This research could spark a revolution in transplant surgery," says Kirby S. Black, who with Charles W. Hewitt, David Furnas and Bruce Achauer conducted the experiments at the University of California at Irvine. "For the first time we have shown that tissue of this kind [a composite of different types of tissues] can be transplanted for long terms of survival in animals."

The scientists are using the rat limb as a model system for the transplantation of composite tissues, says Hewitt. They want to go beyond limb transplants to the use of such blocks of tissue to correct congenital anomalies and for reconstructive surgery after burns and after surgical removal of massive tumors.



The procedures for transplanting rat legs are similar to those used to reattach limbs of human accident victims. "We hook up bones, muscle, nerve and skin and do vascular surgery," Hewitt says. In rats, this takes about three hours.

The experiments focused on the use of cyclosporine, an immunosuppressant widely used in human kidney, heart-lung, bone marrow, pancreas and liver transplants. Black, Hewitt and their colleagues demonstrated that surprisingly low doses were effective in the rat limb transplants. In addition, they found that in several cases the rats did not reject their new limbs even when the drug was gradually discontinued. In contrast, human transplant patients continue taking cyclosporine all their lives.

At risk for Down's syndrome

Some families have a hereditary characteristic that predisposes them to Down's syndrome, report geneticists at Johns Hopkins Medical Institutions in Baltimore. This factor is unrelated to the mother's age. Although much previous work has documented that the risk of Down's syndrome increases with the age of the mother, Stylianos E. Antonarakis and his colleagues observed that in a Greek population there was the same frequency of the Down's syndrome births among mothers of various ages.

Antonarakis found that Greek families in which Down's syndrome had occurred were twice as likely as other Greek families to have a particular version of chromosome number 21, the chromosome that is present in an extra copy in the cells of individuals with Down's syndrome. He identified the chromosome by a set of variations in DNA sequence called polymorphisms. This version of chromosome 21 is more likely to fail to divide normally during cell reproduction, Antonarakis says. Geneticists are now investigating whether polymorphisms are associated with a predisposition to having a child with Down's syndrome in other ethnic groups.

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Cofactor in AIDS?

A large number of homosexual men have been infected with the AIDS-associated virus, yet most of them haven't contracted AIDS. The hidden cofactor in developing AIDS, suggest W. Lawrence Drew of Mt. Zion Hospital in San Francisco and his colleagues, could be cytomegalovirus, one of the herpesviruses.

In a study of homosexual men without overt signs of AIDS, 33 of 67 men who showed signs of recent cytomegalovirus infection had an abnormal ratio between two types of white blood cells called T lymphocytes. This immunological disorder can presage AIDS. But only two of 42 men without cytomegalovirus antibodies had the abnormal ratio, the researchers report in the July ANNALS OF INTERNAL MEDICINE.

Until the researchers have completed long-term observation to see if only the cytomegalovirus-infected men go on to get AIDS — which can take years to develop — the study only suggests a relationship. But it brings cytomegalovirus a little closer to identification as the cofactor, says Drew. "It might be that the primary event is cytomegalovirus infection, which does something detrimental to the lymphocytes."

A cytomegalovirus factor could explain the AIDS-homosexual connection, says Drew. A study several years ago showed that over 95 percent of the homosexual community in San Francisco showed evidence of past cytomegalovirus infection, compared with only 50 percent of the heterosexuals. In addition, cytomegalovirus is absorbed rectally much more readily than vaginally. What could be happening, says Drew, is that during an active cytomegalovirus infection the exhausted immune system might not put up as strong a defense against the AIDS virus; with homosexuals encountering the virus more often, they would be more vulnerable to the AIDS retrovirus.

What would strengthen the cytomegalovirus case is more epidemiological studies, as well as laboratory studies showing that preinfecting lymphocytes with cytomegalovirus makes them more receptive to the retrovirus, says Drew.

Babymaking failure

Some *in vitro* fertilization clinics may be making more money than babies. Medical Tribune, a medical news publication circulated to doctors, recently surveyed 108 such clinics. While some clinics had achieved scores of pregnancies, of the 54 clinics responding, half had never achieved a pregnancy as a result of the \$1,375 to \$7,000 procedure.

Childhood cancer clue

In 1983, Paul Zeltzer of the University of Texas Health Science Center at San Antonio and his colleagues found that children with neuroblastoma, a nerve cell cancer, had high levels of an enzyme called NSE (neuron-specific enolase) in the tumor and bloodstream. They have now found that children with medulloblastoma, a brain tumor, also have high levels of the enzyme.

Brain tumors are the second most common childhood cancer, behind leukemia, and neuroblastoma is third. Both neuroblastoma and medulloblastoma are often fatal.

Finding high levels of the same enzyme in the two tumors suggests a biochemical link that could help with treatment. "If we find a group of drugs that are successful in treating one, they may be useful for the other," Zeltzer told SCIENCE NEWS.

With neuroblastoma, levels of the enzyme are measured to establish the severity of the cancer and how aggressively it should be treated. "This enzyme is like a sophisticated crystal ball," Zeltzer says. If the enzyme level is as predictive in medulloblastoma, children with a low NSE level can be spared toxic, experimental treatments.

Other advantages, notes Zeltzer, are that it could make diagnosis easier and provide a marker for effectiveness of treatment.

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