

Rotavirus Vaccine

TECHNICAL FIELD 
Therapeutic: Rotavirus

BACKGROUND

Rotavirus infection is the primary cause of hospitalization due to gastroenteritis in developed countries and is responsible for approximately 1.0 million deaths annually worldwide. Since natural infection provides partial protection against rotavirus, vaccines developed to date have all utilized live, attenuated strains that are orally delivered and which provide partial immunity.

One such vaccine recently approved in August 1998 for use in the United States, however, was pulled from the market due to the occurrence of intestinal intussusception. Other live, orally delivered vaccine candidates are being tested, but neither their efficacies nor their association with intussusception have been fully established.



APPLICATIONS

1. Therapeutic

ADVANTAGES

- Easy to Administer
- No Needles
- Greater Patient and Parent Satisfaction

INVESTIGATOR

Richard Ward, PhD
Infectious Diseases
Research Professor of Pediatrics
Cincinnati Children's Hospital Medical Center

STATUS

US and Australian patents issued
Other foreign patent applications pending.

CONTACT

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TECHNOLOGY

Drs. Richard Ward and Anthony Choi of the Cincinnati Children's Research Foundation have developed a non-replicating vaccine candidate shown to provide excellent protection against rotavirus shedding in a mouse model (J.Virol. 73:7574-81, 1999). The new vaccine is the rotavirus VP6 protein that forms the intermediate capsid layer of the virus particle. The VP6 protein is highly conserved among rotavirus strains and is, therefore, expected to elicit cross-protection against multiple serotypes of rotavirus. The VP6 protein used in these studies is expressed in *E. coli* as a recombinant fusion protein and is readily purified. Intranasal administration in mice in concentrations as low as 1 µg or less together with attenuated *E. coli* heat-labile toxin LT(R192G) as adjuvant, consistently reduces rotavirus shedding in stool by 99% following murine rotavirus challenge. Oral immunization with this protein and LT(R192G) likewise results in nearly complete protection against rotavirus shedding. Protection remains intact for at least one year after initial immunization.

Recently, the human VP6 homologue has been cloned and tested in this same model with equally impressive results. Although dissociation with intussusception has not been established, we postulate that such events will not occur based on the nature of the vaccine and its mechanism of action. U.S and Australian patents have been issued to us. Other foreign patent applications are pending.

THE INVENTOR

Richard Ward, PhD
Infectious Diseases

BACKGROUND

Richard L. Ward, PhD, was born and educated through undergraduate training in Montana. He completed a PhD degree in biochemistry at the University of California, Berkeley in 1969 and conducted post-doctoral research in Munich, Germany and the Roche Institute in Nutley, NJ.

Dr. Ward held positions at the University of California in Los Angeles and Sandia National Laboratories in Albuquerque, NM, before joining the USEPA in Cincinnati in 1980. After that he joined the Gamble Institute of Medical Research (1981) and Children's Hospital Medical Center (1995). His entire research career has been on viral studies.



Credentials

PhD: Biochemistry, University of California, Berkley, 1969.

BS: Montana State University, Bozeman, MT, 1965.

Research

Mechanisms of immune protection against rotavirus;
development of rotavirus vaccines.

Special Interests

Identification of viral agents of severe gastroenteritis;
epidemiology of rotavirus infections and disease worldwide;
pathogenesis of rotavirus disease.