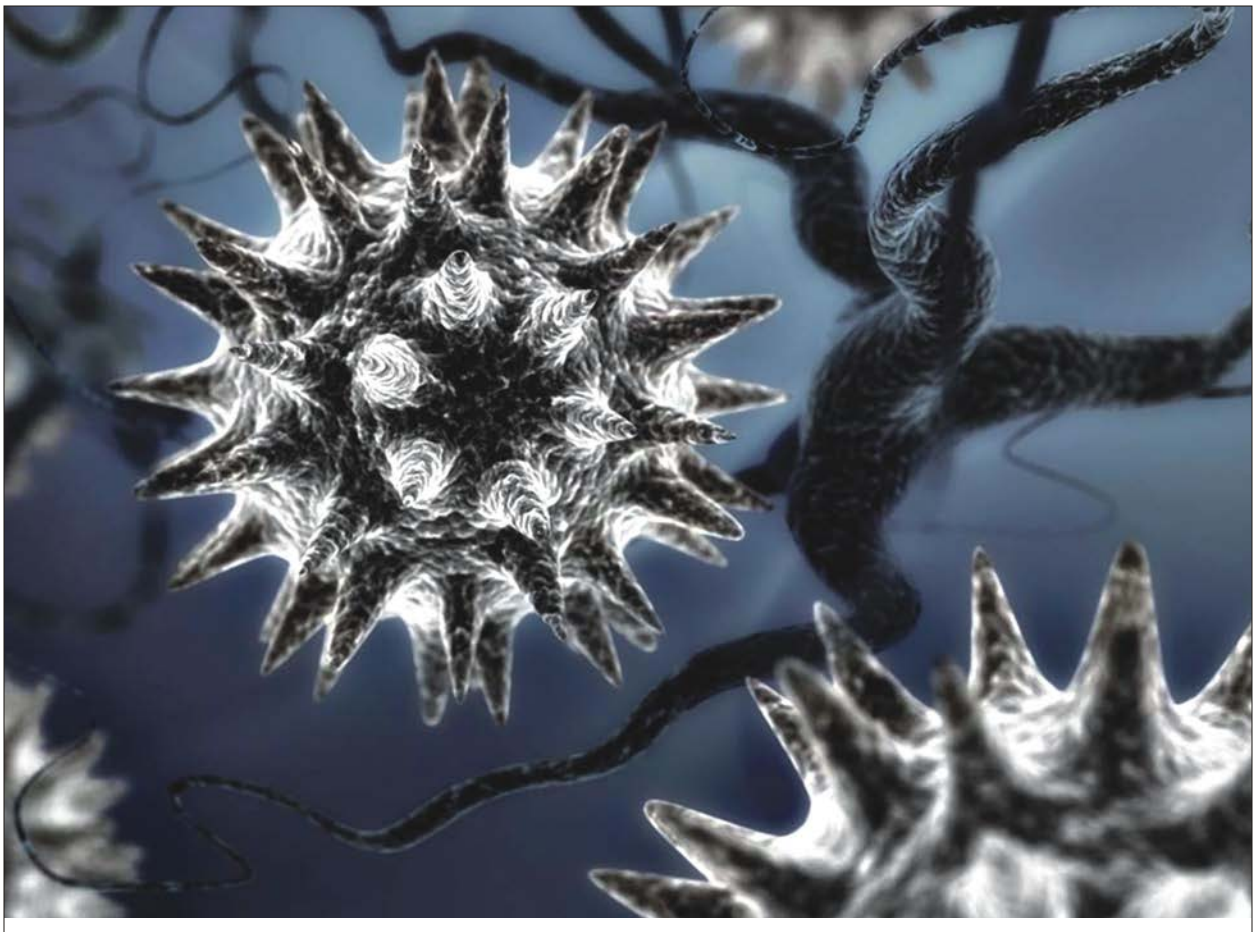

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Nanoparticle Vaccine Protects Against Stomach Flu

A new vaccine strategy using nanoparticles as carriers may be the key to developing a vaccine against norovirus, one of the most common causes of foodborne disease in the United States. Researchers from the Cincinnati Children's Hospital Medical Center report promising findings in the January 2011 issue of the Journal of Virology.

The application of nanoparticles as carriers to present small peptide antigens is a growing field within vaccine development. Researchers led by Xi Jason Jiang of Cincinnati Children's Hospital Medical Center, have described a new nanocarrier, called a P particle, which holds promise as a scaffold for a variety of vaccines. In the current study they inserted rotavirus antigen into the P particle, which boosted immune response to rotavirus, as well as norovirus, in mice.

Both rotavirus and norovirus are important causes of acute gastroenteritis. The former causes severe diarrhea in children, and kills an estimated 527,000 worldwide, annually. Norovirus is a notably highly transmissible, and particularly unpleasant flu, which can result in one to three days of vomiting and diarrhea in otherwise healthy adults, and which kills 200,000 children annually.

"The dual vaccine holds promise for controlling gastroenteritis in children," says Jiang.

The P particle's unique feature is the scaffold. The P particle consists of 24 copies of an outer coat protein from norovirus. The beauty of the P particle is that it contains three types of surface loops, which are ideal for presenting a wide variety of antigens. Additionally, it is highly immunogenic and extremely stable, the latter an important quality for use in developing nations. The antigens can easily be inserted during the manufacturing process. Production is a simple matter of expressing the cloned P particle in *E. coli*.

In addition to the rotavirus antigen, the team has succeeded in inserting a number of antigens into the P particle, varying in size up to more than 200 amino acids. The resulting vaccines have induced significantly stronger immune responses in mice than have free antigens.

Jiang is principal investigator for a five year, $4.1 million grant from the National Institute of Allergy and Infectious Disease (NIAID) that Cincinnati Children's received last May to develop the P particle vaccine against norovirus. "With the unique features of high efficiency, easy production, and low cost, this new platform will find a broad application in the biomedical sciences," says Jiang.

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