Murine Norovirus Study

STUDY OVERVIEW & HIGHLIGHTS

October, 2014

Study Conducted by Jan Biotech, Inc.
Results Summarized by Jennifer Sweeney, MBA
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ABSTRACT

Laboratory research conducted by Jan Biotech, Inc. in October, 2014 confirmed that ProKure™ V begins to kill murine norovirus in as little as 10 seconds. In 30 seconds, the virus has been 99.999% eliminated.

Background

Norovirus is the name of a class of extremely contagious gastrointestinal viruses that affect both people and animals. When a concentrated number of people are in a confined area (such as a school, hospital, cruise ship, etc.), the illnesses can spread fast and furiously.

Noroviruses cause inflammation of the stomach and intestines resulting in severe abdominal pain, forceful vomiting, and diarrhea. The viruses can be contracted through contact with infected people, eating contaminated food or water, or by touching contaminated surfaces.

What makes noroviruses so contagious and so problematic is that transmission is aerosolized when those stricken with the illness vomit or flush the toilet. Furthermore, the virus can continue to spread even after symptoms have subsided, in some cases for weeks as noroviruses are able to remain viable on environmental surfaces for extended periods of time. In addition, noroviruses are resistant to a number of active ingredients in disinfectants.

In short, noroviruses are highly transmissible, highly infectious, and highly resistant microorganisms.

Study Objective

The objective of this study was to evaluate the virucidal efficacy of ProKure™ V, against murine norovirus (MVN), a surrogate for human norovirus.

Virus Tested

Although direct assessment of virucidal efficacy against human norovirus would have been most ideal, it can be very difficult to obtain human viruses for testing purposes. A straightforward cell culture system allowing for detection of infectious noroviruses remains elusive.

Because murine norovirus belongs to the same viral family as human noroviruses, it has been increasingly used as a surrogate in veridical efficacy evaluations. MNV and human noroviruses are both enteric (related to or occurring in the intestines) pathogens of mice and humans, respectively. While viral surrogates for human norovirus have associated pros and cons, they continue to serve as viable research models for efficacy testing. The specific virus tested in this study was MVN-1.

Survey Administration

Pantheon Enterprises Inc., hired Dr. Janet Huie of Jan Biotech Inc. to test the virucidal efficacy of ProKure V against murine norovirus. Dr. Huie holds a PhD. In Molecular Biology from Princeton University among other qualifications. Dr. Huie's previous research resulted in a change to EPA regulations for disinfection of airline water systems.

Dr. Huie and her team conducted the study at Cornell University's Nanobiotechnology Center in Ithaca, N.Y. The researchers, Ph.D-level microbiologists, adhered to Standard Operating Procedures and testing criteria based on U.S. Environmental Protection Agency guidelines, ASTM and ISO procedures.

Survey Process

Using 100 ppm (parts per million) of ProKure V, the scientists tested the solution to see how effective it was at killing MVN in 10 and 30 second intervals in suspension and on a nonporous glass surface.[1]

Key Findings

This study confirmed that the virucidal efficacy of ProKure V against murine norovirus significantly exceeds EPA disinfection standards. In order to meet EPA disinfection standards, a disinfectant must kill 99.999% of the virus within 10 minutes: ProKure V did it in 30 seconds.

ProKure actually began to kill MVN-1 in 10 seconds. In 30 seconds, the virus was completely eliminated and the surface was disinfected. *In fact, on the glass surface, ProKure V eliminated 99.9999% of the virus in 30 seconds, which actually meets the EPA's definition for sterilization.*

Thus, these test results confirm that ProKure V is a powerfully fast and effective disinfectant on murine norovirus, a surrogate for human norovirus.

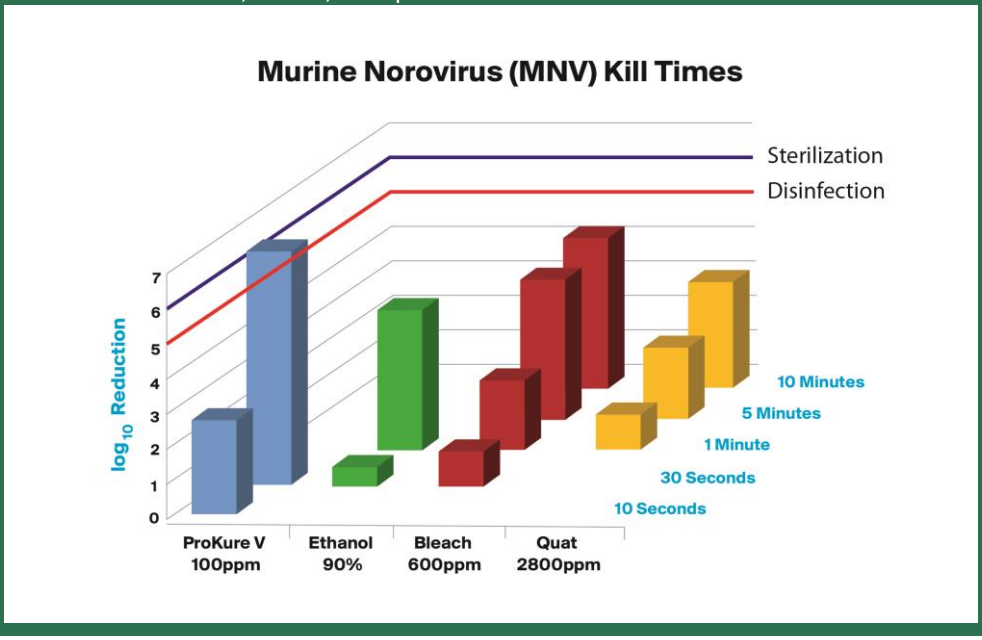
Further Confirmation that ProKure V Kills Norovirus

Another outside study conducted by Antimicrobial Test Laboratories (ATL) in Austin, Texas in June, 2014 showed similar results about the efficacy of ProKure V. *The study by ATL tested the efficacy of ProKure V against feline calicivirus (FCV), which is actually the EPA-approved surrogate microorganism for human norovirus label claims.*

In this study ProKure V, again, was able to kill 99.9994% of the virus in 30 seconds. Of even more significance is the fact that in this study, ProKure V achieved these results at only 50 ppm.

Additional Information

Based on a meta-analysis of independent various studies conducted on the efficacy of chlorine dioxide, ProKure V is the only disinfectant that kills murine norovirus at the various concentrations tested below. Ethanol, bleach, or a quat disinfectant were all unable to kill the murine norovirus.[2]



[1] For this particular study, the researchers followed test criteria based on US EPA Guidelines DIS/TSS-7, Initial and Confirmatory testing, Hoelzer et al., 2013 and Nims and Plavsic, 2013. The tests followed exactly the ASTM E1052-11 protocols for viruses in suspension and ASTM E1053-11 for viruses on a nonporous inanimate environmental surfaces.

[2] The information in the graph above comes from several sources. The ProKure V data come from the Jan Biotech study. The data for the ethanol, bleach and quat came from either a study published in the Journal of Food Protection; "Efficacy of Commonly Used Disinfectants for Inactivation of Human Noroviruses and Their Surrogates," or a study published by Stephanie Chiu at the University of British Columbia in Vancouver, Canada in 2013; "Efficacy of Common Disinfectant/Cleaning Agents in Inactivating Murine Norovirus and Feline Calicivirus as Surrogate Viruses for Human Norovirus."