



TESTING NOROVIRUS IN FOOD, CLINICAL AND ENVIRONMENTAL SAMPLES

INTRODUCTION

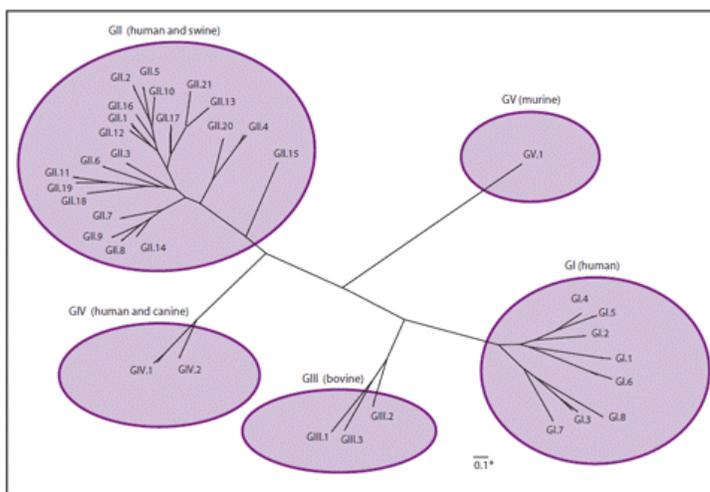
Human noroviruses (HuNoVs) are the leading cause of acute nonbacterial gastroenteritis, infecting more than 23 million people in the U.S. per year according to estimation by the U.S. Centers for Disease Control and Prevention (CDC). They are considered responsible for more than 80% of all outbreaks of acute gastroenteritis in crowded locations such as cruise ships and other vacation settings, restaurants, hospitals, nursing homes and schools. HuNoVs are also commonly found in shellfish grown in polluted waters. Recently, the Food and Drug Administration (FDA) issued a notice urging food distributors, retailers, handlers and vendors to remove from the market shellfish imported from South Korea because of possible norovirus contamination. The warning covers all fresh, frozen canned or processed mollusks such as oysters, clams, mussels and scallops from South Korea.

Detecting norovirus at an early stage and keeping an effective surveillance program is critical for food and environmental safety. MicroBioTest, a division of Microbac Laboratories, Inc. is proud to offer testing services for detection and quantitation of human noroviruses in food, clinical and environmental samples.

NOROVIRUS BIOLOGY

Noroviruses are a group of small (25 – 40 nm), non-enveloped viruses that contain single- stranded RNA as the genome. They all belong to the caliciviridae family of viruses but can be genetically divided into at least 35 genotypes based on the sequence diversity in the capsid protein VP1. All genotypes are grouped into five genogroups – GI to GV. Human norovirus strains are all within GI, GII, and GIV, with the GII genotype causing most outbreaks (~80%).

Figure - Classification of noroviruses into 5 genogroups (GI – GV) and 35 genotypes (reference: CDC, 2011)





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CLINICAL SYMPTOMS

Noroviruses are often referred to as the “stomach flu”. The onset of symptoms occur after 12 – 48 hours post infection (median 33 – 36 hours). The symptoms include nausea, acute onset vomiting (>50% of cases), watery non-bloody diarrhea, abdominal cramps, low-grade fever (~ 50% of cases), myalgia, malaise, and headache, etc. The symptoms typically last for 18 – 60 hours. The infected patients remain contagious up to 48 – 72-hours after symptoms subside. It shall be noted that approximately 30% of infections are asymptomatic but the patients may still spread the virus.

EPIDEMIOLOGY AND PUBLIC BURDEN

Noroviruses are highly contagious. As few as 10 to 100 virus particles are sufficient to cause infection. The virus can survive under various temperatures (freezing to ~60°C) for days to months. The transmission is primarily through the fecal-oral route and direct person to person contact. Fecal (or vomitus) contaminated food or water is considered the major source of infection. There is no evidence that suggests infections occur through the respiratory system.

CDC estimates that more than 23 million cases of acute gastroenteritis each year in the U.S. are due to norovirus infection. More than 50% of all foodborne disease outbreaks can be attributed to noroviruses. From July 1997 to June 2000, there were 232 reported outbreaks of noroviruses, 57% of which were foodborne. New estimates (2011) attribute 58% of all food-related illness to norovirus.

Food-related norovirus outbreaks have been associated with multiple products, such as fresh produce, deli-meats, salad bars, raw and undercooked molluscan shellfish, baked desserts, orange juice and frozen raspberries, etc.

DIAGNOSTICS

Currently, the reverse transcriptase polymerase chain reaction (RT-PCR) is a standard method for norovirus diagnosis. Clinical laboratories may also use

enzyme immunoassays (EIA), ELISA, electron microscopy (EM) and transmission microscopy (TEM) for additional or supplemental diagnostic methods.



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NOROVIRUS LABORATORY TESTING

The standard methodology for HuNoV detection is by RT-PCR. Extensive research has been carried out in this field for test optimization. MicroBioTest has established and validated a RT-PCR assay to test for HuNoV contamination in food (e.g. shellfish and fish sauce, etc.), clinical and environmental samples rapidly, reliably and sensitively.

The assay is quantitative or qualitative depending on the testing purpose. It includes an evaluation of the matrix interfering effect and a concentration of the sample prior to the assay if required. Specificity and sensitivity has been demonstrated. Our assay has a broad reactivity and can detect multiple genogroups of HuNoV at a detection limit (LOD) of 0.01 to 1.0 genome copies (GC) per Liter.

As a leader in contract testing, MicroBioTest, a division of Microbac Laboratories, has offered microbial and viral contract testing for regulatory submissions or marketing and other purposes since 1986. For further information or to request a brochure, please contact us at 703- 925-0100 or sales@microbac.com. We look forward to working with you to meet your testing needs.

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