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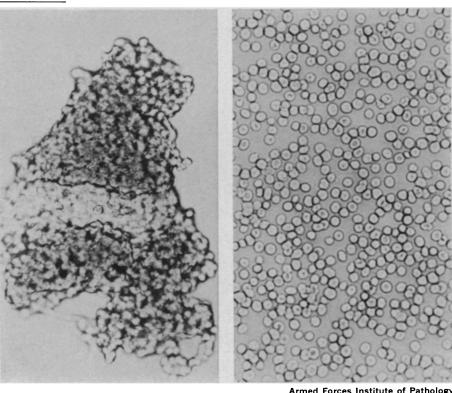
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IMMUNOLOGY



Armed Forces Institute of Pathology

In lab tests, Rh-positive blood (left) clumps; Rh-negative does not.

vaccine conquers baby-killer

Rh disease can be eliminated as new medicine moves into production

Barbara J. Culliton

Rh blood disease kills 10,000 babies in the United States every year. Around the world, it takes the lives of 200,000.

Until now, doctors have been able to save only about 25 percent of Rh diseased babies by drastic transfusions which replace the entire blood supply. For the other 75 percent, the situation has been hopeless.

A new vaccine which prevents the disease in almost 100 percent of the cases may be available within months.

Technically known as erythroblastosis fetalis, Rh disease is a condition in which antibodies in the blood of an Rh-negative woman destroy the blood cells of her unborn Rh-positive child. It can occur only in cases in which an Rh-negative woman marries a man whose blood is Rh-positive—as happens in one out of eight marriages.

If the father carries two genes for the positive blood factor, the baby will inevitably inherit his blood type. Firstborn children seldom suffer any ill effects; the risk to later children increases with each pregnancy.

During delivery, some of the baby's

Rh-positive cells may enter the mother's body. When this happens, she manufactures antibodies to wipe out these foreign cells as if they were invading viruses or bacteria. In subsequent pregnancies these antibodies may pass from the mother into the baby where they attack and destroy his blood cells.

The new vaccine will prevent Rhnegative women from ever producing antibodies to Rh-positive blood. If there are no antibodies, there can be no destruction of the unborn infant's blood -hence, no disease.

The vaccine, called RhoGAM by its manufacturer, the Ortho Pharmaceutical Corporation, Raritan, N.J., has been in clinical testing since 1964 on almost 600 women. "So far, we've had only one failure, and we're not certain that this patient did not already have antibodies before we gave her the vaccine," Dr. William Pollack of the Ortho Research Foundation says. "It's a fantastic rate of success."

RhoGAM is made from the blood of Rh-negative women who already have antibodies to the positive blood factor in their bodies and from the blood of Rh-negative men who volunteer to become sensitized by injections of Rh-positive blood. By chemical extraction, scientists remove the anti-Rh-positive antibodies from these individuals, dry them to a powder and mix them in a solution of amino acids and other biological materials to make the vaccine.

If RhoGAM is injected into an Rhnegative mother within 72 hours after delivery, the antibodies in the vaccine destroy any Rh-positive cells that are in her body before those cells can trigger her own defense system into action.

Within a matter of months, the RhoGAM antibodies are out of the mother's blood, leaving her in the same physiological state she was in before delivery. If, on the other hand, she produces her own antibodies to destroy the positive cells in her system, her immunity is permanent instead of temporary. To be effective, RhoGAM must be administered after each delivery.

The Rh-factor, named after the Rhesus monkeys in which it was identified, was first discovered in 1939 by Dr. Philip Levine of the Ortho Foundation. It is a chemical substancepossibly a protein or a lipo-polysaccharide—that sits on the surface of the red blood cells of about 85 percent of individuals. Persons who don't carry this positive factor are Rh-negative. The Rh-factor has nothing to do with red cell activity-carrying oxygen to tissues—and has no particular importance except in situations involving blood incompatibility during pregnancy. Precise determination of its chemical nature is difficult, Dr. Pollack explains, because available methods of separating it from the blood cell merely destroy it.

The vaccine to eilminate Rh-factor disease is for "future generations," according to Dr. Vincent J. Freda of Columbia Presbyterian Medical Center, New York, who, with Dr. John G. Gorman, has used it in experimental trials. "There is a whole generation of mothers for whom RhoGAM isn't going to do any good." Once a woman has been immunized to Rh-positive blood, there is nothing to reverse that immunization.

But for some 100,000 or more Rhnegative women, RhoGAM is the key to safe childbearing. Ortho is already stockpiling supplies of the vaccine in anticipation of the final authority for marketing from the National Institutes of Health. However, difficulties in getting enough Rh-negative human blood—the basic ingredient—mean it may be several months to a year before there will be enough vaccine to go around.

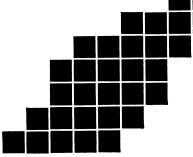
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