

Study lays groundwork for norovirus anti-viral treatments

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An animal model of the human norovirus created at the University of Michigan Health System lays the groundwork for understanding the biology of the pesky virus and developing antiviral drug treatment.

Well-known as the virus that impacts cruise ship vacations, [norovirus](#) leads to misery on land too. The virus spreads quickly from person to person in any closed-in space, such as schools, nursing homes, or day-care centers.

"The first virus in this group was discovered in 1972 following a disease outbreak at a school in Norwalk, Ohio in 1968. Since then research has been underway to culture noroviruses in the laboratory and develop animal models," says lead researcher Christiane Wobus, Ph.D., assistant professor in the Department of Microbiology and Immunology at the University of Michigan Medical School.

An international group of scientists from the U.S. and Germany authored the study published in *mBIO*, a journal of the American Society of Microbiology.

"Norovirus research has been hampered by the absence of a norovirus cell culture and a genetically manipulable small [animal model](#)," Wobus says. "This new model gives us the tool to test potential [antiviral compounds](#) and may lay the foundation to culture these viruses in the lab."

The new model was developed by determining whether human noroviruses can infect "humanized" mice, this is mice containing [human immune cells](#). These mice are widely used for study of the [human immunodeficiency virus](#) (HIV), a virus which can only infect [human cells](#).

As a control researchers also included the same mice without human [immune cells](#). In the study, both groups of mice were infected by human norovirus.

Additional studies determined that the immunodeficient background of this particular mouse strain is important in permitting human norovirus infection and identified macrophages, a vital immune cell in the body, as the cell type infected by the virus.

Very few particles of the virus can lead to infection. Estimates are as few as 18 particles can cause gastroenteritis (inflammation of the stomach and intestines) and lead to diarrhea, vomiting and stomach pain. In the U.S. norovirus causes approximately 21 million cases of acute gastroenteritis a year, and 800 deaths.

"Most people can cope with the symptoms, but deaths are more likely among the elderly mainly because of dehydration," Wobus says.

Only the common cold is more widespread than the norovirus, which can remain on surfaces for weeks, ready to cause more infections. Because it lacks a lipid envelope, norovirus is not susceptible to common disinfectants and alcohol-based sanitizers.

The economic impact of these infections is staggering with an economic cost for norovirus associated food-borne outbreaks alone of \$5.8 billion in the U.S.

There is no vaccine for preventing norovirus infection and no drug to treat it. But the Centers for Disease Control and Prevention offers some tips for prevention, including handwashing with soap and water, washing fruits and vegetables properly and cleaning and disinfecting surfaces, and if you are sick not preparing food or caring for others.

More information: *mBIO* 4:e00450-13.

mbio.asm.org/content/4/4/e00450-13

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