Biology

Julie Ann Miller reports from Washington, D.C., at the annual meeting of the American Society for Microbiology

Malaria vaccine tests under way

Human trials of a genetically engineered vaccine for malaria have just begun. "It was the most benign immunization I ever received," said researcher J.D. Chulay two days after being injected. The vaccine consists of a protein characteristic of the malaria sporozoite, the form in which the disease-causing microorganism is carried by mosquitoes to infect new hosts. "The vaccine we are testing is probably the purest vaccine ever given to humans or animals," Chulay says. "So far [nine days after the first volunteers received injections], blood tests show the vaccine to be benign."

Chulay and his colleagues at Walter Reed Army Hospital in Washington, D.C., plan to do safety tests on 20 to 40 normal volunteers. If those trials go well, the investigators will then proceed to tests of efficacy.

Procedures to deliberately infect volunteers with malaria and then cure the disease were recently demonstrated by the Walter Reed scientists and scientists at the University of Maryland Center for Vaccine Development in Baltimore, in collaboration with Ruth S. Nussenzweig at New York University in New York City. The methods are similar to those used to evaluate antimalarial drugs. Mosquitoes infected with drug-sensitive malaria parasites are placed in a container, which is then attached to the volunteer's arm. After being bitten by five infected mosquitoes, the volunteer is hospitalized and monitored for malarial infection. The disease can be cured rapidly if it is treated as soon as parasites are detected. Both research teams report success in infecting volunteers, and then in curing the illness, which may include headache and fever, in less than two days. In future tests, the scientists plan to "challenge" volunteers, by exposing them to malaria-carrying mosquitoes, at different times after vaccination.

Transplant drug binds to blood cells

The recent success of kidney, liver and heart transplants rests on the use of cyclosporine, a drug that suppresses the patient's normal immune response, which would otherwise reject the foreign tissue. But patients vary widely in how much drug must be administered to have the optimal effect. A protein present on red blood cells may be the explanation for these differences, say scientists at Georgetown University Medical Center in Washington, D.C.

Most of the cyclosporine in a patient's blood binds to a single protein, and different patients have quite different levels of the protein, Richard A. McPherson and his colleagues report. The next step in the research will be to determine whether being bound to the protein contributes to or inhibits cyclosporine's action. Measurement of the binding protein may be useful to predict the cyclosporine dose a patient requires. Transplant patients take cyclosporine for the rest of their lives.

Aerosol spread of diarrheal diseases

A virologist is making what he calls a "radical" proposal for the mechanism of dispersal of rotaviruses, the agents most commonly responsible for hospitalized cases of diarrheal disease in children. Previous research had demonstrated transmission of the viruses by contaminated water, but Carl D. Brand of Children's Hospital in Washington, D.C., argues that they must also employ other routes. In temperate climates, rotaviruses show a striking seasonality; there are several hundred times as many cases in the winter as in the summer. Brand proposes that the low indoor humidity in winter increases the survival of the virus, which is released into the environment in large numbers — 1 billion viruses per gram of feces of an infected infant. A "rotavirus aerosol" might be created when an infant's diapers are changed, bedding is aired or a toilet is flushed.

Biomedicine

Vaccinia hitched to new load

Vaccinia, the workhorse virus used to vaccinate against smallpox, is under investigation as a carrier of genetic material from other organisms. Vaccinia hybrids that produce proteins from several viruses have already proved effective in animal trials (SN: 6/15/85, p. 379); now researchers from the Bethesda, Md.-based National Institutes of Health have used vaccinia to carry respiratory syncytial virus (RSV) genetic material.

RSV is a common cause of lower respiratory tract infection; in children, its effects range from mild to lethal. The researchers cloned an RSV gene that dictates the production of a glycoprotein, put the copies into vaccinia and inoculated rats with the hybrid organism. The rats produced antibodies to the glycoprotein and were able to resist RSV infection, the researchers report in the March PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (No. 7).

Babies from unconventional places

Australia, Holland, France and England have already announced the birth of babies from frozen embryos, and now the United States is expecting. Richard P. Marrs of the University of Southern California in Los Angeles says one of his patients, implanted with an embryo that had been frozen after *in vitro* fertilization, is due to deliver in June.

In Israel, researchers from Hadassah University Hospital in Jerusalem have announced the birth of two babies from mothers with no ovaries. The women had received embryos transferred from other women, as well as hormones to replace what would have been produced by their ovaries, the researchers report in the March 27 NEW ENGLAND JOURNAL OF MEDICINE.

AIDS and hemophilia: Still a risk?

With the advent last year of heat treatment of vital blood factors, AIDS from such products was supposed to cease being a risk to hemophiliacs. But a report in the March 15 LANCET describes a hemophiliac whose blood showed he had been exposed to the AIDS virus after he received heat-treated factor VIII. The connection, says coauthor Gilbert C. White II of the University of North Carolina (UNC) in Chapel Hill, warrants further investigation but doesn't yet mean factor VIII is hazardous. And Peter Levine of Memorial Hospital in Worcester, Mass., a medical co-director of the National Hemophilia Foundation, says the possibility that the hemophiliac was exposed to AIDS through intravenous drug use cannot be ruled out.

The man, who received heat-treated factor VIII following an operation, was a mild hemophiliac who had not received blood products since 1975. Upon questioning by physicians, he admitted to having used intravenous drugs prior to 1978, but said he no longer used them and was in no other AIDS risk group. His blood showed no evidence of AIDS antibodies before the operation, but a blood sample taken five weeks after the operation came up positive.

White and his UNC and Duke University co-workers examined several possibilities for the finding: The heat-treated factor VIII could have included live virus; inactivated virus could have caused an immune response; the factor VIII preparation could have contained AIDS antibodies; or the patient could have used intravenous drugs recently.

"We think it may well have been live virus," says White, "but we're not sure." While donor-blood screening — which was not available when the man received the factor VIII — combined with heat treatment is likely to handle the problem, the safety of such blood products still needs to be studied, says White.

According to Levine, an international study of hemophiliacs who have received only heat-treated blood products has found no antibody-positive patients among several hundred hemophiliacs checked so far.