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(54) Title: NOROVIRUS DERIVED IMMUNOGENIC COMPOSITIONS AND METHODS

(57) Abstract: The invention relates to chimeric norovirus VP 1 proteins containing the S-domain of VP 1 of a first norovirus strain and a P-domain that contains at least a portion of the P-domain of VP 1 of a second norovirus strain. The invention also relates to nucleic acids that encode the chimeric VPl proteins, virus-like particles that contain a chimeric norovirus VPl protein, and to immunogenic compositions.

NOROVIRUS DERIVED IMMUNOGENIC COMPOSITIONS AND METHODS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/361,581, filed July 6, 2010, the complete contents of which are hereby incorporated herein by reference for all purposes.

[0002] Noroviruses (formerly known as Norwalk-like viruses, NVLs, or Norwalk viruses) are the primary etiological agents of acute viral gastroenteritis in adults and children. noroviruses are highly infectious and spread by ingestion of contaminated food, such as oysters and water. Noroviruses also spread rapidly by person-to-person transmission through the fecal-oral route in semiclosed communities, such as hospitals, schools, nursing homes, and cruise ships. These characteristics make noroviruses a major public health concern. For example, in the United States alone, noroviruses cause greater than 95% of viral gastroenteritis outbreaks and an estimated 23 million cases of gastroenteritis per year (Fankhauser *et al.* (2002) J. Infect. Dis. 186:1-7; MMWR Morb. Mortal Weekly Rep. (2000) 49:207-21 1).

[0003] The symptoms of norovirus infection include diarrhea and vomiting as well as fever, headaches, chills and stomach-aches. The cause of such symptoms may be related to the binding of noroviruses to carbohydrate receptors of intestinal epithelial cells, which results in an imbalance in ion transfer (Marionneau *et al.* (2002) Gastroenterology 122:1967-1977; Hutson *et al.* (2003) J. Virol. 77:405-415). Extremely contagious, noroviruses can cause disease by infection with as few as 10 virions. Although otherwise healthy, people infected with noroviruses may recover within 2-4 days, they may still shed virus for up to 2 weeks after the onset of symptoms. Approximately 30-40% of infected people may remain symptom-free but spread infection by shedding of virus to others who may be more susceptible to infection (Hutson *et al.* (2004) Trends Microbiol. 12(6):279-287).

[0004] Noroviruses are members of the *Caliciviridae* family of small, non-enveloped, icosahedral viruses, 27-40 nm in diameter, containing a single-strand of positive-sense RNA. Phylogenic studies show that the genus Norovirus is made up of at least 40 diverse virus strains categorized into 5 genogroups, GI-GV, on the basis of sequence similarity. Among these 5 genogroups, GI and Gil are the most important genogroups for human infection. Each genogroup is further divided into genotypes. Currently, GI includes 8

distinct genotypes and Gil has at least 17 different genotypes. At the genomic level, strains in a genogroup have 51-56% nucleotide sequence identity, and strains in a genotype have 69-70% nucleotide sequence similarity (Donaldson *et ah,* Nat. Rev. Microbiol. 2010 Feb 2. [e-pub ahead of print]).

[0005] Norovirus RNA includes three open reading frames (ORFs), which encode the structural and non-structural proteins of the virus. The major structural protein of noroviruses is viral protein 1 (VPl). It is exclusively encoded by ORF2 of the norovirus RNA and forms the norovirus capsid structure. The norovirus capsid is made up of 180 copies of VPl monomers. When VPl is expressed recombinantly, it can self-assemble into an icosahedral capsid structure that lacks a viral genome and is known as virus-like particle (VLP).

[0006] X-ray crystallography studies have revealed that each capsid protein, VPl, is made up of two distinct domains, the shell (S) domain and the protruding (P) domain. These two domains are tethered together by a short flexible linker or hinge. The S-domains of the VP1 monomers collectively form the core of the norovirus VLP, and the P-domains extend radially on the surface of VLP and include the bulk of the known antigenic epitopes of norovirus. The P domain (aa 226-530, Norwalk strain numbering) is divided into two subdomains, PI and P2. The P2 domain is located at the outermost surface of the virion (or VLP) radially and is considered to be hypervariable in sequence. (See, *e.g.,* Chen *et al.* (2004) *J. Virol.* 78:6469-6479). The P2 domain is the least conserved region of VPl among norovirus strains and is thought to play an important role in receptor binding and immune reactivity. (Kitamoto *et ah* (2002) J. Clin. Microbiol. 40:2459-2465; Prasad *et ah* (1999) Science 286:287-290; Tan *et ah* (2003) J. Virol. 77:12562-12571; White *et ah* (1996) J. Virol. 70:6589-6597; Vance *et ah* (2005) J. General Virol. 86:2799-2806). Structural studies have shown diversity in the shape and size of the P2 subdomains of different noroviruses, consistent with the observed sequence variability of the P2 subdomains. Chen *et ah* (2004) J. Virology 78(12):6469-6479.

[0007] The expression and self-assembly of Norwalk virus VLPs was first demonstrated using the baculovirus-infected insect cell expression system (Jiang *et ah* (1992) J. Virol. 66:6527-6532) and then using a Venezuelan equine encephalitis vector-infected mammalian cell expression system (Baric *et ah* (2002) J. Virol. 76:3025-3030). When expressed at high levels in eukaryotic expression systems, the VPl monomers in Norwalk

virus, and certain other noroviruses, self-assemble into VLPs that structurally mimic native norovirus virions. VLPs preserve the authentic conformation of the viral capsid protein but lack norovirus genetic material. When injected into animals, norovirus VLPs can elicit an appropriate host immune response.

[0008] Despite what is known about the antigenic properties of norovirus, the development of an effective vaccine against norovirus has been slow and challenging. There are several reasons why it has been a challenge to develop a norovirus vaccine that is effective against a broad range of norovirus strains, including field isolates from different genogroups and genotypes. One reason has been the complex antigenic diversity that exists among different norovirus strains. Genotypic variations can result in new ligand-binding characteristics and antigenic properties (Donaldson *et al.,* Nat. Rev. Microbiol. 2010 Feb 2. [e-pub ahead of print]). A second reason is the sequential replacement of the dominant circulating norovirus strains (Siebenga *et al.* (2007) J. Virol 81:9932-9941). A third reason is the lack of a cell culture model for human noroviruses, preventing the development of a neutralization assay. A fourth reason is the lack of an animal model for human noroviruses, limiting preclinical testing of vaccine efficacy and impeding research to understand norovirus pathogensis and immunity (Donaldson et al. (2010) Nature Rev. Microbiol. 8:231-241).

[0009] To present immunodominant norovirus epitopes as vaccines, previously, VLPs containing either one type of VPl protein from only one norovirus strain (also known as monovalent VLPs) or a mixture of non-chimeric VP1 proteins from two or more norovirus strains (also known as multivalent VLPs) have been prepared. See, *e.g.,* WO2009039229. Monovalent VLPs may be less effective against a broad range of norovirus strains than multivalent VLPs. Current multivalent VLPs may be constrained in the range of VPl's from different strains that can be co-assembled due to their differences in VPl -VPl interaction surfaces between strains. Because of these problems, neither of the above-mentioned vaccine systems are suitable for rapid customization against the new noroviruses that emerge due to viral evolution.

[0010] Noroviruses undergo progressive changes in antigenic type, with new antigenic variants replacing older antigenic variants. Therefore, it is likely that there will be a need to periodically change the strain composition of a norovirus vaccine, as is done today for seasonal influenza vaccines. The assembly of VLPs from VPl of different norovirus strains occurs with different levels of efficiency, and the resulting VLPs have different levels

of yield and stability. This variability between strains would impede the speed, reliability, and facility of needed strain changes in a norovirus vaccine composition.

[0011] Therefore, there remains a need for an improved norovirus vaccine development approach that allows for rapid changes in the strain composition of efficiently prepared, stable, and properly presented norovirus immunogenic materials from any desired norovirus strain, including new field and/or clinical isolates.

SUMMARY OF THE INVENTION

[0012] The present invention, in part, provides immunogenic compositions comprising norovirus antigens and materials and methods that can be used for rapid development of such compositions. The norovirus antigens of the invention comprise chimeric norovirus VP1 proteins in which all or a portion of the P-domain is replaced with all or a portion of a P-domain from a different norovirus strain.

[0013] In one aspect the invention relates to a chimeric norovirus viral protein 1 (VP1), which contains the S-domain of VP1 from a first norovirus strain and at least a portion of the P-domain of VP1 from a second norovirus strain, and optionally, a linker peptide that operably links the S-domain and the P-domain. When present, the linker peptide can be any suitable linker, such as the linker peptide of the VP1 from the first norovirus strain, from the second norovirus strain, or from a third norovirus strain. The chimeric VP1 can have a structure according to Formula (I): A—S—L—P—B (I).

[0014] In Formula (I), A and B are independently absent or any desired amino acid sequence; S is the S-domain of VP1 from a first norovirus strain; L is absent or a linker peptide; and P is a norovirus VP1 P-domain; wherein at least a portion of the P-domain is from a second norovirus strain.

[0015] In some embodiments, P is the P-domain from a second norovirus strain. In other embodiments, P comprises a Pl-subdomain, or portion thereof, from the first norovirus strain and a P2-subdomain from a second norovirus strain.

[0016] The chimeric VP1 protein can contain portions, e.g., S-domain, P-domain, from any desired norovirus strain, such as the norovirus strains listed in Table 1. In some embodiments, the S-domain is from the Snow Mountain strain. In these embodiments, the P-

domain or a portion thereof (e.g., P2 subdomain) can be from any other norovirus strain, such as those listed in Table 1. In particular embodiments, the S-domain is from the Snow Mountain strain and the P-domain or a portion thereof (e.g., P2 subdomain) is from a different norovirus strain from genogroup Gil, a norovirus strain from genogroup GI or a norovirus strain from genogroup GIV. In more particular embodiments, the S-domain is from the Snow Mountain strain and the P-domain or a portion thereof (e.g., P2 subdomain) is from Norwalk virus, GII.4.2006a, or New Orleans.

[0017] In another aspect, the invention relates to a norovirus virus like particle (VLP) comprising a chimeric VP1 protein as described herein. The VLP can be monovalent or multivalent. The multivalent VLP can comprise two or more different chimeric VPl protein as described herein. The multivalent VLP can comprise a chimeric VPl protein as described herein and a naturally occurring norovirus VP1 protein.

[0018] The invention also relates to recombinant nucleic acids that encode a chimeric norovirus VP1 protein as described herein. The recombinant nucleic acid can be, for example, RNA or DNA, and if desired, can comprise a vector. In some embodiments, the recombinant nucleic acid is self-replicating, such as a self-replicating RNA.

[0019] In another aspect, the invention relates to immunogenic compositions comprising a chimeric norovirus VP1 protein as described herein, a VLP as described herein or combinations thereof. The invention also relates to an immunogenic composition comprising a recombinant nucleic acid that encodes encode a chimeric norovirus VPl protein as described herein.

[0020] In another aspect, the invention relates to a recombinant host cell comprising a recombinant nucleic acid that encodes encode a chimeric norovirus VPl protein as described herein. The host cell can be, for example, insect cells, mammalian cells, avian cells, bacteria, yeast cells, Tetrahymena cells and combinations thereof.

[0021] The invention also relates to a method of producing a chimeric norovirus VPl protein and/or VLP, comprising culturing a recombinant host cell as described herein under conditions whereby the recombinant nucleic acid is expressed and chimeric VPl protein is produced. In some embodiments, the recombinant host cell is maintained under conditions suitable for formation of VLPs. In some embodiments, the method further comprises

isolating the chimeric norovirus VPl protein and/or VLPs from the culture media and/or the recombinant host cells.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] FIG. 1 depicts the diagram for vector pMADC5 suitable for subcloning and amplification of the chimeric VPl oligonucleotides of the invention.

[0023] FIG. 2 depicts the diagram of a vector pBS24.1 suitable for expression of chimeric VPl proteins and VLPs in *S. cerevisiae.*

[0024] FIG. 3 is an amino acid alignment of VP1 proteins from three different norovirus strains, Norwalk (norw) genotype Gl.l (SEQ ID NO: 11), Snow Mountain (snow) genotype GII.2 (SEQ ID NO: 12), and 2006a **(g2.4)** GII.4 (SEQ ID NO: 13). As shown, the shell domain (S-domain) is residues 1-221, the linker peptide is residues 222-230, and the protruding domain (P-domain) is residues 231-530.

[0025] FIG. 4A depicts the nucleotide sequence (SEQ ID NO: 14) of ORF2 in norovirus strain Snow Mountain, which encodes the VPl protein in that strain. FIG. 4B show the translated amino acid sequence (SEQ ID NO: 12) of VPl protein encoded by ORF2 of Snow Mountain.

[0026] FIG. 5 depicts a nucleic acid (SEQ ID NO: 15) encoding a chimeric VPl protein whose S-domain is derived from the Snow Mountain strain, and P-domain is derived from the Norwalk strain.

[0027] FIG. 6 depicts a nucleic acid (SEQ ID NO: 16) encoding a chimeric VPl protein whose S-domain is derived from the Snow Mountain strain, and P-domain is derived from the GII.4 2006a strain.

[0028] FIG. 7 shows 24 schematic representations of the primary structure of exemplary chimeric VPl proteins of the invention. The variables A, S, L, Pl-1, P2, Pl-2, and B are as described herein.

[0029] FIGS. 8A-8E show a multiple amino acid alignment of VPl sequences of several norovirus strains. See, Hansman *et al.* (2006) J. General Virology 87:909-919. The following regions are indicated in these figures: N-terminal region (line); S-domain (filled

box), Pi-i-subdomain (open box); P_2-subdomain (XXX); Pi_{-2}-subdomain (open box) and C-terminal region (line). Asterisks indicate conserved amino acids. The sequences depicted are from the following norovirus strains: #8 (SEQ ID NO: 17) (AB058547, a GI/11 strain); SeV (SEQ ID NO:18) (AB031013, a *GVl* strain); 258 (SEQ ID NO:19) (AB078335, a GI/2 strain); 645 (SEQ ID NO:20) (BD01 1871, a GI/3 strain); CV (SEQ ID NO:21) (AB042808, a GI/4 strain); WUG1 (SEQ ID NO:22) (AB081723, a GI/8 strain); HV (SEQ ID NO:23) (U07611, a GII/1 strain); 485 (SEQ ID NO:24) (DQ093065, a GII/1 strain); Ina (SEQ ID NO:25) (AB195225, a *GIV2* strain); 809 (SEQ ID NO:26) (BD011876, a GII/3 strain); Sh5 (SEQ ID NO:27) (AB195226, a GII/3 strain); 18-3 (SEQ ID NO:28) (DQ093062, a GII/3 strain); 336 (SEQ ID NO:29) (DQ093063, a GII/3 strain); 1152 (SEQ ID NO:30) (DQ0930); 104 (SEQ ID NO:31) (AB078336, a GII/4 strain); 754 (SEQ ID NO:32) (BD011877, a GII/5 strain); 7k (SEQ ID NO:33) (AB078337, GII/6 strain); 445 (SEQ ID NO:34) (DQ093064, a GII/6 strain); 10-25 (SEQ ID NO:35) (9BD011881, a GII/7 strain); U25 (SEQ ID NO:36) (AB039780, a GII/8 strain); 026 (SEQ ID NO:37) (AF504671, a GII/10 strain) ; CHV (SEQ ID NO:38) (AB032758, a GII/12 strain); 47 (SEQ ID NO:39) (AB078334, a GII/14 strain); Hiro (SEQ ID NO:40) (AB044366, a GII/12 strain); Alph23 (SEQ ID NO:41) (DQ093067, a GII/1 7 strain).

[0030] FIG. 9 is a table showing amino acid residues identified by Chakavarty *et al.* (2005) J. Virology, 79(l):554-568, from S and P domains, that distinguish different known and suggested antigenic norovirus strains and classes.

[0031] FIG. 10A is an X-ray structure of Norwalk virus-like particles with the S-domain (internal) in dark gray and the P-domain (external) in light grey. FIG. 10B is a view of a single monomer colored as in FIG. 10A.

[0032] FIG. 11A is an image depicting a purified protein of Snow Mountain VLPs. FIG. 1IB is an electron micrograph of Snow Mountain VLPs.

[0033] FIG. 12A is an image depicting a purified protein of Snow Mountain/Norwalk VLP chimera. FIG. 12B is an electron micrograph of Snow Mountain/Norwalk chimeric VLPs.

DETAILED DESCRIPTION OF THE INVENTION

[0034] The present invention provides compositions and methods for production and use of chimeric norovirus VP1 proteins. The invention further provides immunogenic compositions that include norovirus VLPs comprising said chimeric VP1 proteins in which the S-domain is derived from a first norovirus strain and all or part of the P-domain is derived from a second norovirus strain.

[0035] Other aspects of the present invention include nucleic acids and polypeptides, and methods for preparing and purifying such nucleic acids and polypeptides. These aspects of the invention together with the VLPs of the invention and their use in immunogenic compositions and methods of using such compositions in the treatment or prevention of norovirus are described in more detail below.

I. Definitions

[0036] All scientific and technical terms used in this application have meanings commonly used in the art unless otherwise specified. As used in this application, the following words or phrases have the meanings specified.

[0037] As used herein, "a", "an" and "the" include singular and plural references unless the content clearly dictates otherwise. Thus, for example, reference to "a polynucleotide" includes a mixture of two or more such polynucleotides, and the like.

[0038] The term "about" in relation to a numerical value x means, for example, x+10%.

[0039] As used herein, the terms "norovirus" and "Norwalk-like virus" refer to members of the genus norovirus of the family Caliciviridae of positive-sense, single-stranded RNA, nonenveloped viruses (Green *et ah,* Human Caliciviruses, in Fields Virology Vol. 1, pp. 841-874 (Knipe and Howley, editors-in-chief, 4th ed., Lippincott Williams & Wilkins 2001)). The term norovirus includes strains in all genogroups of the virus. Currently, norovirus strains are divided into five genogroups (GI-GV), which are subdivided into at least 20 genetic clusters or genotypes. In particular, the term norovirus includes, but is not limited to, the species Norwalk virus (NV), Lordsdale virus (LV), Mexico virus (MV), Hawaii virus (HV), Snow Mountain virus (SMV), Desert Shield virus (DSV), and Southhampton virus

(SV). A large number of norovirus isolates have been partially or completely sequenced. See, *e.g.,* the GenBank database (ncbi.nlm.nih.gov), the Taxonomy Database at National Center for Biotechnology Information (ncbi.nlm.nih.gov) or the PathoSystems Resource Integration Center Database on Caliciviridae (patric.vbi.vt.edu). The term norovirus also includes isolates not characterized at the time of filing.

[0040] The terms "polypeptide" and "protein" refer to a polymer of amino acid residues and are not limited to a minimum length of the product. Thus, peptides, oligopeptides, dimers, multimers, and the like, are included within the definition. Both full-length proteins and fragments thereof are encompassed by the definition. The terms also include postexpression modifications of the polypeptide, for example, glycosylation, acetylation, phosphorylation and the like. Furthermore, for purposes of the present invention, a "polypeptide" refers to a protein which includes modifications, such as deletions, additions and substitutions (generally conservative in nature), to the native sequence, so long as the protein maintains the desired activity. These modifications may be deliberate, as through site-directed mutagenesis, or may be accidental, such as through mutations of hosts which produce the proteins or errors due to PCR amplification.

[0041] "Substantially purified" generally refers to isolation of a substance (compound, polynucleotide, protein, polypeptide, polypeptide composition) such that the substance comprises the majority percent of the sample in which it resides. Typically in a sample, a substantially purified component comprises 50%, preferably 80%-85%, more preferably 90-95% of the sample. Techniques for purifying polynucleotides and polypeptides of interest are well-known in the art and include, for example, ion-exchange chromatography, affinity chromatography and sedimentation according to density.

[0042] By "isolated" is meant, when referring to a polypeptide, that the indicated molecule is separate and discrete from the whole organism with which the molecule is found in nature or is present in the substantial absence of other biological macro-molecules of the same type. The term "isolated" with respect to a polynucleotide is a nucleic acid molecule devoid, in whole or part, of sequences normally associated with it in nature; or a sequence, as it exists in nature, but having heterologous sequences in association therewith; or a molecule disassociated from the chromosome.

[0043] "Recombinant" as used herein to describe a nucleic acid molecule means a polynucleotide of genomic, cDNA, viral, semisynthetic, or synthetic origin which, by virtue of its origin or manipulation, is not associated with all or a portion of the polynucleotide with which it is associated in nature. The term "recombinant" as used with respect to a protein or polypeptide means a polypeptide produced by expression of a recombinant polynucleotide. In general, the gene of interest is cloned and then expressed in transformed organisms, as described further below. The host organism expresses the foreign gene to produce the protein under expression conditions.

[0044] The term "transformation" refers to the insertion of an exogenous polynucleotide into a host cell, irrespective of the method used for the insertion. For example, direct uptake, transfection, transduction or f-mating are included. The exogenous polynucleotide may be maintained as a non-integrated vector, for example, a plasmid, or alternatively, may be integrated into the host genome.

[0045] "Recombinant host cells", "host cells," "cells", "cell lines," "cell cultures", and other such terms denoting microorganisms or higher eukaryotic cell lines cultured as unicellular entities refer to cells which can be, or have been, used as recipients for recombinant vector or other transferred DNA, and include the original progeny of the original cell which has been transfected.

[0046] A "coding sequence" or a sequence which "encodes" a selected polypeptide, is a nucleic acid molecule which is transcribed (in the case of DNA) and translated (in the case of mRNA) into a polypeptide *in vivo* when placed under the control of appropriate regulatory sequences (or "control elements"). The boundaries of the coding sequence can be determined by a start codon at the 5' (amino) terminus and a translation stop codon at the 3' (carboxy) terminus. A coding sequence can include, but is not limited to, cDNA from viral, procaryotic or eucaryotic mRNA, genomic DNA sequences from viral or procaryotic DNA or RNA, and even synthetic DNA sequences. A transcription termination sequence may be located 3' to the coding sequence.

[0047] Typical "control elements," include, but are not limited to, transcription promoters, transcription enhancer elements, transcription termination signals, polyadenylation sequences (located 3' to the translation stop codon), sequences for

optimization of initiation of translation (located 5' to the coding sequence), and translation termination sequences.

[0048] The term "nucleic acid" includes DNA and RNA, and also their analogues, such as those containing modified backbones *(e.g.* phosphorothioates, etc.), and also peptide nucleic acids (PNA), etc. The invention includes nucleic acids comprising sequences complementary to those described above *(e.g.* for antisense or probing purposes).

[0049] The term "self-replicating" refers to a nucleic acid molecule that encodes a polymerase, contains nucleotide sequence elements that enable that polymerase to replicate the nucleic acid molecule and, preferably, also encodes a desired polypeptide, such as a chimeric norovirus VP1. Preferably, the self-replication nucleic acid is a self-replicating RNA molecule. For example, a self-replicating RNA molecule can be based on an alphavirus genome, and encode nonstructural proteins that can direct replication of the RNA molecule, contains a replication recognition sequence sufficient to allow replication of the RNA molecule, and also encode a desired target polypeptide, such as such as a chimeric norovirus VP1. Optionally, one or more structural viral genes (e.g., capsid and/or envelope glycoproteins) are deleted or omitted from the self-replicating RNA molecule. Suitable alphaviruses that can be used to produce self-replicating RNA molecules include Sindbis virus, Semliki forest virus, Eastern Equine Encephalitis virus, Venezuelan equine encephalitis virus and the like. (See, e.g., EP 1 751 289 Bl; Ying et al. (1999) Nat. Med. 5(7):823-827; Racanelli et al. (2004) Immunity, 20(l):47-58, regarding self-replicating RNA molecules.)

[0050] "Operably linked" refers to an arrangement of elements wherein the components so described are configured so as to perform their usual function. Thus, a given promoter operably linked to a coding sequence is capable of effecting the expression of the coding sequence when the proper enzymes are present. The promoter need not be contiguous with the coding sequence, so long as it functions to direct the expression thereof. Thus, for example, intervening untranslated yet transcribed sequences can be present between the promoter sequence and the coding sequence and the promoter sequence can still be considered "operably linked" to the coding sequence.

[0051] "Encoded by" refers to a nucleic acid sequence which codes for a polypeptide sequence, wherein the polypeptide sequence or a portion thereof contains an amino acid sequence of at least 3 amino acids.

[0052] "Expression cassette" or "expression construct" refers to an assembly which is capable of directing the expression of the sequence(s) or gene(s) of interest. An expression cassette generally includes control elements, as described above, such as a promoter which is operably linked to (so as to direct transcription of) the sequence(s) or gene(s) of interest, and often includes a polyadenylation sequence as well. Within certain embodiments of the invention, the expression cassette described herein may be contained within a plasmid construct. In addition to the components of the expression cassette, the plasmid construct may also include, one or more selectable markers, a signal which allows the plasmid construct to exist as single-stranded DNA *(e.g.,* a M13 origin of replication), at least one multiple cloning site, and a "mammalian" origin of replication *(e.g.,* a SV40 or adenovirus origin of replication).

[0053] "Purified polynucleotide" refers to a polynucleotide of interest or fragment thereof which is essentially free, *e.g.,* contains less than about 50%, preferably less than about 70%, and more preferably less than about at least 90%, of the protein with which the polynucleotide is naturally associated. Techniques for purifying polynucleotides of interest are well-known in the art and include, for example, disruption of the cell containing the polynucleotide with a chaotropic agent and separation of the polynucleotide(s) and proteins by ion-exchange chromatography, affinity chromatography and sedimentation according to density.

[0054] A "vector" is capable of transferring nucleic acid sequences to target cells *(e.g.,* viral vectors, non-viral vectors, particulate carriers, and liposomes). Typically, "vector construct," "expression vector," and "gene transfer vector," mean any nucleic acid construct capable of directing the expression of a nucleic acid of interest and which can transfer nucleic acid sequences to target cells. Thus, the term includes cloning and expression vehicles, as well as viral vectors.

[0055] As used herein, the term "epitope" generally refers to the site on an antigen which is recognized by a T-cell receptor and/or an antibody. It may be a short peptide derived from or as part of a protein antigen. The three-dimensional structure of the epitope may or may not be important for its function. However the term is also intended to include peptides with glycopeptides and carbohydrate epitopes. Several different epitopes may be carried by a single antigenic molecule. The term "epitope" also includes modified sequences of amino acids or carbohydrates which stimulate responses which recognize the whole

organism. It is advantageous if the selected epitope is an epitope of an infectious agent, which causes the infectious disease.

[0056] For a description of various norovirus capsid epitopes, see, *e.g.,* Hardy *et ah,* U.S. Patent Application Publication No. 2005/015291 1; incorporated herein by reference in its entirety. In particular, Hardy *et ah* have identified epitopes of the Norwalk virus capsid protein at residues 133-137 and of the Snow Mountain virus capsid protein at residues 319-327, comprising the following sequences: WTRGSHNL, (SEQ ID NO:l), WTRGGHGL, (SEQ ID NO:2), WTRGQHQL (SEQ ID NO:3), or WLPAPIDKL (SEQ ID NO:4). Immunogenic polypeptides comprising such capsid epitopes and nucleic acids encoding them may be used in the practice of the invention.

[0057] As used herein, the term "T cell epitope" refers generally to those features of a peptide structure which are capable of inducing a T cell response and a "B cell epitope" refers generally to those features of a peptide structure which are capable of inducing a B cell response.

[0058] An "immunological response" to an antigen or composition is the development in a subject of a humoral and/or a cellular immune response to an antigen present in the composition of interest. For purposes of the present invention, a "humoral immune response" refers to an immune response mediated by antibody molecules, while a "cellular immune response" is one mediated by T-lymphocytes and/or other white blood cells. One important aspect of cellular immunity involves an antigen-specific response by cytolytic T-cells ("CTL"s). CTLs have specificity for peptide antigens that are presented in association with proteins encoded by the major histocompatibility complex (MHC) and expressed on the surfaces of cells. CTLs help induce and promote the destruction of intracellular microbes, or the lysis of cells infected with such microbes. Another aspect of cellular immunity involves an antigen-specific response by helper T-cells. Helper T-cells act to help stimulate the function, and focus the activity of, nonspecific effector cells against cells displaying peptide antigens in association with MHC molecules on their surface. A "cellular immune response" also refers to the production of cytokines, chemokines and other such molecules produced by activated T-cells and/or other white blood cells, including those derived from CD4+ and CD8+ T-cells.

[0059] An immunogenic composition or vaccine that elicits a cellular immune response may serve to sensitize a vertebrate subject by the presentation of antigen in association with MHC molecules at the cell surface. The cell-mediated immune response is directed at, or near, cells presenting antigen at their surface. In addition, antigen-specific T-lymphocytes can be generated to allow for the future protection of an immunized host.

[0060] The ability of a particular antigen to stimulate a cell-mediated immunological response may be determined by a number of assays, such as by lymphoproliferation (lymphocyte activation) assays, CTL cytotoxic cell assays, or by assaying for T-lymphocytes specific for the antigen in a sensitized subject. Such assays are well known in the art. See, *e.g.,* Erickson *et al.* (1993) J. Immunol. 151:4189-4199; Doe *et al.* (1994) Eur. J. Immunol. 24:2369-2376. Recent methods of measuring cell-mediated immune response include measurement of intracellular cytokines or cytokine secretion by T-cell populations, or by measurement of epitope specific T-cells *(e.g.,* by the tetramer technique) (reviewed by McMichael, A.J. and O'Callaghan, C.A. (1998) J. Exp. Med. 187(9)1367-1371; Mcheyzer-Williams, M.G. *et al.* (1996), Immunol. Rev. 150:5-21; Lalvani, A. *et al.* (1997) J. Exp. Med. 186:859-865).

[0061] Thus, an immunological response as used herein may be one that stimulates the production of antibodies *(e.g.,* neutralizing antibodies that block bacterial toxins and pathogens such as viruses entering cells and replicating by binding to toxins and pathogens, typically protecting cells from infection and destruction). The antigen of interest may also elicit production of CTLs. Hence, an immunological response may include one or more of the following effects: the production of antibodies by B-cells; and/or the activation of suppressor T-cells and/or memory/effector T-cells directed specifically to an antigen or antigens present in the composition or vaccine of interest. These responses may serve to neutralize infectivity, and/or mediate antibody-complement, or antibody dependent cell cytotoxicity (ADCC) to provide protection to an immunized host. Such responses can be determined using standard immunoassays. The innate immune system of mammals also recognizes and responds to molecular features of pathogenic organisms via activation of Toll-like receptors and similar receptor molecules on immune cells. Upon activation of the innate immune system, various non-adaptive immune response cells. are activated to, *e.g.,* produce various cytokines, lymphokines and chemokines. Cells activated by an innate immune response include immature and mature Dendritic cells of the monocyte and plasmacytoid

lineage (MDC, PDC), as well as gamma, delta, alpha and beta T cells and B cells and the like. Thus, the present invention also contemplates an immune response wherein the immune response involves both an innate and adaptive response.

[0062] An "immunogenic composition" is a composition that comprises an antigenic molecule where administration of the composition to a subject results in the development in the subject of a humoral and/or a cellular immune response to the antigenic molecule of interest.

[0063] The terms "immunogenic" protein or polypeptide refer to an amino acid sequence which elicits an immunological response as described above. An "immunogenic" protein or polypeptide, as used herein, includes the full-length natural or recombinant sequence of the protein in question, including the precursor and mature forms, analogs thereof, or immunogenic fragments thereof.

[0064] A norovirus polynucleotide, oligonucleotide, nucleic acid, protein, polypeptide, or peptide, as defined above, is a molecule derived from a norovirus, respectively, including, without limitation, any of the various isolates of norovirus. The molecule need not be physically derived from the particular isolate in question, but may be synthetically or recombinantly produced.

[0065] In particular, the genomes of norovirus strains contain three open reading frames: ORF1, which is transcribed into a polyprotein; ORF2, which is transcribed into the major capsid protein VP1; and ORF3, which is transcribed into the minor structural protein VP2. In norovirus strain Norwalk, the boundaries of the polypeptide domains within the VP1 protein are as follows: the shell (S) domain formed by amino acid residues 1-221, a flexible hinge region at amino acid residues 222-230, and the protruding (P) domain formed by amino residues 231-530. The P-domain is further divided into two subdomains, P1 and the hypervariable P2, which extends farthest out from the capsid shell and contains the putative receptor-binding sites (Choi, *et al.* (2008) Proc. Natl. Aacd. Sci. USA 105:9175-9180, Prasad *et al.* (1999) Science 286:287-290). Although, the foregoing numbering is relative to the polyprotein amino acid sequence of Norwalk strain (SEQ ID NO: 11), it is to be understood that the corresponding amino acid positions in sequences obtained from other genotypes and isolates of norovirus are also intended to be encompassed by the present invention. For example, see FIG. 3. Any one of the polypeptides encoding the full-length VP1 or VP2, as

well as variants thereof, immunogenic fragments thereof, and nucleic acids encoding such polypeptides, variants or immunogenic fragments can be used in the practice of the invention.

[0066] Nucleic acid and protein sequences for a number of norovirus isolates are known. Representative norovirus VP1 and VP2 sequences are presented in FIGS. 4A-4B and 5A-5B. Additional representative sequences, including sequences of ORF1, ORF2, ORF3, and their encoded polypeptides from norovirus isolates are listed in the National Center for Biotechnology Information (NCBI) database. See, for example, GenBank entries: norovirus genogroup 1 strain Hu/NoV/West Chester/2001/USA, GenBank Accession No. AY502016; norovirus genogroup 2 strain Hu/NoV/Braddock Heights/1999/USA, GenBank Accession No. AY502015; norovirus genogroup 2 strain Hu/NoV/Fayette/1999/USA, GenBank Accession No. AY502014; norovirus genogroup 2 strain Hu/NoV/Fairfield/1999/USA, GenBank Accession No. AY502013; norovirus genogroup 2 strain Hu/NoV/Sandusky/1999/USA, GenBank Accession No. AY502012; norovirus genogroup 2 strain Hu/NoV/Canton/1999/USA, GenBank Accession No. AY50201 1; norovirus genogroup 2 strain Hu/NoV/Tiffin/1999/USA, GenBank Accession No. AY502010; norovirus genogroup 2 strain Hu/NoV/CS-El/2002/USA, GenBank Accession No. AY50200; norovirus genogroup 1 strain Hu/NoV/Wisconsin/2001/USA, GenBank Accession No. AY502008; norovirus genogroup 1 strain Hu/NoV/CS-84 1/2001/USA, GenBank Accession No. AY502007; norovirus genogroup 2 strain Hu/NoV/Hiram/2000/USA, GenBank Accession No. AY502006; norovirus genogroup 2 strain Hu/NoV/Tontogany/1999/USA, GenBank Accession No. AY502005; Norwalk virus, complete genome, GenBank Accession No. NC—001959; norovirus Hu/GI/Otofuke/1979/JP genomic RNA, complete genome, GenBank Accession No. AB187514; norovirus Hu/Hokkaido/133/2003/JP, GenBank Accession No. AB212306; norovirus Sydney 2212, GenBank Accession No. AY588132; Norwalk virus strain SN2000JA, GenBank Accession No. AB190457; Lordsdale virus complete genome, GenBank Accession No. X86557; Norwalk-like virus genomic RNA, Gifu'96, GenBank Accession No. AB045603; Norwalk virus strain Vietnam 026, complete genome, GenBank Accession No. AF504671; norovirus Hu/GII.4/2004/N/L, GenBank Accession No. AY883096; norovirus Hu/GII/Hokushin/03/JP, GenBank Accession No. AB195227; norovirus Hu/GII/Kamo/03/JP, GenBank Accession No. AB195228; norovirus Hu/GII/Sinsiro/97/JP, GenBank Accession No. AB195226; norovirus Hu/GII/Ina/02/JP, GenBank Accession No. AB195225; norovirus Hu/NLV/GII/Neustrelitz260/2000/DE, GenBank Accession No. AY772730; norovirus Hu/NLV/Dresdenl74/pUS-NorII/1997/GE,

GenBank Accession No. AY741811; norovirus Hu/NLV/Oxford/B2S16/2002/UK, GenBank Accession No. AY587989; norovirus Hu/NLV/Oxford/B4S7/2002/UK, GenBank Accession No. AY587987; norovirus Hu/NLV/Witney/B7S2/2003/UK, GenBank Accession No. AY588030; norovirus Hu/NLV/Banbury/B9S23/2003/UK, GenBank Accession No. AY588029; norovirus Hu/NLV/ChippingNorton/2003/UK, GenBank Accession No. AY588028; norovirus Hu/NLV/Didcot/B9S2/2003/UK, GenBank Accession No. AY588027; norovirus Hu/NLV/Oxford/B8S5/2002/UK, GenBank Accession No. AY588026; norovirus Hu/NLV/Oxford/B6S4/2003/UK, GenBank Accession No. AY588025; norovirus Hu/NLV/Oxford/B6S5/2003/UK, GenBank Accession No. AY588024; norovirus Hu/NLV/Oxford/B5S23/2003/UK, GenBank Accession No. AY588023; norovirus Hu/NLV/Oxford/B6S2/2003/UK, GenBank Accession No. AY588022; norovirus Hu/NLV/Oxford/B6S6/2003/UK, GenBank Accession No. AY588021; Norwalk-like virus isolate Bo/ThirsklO/00/UK, GenBank Accession No. AY126468; Norwalk-like virus isolate Bo/Penrith55/00/UK, GenBank Accession No. AY126476; Norwalk-like virus isolate Bo/Aberystwyth24/00/UK, GenBank Accession No. AY126475; Norwalk-like virus isolate Bo/Dumfries/94/UK, GenBank Accession No. AY126474; norovirus NLV/IF2036/2003/Iraq, GenBank Accession No. AY675555; norovirus NLV/IF1998/2003/Iraq, GenBank Accession No. AY675554; norovirus NLV/BUDS/2002/USA, GenBank Accession No. AY660568; norovirus NLV/Paris Island/2003/USA, GenBank Accession No. AY652979; Snow Mountain virus, complete genome, GenBank Accession No. AY134748; Norwalk-like virus NLV/Fort Lauderdale/560/1998/US, GenBank Accession No. AF414426; Hu/norovirus/hiroshima/1999/JP(9912-02F), GenBank Accession No. AB044366; Norwalk-like virus strain 11MSU-MW, GenBank Accession No. AY274820; Norwalk-like virus strain B-1SVD, GenBank Accession No. AY274819; norovirus genogroup 2 strain Hu/NoV/Farmington Hills/2002/USA, GenBank Accession No. AY502023; norovirus genogroup 2 strain Hu/NoV/CS-G4/2002/USA, GenBank Accession No. AY502022; norovirus genogroup 2 strain Hu/NoV/CS-G2/2002/USA, GenBank Accession No. AY502021; norovirus genogroup 2 strain Hu/NoV/CS-G12002/USA, GenBank Accession No. AY502020; norovirus genogroup 2 strain Hu/NoV/Anchorage/2002/USA, GenBank Accession No. AY502019; norovirus genogroup 2 strain Hu/NoV/CS-Dl/2002/CAN, GenBank Accession No. AY502018; norovirus genogroup 2 strain Hu/NoV/Germanton/2002/USA, GenBank Accession No. AY502017; Human calicivirus NLV/GII/Langenl061/2002/DE, complete genome, GenBank Accession No. AY485642; Murine norovirus 1 polyprotein, GenBank Accession No. AY228235; Norwalk virus,

GenBank Accession No. AB067536; Human calicivirus NLV/Mex7076/1999, GenBank Accession No. AF542090; Human calicivirus NLV/Oberhausen 455/01/DE, GenBank Accession No. AF539440; Human calicivirus NLV/Herzberg 385/01/DE, GenBank Accession No. AF539439; Human calicivirus NLV/Boxer/2001/US, GenBank Accession No. AF538679; Norwalk-like virus genomic RNA, complete genome, GenBank Accession No. AB081723; Norwalk-like virus genomic RNA, complete genome, isolate: Saitama U201, GenBank Accession No. AB039782; Norwalk-like virus genomic RNA, complete genome, isolate: Saitama U18, GenBank Accession No. AB039781; Norwalk-like virus genomic RNA, complete genome, isolate: Saitama U25, GenBank Accession No. AB039780; Norwalk virus strain:U25GII, GenBank Accession No. AB067543; Norwalk virus strain:U201 Gil, GenBank Accession No. AB067542; Norwalk-like viruses strain 416/97003 156/1996/LA, GenBank Accession No. AF080559; Norwalk-like viruses strain 408/97003012/1996/FL, GenBank Accession No. AF080558; Norwalk-like virus NLV/Burwash Landing/33 1/1995/US, GenBank Accession No. AF414425; Norwalk-like virus NLV/Miami Beach/326/1 995/US, GenBank Accession No. AF414424; Norwalk-like virus NLV/White River/290/1994/US, GenBank Accession No. AF414423; Norwalk-like virus NLV/New Orleans/306/1994/US, GenBank Accession No. AF414422; Norwalk-like virus NLV/Port Canaveral/30 1/1 994/US, GenBank Accession No. AF4 14421; Norwalk-like virus NLV/Honolulu/314/1994/US, GenBank Accession No. AF414420; Norwalk-like virus NLV/Richmond/283/1994/US, GenBank Accession No. AF414419; Norwalk-like virus NLV/Westover/302/1 994/US, GenBank Accession No. AF414418; Norwalk-like virus NLV/UK3-17/12700/1992/GB, GenBank Accession No. AF414417; Norwalk-like virus NLV/Miami/81/1986/US, GenBank Accession No. AF414416; Snow Mountain strain, GenBank Accession No. U70059; Desert Shield virus DSV395, GenBank Accession No. U04469; Norwalk virus, complete genome, GenBank Accession No. AF093797; Hawaii calicivirus, GenBank Accession No. U07611; Southampton virus, GenBank Accession No. L07418; Norwalk virus (SRSV-KY-89/89/J), GenBank Accession No. L23828; Norwalk virus (SRSV-SMA/76/US), GenBank Accession No. L23831; Camberwell virus, GenBank Accession No. U46500; Human calicivirus strain Melksham, GenBank Accession No. X81879; Human calicivirus strain MX, GenBank Accession No. U22498; Minireovirus TV24, GenBank Accession No. U02030; and Norwalk-like virus NLV/Gwynedd/273/1994/US, GenBank Accession No. AF414409; all of which sequences (as entered by the date of filing of this application) are herein incorporated by reference. Additional norovirus sequences are disclosed in the following patent publications: WO

05/030806, WO 00/79280, JP2002020399, US2003 129588, U.S. Pat. No. 6,572,862, WO 94/05700, and WO 05/032457, all of which are herein incorporated by reference in their entireties. See also Green *et al.* (2000) J. Infect. Dis. 181(Suppl. 2):S322-S330; Wang *et al.* (1994) J. Virol. 68:5982-5990; Chen *et al.* (2004) J. Virol. 78: 6469-6479; Chakravarty *et al.* (2005) J. Virol. 79: 554-568; and Fankhauser *et al.* (1998) J. Infect. Dis. 178:1571-1578; for sequence comparisons and a discussion of genetic diversity and phylogenetic analysis of noroviruses.

[0067] As used herein, the terms "major capsid protein" or "major capsid polypeptide" or "VP1" in reference to a norovirus refer to a polypeptide comprising a sequence homologous or identical to the ORF2-encoded polypeptide of a norovirus, and includes sequences displaying at least about 70-100% or about 80-100% amino acid sequence identity thereto, including any percent identity within this range, such as 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100% amino acid sequence identity thereto.

[0068] As used herein, the terms "minor structural protein" or "minor structural polypeptide" or "VP2" or "small basic protein" in reference to a norovirus refer to a polypeptide comprising a sequence homologous or identical to the ORF3-encoded polypeptide of a norovirus, and includes sequences displaying at least about 70-100% or about 80-100% amino acid sequence identity thereto, including any percent identity within this range, such as 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100% amino acid sequence identity thereto.

[0069] As used herein, the term "virus-like particle" or "VLP" refers to a nonreplicating, noninfectious viral shell, that contains a viral capsid but lacks all or part of the viral genome, in particular, the replicative and infectious components of the viral genome. VLPs are generally composed of one or more viral proteins, such as, but not limited to those proteins referred to as capsid, coat, shell, surface, structural proteins *(e.g.,* VP1, VP2). norovirus VLPs can form spontaneously upon recombinant expression of VP1 in an appropriate expression system. Methods for producing particular VLPs are known in the art and discussed more fully below. The presence of VLPs following recombinant expression of viral proteins can be detected using conventional techniques known in the art, such as by electron microscopy, biophysical characterization, and the like. For example, VLPs can be isolated by density gradient centrifugation and/or identified by characteristic density banding.

Alternatively, cryoelectron microscopy can be performed on vitrified aqueous samples of the VLP preparation in question, and images recorded under appropriate exposure conditions. Negative stained electron microscopy can be performed on norovirus or norovirus VLP samples after coating with an electron-dense negative contrast agent, such as uranyl acetate, uranuyl formate, or phosphotungstic acid.

[0070] As used herein, a "biological sample" refers to a sample of tissue or fluid isolated from a subject, including but not limited to, for example, blood, plasma, serum, fecal matter, urine, bone marrow, bile, spinal fluid, lymph fluid, samples of the skin, external secretions of the skin, respiratory, intestinal, and genitourinary tracts, tears, saliva, milk, blood cells, organs, biopsies and also samples of *in vitro* cell culture constituents including but not limited to conditioned media resulting from the growth of cells and tissues in culture medium, *e.g.*, recombinant cells, and cell components. In particular, norovirus may be obtained from biological samples such as vomit or diarrhea from individuals infected with the viruses.

[0071] By "subject" is meant any member of the subphylum chordata, including, without limitation, humans and other primates, including non-human primates such as chimpanzees and other apes and monkey species; farm animals such as cattle, sheep, pigs, goats and horses; domestic mammals such as dogs and cats; laboratory animals including rodents such as mice, rats and guinea pigs; birds, including domestic, wild and game birds such as chickens, turkeys and other gallinaceous birds, ducks, geese, and the like. The term does not denote a particular age. Thus, both adult and newborn individuals are intended to be covered.

[0072] "Homology" refers to the percent identity between two polynucleotide or two polypeptide moieties. Two nucleic acid, or two polypeptide sequences are "substantially homologous" to each other when the sequences exhibit at least about 50% sequence identity, preferably at least about 75% sequence identity, more preferably at least about 80%-85% sequence identity, more preferably at least about 90% sequence identity, and most preferably at least about 95%-98% sequence identity over a defined length of the molecules. As used herein, substantially homologous also refers to sequences showing complete identity to the specified sequence.

[0073] In general, "identity" refers to an exact nucleotide-to-nucleotide or amino acid-to-amino acid correspondence of two polynucleotides or polypeptide sequences, respectively. Percent identity can be determined by a direct comparison of the sequence information between two molecules by aligning the sequences, counting the exact number of matches between the two aligned sequences, dividing by the length of the shorter sequence, and multiplying the result by 100. Readily available computer programs can be used to aid in the analysis, such as ALIGN, Dayhoff, M.O. in Atlas of Protein Sequence and Structure M.O. Dayhoff ed., 5 Suppl. 3:353-358, National biomedical Research Foundation, Washington, D.C., which adapts the local homology algorithm of Smith and Waterman (1981) Advances in Appl. Math. 2:482-489 for peptide analysis. Programs for determining nucleotide sequence identity are available in the Wisconsin Sequence Analysis Package, Version 8 (available from Genetics Computer Group, Madison, Wis.) for example, the BESTFIT, FASTA and GAP programs, which also rely on the Smith and Waterman algorithm. These programs are readily utilized with the default parameters recommended by the manufacturer and described in the Wisconsin Sequence Analysis Package referred to above. For example, percent identity of a particular nucleotide sequence to a reference sequence can be determined using the homology algorithm of Smith and Waterman with a default scoring table and a gap penalty of six nucleotide positions.

[0074] Another method of establishing percent identity in the context of the present invention is to use the MPSRCH package of programs copyrighted by the University of Edinburgh, developed by John F. Collins and Shane S. Sturrok, and distributed by IntelliGenetics, Inc. (Mountain View, Calif). From this suite of packages the Smith-Waterman algorithm can be employed where default parameters are used for the scoring table (for example, gap open penalty of 12, gap extension penalty of one, and a gap of six). From the data generated the "Match" value reflects "sequence identity." Other suitable programs for calculating the percent identity or similarity between sequences are generally known in the art, for example, another alignment program is BLAST, used with default parameters. For example, BLASTN and BLASTP can be used using the following default parameters: genetic code=standard; filter=none; strand=both; cutoff=60; expect=10; Matrix=BLOSUM62; Descriptions=50 sequences; sort by=HIGH SCORE; Databases=non-redundant, GenBank+EMBL+DDBJ+PDB+GenBank CDS translations+Swiss protein+Spupdate+PIR. Details of these programs are readily available.

[0075] Alternatively, homology can be determined by hybridization of polynucleotides under conditions which form stable duplexes between homologous regions, followed by digestion with single-stranded-specific nuclease(s), and size determination of the digested fragments. DNA sequences that are substantially homologous can be identified in a Southern hybridization experiment under, for example, stringent conditions, as defined for that particular system. Defining appropriate hybridization conditions is within the skill of the art.

[0076] Amino acid substitutions, when present in the chimeric VP1 proteins, are preferably conservative in nature, *i.e.,* substitutions in which a first amino acid is replaced with a second amino acid that have similar properties based on their side chains. Specifically, amino acids are generally divided into four families and substitutions with families are considered to be conservative substitutions. The four families are: (1) acidic amino acids — aspartate and glutamate; (2) basic amino acids — lysine, arginine, histidine; (3) non-polar amino acids — alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan; and (4) uncharged polar amino acids — glycine, asparagine, glutamine, cysteine, serine, threonine, tyrosine. Phenylalanine, tryptophan, and tyrosine are sometimes classified as aromatic amino acids.

[0077] By "therapeutically effective amount" in the context of the immunogenic compositions is meant an amount of an immunogen *(e.g.,* chimeric VP1 protein, VLP, or nucleic acid encoding an antigen) which will induce an immunological response, either for antibody production or for treatment or prevention of norovirus infection or disease. Such a response will generally result in the development in the subject of an antibody-mediated and/or a secretory or cellular immune response to the composition. Usually, such a response includes but is not limited to one or more of the following effects; the production of antibodies from any of the immunological classes, such as immunoglobulins A, D, E, G or M; the proliferation of B and T lymphocytes; the provision of activation, growth and differentiation signals to immunological cells; expansion of helper T cell, suppressor T cell, and/or cytotoxic T cell and/or γδT cell populations.

[0078] For purposes of the present invention, an "effective amount" of an adjuvant will be that amount which enhances an immunological response to a coadministered antigen or nucleic acid encoding an antigen.

[0079] As used herein, "treatment" refers to any of (i) the prevention of infection or reinfection or disease, (ii) the reduction or elimination of symptoms, and (iii) the substantial or complete elimination of the pathogen in question. Treatment may be effected prophylactically (prior to infection) or therapeutically (following infection).

II. MODES OF CARRYING OUT THE INVENTION

[0080] The invention described herein is not limited to particularly exemplified molecules or process parameters as such may vary. The terminology used herein is for the purpose of describing particular aspects, features and embodiments of the invention only, and is not intended to be limiting. In addition, the practice of the present invention will employ conventional methods of virology, microbiology, molecular biology, recombinant DNA techniques and immunology all of which are within the ordinary skill of the art. Such techniques are explained fully in the literature. See, *e.g.,* Sambrook, *et ah,* Molecular Cloning: A Laboratory Manual (3rd Edition, 2000); DNA Cloning: A Practical Approach, vol. I & II (D. Glover, ed.); Oligonucleotide Synthesis (N. Gait, ed., 1984); A Practical Guide to Molecular Cloning (1984); and Fundamental Virology, 4th Edition, 2001 (B. N. Fields and D. M. Knipe, eds.); Handbook of Experimental Immunology, Vols. I-TV (D. M. Weir and C. C. Blackwell eds., Blackwell Scientific Publications); A. L. Lehninger, Biochemistry (Worth Publishers, Inc., current addition); Methods In Enzymology (S. Colowick and N. Kaplan eds., Academic Press, Inc.). Although a number of methods and materials similar or equivalent to those described herein can be used in the practice of the present invention, the preferred materials and methods are described herein. In addition, all publications, patents and patent applications cited herein, whether supra or infra, are hereby incorporated by reference in their entireties.

[0081] The present invention is, in part, based on the discovery that all or a portion of the P-domain of the VP1 protein of a first norovirus strain can be replaced with all or the corresponding portion of the P-domain of a second norovirus strain, and that when expressed, such chimeric VPl proteins can self-assemble into VLPs. It has also been discovered that VLPs that contain any desired VPl P-domain, even P-domains from VPl proteins of norovirus strains that are not expressed well in recombinant host cells and therefore do not readily form VLPs. This is accomplished by preparing a chimeric VPl protein that contains the S-domain of a VPl from a norovirus strain that is well expressed and, therefore, can readily form VLPs, and all or a portion of the P-domain of a VP1 protein

of any other desired norovirus strain. Accordingly, the present invention provides chimeric norovirus VPl proteins, and norovirus VLPs, that contain all or a portion of any desired P-domain. Now, chimeric norovirus VPl proteins, and norovirus VLPs, that contain all or a portion of any P-domain, including P-domains from emerging norovirus strains can be produced relatively easily and rapidly.

[0082] Therefore, the present invention provides compositions and methods for rapid generation of immunogenic compositions that can be used to induce an immune response in a subject, that preferably can protect the subject from norovirus infection and/or norovirus disease. The invention provides immunogenic compositions comprising chimeric norovirus VPl protein in the form of monomers or in the form of VLPs. The chimeric norovirus VP1 proteins contain the VP1 S-domain from a first norovirus strain and all or a portion of the VPl P-domain from a second norovirus strain.

[0083] The norovirus VLPs of the present invention can be monovalent, and be composed of a single type of chimeric VPl protein. Such monovalent VLPs contain multiple copies of a single VPl P-domain from a single norovirus strain. If desired, the norovirus VLP of the present invention can be multivalent, and be composed of two or more different chimeric VPl proteins. Preferably, the two or more different chimeric VPl proteins contain the VPl S-domain from the same norovirus strain, but VPl P-domains from different norovirus strains.

[0084] In addition, the immunogenic compositions of the present invention can further comprise one or more adjuvants or nucleic acids encoding adjuvants, wherein immunogenic polypeptides and/or VLPs are mixed or co-expressed with adjuvants. Immunogenic compositions may also comprise additional antigens other than norovirus antigens, such as antigens that can be used in immunization against pathogens that cause diarrheal diseases.

[0085] Also provided are immunogenic compositions that comprise a nucleic acid molecule that encodes a chimeric norovirus VPl, such as an RNA molecule or a self-replicating RNA molecule. Such compositions can be administered to a subject and the encoded chimeric norovirus VPl can be produced in the subject, preferably in the form of a VLP.

[0086] In order to further understand other aspects of the present invention, including nucleic acids, polypeptides and/or VLPs and methods for their preparation, purification and use in the treatment or prevention of norovirus infection, more detailed discussions are provided below.

A. **Polypeptides and VLPs**

[0087] The chimeric norovirus VP1 protein contains the S-domain of VP1 of a first norovirus strain and a P-domain that contains at least a portion of the P-domain of VP1 of a second norovirus strain. The S-domain and the P-domain of the chimeric norovirus VP1 protein are generally joined through a linker peptide, as they are in naturally occurring VP1 proteins. The linker peptide can allow the chimeric VP1 protein to fold properly, so that it self-assembles to form VLPs. The linker peptide can be any suitable amino acid sequence, such as the linker peptide from the VP1 protein of the first norovirus strain, the second norovirus strain or a third norovirus strain. The first, second, and third norovirus strains can be any desired norovirus strains, such as any of the strains listed in Table 1. For example, the first norovirus strain can be the Snow Mountain strain, and the second norovirus strain can be any other strain, such as the Norwalk strain or the 2006a strain.

[0088] If desired, the amino acid sequence of the S domain, linker and/or P domain of a chimeric VP1 may differ from the corresponding naturally occurring amino acid sequence by one or more amino acid replacement, addition or deletion *(e.g.,* mutation, substitution, insertion, deletion, truncation and the like). Such sequence changes should not prevent the chimeric VP1 proteins from folding properly and self-assembling into VLPs. Generally, it is acceptable for amino acid sequences to vary (including by addition or deletion of one or more amino acids) from naturally occurring sequences in areas that are not highly conserved. For example, as shown in FIGS. 8A-8B alignment of the amino acid sequences of several norovirus VP1 proteins reveals that the S domain is highly conserved whereas the P domain, and the P2 subdomain in particular, is more variable. Accordingly, amino acid sequence variation can be introduced, if desired, into the amino-terminal region, carboxy-terminal region, and P domain. Some amino acid sequence variations can also be introduced into the S domain and/or P1 subdomain, preferably at nonconserved positions, which are not marked with an asterisk in FIG 8A.

[0089] The VPl proteins of some norovirus strains are difficult to produce in high yields by recombinant expression in host cells, such as yeast. However, when the chimeric norovirus VPl protein contains an S-domain from a strain that is a high expressor (such as the Snow Mountain strain where expression can be >40 mg per liter of yeast cells) in a desired host cell, such as yeast cells, the chimeric protein can be produced in high yield in that host cell even if the P-domain is from a strain that is not well expressed. For example, the secreted soluble expression of Norwalk P-domain can be increased greater than 5-fold by generating a chimeric construct as described with a Snow Mountain S-domain. Accordingly, the chimeric VPl proteins of the invention can be used to make VLPs that contain the VPl P-domain from strains that are not well expressed in host cells, and therefore do not readily form VLPs. Thus, it is generally preferred that the S-domain is from the VPl protein of a strain that is well expressed in a desired host cell, such as yeast cells. Preferably, the high expressor norovirus strain is a strain whose VPl protein can be produced recombinantly in a host cell, preferably yeast, in a quantity of at least about 5 mg/liter of cells, at least about 10 mg/liter of cells, at least about 15 mg/liter of cells, at least about 20 mg/liter of cells, at least about 25 mg/liter of cells, at least about 30 mg/liter of cells, at least about 35 mg/liter of cells, or at least about 40 mg/liter of cells.

[0090] The chimeric norovirus VPl protein can have a structure according to Formula I:

A—S—L—P—B (I)

wherein,

A and B are independently absent or any desired amino acid sequence;

S is the S-domain of VPl of a first norovirus strain;

L is a linker peptide or absent; and

P is a norovirus VP1 P-domain, wherein at least a portion of P is from the P-domain of a second norovirus strain.

[0091] The linker peptide (L) can be any amino acid sequence that allows the chimeric VPl protein to fold properly and to self-assemble to form a VLP. Suitable linker peptides include the linker peptide from the VPl protein of the first norovirus strain, the

second norovirus strain or a third norovirus strain. Alternatively, the linker peptide (L) can be a short amino acid sequence that permits the chimeric protein to fold properly and self-assemble into VLPs, *e.g.,* 20 or fewer amino acids *(i.e.,* 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 amino acids), preferably about 9 amino acids. Examples of suitable linker peptides (L) include poly-glycine linkers (Gly_n where n=2, 3, 4, 5, 6, 7, 8, 9, 10 or more (SEQ ID NO:5)), and (GGGS)n wherein n=l, 2, 3 or 4 (SEQ ID NO:6), and highly charged linkers, such as (SRSK)n wherein n=l, 2, 3 or 4 (SEQ ID NO:7). Preferably, L is the linker peptide from the VP1 protein of the first norovirus strain, the second norovirus strain or a third norovirus strain.

[0092] A and B, when present, are independently any desired amino acid sequence, such as, a sequence of about 1-500 amino acids, about 1-250 amino acids, about 1-100 amino acids, about 1-50 amino acids, about 1-40 amino acids, about 1-30 amino acids, about 1-20 amino acids, about 1-10 amino acids, or about 1-5 amino acids. For example, A and B can be one or more amino acids that are added to the chimeric protein to facilitate or as a result of cloning, or to facilitate protein purification such as an epitope tag or a histidine tag (**His_n** where n=3, 4, 5, 6, 7, 8, 9, 10 (SEQ ID NO:8)). An epitope tag could consist of a strong T cell epitope or a modified epitope designed to improve the immunogenicity of the protein. These additional residues could comprise a modified TLR agonist as part of an immunomodulator strategy. If desired, A and/or B can comprise immunogenic fragments including, for example, the heat shock proteins or fragments, such as those disclosed in U.S. Publication No. 20060264609, or viral and bacterial antigens, such as those disclosed in U.S. Patent No. 7,527,801. Alternately, A and/or B can comprise a full length protein, for example a recombinant protein that is to be displayed on a norovirus VP1 fusion protein, or that is to be used to display norovirus VPl or portion thereof. In some embodiments, A and B are both absent.

[0093] As described herein, the P-domain of VPl comprises a P^1 subdomain and a P^2 subdomain. Thus, in the formulas disclosed herein, P can be depicted as P^1—P^2, wherein P^1 is the P^1 subdomain and P^2 is the P^2 subdomain.

[0094] In the primary structure of the P-domain, the P^2 subdomain amino acids are inserted into the sequence of the P^1 subdomain amino acids, and the primary structure has the formula P^1-1—P^2—P^1-2, where P^1-1 is the amino-terminal portion of the sequence of the

P^1 subdomain, P^1-2 is the remainder of the sequence of the P^1 subdomain, and P^2 is the sequence of the P^2 subdomain.

[0095] In some exemplary embodiments, the chimeric norovirus VP1 protein can be of Formula I, wherein S is from a first norovirus strain, and P is from a second norovirus strain. In such embodiments, L can be any suitable linker, such as the natural linker from the first norovirus strain or the second norovirus strain, or be absent.

[0096] As described herein, the chimeric norovirus VP1 protein can contain a P-domain in which a portion of the P-domain is from the same strain as the S domain, and a portion of the P-domain is from a different strain. The portion from the different stain can be the P^1 domain or a portion thereof, the P^2 domain or a portion thereof and any combination of portions of the P^1 domain and the P^2 domain. Preferably, the portion from the different strain is the P^2 domain or a portion thereof. For example, in some embodiments, the chimeric norovirus VP1 protein can have a structure according to Formula II or Formula III.

A—S—L—P^1—P^2—B (II)

A—S—P^1—P^2—B (III)

[0097] In Formulas II and III, the variables A, S, L and B are as described in Formula I, P^1 is the P^1 domain of VP1 and P^2 is the P^2 domain of VP1, and at least one of P^1 and P^2 is from a norovirus stain different from the strain that provides S. In some embodiments, S and P^1 are from a first norovirus stain and P^2 is from a second norovirus strain. In other embodiments, S and P^2 are from a first norovirus strain and P^1 is from a second norovirus strain. In such embodiments, the linker L, if present, can be any suitable linker, such as the linker from the first norovirus strain or the second norovirus strain. In some embodiments, the chimeric norovirus VP1 protein is of Formula II wherein S, L and P^1 are from a first norovirus strain and P^2 is from a second norovirus strain. This description of exemplary embodiments encompassed by Formulas II and III is illustrative of chimeric norovirus VP1 proteins that contain a P-domain in which a portion of the P domain is from the same strain as the S domain, and a portion of the P domain is from a different strain.

[0098] In some embodiments, the chimeric norovirus VP1 protein has a structure according to any one of Formulas IV and XVII: SNV—L—PSMV (IV), SSMV—L—PNV (V), SNV—L—P_{dsv} (VI), SSMV—L—PDSV (VII), SNV—L—P_{GI} (VIII), SNV—L—PQII (IX), SNV—

L—PGIII (X), S_{NV}—L—P_{giv} (XI), S_{NV}—L—P_{GV} (XII), S_{SMV}—L—P_{Gi} (XIII), SNV—L—P_{GII} (XIV), SSMV—L—PGIII (XV), S_{SMV}—L—PGIV (XVI), S_{SMV}—L—P_{GV} (XVII), where P represents the P-domain, including the P^1 and P^2 subdomains, where the subscript indicates that the S-domain or the P-domain is from the following strains: NV, Norwalk strain; SMV, Snow Mountain strain; DSV, Desert Storm strain; and GI, Gil, GUI, GIV and GV are any norovirus from genogroups GI, Gil, GUI, GIV and GV, respectively.

[0099] In particular embodiments, the chimeric norovirus VPl protein comprises an S-domain from the VPl of Snow Mountain strain, the linker peptide from the VPl of Snow Mountain strain, and a P-domain that contains at least a portion of the P-domain of the VPl of another norovirus strain. In more particular embodiments, the P-domain or portion thereof is from the VPl of the Norwalk strain, 2006a strain, or the New Orleans strain.

[00100] In some embodiments, the chimeric norovirus VPl protein has a primary structure according to Formula XVIII:

$$A—S_{First}—L—P1\text{-}1_{(First)}—P2_{(Second)}—P1\text{-}2_{(First)}—B \quad (XVIII),$$

In formula XVIII, the subscripts First and Second indicate that the domain is from a first strain or a second strain, respectively. In certain examples, the chimeric norovirus VPl protein has a primary structure according to any one of Formulas XIX - XLVI: A—S_{NV}—L—P^1-1(NV)—P^2(SMV)—P I-2(NV)—B (XIX), A—SSMV—L—P^1-1(SMV)—$P_{2(NV)}$—P 1-2(SMV)—B (XX), A—SNV—L—P^1-1(NV)—$P_{2(DSV)}$—P 1-2(NV)—B (XXI), A—SSMV—L—P^1-^SMV)—P 2(DSV)—P 1-2(SMV)—B (XXII), A—SNV—L—P^1-1(NV)—$P_{2(GI)}$—P 1-2(NV)—B (XXIII), A—SNV—L—P^1-1(NV)—$P_{2(}$GII)—P 1-$2_{(N}$v)—B (XXIV), A—SNV—L—P^1-1(NV)—$P_{2(}$GIII)—P 1-2(NV)—B (XXV), A—SNV—L—P^1-^NV)—P $2(G_I$V)—P 1-2(NV)—B (XXVI), A—SNV—L—P^1-1(NV)—$P_{2(GV)}$—P1-2(NV)—B (XXVII), A—SSMV—L—P^1-1(SMV)—$P_{2(GI)}$—P1-2(SMV)—B (XXVIII), A—SS_MV—L—P^lcsMV)—P2(Gii)—P 1-2(S_MV)—B (XXIX), A—SS_MV—L—P^1-l(SMV)—$P_{2(GIII)}$—P 1-2(SMV)—B (XXX), A—SSMV—L—P^1-^SMV)—$P_{2(GIV)}$—P 1-2(SMV)—B (XXXI), A—S_{SMV}—L—P^1-1($_{SMV}$)—$P2_{(GV)}$—P1-$2_{(SMV)}$—B (XXXII), A—SNV—L—P^1-1(NV)—$P_{2(SMV)}$—B (XXXIII), A—SSMV—L—P^1-^SMV)—$P_{2(NV)}$—B (XXXIV), A—SNV—L—P^1-1(NV)—$P2_{(D}$sv)—B (XXXV), A—SS_MV—L—P^1-$1_{(}S_M$V)—P2($_D$SV)—B (XXXVI), A—SNV—L—P^^NV)—P2(Gi)—B (XXXVII), A—SNV—L—P^1-$1_{(NV)}$—P $2_{(G_{II}}$)—B (XXXVIII), A—SNV—L—P^lcNV)—P 2(GIII)—B (XXXIX), A—SNV—L—P^1-1(NV)—$P_{2(GIV)}$—B (XL), A—SNV—L—P^1-$1_{(NV)}$—P 2(GV)—B (XLI), A—SS_MV—L—P^1-$1_{(}S_M$V)—$P2_{(G_I}$)—B (XLII), A—

$_{SSMV}$—L—P^{1}-$_{\wedge SMV)}$—$_{P2(GII)}$—B (XLIII), A—$_{SSMV}$—L—P^{1}-$_{\wedge SMV)}$—$_{P2(GIII)}$—B (XLIV), A—$_{SSMV}$—L—P^{1}-$_{1(SMV)}$—$_{P2(GIV)}$—B (XLV), A—$_{SSMV}$—L—P^{1}-$_{1(SMV)}$—$_{P2(GV)}$—B (XLVI), wherein the subscript indicates that the S-domain or the P-subdomain is from the following strains: NV, Norwalk strain; SMV, Snow Mountain strain; DSV, Desert Storm strain; and GI, Gil, GUI, GIV and GV are any norovirus from genogroups GI, Gil, GUI, GIV and GV, respectively.

[00101] By following the teachings of this invention, a vast number of different chimeric VPl proteins can be produced by recombinant means using standard procedures. The amino acid sequences of VP1 proteins, and the nucleotide sequences encoding them, from the different strains of norovirus can be obtained from the GenBank database (ncbi.nlm.nih.gov), the Taxonomy Database at National Center for Biotechnology Information (ncbi.nlm.nih.gov) or the PathoSystems Resource Integration Center Database on Caliciviridae (patric.vbi.vt.edu).

[00102] When the chimeric VPl proteins of the invention are produced by expression in a host cell, such as yeast cells, they can self-assemble into VLPs. This is particularly the case for chimeric VPl proteins that contain an S-domain of VPl of a norovirus strain that is well expressed in the host cell, such as the S-domain of the Snow Mountain strain. Thus, the present invention further provides VLPs that contain a chimeric VPl. The VLPs can be monovalent or bivalent or multivalent. Monovalent VLPs contain a chimeric VPl protein and only one P-domain. In some embodiments, the monovalent VLP can contain a chimeric VPl and a naturally occurring VPl that each contain the same P-domain. Preferred monovalent VLPs are composed of multiple copies *(e.g.,* 180 copies) of a single chimeric VPl protein. Accordingly, in certain embodiments, the monovalent VLPs of the invention include 180 copies of a single chimeric VPl of any one of Formulas I - XLVI, for example .

[00103] Bivalent and multivalent VLPs contain a chimeric VPl protein and at least 2 different P-domains. For example, in some embodiments, a bivalent VLP can contain a chimeric VPl that contains a first P-domain and a naturally occurring VPl that contains a second P-domain. In such embodiments, it is preferred that the S-domain in the chimeric VPl and in naturally occurring VPl is the same. In other embodiments, the bivalent or multivalent VLP contains two or more different chimeric VPl proteins that contain P-

domains from different strains. Preferably the two or more chimeric VPl proteins contain the same S-domain.

[00104] In certain other embodiments, the bivalent or multivalent VLPs of the invention include two or more chimeric VPl proteins selected from the group consisting of chimeric VP1 proteins according to Formulas I - XLVI, for example.

[00105] If desired, the amino acid sequence of one or both of the S- and P-domains (including P-subdomains) of a chimeric VP1 can be altered (by insertion, deletion, mutation, substitution) to include one or more amino acid insertion(s), deletion(s), mutation(s) or substitution(s) that render the amino acid sequence of the domain or subdomain different from the corresponding naturally occurring amino acid sequence, for example by up to about 20%, up to about 1%, up to about 2%, up to about 3%, up to about 4%, up to about 5%, up to about 10%, up to about 15%, or up to about 20% over the length of the amino acid sequence of the domain or subdomain.

[00106] As shown in FIGS. 8A-8E, alignment of naturally occurring VPl amino acid sequences demonstrates that the N-terminal region (aa 1-49), S-domain (aa 50-225) and Pi-i subdomain (aa 226-278) amino acid sequences are more conserved (asterisks indicate conserved amino acids) than the amino acid sequence of the P2 subdomain (aa 279-405), Pl-2 domain (aa 406-520) and C-terminal region (Hansman *et al.* (2006) J. General Virology 87: 909-919). Because conserved amino acid residues are often important for proper folding or function, it is preferred that any amino acid sequence alterations that are present are not introduced at conserved positions. For example, conserved amino acids in the S-domain may be important for proper folding and formation of VLPs. Therefore, in the chimeric VPl proteins of the present invention, conserved amino acid residues are preferably not deleted or replaced.

[00107] Thus, in some embodiments, the S-domain of the chimeric VPl protein of the invention can have at least about 70-100% or about 80-100% amino acid sequence identity to a naturally occurring S-domain, including any percent identity within this range, such as at least about 70, at least about 71, at least about 72, at least about 73, at least about 74, at least about 75, at least about 76, at least about 77, at least about 78, at least about 79, at least about 80, at least about 81, at least about 82, at least about 83, at least about 84, at least about 85, at least about 86, at least about 87, at least about 88, at least about 89, at least about

90, at least about 91, at least about 92, at least about 93, at least about 94, at least about 95, at least about 96, at least about 97, at least about 98, at least about 99, orl00% amino acid sequence identity. Alternatively or in addition, the Pl-l-subdomain of the chimeric VPl protein of the invention can have at least about 70-100% or about 80-100% amino acid sequence identity relative to a naturally occurring Pl-l-subdomain, including any percent identity within this range, such as at least about 70, at least about 71, at least about 72, at least about 73, at least about 74, at least about 75, at least about 76, at least about 77, at least about 78, at least about 79, at least about 80, at least about 81, at least about 82, at least about 83, at least about 84, at least about 85, at least about 86, at least about 87, at least about 88, at least about 89, at least about 90, at least about 91, at least about 92, at least about 93, at least about 94, at least about 95, at least about 96, at least about 97, at least about 98, at least about 99, orl00% amino acid sequence identity. Alternatively or in addition, the P2-subdomain of the chimeric VPl protein of the invention can have at least about 70-100% or about 80-100% amino acid sequence identity to a naturally occurring P2-subdomain, including any percent identity within this range, such as at least about 70, at least about 71, at least about 72, at least about 73, at least about 74, at least about 75, at least about 76, at least about 77, at least about 78, at least about 79, at least about 80, at least about 81, at least about 82, at least about 83, at least about 84, at least about 85, at least about 86, at least about 87, at least about 88, at least about 89, at least about 90, at least about 91, at least about 92, at least about 93, at least about 94, at least about 95, at least about 96, at least about 97, at least about 98, at least about 99, or 100% amino acid sequence identity. Alternatively or in addition, the Pl-2-subdomain of the chimeric VPl protein of the invention can have at least about 70-100% or about 80-100% amino acid sequence identity to a naturally occurring P1-2-subdomain, including any percent identity within this range, such as at least about 70, at least about 71, at least about 72, at least about 73, at least about 74, at least about 75, at least about 76, at least about 77, at least about 78, at least about 79, at least about 80, at least about 81, at least about 82, at least about 83, at least about 84, at least about 85, at least about 86, at least about 87, at least about 88, at least about 89, at least about 90, at least about 91, at least about 92, at least about 93, at least about 94, at least about 95, at least about 96, at least about 97, at least about 98, at least about 99, orl00% amino acid sequence identity.

[00108] The S-domains of the VPl proteins of the invention are full-length or near full-length relative to a naturally occurring S-domain. Truncation at either N- or C-terminals or both and internal deletions, are acceptable provided that the ability to form VLPs under

conditions that favor VLP formation is preserved. Accordingly, the S-domain may comprise the full-length sequence, fragments, truncated and partial sequences, as well as analogs and precursor forms of the reference or native S-domain. In some embodiments, the S-domain of the VP1 proteins of the invention is truncated at its N-terminal end by 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 amino acid residues. Alternatively or in addition, the S-domain of the VP1 proteins of the invention can be truncated at its C-terminal end by 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 amino acid residues. Alternatively or in addition, the S-domain of the VP1 proteins of the invention can contain an internal deletion of 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 amino acid residues in length.

[00109] The Pl-l-subdomains of the VP1 proteins of the invention are full-length or near full-length relative to a naturally occurring PI- 1-subdomain, with sequence truncation at either N- or C-terminals or both and/or with internal deletions. Accordingly, the Pl-1-subdomain may comprise the full-length sequence, fragments, truncated and partial sequences, as well as analogs and precursor forms of the naturally occurring PI- 1-domain. In some embodiments, the PI-1-subdomain of the VP1 proteins of the invention is truncated at its N-terminal end by 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 amino acid residues. Alternatively, or in addition, the Pl-l-subdomain of the VP1 proteins of the invention can be truncated at its C-terminal end by 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 amino acid residues. Alternatively or in addition, the Pl-l-subdomain of the VP1 proteins of the invention can contain an internal deletion of 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 amino acid residues in length.

[00110] The P2-subdomains of the VP1 proteins of the invention are full-length or near full-length relative to the naturally occurring P2-subdomain, with sequence truncation at either N- or C-terminals or both and/or with internal deletions. Accordingly, the P2-subdomain may comprise the full-length sequence, fragments, truncated and partial sequences, as well as analogs and precursor forms of the naturally occurring P2-domain. In some embodiments, the P2-subdomain of the VP1 proteins of the invention is truncated at its N-terminal end by 1 to about 26 amino acids, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 24 or 26 amino acid residues. Alternatively, or in addition, the P2-subdomain of the VP1 proteins of the invention can be truncated at its C-terminal end by 1 to about 26 amino acids, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 24 or 26 amino acid residues. Alternatively, or in addition, the P2-subdomain of the VP1 proteins of the invention can contain an internal

deletion of 1 to about 26 amino acids, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 24 or 26 amino acid residues.

[00111] The Pl-2-subdomains of the VP1 proteins of the invention are full-length or near full-length relative to the native or reference P1-2-subdomain, with sequence truncation at either N- or C-terminals or both and/or with internal deletions. Accordingly, the PI-2-subdomain may comprise the full-length sequence, fragments, truncated and partial sequences, as well as analogs and precursor forms of the naturally occurring PI-2-domain. In some embodiments, the PI-2-subdomain of the VP1 proteins of the invention is truncated at its N-terminal end by 1 to about 26 amino acids, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 24 or 26 amino acid residues. Alternatively, or in addition, the PI-2-subdomain of the VP1 proteins of the invention can be truncated at its C-terminal end by 1 to about 26 amino acids, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 24 or 26 amino acid residues. Alternatively or in addition, the PI-2-subdomain of the VP1 proteins of the invention can contain an internal deletion of 1 to about 26 amino acids, such as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 20, 24 or 26 amino acid residues.

[00112] In some embodiments, the P-domains (including Pl-1, P2 and PI-2 subdomains) of the chimeric VP1 proteins of the invention can include amino acid sequence insertions or replacements that are portions of other polypeptides, such as polypeptides that are displayed on the chimeric VP1. For example, the P-domain can be fused to another polypeptide or portion of another polypeptide. For example, in Formula 1B can be an amino acid sequence of another polypeptide that is displayed on the chimeric VP1. In such situations, the other polypeptide can be displayed on the surface of a VLP that contains the chimeric VP1 protein.

[00113] The chimeric VP1 proteins of the invention can be produced by expression in suitable recombinant host cells, such as yeast cells, using any suitable methods, including those described herein.

B. Nucleic Acids

[00114] The invention further provides recombinant nucleic acids that encode the chimeric norovirus VP1 proteins described herein. These nucleic acids contain a first nucleotide sequence that encodes the S-domain of VP1 of a first norovirus strain, a second nucleotide sequence that encodes a P-domain that contains at least a portion of the P-domain

of a second norovirus strain, and optionally, third, forth and fifth nucleotide sequences that encode a linker peptide, and amino acid sequences A and B, respectively. The nucleic acid sequences are operably linked so that the nucleic acid can be transcribed and/or translated to produce a chimeric VP1 protein that self assembles into a VLP. Any suitable nucleic acid sequences that encode the S-domain and the P-domain of VP1 from desired norovirus strains can be used. For example, nucleic acids that have the same nucleotide sequences as the corresponding sequences in ORF2 in the genome of the desired norovirus strain, or codon optimized variants thereof that are optimized for recombinant expression in a desired host cell, such as yeast cells, can be used.

[00115] A representative norovirus ORF2 sequence from the Snow Mountain strain is known and is presented in FIG. 4A. The nucleotide sequences of ORF2 of many other norovirus strains are known in the art, such as the ORF2 sequences of Norwalk virus, GenBank Accession No. M87661, Hawaii virus; GenBank Accession No. U07611, and sequences disclosed in the following patent publications: WO 05/030806, WO 00/79280, JP2002020399, US2003 129588, U.S. Pat. No. 6,572,862, WO 94/05700, and WO 05/032457. See also Green *et al.* (2000) J. Infect. Dis. 181(Suppl. 2):S322-330; Wang *et al.* (1994) J. Virol. 68:5982-5990; Chen *et al.* (2004) J. Virol. 78: 6469-6479; Chakravarty *et al.* (2005) J. Virol. 79: 554-568; and Fankhauser *et al.* (1998) J. Infect. Dis. 178:1571-1578; for sequence comparisons of different norovirus strains. Further information about nucleotide sequences of noroviruses can be obtained from the GenBank database (ncbi.nlm.nih.gov), the Taxonomy Database at National Center for Biotechnology Information (ncbi.nlm.nih.gov) or the PathoSystems Resource Integration Center Database on Caliciviridae (patric.vbi.vt.edu).

[00116] In some aspects, the recombinant nucleic acids encode a chimeric VP1 protein described herein, such as a chimeric VP1 protein according to Formula I. For example, the recombinant nucleic acid can include a coding sequence according to Formula LIV

A'— S'— L'— P'— B' (XLVII)

wherein,

A' and B' are independently absent or a nucleotide sequence encoding any desired amino acid sequence;

S' is a nucleotide sequence encoding the S-domain of VP1 of a first norovirus strain ;

L' is absent or a nucleotide sequence encoding a linker peptide and;

P' is a nucleotide sequence encoding a norovirus VP1 P-domain, wherein at least a portion of P is from the P-domain of a second norovirus strain.

[00117] The linker peptide encoded by L', and the amino acid sequences encoded by A', S', P' and B' are as described herein for L, A, S, P, and B, respectively.

[00118] In particular embodiments, the recombinant nucleic acid contains a coding sequence that encodes a chimeric VP1 protein according to any one of Formulas I - XLVI.

[00119] In other particular embodiments, the recombinant nucleic acid contains a coding sequence that encodes a chimeric VP1 protein have any of the primary structures shown in FIG. 7.

[00120] Representative recombinant nucleic acids that encode chimeric VP1 proteins that contain the S-sequence from Snow Mountain strain and the P-sequence from Norwalk stain; or the S-sequence from Snow Mountain strain and the P-sequence from GII.4 2006a.OPTLP strain are shown in FIGS. 5 and 6 respectively. In the case of the Snow Mountain sequence, the S-domain encompasses residues 1-216 and the linker includes residues 217 to 226. For Norwalk the P-sequence encompassed residues 231-530. For the 2006a sequence, the P-sequence encompassed residues 227-541. Additional representative norovirus sequences are Norwalk virus, GenBank Accession No. M87661, Snow Mountain virus, GenBank Accession No. U70059; Snow Mountain virus, GenBank Accession No. AY134748, Hawaii virus; GenBank Accession No. U0761 1, and sequences disclosed in the following patent publications: WO 05/030806, WO 00/79280, JP2002020399, US2003 129588, U.S. Pat. No. 6,572,862, WO 94/05700, and WO 05/032457. See also Green *et al.* (2000) J. Infect. Dis. 181(Suppl. 2):S322-330; Wang *et al.* (1994) J. Virol. 68:5982-5990; Chen *et al.* (2004) J. Virol. 78:6469-6479; Chakravarty *et al.* (2005) J. Virol. 79:554-568; and Fankhauser *et al.* (1998) J. Infect. Dis. 178:1571-1578; for sequence comparisons of different norovirus strains.

[00121] A nucleic acid encoding a chimeric VP1 protein can be RNA or DNA, can be constructed using any suitable method *(e.g.* by chemical synthesis, using recombinant

DNA technology) and can take various forms *(e.g.* single stranded, double stranded, vectors, etc.). Many suitable methods for producing recombinant constructs are well-known and conventional in the art. For example, the recombinant nucleic acids can be produced from two or more oligonucleotides comprising sequences encoding portions of the chimeric VP1 protein or by ligating oligonucleotides to form a coding sequence for the full-length chimeric VP1 protein using standard molecular biology techniques. See, *e.g.,* U.S. Pat. No. 6,632,601 and U.S. Pat. No. 6,630,298. Preferably, nucleic acids are prepared in substantially pure form *(i.e.* substantially free from other host cell or non host cell nucleic acids).

[00122] Polynucleotides that encode VP1 proteins of interest can be isolated from a genomic library derived from viral RNA, present in, for example, stool or vomit samples from an infected individual. Alternatively, norovirus nucleic acids can be isolated from infected humans or other mammals or from stool or vomit samples collected from infected individuals as described in *e.g.,* Estes *et al.* U.S. Pat. No. 6,942,865; Guntapong *et al.* (2004) Jpn J. Infect. Dis. 57:276-278; Harrington *et al.* (2004) J. Virol. 78:3035-3045; Fankhauser *et al.* (1998) J. Infect. Dis. 178:1571-1578; and Dolin *et al.* (1971) J. Infect. Dis. 123:307-312. Porcine viruses can be grown in LLC-PK cells in the presence of intestinal fluid containing bile acids (Chang *et al.* (2004) Proc. Natl. Acad. Sci. U.S.A. 101:8733-8738). An amplification method such as PCR can be used to amplify polynucleotides from either norovirus genomic RNA or cDNA encoding therefore. Alternatively, polynucleotides can be chemically synthesized. The nucleotide sequence can be designed with the appropriate codons for the particular amino acid sequence desired. Preferably, synthetic constructs will contain codons optimized for expression in the intended host cell in which the chimeric VP1 protein will be produced. The complete sequence of the polynucleotide of interest can be assembled from overlapping oligonucleotides prepared by standard methods and assembled into a complete coding sequence. See, *e.g.,* Edge (1981) Nature 292:756; Nambair *et al.* (1984) Science 223:1299; Jay *et al.* (1984) J. Biol. Chem. 259:631 1; Stemmer *et al.* (1995) Gene 164:49-53. The polynucleotides can be RNA or single- or double-stranded DNA. Preferably, the polynucleotides are isolated free of other components, such as proteins and lipids.

[00123] Alternatively, particular nucleotide sequences can be obtained from vectors harboring the desired sequences or synthesized completely or in part using various oligonucleotide synthesis techniques known in the art, such as site-directed mutagenesis and

polymerase chain reaction (PCR) techniques where appropriate. See, *e.g.*, Sambrook, supra. In particular, one method of obtaining nucleotide sequences encoding the desired sequences is by annealing complementary sets of overlapping synthetic oligonucleotides, followed by ligation with an appropriate DNA ligase and amplification of the ligated nucleotide sequence via PCR. See, *e.g.*, Jayaraman *et al.* (1991) Proc. Natl. Acad. Sci. USA 88:4084-4088. Additionally, oligonucleotide directed synthesis (Jones *et al.* (1986) Nature 54:75-82), oligonucleotide directed mutagenesis of pre-existing nucleotide regions (Riechmann *et al.* (1988) Nature 332:323-327 and Verhoeyen *et al.* (1988) Science 239:1534-1536), and enzymatic filling-in of gapped oligonucleotides using T4 DNA polymerase (Queen *et al.* (1989) Proc. Natl. Acad. Sci. USA 86:10029-10033) can be used.

[00124] Recombinant constructs encoding chimeric VP1 proteins can be prepared in suitable vectors, such as expression vectors, using conventional methods. The recombinant construct, such as an expression vector, includes a nucleic acid sequence which encodes a chimeric norovirus VP1 protein. The recombinant construct can be in the form of DNA, RNA, and can be either single or double stranded. For example, the construct can be in the form of a plasmid. A number of suitable vectors for expression of recombinant proteins in a desired host cell are well-known and conventional in the art. Suitable vectors can contain a number of components, including, but not limited to one or more of the following: an origin of replication; a selectable marker gene; one or more expression control elements, such as a transcriptional control element *(e.g.,* a promoter, an enhancer, a terminator), and/or one or more translation signals; and a signal sequence or leader sequence for targeting to the secretory pathway in a selected host cell *(e.g.,* of mammalian origin or from a heterologous mammalian or non-mammalian species). For example, for expression in insect cells a suitable baculovirus expression vector, such as pFastBac (Invitrogen), is used to produce recombinant baculovirus particles. The baculovirus particles are amplified and used to infect insect cells to express recombinant protein. For expression in mammalian cells, a vector that will drive expression of the construct in the desired mammalian host cell *(e.g.,* Chinese hamster ovary cells) is used. Similarly, for expression in yeast, a vector that will drive expression in the desired yeast host cell *(e.g., Saccharomyces cerevisiae, Candida albicans, Candida maltosa, Hansenual polymorpha, Kluyveromyces fragilis, Kluyveromyces lactis, Pichia guillerimondii, Pichia pastoris, Schizosaccharomyces pombe* and *Yarrowia lipolytica)* is used.

[00125] Viral vectors can be used for the production of VLPs of the invention in eukaryotic cells, such as those derived from the pox family of viruses, including vaccinia virus and avian poxvirus. Additionally, a vaccinia based infection/transfection system, as described in Tomei *et al.* (1993) J. Virol. 67:4017-4026 and Selby *et al.* (1993) J. Gen. Virol. 74:1103-1 113, will also find use with the present invention. In this system, cells are first infected *in vitro* with a vaccinia virus recombinant that encodes the bacteriophage T7 RNA polymerase. This polymerase displays exquisite specificity in that it only transcribes templates bearing T7 promoters. Following infection, cells are transfected with the DNA of interest, driven by a T7 promoter. The polymerase expressed in the cytoplasm from the vaccinia virus recombinant transcribes the transfected DNA into RNA which is then translated into protein by the host translational machinery. Alternately, T7 can be added as a purified protein or enzyme as in the "Progenitor" system (Studier and Moffatt (1986) J. Mol. Biol. 189:1 13-130). The method provides for high level, transient, cytoplasmic production of large quantities of RNA and its translation product(s).

[00126] The recombinant nucleic acids can be in the form of, or components of, a vectored expression system, such as a self-replicating nucleic acid molecule (e.g., RNA), an alphavirus particle, an alphavirus replicon, and the like.

[00127] If desired, the vector can include a detectable marker. For example, the detectable marker can be a polypeptide that confers resistance to one or more antibiotics. Additional information about the vectors of the invention is provided below in section C.

C. Production of Viral-like Particles (VLPs) & Host Cells for Same

[00128] The invention further provides recombinant host cells that contain a nucleic acid that encodes a chimeric norovirus VPl protein, and methods for producing a chimeric norovirus VPl protein and VLPs that contain the chimeric VPl protein. The chimeric VPl proteins can be produced using any suitable method. Generally, they are produced by expression of recombinant constructs that encode the chimeric VPl protein in suitable recombinant host cells, such as insect cells *(e.g., Aedes aegypti, Autographa californica, Bombyx mori, Drosophila melanogaster, Spodoptera frugiperda,* and *Trichoplusia ni),* mammalian cells *(e.g.,* human, non-human primate, horse, cow, sheep, dog, cat, and rodent *(e.g.,* hamster), avian cells *(e.g.,* chicken, duck, and geese, bacteria *(e.g.,* E.

coli, Bacillus subtilis, and Streptococcus spp.), yeast cells *(e.g., Saccharomyces cerevisiae, Candida albicans, Candida maltosa, Hansenual poiymorpha, Kluyveromyces fragiiis, Kluyveromyces lactis, Pichia guillerimondii, Pichia pastoris, Schizosaccharomyces pombe* and *Yarrowia Upolytica),* Tetrahymena cells *(e.g., Tetrahymena thermophila)* or combinations thereof. Many suitable insect cells and mammalian cells are well-known in the art. Suitable insect cells include, for example, Sf9 cells, Sf21 cells, Tn5 cells, Schneider S2 cells, and High Five cells (a clonal isolate derived from the parental Trichoplusia ni BTI-TN-5B1-4 cell line (Invitrogen)). Suitable mammalian cells include, for example, Chinese hamster ovary (CHO) cells, human embryonic kidney cells (HEK293 cells, typically transformed by sheared adenovirus type 5 DNA), NIH-3T3 cells, 293-T cells, Vero cells, HeLa cells, PERC.6 cells (ECACC deposit number 96022940), Hep G2 cells, MRC-5 (ATCC CCL-171), WI-38 (ATCC CCL-75), fetal rhesus lung cells (ATCC CL-160), Madin-Darby bovine kidney ("MDBK") cells, Madin-Darby canine kidney ("MDCK") cells *(e.g.,* MDCK (NBL2), ATCC CCL34; or MDCK 33016, DSM ACC 2219), baby hamster kidney (BHK) cells, such as BHK21-F, HKCC cells, and the like. Suitable avian cells include, for example, chicken embryonic stem cells *(e.g.,* EBx® cells), chicken embryonic fibroblasts, chicken embryonic germ cells, duck cells *(e.g.,* AGE1.CR and AGEl.CR.pIX cell lines (ProBioGen) which are described, for example, in *Vaccine* 27:4975-4982 (2009) and WO2005/042728), EB66 cells, and the like.

[00129] Suitable insect cell expression systems, such as baculovirus systems, are known to those of skill in the art and described in, *e.g.,* Summers and Smith, *Texas Agricultural Experiment Station Bulletin* No. 1555 (1987). Materials and methods for baculovirus/insect cell expression systems are commercially available in kit form from, *inter alia,* Invitrogen, San Diego CA. Avian cell expression systems are also known to those of skill in the art and described in, *e.g.,* U.S. Patent Nos. 5,340,740; 5,656,479; 5,830,510; 6,114,168; and 6,500,668; European Patent No. EP 0787180B; European Patent Publication No. EP1500699; WO 03/043415; and WO 03/076601. Similarly, yeast, bacterial and mammalian cell expression systems are also known in the art and described in, *e.g., Yeast Genetic Engineering* (Barr *et al.,* eds., 1989) Butterworths, London.

[00130] In some aspects, the method for producing a chimeric norovirus VP1 protein comprises culturing a host cell transformed with a recombinant nucleic acid that encodes a chimeric VP1 protein under conditions suitable for expression of the nucleic acid,

whereby a chimeric norovirus VPl protein is produced. Chimeric VPl proteins can self-assemble to form VLPs, and preferably the host cell is maintained under conditions suitable for VLP formation. Conditions suitable for the formation of VLPs are well known and easily determined by a person of ordinary skill in the art. *See, e.g.,* U.S. Pat. No. 7,527,801, which describes the production of viral particles in yeast cells *(Saccharomyces cerevisiae)* and insect cells (SF9), and Taube, S. *et al.* (2005) Archives of Virology 150:1425-1431, which describes the production of VLPs in HEK293T cells. If desired, the method can further include the step of isolating or purifying the chimeric norovirus VPl protein, VLPs containing the chimeric VPl protein, or a combination thereof from the culture media or cells. In some preferred embodiments, the host cell used to produce the chimeric VPl protein and/or VLPs containing the chimeric VPl protein is a yeast cell, insect cell, or a combination thereof.

[00131] The invention also provides methods for the production of multivalent VLPs. Multivalent VLPs can be prepared by maintaining a host cell that contains recombinant nucleic acids encoding two different chimeric VLPs. For example, this can be accomplished using a bicistronic expression vector, such as pCDC.7 for expression in yeast. Alternatively, two or more monovalent VLPs can be prepared, and optionally purified, and then mixed to produce a formulation of VLPs that is multivalent.

[00132] The norovirus chimeric VPl proteins, and VLPs, can also be produced by expression of a recombinant nucleic acid molecule that encodes a norovirus chimeric VPl proteins, e.g., in the form of or as a component of a vectored expression system, by the cells of a mammal following administration of the recombinant nucleic acid to the mammal.

D. Isolation and Purification of VLPs

[00133] The present invention further provides a method of isolating or purifying norovirus VLPs from culture media, host cells or a combination thereof. Preferably, the VLPs are isolated or purified directly from the host cell culture media, *i.e.,* conditioned culture media. However, if desired, the host cells can be recovered, for example by centrifugation, a host cell homogenate or lysate can be formed using any suitable methods, and VLPs can be isolated. Suitable chemical, physical or mechanical means, which lyse the cells yet keep the VLPs substantially intact are known in the art and are described in, *e.g.,*

Protein Purification Applications: A Practical Approach, (E. L. V. Harris and S. Angal, Eds., 1990).

[00134] VLPs can be isolated from culture media or host cells, *e.g.,* a cell lysate or homogenate, using any suitable method. Suitable methods that maintain the integrity of VLPs, such as, density gradient centrifugation, *e.g.,* sucrose gradients, PEG-precipitation, pelleting, and the like (see, *e.g.,* Kirnbauer *et al.* (1993) J. Virol. 67:6929-6936), as well as standard purification techniques including, *e.g.,* ion exchange and gel filtration chromatography can be used. Centrifugation, on a sucrose cushion or sucrose gradient is convenient method for isolating VLPs from VPl monomers or oligomers and from other cellular components. These methods can be used singly, consecutively and integrated into a larger purification scheme. For example, VLPs that are purified on a sucrose cushion or gradient can then be further purified if desired, for example, using ion exchange chromatography, size exclusion chromatography or any other suitable method. In a particular example, norovirus virus-like particles (VLPs) can be purified from the media of yeast cells expressing the norovirus VPl protein. A low speed spin (15,000 x g) can be performed on the media to remove extra cells or cellular debris. Following this step a high speed spin (100,000 x g) through a 40% sucrose cushion can be performed to separate the virus-like particles from free protein and other material. The pellet containing the VLPs can be resuspended in buffer (50 mM Tris pH 7.5, 100 mM NaCl) and loaded onto an ion exchange column. The VLPs can be eluted from the column using a salt gradient. Finally, the eluted fractions containing the VLPs can be concentrated and buffer exchanged into a lower salt buffer (20 mM Tris pH 7.5, 100 mM NaCl) and stored at 4° Celsius until needed.

E. Immunogenic Compositions

[00135] As described earlier, the invention also provides immunogenic compositions comprising one or more chimeric VPl proteins, preferably in the form of a VLP. Two or more different chimeric VPl proteins, monovalent VLPs, or multivalent VLPs may be mixed together to produce a multivalent immunogenic composition that contains two or more different VPl P-domains.

[00136] The immunogenic compositions may comprise a mixture of chimeric VPl proteins, VLPs and nucleic acids, which in turn may be delivered using the same or different vehicles. Antigens may be administered individually or in combination, in *e.g.,* prophylactic

(i.e., to prevent infection) or therapeutic (to treat infection) immunogenic compositions. The immunogenic composition may be given more than once *(e.g.,* a "prime" administration followed by one or more "boosts") to achieve the desired effects. The same composition can be administered in one or more priming and one or more boosting steps. Alternatively, different compositions can be used for priming and boosting.

[00137] The immunogenic composition may further comprise one or more other antigens, from a norovirus or from another pathogen, if desired. For example, a combination immunogenic composition can contain a norovirus VLP that comprises a chimeric VP1 protein and one or more antigens from another pathogen, such as a bacterial, viral or fungal pathogen. For example, the immunogenic composition of the invention can comprise a norovirus VLP that comprises a chimeric VP1 protein as described herein, and one or more rotavirus antigens such as a live attenuated rotavirus *(e.g.,* ROTARTX (rotavirus vaccine, live, oral; GlaxoSmithKline)), one or more live reassortant rotaviruses *(e.g.,* ROTATEQ (rotavirus vaccine, live, oral, pentavalent; Merck), ROTASHIELD (rotavirus vaccine, live, oral, tetravalent; Wyeth-Lederle)), non-human rotaviruses *(e.g.,* lamb (Lanzhou), bovine, rhesus), reassortant rotaviruses *(e.g.,* human-bovine, human-lamb, human-rhesus), inactivated rotavirus (e.g., heat inactivated), rotavirus subunits (e.g., VP2, VP4, VP6, VP7, or any combination thereof), rotavirus subunit VLP or vaccines.

[00138] In another aspect, the immunogenic composition comprises a recombinant nucleic acid molecule that encodes a norovirus chimeric VP1 protein. If desired, such immunogenic compositions can contain a suitable nucleic acid delivery system, such as liposomes, lipoplexes, emulsions (nanoemulsions, microemulsions), particles (nanoparticles, microparticles), a vector, such as a viral particle, a replicon, and the like.

[00139] The immunogenic compositions generally include one or more "pharmaceutically acceptable excipients or vehicles" such as water, saline, glycerol, ethanol, and the like singly or in combination. Immunogenic compositions will typically, in addition to the components mentioned above, comprise one or more "pharmaceutically acceptable carriers." These include any carrier which does not itself induce the production of antibodies harmful to the individual receiving the composition. Suitable carriers typically are large, slowly metabolized macromolecules such as proteins, polysaccharides, polylactic acids, polyglycolic acids, polymeric amino acids, amino acid copolymers, and lipid aggregates (such as oil droplets or liposomes). Such carriers are well known to those of ordinary skill in

the art. Additionally, an auxiliary substance, such as a wetting or emulsifying agent, pH buffering substance, and the like, may be present. A thorough discussion of pharmaceutically acceptable components is available in Gennaro (2000) Remington: The Science and Practice of Pharmacy. 20th ed., ISBN: 0683306472.

[00140] Pharmaceutically acceptable salts can also be used in immunogenic compositions of the invention, for example, mineral salts such as hydrochlorides, hydrobromides, phosphates, or sulfates, as well as salts of organic acids such as acetates, proprionates, malonates, orbenzoates.

[00141] If desired, antigens can be adsorbed to, entrapped within or otherwise associated with liposomes and particulate carriers such as poly(D,L-lactide co-glycolide) (PLG) microparticles or nanoparticles. Antigens can be conjugated to a carrier protein in order to enhance immunogenicity. See Ramsay *et al.* (2001) Lancet 357(9251): 195-196; Lindberg (1999) Vaccine 17 Suppl 2:S28-36; Buttery & Moxon (2000) J R Coll Physicians Lond 34:163-168; Ahmad & Chapnick (1999) Infect Dis Clin North Am 13:1 13-133, vii; Goldblatt (1998) J. Med. Microbiol. 47:563-567; European patent 0 477 508; U.S. Pat. No. 5,306,492; W098/42721; Conjugate Vaccines (eds. Cruse *et al.)* ISBN 3805549326, particularly vol. 10:48-1 14; Hermanson (1996) Bioconjugate Techniques ISBN: 0123423368 or 012342335X.

[00142] Immunogenic compositions of the present invention may be administered in conjunction with other immunoregulatory agents. For example, an immunogenic composition of the invention can include an adjuvant. Preferred adjuvants include, but are not limited to, one or more of the following types of adjuvants described below. Immunogenic compositions of the present invention may also be pre-mixed with an adjuvant before administration.

[00143] Alum

[00144] In one embodiment, the adjuvant for use in the present invention is alum (aluminum potassium sulfate ($A1K(S0_4)_2$)), or an alum derivative, such as that formed in-situ by mixing an antigen in phosphate buffer with alum, followed by titration and precipitation with a base such as ammonium hydroxide or sodium hydroxide.

[00145] Retinoic acid

[00146] In one embodiment, the adjuvant for use in the present invention is retinoic acid, the oxidized form of Vitamin A, with only partial vitamin A function.

[00147] MF59C.1

[00148] In one embodiment, the adjuvant for use in the present invention is MF59C.1, an oil-in-water emulsion (squalene) in citrate buffer. MF59C.1 has been shown to be an effective adjuvant and enhance the production of high titers of neutralizing antibodies against parvovirus B19 (Bailou *et al.* (2003) JID, 187:675-678).

[00149] Mineral Containing Compositions

[00150] Mineral containing compositions suitable for use as adjuvants in the invention include mineral salts, such as aluminum salts and calcium salts. Suitable mineral salts include hydroxides *(e.g.* oxyhydroxides), phosphates *(e.g.* hydroxyphosphates, orthophosphates), sulfates, etc. *(e.g.* see chapters 8 & 9 of Vaccine Design . . . (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.), or mixtures of different mineral compounds *(e.g.* a mixture of a phosphate and a hydroxide adjuvant, optionally with an excess of the phosphate), with the compounds taking any suitable form *(e.g.* gel, crystalline, amorphous, etc.), and with adsorption to the salt(s) being preferred. The mineral containing compositions may also be formulated as a particle of metal salt (WO00/23105).

[00151] The adjuvants known as "aluminium hydroxide" are typically aluminium oxyhydroxide salts, which are usually at least partially crystalline. Aluminium oxyhydroxide, which can be represented by the formula AIO(OH), can be distinguished from other aluminium compounds, such as aluminium hydroxide $Al(OH)_3$, by infrared (IR) spectroscopy, in particular by the presence of an adsorption band at $1070cm^{-1}$ and a strong shoulder at 3090-3 $100cm^{-1}$ [chapter 9 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.] The degree of crystallinity of an aluminum hydroxide adjuvant is reflected by the width of the diffraction band at half height (WHH), with poorly-crystalline particles showing greater line broadening due to smaller crystallite sizes. The surface area increases as WHH increases, and adjuvants with higher WHH values have been seen to have greater capacity for antigen adsorption. A fibrous morphology *(e.g.* as seen in transmission electron micrographs) is typical for aluminum hydroxide adjuvants. The pi of aluminium hydroxide adjuvants is typically about 11 *i.e.* the adjuvant itself has a positive

surface charge at physiological pH. Adsorptive capacities of between 1.8-2.6 mg protein per mg Al^{+++} at pH 7.4 have been reported for aluminium hydroxide adjuvants.

[00152] The adjuvants known as "aluminium phosphate" are typically aluminium hydroxyphosphates, often also containing a small amount of sulfate *(i.e.* aluminium hydroxyphosphate sulfate). They may be obtained by precipitation, and the reaction conditions and concentrations during precipitation influence the degree of substitution of phosphate for hydroxyl in the salt. Hydroxyphosphates generally have a PO_4/AI molar ratio between 0.3 and 1.2. Hydroxyphosphates can be distinguished from strict $AIPO_4$ by the presence of hydroxyl groups. For example, an IR spectrum band at 3164cm^{-1} *(e.g.* when heated to 200°C) indicates the presence of structural hydroxyls [ch. 9 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.].

[00153] The $P0_4/A1^{3+}$ molar ratio of an aluminium phosphate adjuvant will generally be between 0.3 and 1.2, preferably between 0.8 and 1.2, and more preferably 0.95±0.1. The aluminium phosphate will generally be amorphous, particularly for hydroxyphosphate salts. A typical adjuvant is amorphous aluminium hydroxyphosphate with PO_4/AI molar ratio between 0.84 and 0.92, included at 0.6mg Al^{3+}/ml. The aluminium phosphate will generally be particulate *(e.g.* plate-like morphology as seen in transmission electron micrographs). Typical diameters of the particles are in the range 0.5-20μιη *(e.g.* about 5-10μιη) after any antigen adsorption. Adsorptive capacities of between 0.7-1.5 mg protein per mg Al^{+++} at pH 7.4 have been reported for aluminium phosphate adjuvants.

[00154] The point of zero charge (PZC) of aluminium phosphate is inversely related to the degree of substitution of phosphate for hydroxyl, and this degree of substitution can vary depending on reaction conditions and concentration of reactants used for preparing the salt by precipitation. PZC is also altered by changing the concentration of free phosphate ions in solution (more phosphate = more acidic PZC) or by adding a buffer such as a histidine buffer (makes PZC more basic). Aluminium phosphates used according to the invention will generally have a PZC of between 4.0 and 7.0, more preferably between 5.0 and 6.5 *e.g.* about 5.7.

[00155] Suspensions of aluminium salts used to prepare compositions of the invention may contain a buffer *(e.g.* a phosphate or a histidine or a Tris buffer), but this is not always necessary. The suspensions are preferably sterile and pyrogen-free. A suspension

may include free aqueous phosphate ions *e.g.* present at a concentration between 1.0 and 20 mM, preferably between 5 and 15 mM, and more preferably about 10 mM. The suspensions may also comprise sodium chloride.

[00156] In one embodiment, an adjuvant component includes a mixture of both an aluminium hydroxide and an aluminium phosphate. In this case there may be more aluminium phosphate than hydroxide *e.g.* a weight ratio of at least 2:1 *e.g.* >5:1, >6:1, >7:1, >8:l, >9:l, *e*ъ .

[00157] The concentration of Al^{+++} in a composition for administration to a patient is preferably less than lOmg/ml *e.g.* ≤5 mg/ml, ≤4 mg/ml, ≤3 mg/ml, ≤2 mg/ml, ≤1 mg/ml, *etc.* A preferred range is between 0.3 and lmg/ml. A maximum of <0.85mg/dose is preferred.

[00158] Oil-Emulsions

[00159] Oil emulsion compositions suitable for use as adjuvants in the invention include squalene-water emulsions, such as MF59 [Chapter 10 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.] (5% Squalene, 0.5% Tween 80, and 0.5% Span 85, formulated into submicron particles using a microfluidizer). Complete Freund's adjuvant (CFA) and incomplete Freund's adjuvant (IFA) may also be used.

[00160] Various suitable oil-in-water emulsions are known, and they typically include at least one oil and at least one surfactant, with the oil(s) and surfactant(s) being biodegradable (metabolisable) and biocompatible. The oil droplets in the emulsion are generally less than 5μιη in diameter, and advantageously the emulsion comprises oil droplets with a sub-micron diameter, with these small sizes being achieved with a microfluidiser to provide stable emulsions. Droplets with a size less than 220nm are preferred as they can be subjected to filter sterilization.

[00161] The invention can be used with oils such as those from an animal (such as fish) or vegetable source. Sources for vegetable oils include nuts, seeds and grains. Peanut oil, soybean oil, coconut oil, and olive oil, the most commonly available, exemplify the nut oils. Jojoba oil can be used *e.g.* obtained from the jojoba bean. Seed oils include safflower oil, cottonseed oil, sunflower seed oil, sesame seed oil and the like. In the grain group, corn oil is the most readily available, but the oil of other cereal grains such as wheat, oats, rye,

rice, teff, triticale and the like may also be used. 6-10 carbon fatty acid esters of glycerol and 1,2-propanediol, while not occurring naturally in seed oils, may be prepared by hydrolysis, separation and esterification of the appropriate materials starting from the nut and seed oils. Fats and oils from mammalian milk are metabolizable and may therefore be used in the practice of this invention. The procedures for separation, purification, saponification and other means necessary for obtaining pure oils from animal sources are well known in the art. Most fish contain metabolizable oils which may be readily recovered. For example, cod liver oil, shark liver oils, and whale oil such as spermaceti exemplify several of the fish oils which may be used herein. A number of branched chain oils are synthesized biochemically in 5-carbon isoprene units and are generally referred to as terpenoids. Shark liver oil contains a branched, unsaturated terpenoid known as squalene, 2,6,10,15, 19,23-hexamethyl-2,6,10,14,18,22-tetracosahexaene. Other preferred oils are the tocopherols (see below). Oil in water emulsions comprising sqlauene are particularly preferred. Mixtures of oils can be used.

[00162] Surfactants can be classified by their 'HLB' (hydrophile/lipophile balance). Preferred surfactants of the invention have a HLB of at least 10, preferably at least 15, and more preferably at least 16. The invention can be used with surfactants including, but not limited to: the polyoxyethylene sorbitan esters surfactants (commonly referred to as the Tweens), especially polysorbate 20 and polysorbate 80; copolymers of ethylene oxide (EO), propylene oxide (PO), and/or butylene oxide (BO), sold under the DOWFAX™ tradename, such as linear EO/PO block copolymers; octoxynols, which can vary in the number of repeating ethoxy (oxy-l,2-ethanediyl) groups, with octoxynol-9 (Triton X-100, or t-octylphenoxypolyethoxyethanol) being of particular interest; (octylphenoxy)polyethoxyethanol (IGEPAL CA-630/NP-40); phospholipids such as phosphatidylcholine (lecithin); polyoxyethylene fatty ethers derived from lauryl, cetyl, stearyl and oleyl alcohols (known as Brij surfactants), such as triethyleneglycol monolauryl ether (Brij 30); and sorbitan esters (commonly known as the SPANs), such as sorbitan trioleate (Span 85) and sorbitan monolaurate. Preferred surfactants for including in the emulsion are Tween 80 (polyoxyethylene sorbitan monooleate), Span 85 (sorbitan trioleate), lecithin and Triton X-100. As mentioned above, detergents such as Tween 80 may contribute to the thermal stability seen in the examples below.

[00163] Mixtures of surfactants can be used *e.g.* Tween 80/Span 85 mixtures. A combination of a polyoxyethylene sorbitan ester such as polyoxyethylene sorbitan monooleate (Tween 80) and an octoxynol such as t-octylphenoxypolyethoxyethanol (Triton X-100) is also suitable. Another useful combination comprises laureth 9 plus a polyoxyethylene sorbitan ester and/or an octoxynol.

[00164] Preferred amounts of surfactants (% by weight) are: polyoxyethylene sorbitan esters (such as Tween 80) 0.01 to 1%, in particular about 0.1 %; octyl- or nonylphenoxy polyoxyethanols (such as Triton X-100, or other detergents in the Triton series) 0.001 to 0.1 %, in particular 0.005 to 0.02%; polyoxyethylene ethers (such as laureth 9) 0.1 to 20 %, preferably 0.1 to 10 % and in particular 0.1 to 1 % or about 0.5%.

[00165] Specific oil-in-water emulsion adjuvants useful with the invention include, but are not limited to:

- A submicron emulsion of squalene, Tween 80, and Span 85. The composition of the emulsion by volume can be about 5% squalene, about 0.5% polysorbate 80 and about 0.5% Span 85. In weight terms, these ratios become 4.3% squalene, 0.5% polysorbate 80 and 0.48% Span 85. This adjuvant is known as 'MF59'. The MF59 emulsion advantageously includes citrate ions *e.g.* lOmM sodium citrate buffer.

- An emulsion comprising squalene, an a-tocopherol, and polysorbate 80. These emulsions may have from 2 to 10% squalene, from 2 to 10% tocopherol and from 0.3 to 3% Tween 80, and the weight ratio of squalene:tocopherol is preferably ≤ 1 *(e.g.* 0.90) as this provides a more stable emulsion. Squalene and Tween 80 may be present volume ratio of about 5:2, or at a weight ratio of about 11:5. One such emulsion can be made by dissolving Tween 80 in PBS to give a 2% solution, then mixing 90ml of this solution with a mixture of (5g of DL-a-tocopherol and 5ml squalene), then microfluidising the mixture. The resulting emulsion may have submicron oil droplets *e.g.* with an average diameter of between 100 and 250nm, preferably about 180nm.

- An emulsion of squalene, a tocopherol, and a Triton detergent *(e.g.* Triton X-100). The emulsion may also include a 3d-MPL (see below). The emulsion may contain a phosphate buffer.

- An emulsion comprising a polysorbate *(e.g.* polysorbate 80), a Triton detergent *(e.g.* Triton X-100) and a tocopherol *(e.g.* an a-tocopherol succinate). The emulsion may

include these three components at a mass ratio of about 75:11:10 *(e.g.* 750μg/ml polysorbate 80, 110μg/ml Triton X-100 and 100μg/ml a-tocopherol succinate), and these concentrations should include any contribution of these components from antigens. The emulsion may also include squalene. The emulsion may also include a 3d-MPL (see below). The aqueous phase may contain a phosphate buffer.

- An emulsion of squalane, polysorbate 80 and poloxamer 401 ("Pluronic™ L121"). The emulsion can be formulated in phosphate buffered saline, pH 7.4. This emulsion is a useful delivery vehicle for muramyl dipeptides, and has been used with threonyl-MDP in the "SAF-1" adjuvant (0.05-1% Thr-MDP, 5% squalane, 2.5% Pluronic L121 and 0.2% polysorbate 80). It can also be used without the Thr-MDP, as in the "AF" adjuvant (5% squalane, 1.25% Pluronic L121 and 0.2% polysorbate 80). Microfluidisation is preferred.

- An emulsion comprising squalene, an aqueous solvent, a polyoxyethylene alkyl ether hydrophilic nonionic surfactant *(e.g.* polyoxyethylene (12) cetostearyl ether) and a hydrophobic nonionic surfactant *(e.g.* a sorbitan ester or mannide ester, such as sorbitan monoleate or 'Span 80'). The emulsion is preferably thermoreversible and/or has at least 90% of the oil droplets (by volume) with a size less than 200 nm. The emulsion may also include one or more of: alditol; a cryoprotective agent *(e.g.* a sugar, such as dodecylmaltoside and/or sucrose); and/or an alkylpolyglycoside. Such emulsions may be lyophilized.

- An emulsion having from 0.5-50% of an oil, 0.1-10% of a phospholipid, and 0.05-5% of a non-ionic surfactant. Preferred phospholipid components are phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine, phosphatidylinositol, phosphatidylglycerol, phosphatidic acid, sphingomyelin and cardiolipin. Submicron droplet sizes are advantageous.

- A submicron oil-in-water emulsion of a non-metabolisable oil (such as light mineral oil) and at least one surfactant (such as lecithin, Tween 80 or Span 80). Additives may be included, such as QuilA saponin, cholesterol, a saponin-lipophile conjugate (such as GPI-0100, produced by addition of aliphatic amine to desacylsaponin via the carboxyl group of glucuronic acid), dimethyidioctadecylammonium bromide and/or N,N-dioctadecyl-N,N-bis (2-hydroxyethyl)propanediamine.

- An emulsion comprising a mineral oil, a non-ionic lipophilic ethoxylated fatty alcohol, and a non-ionic hydrophilic surfactant *(e.g.* an ethoxylated fatty alcohol and/or polyoxyethylene-polyoxypropylene block copolymer) (see WO2006/1 13373).

- An emulsion comprising a mineral oil, a non-ionic hydrophilic ethoxylated fatty alcohol, and a non-ionic lipophilic surfactant *(e.g.* an ethoxylated fatty alcohol and/or polyoxyethylene-polyoxypropylene block copolymer) (see WO2006/1 13373).

- An emulsion in which a saponin *(e.g.* QuilA or QS21) and a sterol *(e.g.* a cholesterol) are associated as helical micelles.

[00156] Antigens (VLPs) and adjuvants in a composition will typically be in admixture at the time of delivery to a patient. The emulsions may be mixed with antigen (VLP) during manufacture, or extemporaneously, at the time of delivery. Thus the adjuvant and antigen (VLP) may be kept separately in a packaged or distributed vaccine, ready for final formulation at the time of use. The antigen (VLP) will generally be in an aqueous form, such that the vaccine is finally prepared by mixing two liquids. The volume ratio of the two liquids for mixing can vary *(e.g.* between 5:1 and 1:5) but is generally about 1:1.

[00157] **Saponin Formulations** (see chapter 22 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.).

[00158] Saponin formulations may also be used as adjuvants in the invention. Saponins are a heterogeneous group of sterol glycosides and triterpenoid glycosides that are found in the bark, leaves, stems, roots and even flowers of a wide range of plant species. Saponin from the bark of the *Quillaia saponaria* Molina tree have been widely studied as adjuvants. Saponin can also be commercially obtained from *Smilax ornata* (sarsaprilla), *Gypsophiiia paniculata* (brides veil), and *Saponaria offlcianalis* (soap root). Saponin adjuvant formulations include purified formulations, such as QS21, as well as lipid formulations, such as ISCOMs. QS21 is marketed as Stimulon™.

[00159] Saponin compositions have been purified using HPLC and RP-HPLC. Specific purified fractions using these techniques have been identified, including QS7, QS17, QS18, QS21, QH-A, QH-B and QH-C. Preferably, the saponin is QS21. A method of production of QS21 is disclosed in US Patent No. 5,057,540. Saponin formulations may also comprise a sterol, such as cholesterol.

[00160] Combinations of saponins and cholesterols can be used to form unique particles called immunostimulating complexes (ISCOMs) (chapter 23 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.). ISCOMs typically also include a phospholipid such as phosphatidylethanolamine or phosphatidylcholine. Any known saponin can be used in ISCOMs. Preferably, the ISCOM includes one or more of QuilA, QHA & QHC. ISCOMs are further described in W096/33739. Optionally, the ISCOMS may be devoid of additional detergent.

[00161] Virosomes and Virus Like Particles (VLPs)

[00162] Virosomes and virus-like particles (VLPs) can also be used as adjuvants in the invention. These structures generally contain one or more proteins from a virus optionally combined or formulated with a phospholipid. They are generally non-pathogenic, non-replicating and generally do not contain any of the native viral genome. The viral proteins may be recombinantly produced or isolated from whole viruses. These viral proteins suitable for use in virosomes or VLPs include proteins derived from influenza virus (such as HA or NA), Hepatitis B virus (such as core or capsid proteins), Hepatitis E virus, measles virus, Sindbis virus, Rotavirus, Foot-and-Mouth Disease virus, Retrovirus, Norwalk virus, human Papilloma virus, HIV, RNA-phages, QB-phage (such as coat proteins), GA-phage, fr-phage, AP205 phage, and Ty (such as retrotransposon Ty protein pi).

[00163] Bacterial or microbial derivatives

[00164] Adjuvants suitable for use in the invention include bacterial or microbial derivatives such as non-toxic derivatives of enterobacterial lipopolysaccharide (LPS), Lipid A derivatives, immunostimulatory oligonucleotides and ADP-ribosylating toxins and detoxified derivatives thereof.

[00165] Non-toxic derivatives of LPS include monophosphoryl lipid A (MPL) and 3-O-deacylated MPL (3dMPL). 3dMPL is a mixture of 3 de-O-acylated monophosphoryl lipid A with 4, 5 or 6 acylated chains. A preferred "small particle" form of 3 De-O-acylated monophosphoryl lipid A is disclosed in EP-A-0689454. Such "small particles" of 3dMPL are small enough to be sterile filtered through a 0.22μη membrane (EP-A-0689454). Other non-toxic LPS derivatives include monophosphoryl lipid A mimics, such as aminoalkyl glucosaminide phosphate derivatives *e.g.* RC-529.

[00166] Lipid A derivatives include derivatives of lipid A from *Escherichia coli* such as OM-174. OM-174 is described for example in Meraldi *et al* (2003) *Vaccine* 21:2485-2491 and Pajak *et al.* (2003) *Vaccine* 21:836-842.

[00167] Immunostimulatory oligonucleotides suitable for use as adjuvants in the invention include nucleotide sequences containing a CpG motif (a dinucleotide sequence containing an unmethylated cytosine linked by a phosphate bond to a guanosine). Double-stranded RNAs and oligonucleotides containing palindromic or poly(dG) sequences have also been shown to be immunostimulatory.

[00168] The CpG's can include nucleotide modifications/analogs such as phosphorothioate modifications and can be double-stranded or single-stranded. References Kandimalla *et al.* (2003) *Nucleic Acids Research* 31:2393-2400; WO02/26757, and W099/62923 disclose possible analog substitutions *e.g.* replacement of guanosine with 2'-deoxy-7-deazaguanosine. The adjuvant effect of CpG oligonucleotides is further discussed in Krieg (2003) Nature Medicine 9:831-835; McCluskie et al. (2002) FEMS Immunology and Medical Microbiology 32:179-185; WO98/40100; US 6,207,646; US 6,239,116; and US 6,429,199.

[00169] The CpG sequence may be directed to TLR9, such as the motif GTCGTT or TTCGTT (Kandimalla *et al.* (2003) *Biochemical Society Transactions* 31 (part 3):654-658). The CpG sequence may be specific for inducing a Thl immune response, such as a CpG-A ODN, or it may be more specific for inducing a B cell response, such a CpG-B ODN. CpG-A and CpG-B ODNs are discussed in Blackwell et al. (2003) J Immunol 170:4061-4068; Krieg (2002) Trends Immunol 23:64-65 and WO01/95935. Preferably, the CpG is a CpG-A ODN.

[00170] Preferably, the CpG oligonucleotide is constructed so that the 5' end is accessible for receptor recognition. Optionally, two CpG oligonucleotide sequences may be attached at their 3' ends to form "immunomers". See, for example, Kandimalla *et al.* (2003) *Biochemical Society Transactions* 31 (part 3):654-658 & Kandimalla et al. (2003) BBRC 306:948-953; Bhagat et al. (2003) BBRC 300:853-861 and WO03/035836.

[00171] A particularly useful adjuvant based around immunostimulatory oligonucleotides is known as IC-31™ (Schellack *et al.* (2006) *Vaccine* 24:5461-5472). Thus an adjuvant used with the invention may comprise a mixture of (i) an oligonucleotide *(e.g.* between 15-40 nucleotides) including at least one (and preferably multiple) Cpl motifs *(i.e.* a cytosine linked to an inosine to form a dinucleotide), and (ii) a polycationic polymer, such as

an oligopeptide *(e.g.* between 5-20 amino acids) including at least one (and preferably multiple) Lys-Arg-Lys tripeptide sequence(s). The oligonucleotide may be a deoxynucleotide comprising 26-mer sequence 5'-(IC)i3-3' (SEQ ID NO:9). The polycationic polymer may be a peptide comprising 11-mer amino acid sequence KLKLLLLLKLK (SEQ ID NO: 10).

[00172] Bacterial ADP-ribosylating toxins and detoxified derivatives thereof may be used as adjuvants in the invention. Preferably, the protein is derived from *E.coli (E.coli* heat labile enterotoxin "LT"), cholera ("CT"), or pertussis ("PT"). The use of detoxified ADP-ribosylating toxins as mucosal adjuvants is described in W095/17211 and as parenteral adjuvants in W098/42375. The toxin or toxoid is preferably in the form of a holotoxin, comprising both A and B subunits. Preferably, the A subunit contains a detoxifying mutation; preferably the B subunit is not mutated. Preferably, the adjuvant is a detoxified LT mutant such as LT-K63, LT-R72, and LT-G192. The use of ADP-ribosylating toxins and detoxified derivatives thereof, particularly LT-K63 and LT-R72, as adjuvants can be found in Beignon et al. (2002) Infect Immun 70:3012-3019; Pizza et al. (2001) Vaccine 19:2534-2541; Pizza et al. (2000) Int J Med Microbiol 290:455-461; Scharton-Kersten et al. (2000) Infect Immun 68:5306-5313; Ryan et al. (1999) Infect Immun 67:6270-6280; Partidos et al. (1999) Immunol Lett 67:209-216; Peppoloni et al. (2003) Expert Rev Vaccines 2:285-293; Pine et al. (2002) J Control Release 85:263-270 and Tebbey et al. (2000) Vaccine 18:2723-34. A useful CT mutant is or CT-E29H. Numerical reference for amino acid substitutions is preferably based on the alignments of the A and B subunits of ADP-ribosylating toxins set forth in Domenighini *et al.* (1995) *Mol Microbiol* 15:1 165-1 167, specifically incorporated herein by reference in its entirety.

[00173] Human immunomodulators

[00174] Human immunomodulators suitable for use as adjuvants in the invention include cytokines, such as interleukins *(e.g.* IL-1, IL-2, IL-4, IL-5, IL-6, IL-7, IL-12, *etc.)* (WO99/40936 and W099/44636), interferons *(e.g.* interferon-γ), macrophage colony stimulating factor, and tumor necrosis factor. A preferred immunomodulator is IL-12.

[00175] Bioadhesives and Mucoadhesives

[00176] Bioadhesives and mucoadhesives may also be used as adjuvants in the invention. Suitable bioadhesives include esterified hyaluronic acid microspheres (Singh *et al.* (2001) *J. Cont. Release* 70:267-276) or mucoadhesives such as cross-linked derivatives of poly(acrylic acid), polyvinyl alcohol, polyvinyl pyrollidone, polysaccharides and

carboxymethylcellulose. Chitosan and derivatives thereof may also be used as adjuvants in the invention (WO99/27960).

[00177] Microparticles

[00178] Microparticles may also be used as adjuvants in the invention. Microparticles *(i.e.* a particle of -lOOnm to ~150μιη in diameter, more preferably ~200nm to ~30μιη in diameter, and most preferably ~500nm to ~10μιη in diameter) formed from materials that are biodegradable and non-toxic *(e.g.* a poly(a-hydroxy acid), a polyhydroxybutyric acid, a polyorthoester, a polyanhydride, a polycaprolactone, *etc.),* with poly(lactide-co-glycolide) are preferred, optionally treated to have a negatively-charged surface *(e.g.* with SDS) or a positively-charged surface *(e.g.* with a cationic detergent, such as CTAB).

[00179] Liposomes (Chapters 13 & 14 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.).

[00180] Examples of liposome formulations suitable for use as adjuvants are described in US 6,090,406, US 5,916,588 and EP A 0626169.

[00181] Polyoxyethylene ether and polyoxyethylene ester formulations

[00182] Adjuvants suitable for use in the invention include polyoxyethylene ethers and polyoxyethylene esters (W099/52549). Such formulations further include polyoxyethylene sorbitan ester surfactants in combination with an octoxynol (WOOl/21207) as well as polyoxyethylene alkyl ethers or ester surfactants in combination with at least one additional non-ionic surfactant such as an octoxynol (WO01/21 152). Preferred polyoxyethylene ethers are selected from the following group: polyoxyethylene-9-lauryl ether (laureth 9), polyoxyethylene-9-steoryl ether, polyoxytheylene-8-steoryl ether, polyoxyethylene-4-lauryl ether, polyoxyethylene-35-lauryl ether, and polyoxyethylene-23-lauryl ether.

[00183] Polyphosphazene (PCPP)

[00184] PCPP formulations are described, for example, in Andrianov *et al.* (1998) *Biomaterials* 19:109-1 15 and Payne *et al.* (1998) *Adv Drug Delivery Review* 31:185-196.

[00185] Muramyl peptides

[00186] Examples of muramyl peptides suitable for use as adjuvants in the invention include N-acetyl-muramyl-L-threonyl-D-isoglutamine (thr-MDP), N-acetyl-normuramyl-L-alanyl-D-isoglutamine (nor-MDP), and N-acetylmuramyl-L-alanyl-D-isoglutaminyl-L-alanine-2-(l'-2'-dipalmitoyl-5«-glycero-3-hydroxyphosphoryloxy)-ethylamine MTP-PE).

[00187] Imidazoquinolone Compounds

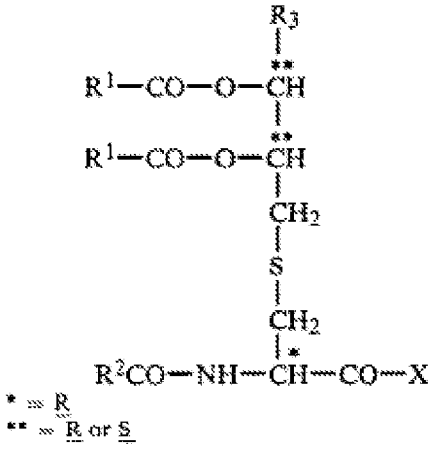
[00188] Examples of imidazoquinolone compounds suitable for use as adjuvants in the invention include Imiquamod and its homologues *(e.g.* "Resiquimod 3M"), described further in Stanley (2002) *Clin Exp Dermatol* 27:571-577 and Jones (2003) *Curr Opin Investig Drugs* 4:214-218.

[00189] Benzonaphthyridines

[00190] Examples of benzonaphthyridine compounds suitable for use as adjuvants in the invention are described in WO 2009/1 11337.

[00191] Lipopeptides

[00192] Lipopeptides (i.e., compounds comprising one or more fatty acid residues and two or more amino acid residues) are known to have immunostimulating character. Lipopeptides based on glycerylcysteine are particularly suitable for use as adjuvants in the invention. Specific examples of such peptides include compounds of the following formula:

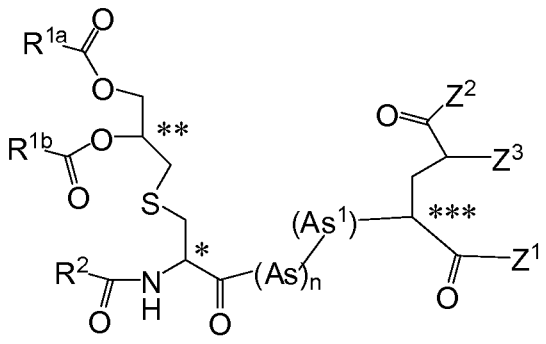


in which each of R^1 and R^2 represents a saturated or unsaturated, aliphatic or mixed aliphatic-cycloaliphatic hydrocarbon radical having from 8 to 30, preferably 11 to 21, carbon atoms that is optionally also substituted by oxygen functions, R^3 represents hydrogen or the radical R_1-CO-O-CH_2- in which R^1has the same meaning as above, and X represents an amino acid

bonded by a peptide linkage and having a free, esterified or amidated carboxy group, or an amino acid sequence of from 2 to 10 amino acids of which the terminal carboxy group is in free, esterified or amidated form. In certain embodiments, the amino acid sequence comprises a D-amino acid, for example, D-glutamic acid (D-Glu) or D-gamma-carboxy-glutamic acid (D-Gla).

[00193] Bacterial lipopeptides generally recognize TLR2, without requiring TLR6 to participate. (TLRs operate cooperatively to provide specific recognition of various triggers, and TLR2 plus TLR6 together recognize peptidoglycans, while TLR2 recognizes lipopeptides without TLR6.) These are sometimes classified as natural lipopeptides and synthetic lipopeptides. Synthetic lipopeptides tend to behave similarly, and are primarily recognized by TLR2.

[00194] Lipopeptides suitable for use as adjuvants in the invention include compounds with the following formula:



where the chiral center labeled * and the one labeled *** are both in the R configuration;

the chiral center labeled ** is either in the R or S configuration;

each R^{1a} and R^{1b} is independently an aliphatic or cycloaliphatic-aliphatic hydrocarbon group having 7-21 carbon atoms, optionally substituted by oxygen functions, or one of R^{1a} and R^{1b}, but not both, is H;

R^2 is an aliphatic or cycloaliphatic hydrocarbon group having 1-21 carbon atoms and optionally substituted by oxygen functions;

n is 0 or 1;

As represents either -O-Kw-CO- or -NH-Kw-CO- , where Kw is an aliphatic hydrocarbon group having 1-12 carbon atoms;

As^1 is a D- or L-alpha-amino acid;

Z^1 and Z^2 each independently represent -OH or the N-terminal radical of a D- or L-alpha amino acid of an amino-(lower alkane)-sulfonic acid or of a peptide having up to 6 amino acids selected from the D- and L-alpha aminocarboxylic acids and amino-lower alkyl-sulfonic acids; and

Z^3 is H or -CO-Z^4, where Z^4 is -OH or the N-terminal radical of a D- or L-alpha amino acid of an amino-(lower alkane)-sulfonic acid or of a peptide having up to 6 amino acids selected from the D and L-alpha aminocarboxylic acids and amino-lower alkyl-sulfonic acids; or an ester or amide formed from the carboxylic acid of such compounds. Suitable amides include -NH_2 and NH(lower alkyl), and suitable esters include C1-C4 alkyl esters. (lower alkyl or lower alkane, as used herein, refers to ***Ci-Ce*** straight chain or branched alkyls).

[00195] Such compounds are described in more detail in US 4,666,886. An example of a lipopeptide compound suitable for use as an adjuvant in the invention is a lipopeptide with the following formula:

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[00196] Another example of a lipopeptide species is called LP40, and is an agonist of TLR2. Akdis et al. (2003) *Eur. J. Immunology,* 33: 2717-2726.

[00197] These are related to a known class of lipopeptides from *E. coli,* referred to as murein lipoproteins. Certain partial degradation products of those proteins called murein lipopeptides are described in Hantke et al. (1973) *Eur. J. Biochem.,* 34: 284-296. These comprise a peptide linked to N-acetyl muramic acid and are thus related to Muramyl peptides, which are described in Baschang, et al, *Tetrahedron* (1989) 45(20): 6331-6360.

[00198] The invention may also comprise combinations of aspects of one or more of the adjuvants identified above. For example, the following adjuvant compositions may be used in the invention: (1) a saponin and an oil-in-water emulsion (W099/1241); (2) a saponin *(e.g.* QS21) + a non-toxic LPS derivative *(e.g.* 3dMPL) (WO94/00153); (3) a saponin *(e.g.* QS21) + a non-toxic LPS derivative *(e.g.* 3dMPL) + a cholesterol; (4) a saponin *(e.g.* QS21) + 3dMPL + IL-12 (optionally + a sterol) (W098/57659); (5) combinations of 3dMPL with, for example, QS21 and/or oil-in-water emulsions (European patent applications 0835318, 0735898 and 0761231); (6) SAF, containing 10% squalane, 0.4% Tween 80™, 5% pluronic-block polymer L121, and thr-MDP, either microfluidized into a submicron emulsion or vortexed to generate a larger particle size emulsion; (7) Ribi™ adjuvant system (RAS), (Ribi Immunochem) containing 2% squalene, 0.2% Tween 80, and one or more bacterial cell

wall components from the group consisting of monophosphorylipid A (MPL), trehalose dimycolate (TDM), and cell wall skeleton (CWS), preferably MPL + CWS (Detox™); and (8) one or more mineral salts (such as an aluminum salt) + a non-toxic derivative of LPS (such as 3dMPL).

[00199] Other substances that act as immunostimulating agents are disclosed in chapter 7 of *Vaccine Design...* (1995) eds. Powell & Newman. ISBN: 030644867X. Plenum.

The use of an aluminium hydroxide and/or aluminium phosphate adjuvant is useful, particularly in children, and antigens are generally adsorbed to these salts. Squalene-in-water emulsions are also preferred, particularly in the elderly. Useful adjuvant combinations include combinations of Thl and Th2 adjuvants such as CpG and alum or resiquimod and alum. A combination of aluminium phosphate and 3dMPL may be used.

[00200] In some embodiments, the invention is an immunogenic composition that contains a parvovirus VLP that contains VP1 and VP2, as described herein, and an adjuvant, such as MF59. The VLP and the adjuvant (e.g, MF59) can be premixed and provided as a single composition, or can be provided as separate components that are to be mixed prior to administration.

E. Administration

[00192] Compositions of the invention (e.g., compositions that contain norovirus chimeric VP1 proteins, VLPs, and nucleic acids that encode norovirus chimeric VP1 proteins) will generally be administered directly to a patient. Direct delivery may be accomplished by parenteral injection *(e.g.* subcutaneously, intraperitoneally, intravenously, intramuscularly, or to the interstitial space of a tissue), or mucosally, such as by rectal, oral *(e.g.* tablet, spray), vaginal, topical, transdermal (See *e.g.* W099/27961) or transcutaneous (See *e.g.* WO02/074244 and WO02/064162), intranasal (See *e.g.* WO03/028760), ocular, aural, pulmonary or other mucosal administration. Transdermal delivery can be achieved, for example, using microneedles. Immunogenic compositions can also be administered topically by direct transfer to the surface of the skin. Topical administration can be accomplished without utilizing any devices, or by contacting naked skin with the immunogenic composition utilizing a bandage or a bandage-like device (see, *e.g.,* U.S. Pat. No. 6,348,450).

[00193] Preferably the mode of administration is parenteral, mucosal or a combination of mucosal and parenteral immunizations. Even more preferably, the mode of

administration is parenteral, mucosal or a combination of mucosal and parenteral immunizations in a total of 1-2 vaccinations 1-3 weeks apart. Preferably the route of administration includes but is not limited to oral delivery, intra-muscular delivery and a combination of oral and intramuscular delivery.

[00194] It has already been demonstrated that mucosal and systemic immune responses to antigens from mucosal pathogens, such as Helicobacter pylori antigens can be enhanced through mucosal priming followed by systemic boosting immunizations (see Vajdy *et al.* (2003) Immunology 110: 86-94). In some embodiments, the method for treating or preventing an infection by a norovirus, comprises mucosally administering to a subject in need thereof a first immunogenic composition comprising one or more norovirus antigens followed by parenterally administering a therapeutically effective amount of a second immunogenic composition comprising one or more norovirus antigens.

[00195] The immunogenic composition may be used to elicit systemic and/or mucosal immunity, preferably to elicit an enhanced systemic and/or mucosal immunity.

[00196] Preferably the immune response is characterized by the induction of a serum IgG and/or intestinal IgA immune response.

[00197] As noted above, prime-boost methods are preferably employed where one or more gene delivery vectors and/or polypeptide antigens are delivered in a "priming" step and, subsequently, one or more second gene delivery vectors and/or polypeptide antigens are delivered in a "boosting" step. In certain embodiments, priming and boosting with one or more gene delivery vectors or polypeptide antigens described herein is followed by additional boosting with one or more polypeptide-containing compositions *(e.g.,* polypeptides comprising norovirus antigens).

[00198] In any method involving co-administration, the various compositions can be delivered in any order. Thus, in embodiments including delivery of multiple different compositions or molecules, the nucleic acids need not be all delivered before the polypeptides. For example, the priming step may include delivery of one or more polypeptides and the boosting comprises delivery of one or more nucleic acids and/or one or more polypeptides. Multiple polypeptide administrations can be followed by multiple nucleic acid administrations or polypeptide and nucleic acid administrations can be performed in any order. Thus, one or more of the gene delivery vectors described herein and one or more of

the polypeptides described herein can be co-administered in any order and via any administration route. Therefore, any combination of polynucleotides and polypeptides described herein can be used to elicit an immune reaction.

(i). Dosage Regime

[00199] Dosage treatment can be according to a single dose schedule or a multiple dose schedule. Multiple doses may be used in a primary immunization schedule and/or in a booster immunization schedule. In a multiple dose schedule, the various doses may be given by the same or different routes, *e.g.* a parenteral prime and mucosal boost, a mucosal prime and parenteral boost, etc.

[00200] Preferably the dosage regime enhances the avidity of the antibody response leading to antibodies with a neutralizing characteristic.

[00201] In some cases there is a correlation between serum antibody levels and protection from disease caused by norovirus. For example, in multiple challenge studies, serum antibody levels were associated with protection after repeated (2-3) oral challenges with high doses of Norwalk virus (Johnson et al. (1990) J. Infect. Dis. 161:18-21). In another study, 18 of 23 infants without pre-existing antibodies developed gastroenteritis caused by human Caliciviruses, whereas 15 of 18 with pre-existing antibody levels did not become ill (Ryder et al. (1985) J. Infect. Dis. 151:99-105). In yet another study, 47% of persons with a baseline Norwalk antibody titre of less than 1:100 developed Norwalk infection compared to 13% of persons with a baseline antibody titre of greater than 1:100 ($p<0.001$) (Ryder et al. (1985) J. Infect. Dis. 151:99-105). Because some individuals do not produce the receptor for certain norovirus strains and are, therefore, inherently resistant to those norovirus strains, anomalous results can be seen in which the presence of antibody correlates with susceptibility to certain strains rather than with protection. See, Parrino *et al.* (1997) N. Engl. J. Med. 297:86-89.

[00202] Chimeric norovirus VP1 proteins and VLPs as described above can be administered to a mammal, such as a mouse, baboon, chimpanzee, or human, to activate norovirus-specific T cells *in vivo*. Administration can be by any means known in the art, including parenteral, intranasal, intramuscular or subcutaneous injection, including injection using a biological ballistic gun, as discussed above.

[00203] A composition of the invention comprising a chimeric norovirus VP1 protein or VLP is administered in a manner compatible with the particular composition used and in an amount which is effective to induce an immune response *(e.g.*, a T cell response and/or a humoral response), preferably a protective immune response.

[00204] Norovirus-specific T cell responses can be measured by, *inter alia*, a 51Cr release assay, a lymphoproliferation assay, or by intracellular staining for IFN-γ. The proteins can be administered either to a mammal which is not infected with a norovirus or can be administered to a norovirus-infected mammal. The particular dosages of the fusion proteins in a composition will depend on many factors including, but not limited to, the species, age, and general condition of the mammal to which the composition is administered, and the mode of administration of the composition. An effective amount of the composition of the invention can be readily determined using only routine experimentation. *In vitro* and *in vivo* models can be employed to identify appropriate doses. Generally, 0.5, 0.75, 1.0, 1.5, 2.0, 2.5, 5 or 10 mg of a norovirus polypeptide or VLP will be administered to a large mammal, such as a baboon, chimpanzee, or human. If desired, co-stimulatory molecules or adjuvants can also be provided before, after, or together with the compositions.

[00205] Immune responses of the mammal generated by the delivery of a composition of the invention, including activation of norovirus-specific T cells, can be enhanced by varying the dosage, route of administration, or boosting regimens. Compositions of the invention may be given in a single dose schedule, or preferably in a multiple dose schedule in which a primary course of vaccination includes 1-10 separate doses, followed by other doses given at subsequent time intervals required to maintain and/or reinforce an immune response, for example, at 1-4 months for a second dose, and if needed, a subsequent dose or doses after several months.

F. Tests to Determine the Efficacy of an Immune Response

[00206] One way of checking efficacy of therapeutic treatment involves monitoring infection after administration of the compositions of the invention. Another way of checking efficacy of prophylactic treatment involves monitoring immune responses both systemically (such as monitoring the level of IgGl and IgG2a production) and mucosally (such as monitoring the level of IgA production) against the antigens in the compositions of the invention after administration of the composition. Typically, serum specific antibody

responses are determined post-immunization but pre-challenge whereas mucosal specific antibody responses are determined post-immunization and post-challenge.

[00207] Another way of assessing the immunogenicity of the component proteins of the immunogenic compositions of the present invention is to express the proteins recombinantly and to screen patient sera or mucosal secretions by immunoblot. A positive reaction between the protein and the patient serum indicates that the patient has previously mounted an immune response to the protein in question—that is, the protein is an immunogen. This method may also be used to identify immunodominant proteins and/or epitopes.

[00208] *In vivo* efficacy models include a human challenge model, which is supported by the NIH and the Center for Disease Control (CDC) (see for example, Lindesmith *et al.* (2003) Nat. Med. 9: 548-553 and Lindesmith *et al.* (2005) J. Virol. 79: 2900-2909).

[00209] The immune response may be one or both of a TH1 immune response and a TH2 response. The immune response may be an improved or an enhanced or an altered immune response. The immune response may be one or both of a systemic and a mucosal immune response. Preferably the immune response is an enhanced systemic and/or mucosal response.

[00210] An enhanced systemic and/or mucosal immunity is reflected in an enhanced TH1 and/or TH2 immune response. Preferably, the enhanced immune response includes an increase in the production of IgGl and/or IgG2a and/or IgA. Preferably the mucosal immune response is a TH2 immune response. Preferably, the mucosal immune response includes an increase in the production of IgA.

[00211] Activated TH2 cells enhance antibody production and are therefore of value in responding to extracellular infections. Activated TH2 cells may secrete one or more of IL-4, IL-5, IL-6, and IL-10. A TH2 immune response may result in the production of IgGl, IgE, IgA and memory B cells for future protection.

[00212] A TH2 immune response may include one or more of an increase in one or more of the cytokines associated with a TH2 immune response (such as IL-4, IL-5, IL-6 and

IL-10), or an increase in the production of IgGl, IgE, IgA and memory B cells. Preferably, the enhanced TH2 immune response will include an increase in IgGl production.

[00213] A TH1 immune response may include one or more of an increase in CTLs, an increase in one or more of the cytokines associated with a TH1 immune response (such as IL-2, IFNy, and TNFp), an increase in activated macrophages, an increase in NK activity, or an increase in the production of IgG2a. Preferably, the enhanced TH1 immune response will include an increase in IgG2a production.

[00214] Immunogenic compositions of the invention, in particular, immunogenic composition comprising one or more antigens of the present invention may be used either alone or in combination with other antigens optionally with an immunoregulatory agent capable of eliciting a Thl and/or Th2 response.

[00215] The invention also comprises an immunogenic composition comprising one or more immunoregulatory agents, such as a mineral salt, such as an aluminium salt and an oligonucleotide containing a CpG motif. Most preferably, the immunogenic composition includes both an aluminium salt and an oligonucleotide containing a CpG motif. Alternatively, the immunogenic composition includes an ADP ribosylating toxin, such as a detoxified ADP ribosylating toxin and an oligonucleotide containing a CpG motif. Preferably, the one or more immunoregulatory agents include an adjuvant. The adjuvant may be selected from one or more of the group consisting of a TH1 adjuvant and TH2 adjuvant, further discussed above.

[00216] The immunogenic compositions of the invention will preferably elicit both a cell mediated immune response as well as a humoral immune response in order to effectively address an infection. This immune response will preferably induce long lasting *(e.g.,* neutralizing) antibodies and a cell mediated immunity that can quickly respond upon exposure to one or more infectious antigens.

G. Use of the Immunogenic Compositions as Medicaments

[00217] The invention also provides a composition of the invention for use as a medicament, in particular for making or for use as a vaccine. The medicament is preferably able to raise an immune response in a mammal *(i.e.* it is an immunogenic composition) and is more preferably a vaccine. The invention also provides the use of the compositions of the

invention in the manufacture of a medicament for raising an immune response in a mammal. The medicament is preferably a vaccine. Preferably the vaccine is used to prevent and/or treat an intestinal infection such as gastroenteritis, preferably acute gastroenteritis. The gastroenteritis may result from an imbalance in ion and/or water transfer resulting in both watery diarrhea and/or intestinal peristalisis and/or motility. The gastroenteritis may also result in vomiting..

[00218] The invention provides methods for inducing or increasing an immune response using the compositions described above. The immune response is preferably protective and can include antibodies and/or cell-mediated immunity (including systemic and mucosal immunity). Immune responses include booster responses.

[00219] The invention also provides a method for raising an immune response in a mammal comprising the step of administering an effective amount of a composition of the invention. The immune response is preferably protective and preferably involves antibodies and/or cell-mediated immunity. Preferably, the immune response includes one or both of a TH1 immune response and a TH2 immune response. The method may raise a booster response.

[00220] The mammal is preferably a human. Where the immunogenic composition, preferably a vaccine, is for prophylactic use, the human is preferably a child *(e.g.* an infant or toddler, pre-schooler, such as a child one year or less, from one to three, or four, or five, or six, or seven, or eight, or nine, or ten years onwards), a teenager, an elderly person *(e.g.,* about 60 years old or older) or a person in a high risk group, such as military personnel, travelers, healthcare workers, child care (day care) providers, and food handlers. The immunogenic composition or vaccine can also be administered to such individuals for therapeutic use. A vaccine intended for children may also be administered to adults *(e.g.* to assess safety, dosage, immunogenicity, etc.).

[00221] Other target groups for the immunogenic compositions *(e.g.,* vaccines) of the present invention include: transplant and immunocompromised individuals; adults and children in, *e.g.,* USA, Canada and Europe including but not limited to the following: food handlers; healthcare workers such as but not limited to hospital and nursing home personnel; day care providers; travelers, including cruise ship travelers; military personnel; and pediatric and/or elderly populations as discussed above.

(i). Norovirus Specific T cells

[00222] Norovirus-specific T cells, which are activated by the chimeric VP1 proteins or VLPs expressed *in vivo* or *in vitro,* preferably recognize an epitope of the P-domain of the VP1. Norovirus-specific T cells can be CD8+ or CD4+.

[00223] Norovirus-specific CD8+ T cells can be cytotoxic T lymphocytes (CTL) which can kill norovirus-infected cells that display any of these epitopes complexed with an MHC class I molecule. Norovirus -specific CD8+ T cells can be detected by, for example, 51Cr release assays. 51Cr release assays measure the ability of norovirus-specific CD8+ T cells to lyse target cells displaying one or more of these epitopes. Norovirus-specific CD8+ T cells which express antiviral agents, such as IFN-γ, are also contemplated herein and can also be detected by immunological methods, preferably by intracellular staining for IFN-γ or like cytokine after *in vitro* stimulation with one or more of the norovirus polypeptides, such as those described herein.

[00224] Norovirus-specific CD4+ T cells can be detected by a lymphoproliferation assay. Lymphoproliferation assays measure the ability of norovirus-specific CD4+ T cells to proliferate in response to, *e.g.*, a VP1.

(ii) Methods of Activating Norovirus-Specific T Cells

[00225] The chimeric norovirus VP1 proteins and VLPs can be used to activate norovirus-specific T cells either *in vitro* or *in vivo.* Activation of norovirus-specific T cells can be used, inter alia, to provide model systems to optimize CTL responses to norovirus and to provide prophylactic or therapeutic treatment against norovirus infection. For *in vitro* activation, proteins are preferably supplied to T cells via a plasmid or a viral vector, such as an adenovirus vector, as described above.

[00226] Polyclonal populations of T cells can be derived from the blood, and preferably from peripheral lymphoid organs, such as lymph nodes, spleen, or thymus, of mammals that have been infected with a norovirus. Preferred mammals include mice, chimpanzees, baboons, and humans. Infection with norovirus serves to expand the number of activated norovirus-specific T cells in the mammal. The norovirus-specific T cells derived from the mammal can then be restimulated *in vitro* by adding, a norovirus immunogenic polypeptide, and/or fusion protein according to the present invention. The norovirus-specific

T cells can then be tested for, *inter alia*, proliferation, the production of IFN-γ, and the ability to lyse target cells displaying, for example, VP1 polypeptide epitopes *in vitro.*

H. Kits

[00227] The invention also provides kits comprising one or more containers of immunogenic compositions of the invention. Compositions can be in liquid form or can be lyophilized, as can individual antigens. Suitable containers for the compositions include, for example, bottles, vials, syringes, and test tubes. Containers can be formed from a variety of materials, including glass or plastic. A container may have a sterile access port (for example, the container may be an intravenous solution bag or a vial having a stopper pierceable by a hypodermic injection needle).

[00228] The kit can further comprise a second container comprising a pharmaceutically-acceptable buffer, such as phosphate-buffered saline, Ringer's solution, or dextrose solution. It can also contain other materials useful to the end-user, including other pharmaceutically acceptable formulating solutions such as buffers, diluents, filters, needles, and syringes or other delivery device. The kit may further include a third component comprising an adjuvant.

[00229] The kit can also comprise a package insert containing written instructions for methods of inducing immunity or for treating infections. The package insert can be an unapproved draft package insert or can be a package insert approved by the Food and Drug Administration (FDA) or other regulatory body.

[00230] The invention also provides a delivery device pre-filled with the immunogenic compositions of the invention.

III. EXPERIMENTAL

[00231] Below are examples of specific embodiments for carrying out the present invention. The examples are offered for illustrative purposes only, and are not intended to limit the scope of the present invention in any way.

Example 1

Expression Constructs for Snow Mountain/Norwalk Chimeric VP1 proteins

[00232] Constructs for production of chimeric norovirus VP1 proteins, and VLPs containing the chimeric proteins, *Saccharomyces cerevisiae* strain AD3 were created by cloning sequences encoding chimeric VP1 proteins into the yeast expression vector pBS24.1. The pBS24.1 vector is described in detail in commonly owned U.S. patent application serial No. 382,805, filed Jul. 19, 1989, which application is hereby incorporated by reference in its entirety herein. The pBS24.1 vector contains the 2-micron sequence for autonomous replication in yeast and the yeast genes leu2d and URA3 as selectable markers. The β-lactamase gene and the ColEl origin of replication, required for plasmid replication in bacteria, are also present in this expression vector. Regulation of expression was put under the control of a hybrid ADH2/GAPDH promoter (described in U.S. Pat. No. 6,183,985) and an alpha-factor terminator.

[00233] The constructs were created and utilized for expression of Snow Mountain (SMVO/Norwalk VP1 proteins included the polynucleotide sequence shown in FIG. 6 (SEQ ID NO: 16). To do that, a fragment corresponding to the S-domain of the a previously generated Snow Mountain gene, excised by restriction enzymes Hindlll and Acc651, was ligated to a fragment corresponding to the P-domain of Norwalk gene that was generated using restriction enzymes Alw211 and Sail. This new chimeric DNA was ligated into a pMADC5 subcloning vector (FIG. 1) at the Hindlll-Sall site and amplified. The amplified fragment (shown in FIG. 5) was then cloned into the expression vector pBS24. 1 (FIG. 2), at the BamHI+Sall site, for expression of the SMV/Norwalk chimeric VP1 protein in 5'. *cervisiae* strain AD3.

Example 2

Expression Constructs for Snow Mountain/GII.4.2006a Chimeras

[00234] In this example, expression vector pBS24.1 was used in production of Snow Mountain/GII.4.2006a VLPs (SMV/GII.4.2006a/chimeras) in *Saccharomyces cerevisiae* strain AD3. The coding sequence that was utilized for the expression of chimeric SMV/ GII.4.2006a VPl proteins is shown in FIG. 7. The coding sequence was generated using synthetic oligonucleotides, based on the cDNA sequences of VPl S- and P-domains of Snow Mountain and GII.4.2006a viruses.

[00235] In this example, a fragment corresponding to the S-domain of a previously generated Snow Mountain gene, excised by restriction enzymes Hindlll and Acc651, was ligated to a fragment corresponding to the P-domain of the Gil.4.2006a gene that was generated using restriction enzymes Xbal-Sall. This new chimeric DNA was ligated into a pMADC5 subcloning vector (FIG. 1) at the Hindlll-Sall site and amplified. The amplified fragment (shown in FIG. 6) was then cloned into the expression vector pBS24. 1 (FIG. 2), at the BamHI+Sall site, for expression of the SMV/Norwalk chimeric VPl protein in 5'. *cervisiae* strain AD3.

Example 3

Expression of chimeric VLPs in Yeast

[00236] *S. cerevisiae* strain AD3 (MAT a, leu2, ura3-52, prbl-1 122, pep4-3, prcl-407, gal2, [cirO], ::pDM15(pGAP/ADRl ::G418R), ::Yip5AleuAD) was transformed with the expression plasmids described above. Before the transformation, the yeast cells were streaked on YEPD (yeast extract bactopeptone 2% glucose) plates and a single colony was selected for preparation of competent cells for transformation.

[00237] Yeast transformation was performed using the Invitrogen S.c. EasyComp™ Transformation Kit. After transformation, several Ura-transformants were streaked onto Ura-8% glucose plates in order to obtain single colonies. The single colonies were subsequently patched onto Leu-8% glucose plates to increase the plasmid copy number. Leu-starter cultures were grown for 24 hours at 30 °C and then diluted 1:20 in YEPD (yeast extract bactopeptone 2% glucose) or Veggie (Novagen Veggie Peptone and Veggie Yeast Extract)

media. Cells were grown for 48-72 hours at 30 °C to allow depletion of the glucose in the media and then harvested. Induction occurred upon depletion of glucose from the media. This system provided a high cell mass before the foreign genes were induced.

Example 4

Purification of chimeric VLPs

[00238] Norovirus virus-like particles (VLPs) were purified from the media of yeast cells expressing the norovirus chimeric VP1 protein. A low speed spin (15,000 x g) was performed on the media to remove extra cells or cellular debris. Following this step, the supernatant was subjected to a four hour high speed spin (100,000 x g) through a 40% sucrose cushion to separate the virus-like particles from free protein and other material. The pellet containing the VLPs was resuspended in buffer (50 mM Tris pH 7.5, 100 mM NaCl) and loaded onto a Capto™ Q column and eluted with high salt. The VLPs were eluted from the column during a gradient of increasing salt. Finally, the eluted fraction containing the VLPs were concentrated and buffer exchanged into a lower salt buffer (20 mM Tris pH 7.5, 100 mM NaCl) and stored at 4° C until use.

Table 1: Norovirus Strains

Norovirus genus	
Norwalk virus	Chitta virus
Camberwell virus	Hawaii calicivirus
Chiba virus	Maryland calicivirus 1
Norovirus genogroup 1	
Desert Shield virus	Norovirus Hu/GI/KE/23 0207- 1/2007/SGP
Norovirus genogroup Gl unidentified subgroup	Norovirus Hu/GI/KE/230207-2/2007/SGP
	Norovirus Hu/GI/KE/230207-3/2007/SGP
Human calicivirus	Norovirus Hu/GI/KE/240407-1 /2007/SGP
HU/NLV/Birmingham/93/UK	Norovirus Hu/GI/KE/240407-2/2007/SGP
Human calicivirus	Norovirus Hu/GI/KE/270607-1 /2007/SGP
HU/NLV/Koblenz/433/2000/DE	Norovirus Hu/GI/KE/270607-2/2007/SGP
Human calicivirus HU/NLV/Musgrove/89/UK	Norovirus Hu/GI/KE/270607-3/2007/SGP
Human calicivirus HU/NLV/Rbh/93/UK	Norovirus Hu/GI/KE/2905 07-1 /2007/SGP
Human calicivirus	Norovirus Hu/GI/KE/290507-2/2007/SGP
HU/NLV/Sindlesham/95/UK	Norovirus Hu/GI/KE/2905 07-3/2007/SGP
Human calicivirus HU/NLV/Thistlehall/90/UK	Norovirus Hu/GI/KS/200307-l/2007/SGP
Human calicivirus HU/NLV/Valetta/95/Malta	Norovirus Hu/GI/KS/200307-2/2007/SGP
Human calicivirus HU/NLV/Whiterose/96/UK	Norovirus Hu/GI/KS/200307-3/2007/SGP
Human calicivirus	Norovirus Hu/GI/KS/230 107- 1/2007/SGP
HU/NLV/Winchester/94/UK	Norovirus Hu/GI/KS/230 107-2/2007/SGP
Human calicivirus HU/NLV/Wortley/90/UK	Norovirus Hu/GI/KS/230 107-3/2007/SGP
Human calicivirus NLV/Stav/95/Nor	Norovirus Hu/GI/KS/230207-l/2007/SGP
Human calicivirus	Norovirus Hu/GI/KS/230207-2/2007/SGP
NLV/Wyoming/US/genogroup 1	Norovirus Hu/GI/KS/240407-l/2007/SGP
Norovirus clam/GI/Shijimil/JPN	Norovirus Hu/GI/KS/240407-2/2007/SGP
Norovirus clam/GI/Shijimill/JPN	Norovirus Hu/GI/KS/270607-l/2007/SGP
Norovii-us clam/GI/Shijimil2a/JPN	Norovirus Hu/GI/KS/270607-2/2007/SGP
Norovirus clam/GI/Shijimi 12b/JPN	Norovirus Hu/GI/KS/270607-3/2007/SGP
Norovirus clam/GI/Shijimi 12c/JPN	Norovirus Hu/GI/KS/290507-l/2007/SGP
Norovirus clam/GI/Shijimi 12d/JPN	Norovirus Hu/GI/KS/290507-2/2007/SGP
Norovirus clam/GI/Shijimi 13/JPN	Norovirus Hu/GI/Marina48/200 1/Botswana
Norovirus clam/GI/Shijimi 16a/JPN	Norovirus Hu/GI/Marina60/2003/Botswana
Norovirus clam/GI/Shijimi 16b/JPN	Norovirus Hu/GI/N9/2003/Irl
Norovirus clam/GI/Shijimi 16c/JPN	Norovirus Hu/GI/NoV360/2004/CAN
Norovirus clam/GI/Shijimi 16d/JPN	Norovirus Hu/GI/NoV69/2004/CAN
Norovirus clam/GI/Shijimi 17/JPN	Norovirus Hu/GI/NoV730/2004/CAN
Norovirus clam/GI/Shijimi 18/JPN	Norovirus Hu/GI/NoV748/2004/CAN
Norovirus clam/GI/Shijimi 19a/JPN	Norovirus Hu/GI/Nsk-D81/2009/RUS
Norovirus clam/GI/Shijimi 19b/JPN	Norovirus Hu/GI/Orstad/749/2004/NOR
Norovirus clam/GI/Shijimi2/JPN	Norovirus Hu/GI/Osakal 115/2006/JPN
Norovirus clam/GI/Shijimi20a/JPN	Norovirus Hu/GI/Osaka896/2006/JPN
Norovirus clam/GI/Shijimi20b/JPN	Norovirus Hu/GI/Oslo/1 504/2002/NOR
Norovirus clam/GI/Shijimi21/JPN	Norovirus Hu/GI/Oslo/776/2004/NOR
Norovirus clam/GI/Shijimi22/JPN	Norovirus Hu/GI/RlD-01 1106/2006/SGP
Norovirus clam/GI/Shijimi23/JPN	Norovirus Hu/GI/RlD-1 11206/2006/SGP
Norovirus clam/GI/Shijimi25a/JPN	Norovirus Hu/GI/RlD-201 106/2006/SGP
Norovirus clam/GI/Shijimi25b/JPN	Norovirus Hu/GI/RlU-03 1006/2006/SGP
Norovirus clam/GI/Shijimi26/JPN	Norovirus Hu/GI/RlU-1 11206/2006/SGP
Norovirus clam/GI/Shijimi28/JPN	Norovirus Hu/GI/R2D-01 1106/2006/SGP
Norovirus clam/GI/Shijimi29/JPN	Norovirus Hu/GI/R2D-l 11206/2006/SGP
Norovirus clam/GI/ Shijimi3 0/JPN	Norovirus Hu/GI/R2D-l 50806/2006/SGP

Norovirus clam/GI/Shijimi3 1/JPN	Norovirus Hu/GI/R2D-220606/2006/SGP
Norovirus clam/GI/Shijimi4/JPN	Norovirus Hu/GI/R2D-240706/2006/SGP
Norovirus clam/GI/Shijimi5/JPN	Norovirus Hu/GI/R2U-03 1006/2006/SGP
Norovirus clam/GI/Shijimi6/JPN	Norovirus Hu/GI/R2U-l 11206-1/2006/SGP
Norovirus clam/GI/Shijimi7/JPN	Norovirus Hu/GI/R2U-l 11206-2/2006/SGP
Norovirus clam/GI/Shijimi8/JPN	Norovirus Hu/GI/R2U-l 50806/2006/SGP
Norovii-us clam/GI/Shijimi9/JPN	Norovirus Hu/GI/R2U-201 106/2006/SGP
Norovirus Cor/Gunma/Apr-3/GI/2004/JP	Norovirus Hu/GI/R2U-220606- 1/2006/SGP
Norovirus Cor/Gunma/Apr-4/GI/2004/JP	Norovirus Hu/GI/R2U-220606-2/2006/SGP
Norovirus Cor/Gunma/Dec- 1/GI/2004/JP	Norovirus Hu/GI/R3D-25 1006/2006/SGP
Norovirus Cor/Gunma/Dec-2/GI/2004/JP	Norovirus Hu/GI/R3U-25 1006- 1/2006/SGP
Norovirus Cor/Gunma/Dec-3/GI/2004/JP	Norovirus Hu/GI/R3U-25 1006-2/2006/SGP
Norovirus Cor/Gunma/Dec-4/GI/2004/JP	Norovirus Hu/GI/R3U-25 1006-3/2006/SGP
Norovirus Cor/Gunma/Dec-5/GI/2004/JP	Norovirus Hu/GI/R3U-25 1006-4/2006/SGP
Norovirus Cor/Gunma/Feb-2/GI/2004/JP	Norovirus Hu/GI/R3U-25 1006-5/2006/SGP
Norovirus Cor/Gunma/Feb-3/GI/2004/JP	Norovirus Hu/GI/Shenzhenl93-06/2006/CHN
Norovirus Cor/Gunma/Feb-5/GI/2004/JP	Norovirus Hu/GI/Shenzhen 197-06/2006/CHN
Norovirus Cor/Gunma/Jan- 1/GI/2 004/JP	Norovirus Hu/GI/Shenzhenl98-06/2006/CHN
Norovirus Cor/Gunma/Jan-2/GI/2 004/JP	Norovirus Hu/GI/Shenzhen 199-06/2006/CHN
Norovirus Cor/Gunma/Jun-2/GI/2004/JP	Norovirus Hu/GI/Shenzhen200-06/2006/CHN
Norovirus Cor/Gunma/Mar- 1/GI/2004/JP	Norovirus Hu/GI/Shenzhen202-06/2006/CHN
Norovirus Cor/Gunma/May- 1/GI/2004/JP	Norovims Hu/GI/Shenzhen84-06/2006/CHN
Norovirus Cor/Gunma/May-3/GI/2004/JP	Norovirus Hu/GI/SI-2002/2006/SVN
Norovirus Cor/Gunma/May-4/GI/2004/JP	Norovirus Hu/GI/Skovde/IV8406/2002/SE
Norovirus Cor/Gunma/Nov-1 /GI/2 004/JP	Norovirus Hu/GI/SL4450/2005/Arg
Norovirus Cor/Gunma/Nov-2/GI/2 004/JP	Norovirus Hu/GI/Stavanger/754/2004/NOR
Norovirus Cor/Gunma/Oct-2/GI/2 004/JP	Norovirus Hu/GI/Stockholm/IV 1353/2002/SE
Norovirus env/GGI/956/2007/ITA	Norovirus Hu/GI/Trondheim/4448/2000/NOR
Norovirus GI/103/2005/RJ/BRA	Norovirus Hu/GI/UE/200307-l/2007/SGP
Norovirus GI/104/2005/RJ/BRA	Norovirus Hu/GI/UE/200307-2/2007/SGP
Norovirus GI/110/2005/RJ/BRA	Norovirus Hu/GI/UE/23 0107- 1/2007/SGP
Norovirus GI/56/2005/RJ/BRA	Norovirus Hu/GI/UE/2301 07-2/2007/SGP
Norovirus GI/57/2005/RJ/BRA	Norovirus Hu/GI/UE/2301 07-3/2007/SGP
Norovirus GI/Lopburi 105/2006/THA	Norovirus Hu/GI/UE/2301 07-4/2007/SGP
Norovirus groundwater/GI/HE-a- 1/2007/KOR	Norovirus Hu/GI/UE/230207-l/2007/SGP
Norovirus groundwater/GI/HE-b-l/2007/KOR	Norovirus Hu/GI/UE/230207-2/2007/SGP
Norovirus groundwater/GI/HE-c- 1/2007/KOR	Norovirus Hu/GI/UE/230207-3/2007/SGP
Norovirus groundwater/GI/SS-c-l/2007/KOR	Norovirus Hu/GI/UE/240407- 1/2007/SGP
Norovirus groundwater/GI/SS-f- 1/2007/KOR	Norovirus Hu/GI/UE/240407-2/2007/SGP
Norovirus Han River/GI/Dukpoong/Aug01/2005/KOR	Norovirus Hu/GI/UE/270607- 1/2007/SGP
	Norovirus Hu/GI/UE/270607-2/2007/SGP
Norovirus Han River/GI/Dukpoong/FebO 1/2006/KOR	Norovirus Hu/GI/UE/270607-3/2007/SGP
	Norovirus Hu/GI/UE/2905 07-1 /2007/SGP
Norovirus Han River/GI/Dukpoong/Feb02/2006/KOR	Norovirus Hu/GI/UE/2905 07-2/2007/SGP
	Norovirus Hu/GI/UE/2905 07-3/2007/SGP
Norovirus Han River/GI/Dukpoong/JulO 1/2005/KOR	Norovirus Hu/GI/Uppsala/IVl 1029/2002/SE
	Norovirus Hu/GI/US/200307-l/2007/SGP
Norovirus Han River/GI/Dukpoong/Jul02/2005/KOR	Norovirus Hu/GI/US/200307-2/2007/SGP
	Norovirus Hu/GI/US/230 107- 1/2007/SGP
Norovirus Han River/GI/Dukpoong/MayO 1/2006/KOR	Norovirus Hu/GI/US/230 107-2/2007/SGP
	Norovirus Hu/GI/US/230 107-3/2007/SGP
Norovirus Han River/GI/Jamsil/Oct01/2005/KOR	Norovirus Hu/GI/US/230207-l/2007/SGP
	Norovirus Hu/GI/US/230207-2/2007/SGP
Norovirus Han River/GI/Jamsil/Oct02/2005/KOR	Norovirus Hu/GI/US/230207-3/2007/SGP
	Norovirus Hu/GI/US/240407- 1/2007/SGP

Norovirus Han River/GI/Kyoungan/Feb01/2006/KOR	Norovirus Hu/GI/US/240407-2/2007/SGP
Norovirus Han River/GI/Kyoungan/Feb02/2006/KOR	Norovirus Hu/GI/US/240407-3/2007/SGP
Norovirus Han River/GI/Kyoungan/JanO1/2006/KOR	Norovirus Hu/GI/US/270607-l/2007/SGP
Norovirus Han River/GI/Kyoungan/JulO1/2005/KOR	Norovirus Hu/GI/US/270607-2/2007/SGP
Norovirus Han River/GI/Kyoungan/Jul02/2005/KOR	Norovirus Hu/GI/US/270607-3/2007/SGP
Norovirus Han River/GI/Kyoungan/MayO1/2006/KOR	Norovirus Hu/GI/US/290507-l/2007/SGP
Norovirus Han River/GI/Sungnae/JanO1/2006/KOR	Norovirus Hu/GI/US/290507-2/2007/SGP
Norovirus Han River/GI/Sungnae/JulO1/2005/KOR	Norovirus Hu/GI/US/290507-3/2007/SGP
Norovirus Han River/GI/Sungnae/Jul02/2005/KOR	Norovirus Hu/GI/Water-lB/2004/South Korea
Norovirus Han River/GI/Sungnae/MayOl/2006/KOR	Norovirus Hu/GI/Water-2B/2004/South Korea
Norovirus Han River/GI/Sungnae/May02/2006/KOR	Norovirus Hu/GI/Water-A/2004/South Korea
Norovirus Han River/GI/Sungnae/May03/2006/KOR	Norovirus Hu/GI4/5 1059/Jilin/06/CHN
Norovirus Han River/GI/Sungnae/May04/2006/KOR	Norovirus Hu/GI4/5 1296/Anhui/06/CHN
Norovirus Han River/GI/Wangsuk/AugO1/2005/KOR	Norovirus Hu/Gunma/3/GI/JP
Norovirus Han River/GI/Wangsuk/FebO1/2006/KOR	Norovirus Hu/Gunma/4/GI/JP
Norovirus Han River/GI/Wangsuk/Feb02/2006/KOR	Norovirus Hu/Gunma/5/GI/JP
Norovirus Han River/GI/Wangsuk/JanO1/2006/KOR	Norovirus Hu/Mashhad4/GGI/Iran
Norovirus Han River/GI/Wangsuk/JulO1/2005/KOR	Norovirus Hu/NFL-1 107V6/GI/07-2004/CAN
Norovirus Han River/GI/Wangsuk/Jul02/2005/KOR	Norovirus Hu/NV/I/Hualien/LWT/2003/TW
Norovirus Han River/GI/Wangsuk/MayO1/2006/KOR	Norovirus Hu/Pune/PCOl-GI/2005/India
Norovirus Hu/Gl/2232/2006/BRA	Norovirus oyster/cultured/GI/05/JP
Norovirus Hu/Gl/2525/2006/BRA	Norovirus oyster/cultured/GI/MAT/Apr05a/05/JP
Norovirus Hu/Gl/Fin-Kauh/1 999/Finland	Norovirus oyster/cultured/GI/MAT/Dec05/05/JP
Norovirus Hu/G 1/Fin-Keur/l 998/Finland	Norovirus oyster/cultured/GI/MAT/May05a/05/JP
Norovirus Hu/G 1/Fin-Kola/l 999/Finland	Norovirus oyster/cultured/GI/MAT05a/05/JP
Norovirus Hu/G 1/Fin-Nurm/2000/Finland	Norovirus oyster/cultured/GI/MAT05b/05/JP
Norovirus Hu/G 1/Fin-Part/1 999/Finland	Norovirus oyster/cultured/GI/MAT05e/05/JP
Norovirus Hu/Gl/Fin-Porv/1 999/Finland	Norovirus oyster/cultured/GI/ONG05b/05/JP
Norovirus Hu/G l/Fin-Sod/2003/Finland	Norovirus oyster/GI/BFDA-GI-0 1/2009/TAW
Norovirus Hu/G l/Hamburg CN/2005	Norovirus oyster/GI/BFDA-GI-02/2009/TAW
Norovirus Hu/GGI/New Delhi/1 20/02/IND	Norovirus oyster/GI/BFDA-GI-04/2009/TAW
Norovirus Hu/GGI/New Delhi/64/02/IND	Norovirus oyster/GI/BFDA-GI-05/2009/TAW
Norovirus Hu/GGI/NL2001 0045/2001/NL	Norovirus oyster/GI/BFDA-GI-06/2009/TAW
Norovirus Hu/GI/l/JPN	Norovirus oyster/GI/BFDA-GI-07/2009/TAW
Norovirus Hu/GI/1 0B/2004/South Korea	Norovirus oyster/GI/BFDA-GI-08/2009/TAW
	Norovirus oyster/GI/BFDA-GI-09/2008/TAW
	Norovirus oyster/GI/BFDA-GI- 10/2008/TAW
	Norovirus oyster/GI/BFDA-GI- l 1/2008/TAW
	Norovirus oyster/GI/BFDA-GI-12/2008/TAW
	Norovirus oyster/GI/FP19A/2004/CAN
	Norovirus oyster/GI/FP 19D/2004/CAN
	Norovirus oyster/GI/FP 19F/2004/CAN
	Norovirus oyster/GI/FP 19J/2004/CAN
	Norovirus oyster/GI/FP50A/2004/CAN
	Norovirus oyster/GI/FP50C/2004/CAN
	Norovirus oyster/GI/FP50J/2004/CAN
	Norovirus oyster/GI/FP55A/2004/CAN
	Norovirus oyster/GI/FP55B/2004/CAN
	Norovirus oyster/GI/FP58A/2004/CAN
	Norovirus oyster/GI/FP58D/2004/CAN
	Norovirus oyster/GI/FP58G/2004/CAN
	Norovirus oyster/GI/FP58J/2004/CAN
	Norovirus oyster/GI/FP67J/2004/CAN
	Norovirus oyster/GI/FP68F/2004/CAN
	Norovirus oyster/GI/FP69B/2004/CAN

Norovirus Hu/GI/1 1B/2004/South Korea	Norovirus oyster/GI/FP72A/2004/CAN
Norovirus Hu/GI/1 2/JPN	Norovirus oyster/GI/FP72F/2004/CAN
Norovirus Hu/GI/1 278/2006/Ghana	Norovirus oyster/GI/Hiroshimacity/29/02/JP
Norovirus Hu/GI/1 2B/2004/South Korea	Norovirus oyster/GI/Hiroshimacity/36/03/JP
Norovirus Hu/GI/1 313/2006/Ghana	Norovirus oyster/GI/Y amaguchi/32B/03/JP
Norovirus Hu/GI/1 370/2006/Ghana	Norovirus oyster/GI/Y amaguchi/33C/03/JP
Norovirus Hu/GI/1 3B/2004/South Korea	Norovirus oyster/GI/Y amaguchi/39B/03/JP
Norovirus Hu/GI/1 4B/2004/South Korea	Norovirus oyster/GI/Y amaguchi/43A/03/JP
Norovirus Hu/GI/1 507/2006/Ghana	Norovirus oyster/GI/Y amaguchi/43C/03/JP
Norovirus Hu/GI/1 5B/2004/South Korea	Norovirus oyster/GI/Y amaguchi/45C/03/JP
Norovirus Hu/GI/1 6B/2004/South Korea	Norovirus oyster/GI/Y amaguchi/57A/03/JP
Norovirus Hu/GI/1 7/JPN	Norovirus oyster/GI/Y amaguchi/57B/03/JP
Norovirus Hu/GI/1 7B/2004/South Korea	Norovirus oyster/GI/Yamaguchi/H 16-1 05B/04/JP
Norovirus Hu/GI/1 8B/2004/South Korea	Norovirus oyster/GI/Yamaguchi/H 16-1 09B/04/JP
Norovirus Hu/GI/1 9B/2004/South Korea	Norovirus oyster/GI/Yamaguchi/H 16-117B/04/JP
Norovirus Hu/GI/lA/2004/South Korea	Norovirus oyster/GI/Yamaguchi/H 16-21 C/03/JP
Norovirus Hu/GI/lB/2004/South Korea	Norovirus oyster/GI/Yamaguchi/H16-32B/03/JP
Norovirus Hu/GI/2002/2222/Moscow/RUS	Norovirus oyster/GI/Y amaguchi/H 16-51 A/04/JP
Norovirus Hu/GI/2003/3 168/Moscow/RUS	Norovirus oyster/GI/Yamaguchi/H 16-5 7C/04/JP
Norovirus Hu/GI/2005/583 1/Moscow/RUS	Norovirus oyster/GI/Yamaguchi/H 17-1 05B/05/JP
Norovirus Hu/GI/2005/6833/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H 17-110D/05/JP
Norovirus Hu/GI/2005/6835/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H 17-117A/05/JP
Norovirus Hu/GI/2005/6836/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H 17-123A/05/JP
Norovirus Hu/GI/2005/7656/Nizhny Novgorod/RUS	Norovirus oyster/GI/Yamaguchi/H 17-21 B/04/JP
	Norovirus oyster/GI/Yamaguchi/H17-25B/04/JP
Norovirus Hu/GI/2005/7987/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H17-80A/05/JP
Norovirus Hu/GI/2005/8064/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H 17-81 A/05/JP
Norovirus Hu/GI/2005/8086/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H 17-81 B/05/JP
Norovirus Hu/GI/2005/8088/Chelyabinsk/RUS	Norovirus oyster/GI/Yamaguchi/H 17-97C/05/JP
Norovirus Hu/GI/2005/83 88/Chelyabinsk/RUS	Norovirus oyster/wild/GI/SHG/STl/Mar05a/05/JP
Norovirus Hu/GI/2005/8763/Tyumen/RUS	Norovirus oyster/wild/GI/SHG/ST 1/Mar05 f/05/JP
Norovirus Hu/GI/2006/10882/Chelyabinsk/RUS	Norovirus oyster/wild/GI/SHG/ST2/Mar05a/05/JP
	Norovirus oyster/wild/GI/SHG/ST2/Mar05b/05/JP
Norovirus Hu/GI/2006/1 1227/Nizhny Novgorod/RUS	Norovirus oyster/wild/GI/SHG/ST2/Mar05 e/05/JP
	Norovirus oyster/wild/GI/SHG/ST2/Mar05 f/05/JP
Norovirus Hu/GI/2006/9564/Chelyabinsk/RUS	Norovirus oyster/wild/GI/SHG/ST3/Apr05a/05/JP
Norovirus Hu/GI/2006/963 6/Chelyabinsk/RUS	Norovirus oyster/wild/GI/SHG/ST3/Apr05c/05/JP
Norovirus Hu/GI/20B/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Apr05d/05/JP
Norovirus Hu/GI/21B/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Dec05c/05/JP
Norovirus Hu/GI/22B/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Feb06/06/JP
Norovirus Hu/GI/23B/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Jan06a/06/JP
Norovirus Hu/GI/24B/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Jan06c/06/JP
Norovirus Hu/GI/25B/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Mar05/05/JP
Norovirus Hu/GI/28/JPN	Norovirus oyster/wild/GI/SHG/ST3/Mar06a/06/JP
Norovirus Hu/GI/2A/2004/South Korea	Norovirus oyster/wild/GI/SHG/ST3/Mar06c/06/JP
Norovirus Hu/GI/2B/2004/South Korea	Norovirus sewage/GI/Toyama/Apr- 1/2006/JP
Norovirus Hu/GI/3A/2004/South Korea	Norovirus sewage/GI/Toyama/Apr-2/2006/JP
Norovirus Hu/GI/3B/2004/South Korea	Norovirus sewage/GI/Toyama/Apr/2007/JP
Norovirus Hu/GI/4B/2004/South Korea	Norovirus sewage/GI/Toyama/Aug- 1/2007/JP
Norovirus Hu/GI/5B/2004/South Korea	Norovirus sewage/GI/Toyama/Aug-2/2007/JP
Norovirus Hu/GI/6/8014/2005/BRA	Norovirus sewage/GI/Toyama/Aug/2006/JP
Norovirus Hu/GI/6B/2004/South Korea	Norovirus sewage/GI/Toyama/Dec/2007/JP
Norovirus Hu/GI/7/JPN	Norovirus sewage/GI/Toyama/Feb/2007/JP
Norovirus Hu/GI/7B/2004/South Korea	Norovirus sewage/GI/Toyama/Feb/2008/JP
Norovirus Hu/GI/8/JPN	Norovirus sewage/GI/Toyama/Jan- 1/2008/JP

Norovirus Hu/GI/8014/2004/BRA	Norovirus sewage/GI/Toyama/Jan-P2/2 008/JP
Norovirus Hu/GI/8B/2004/South Korea	Norovirus sewage/GI/Toyama/Jan/2007/JP
Norovirus Hu/GI/9B/2004/South Korea	Norovirus sewage/GI/Toyama/Jul/2006/JP
Norovirus Hu/GI/Babbacombe/1 996/GBR	Norovirus sewage/GI/Toyama/Jul/2007/JP
Norovirus Hu/GI/BCCDC03028/2003/CAN	Norovirus sewage/GI/Toyama/Jun/2006/JP
Norovirus Hu/GI/BCCDC04003/2004/CAN	Norovirus sewage/GI/Toyama/Jun/2007/JP
Norovirus Hu/GI/BCCDC04008/2004/CAN	Norovirus sewage/GI/Toyama/Mar-l/2007/JP
Norovirus Hu/GI/BE/200307/2007/SGP	Norovirus sewage/GI/Toyama/Mar-2/2007/JP
Norovirus Hu/GI/BE/2301 07-l/2007/SGP	Norovirus sewage/GI/Toyama/Mar-P2/2007/JP
Norovirus Hu/**GI**/BE/230 107-2/2007/SGP	Norovirus sewage/GI/Toyama/Mar/2008/JP
Norovirus Hu/GI/BE/230 107-3/2007/SGP	Norovirus sewage/GI/Toyama/May-2/2006/JP
Norovirus Hu/GI/BE/230207- 1/2007/SGP	Norovirus sewage/GI/Toyama/May-Pl/2006/JP
Norovirus Hu/GI/BE/230207-2/2007/SGP	Norovirus sewage/GI/Toyama/May/2006/JP
Norovirus Hu/GI/BE/240407- 1/2007/SGP	Norovirus sewage/GI/Toyama/May/2007/JP
Norovirus Hu/GI/BE/240407-2/2007/SGP	Norovirus sewage/GI/Toyama/NoV-l/2006/JP
Norovirus Hu/GI/BE/240407-3/2007/SGP	Norovirus sewage/GI/Toyama/NoV-P2/2006/JP
Norovirus Hu/**GI**/BE/270607-l/2007/SGP	Norovirus sewage/GI/Toyama/NoV/2007/JP
Norovirus Hu/GI/BE/270607-2/2007/SGP	Norovirus sewage/GI/Toyama/Sep- 1/2006/JP
Norovirus Hu/GI/BE/290507- 1/2007/SGP	Norovirus sewage/GI/Toyama/S ep-2/2006/JP
Norovirus Hu/GI/BE/290507-2/2007/SGP	Norovirus sewage/GI/Toyama/Sep-Pl/2006/JP
Norovirus Hu/GI/BE/290507-3/2007/SGP	Norovirus sewage/GI/Toyama/Sep/2007/JP
Norovirus Hu/GI/Beijing/50/2007	Norovirus sewage/GI/Toyama/SW0609-7/2006/JP
Norovirus Hu/GI/Beijing/60/2007	Norovirus sewage/GI/Toyama/SW0701 -2/2006/JP
Norovirus Hu/GI/BHL37/2000/Botswana	Norovirus sewage/GI/Toyama/SW0702-7/2007/JP
Norovirus Hu/GI/BS/200307- 1/2007/SGP	Norovirus sewage/GI/Toyama/SW0703- l 8/2007/JP
Norovirus Hu/GI/BS/200307-2/2007/SGP	Norovirus sewage/GI/Toyama/SW0705-9/2007/JP
Norovirus Hu/GI/BS/230 107- 1/2007/SGP	Norovirus sewage/GI/Toyama/SW0708-l/2007/JP
Norovirus Hu/GI/BS/2301 07-2/2007/SGP	Norovirus water/GI/Gyeonggi/Al 2/2002/KOR
Norovirus Hu/GI/BS/2301 07-3/2007/SGP	Norovirus water/GI/Gyeonggi/Al 4/2003/KOR
Norovirus Hu/GI/BS/2301 07-4/2007/SGP	Norovirus water/GI/Gyeonggi/Al 5/2003/KOR
Norovirus Hu/GI/BS/2301 07-5/2007/SGP	Norovirus water/GI/Gy eonggi/A2- 1*12* 002/KOR
Norovirus Hu/**GI**/BS/230207- 1/2007/SGP	Norovirus water/GI/Gyeonggi/A2-2/2002/KOR
Norovirus Hu/GI/BS/230207-2/2007/SGP	Norovirus water/GI/Gy eonggi/A7/2 002/KOR
Norovirus Hu/GI/BS/240407- 1/2007/SGP	Norovirus water/GI/Gy eonggi/A8/2 002/KOR
Norovirus Hu/GI/BS/240407-2/2007/SGP	Norovirus water/GI/Gy eonggi/Hl 0/2002/KOR
Norovirus Hu/GI/BS/240407-3/2007/SGP	Norovirus water/GI/Gy eonggi/H 12/2002/KOR
Norovirus Hu/GI/BS/270607-l/2007/SGP	Norovirus water/GI/Gy eonggi/Hl 3/2003/KOR
Norovirus Hu/GI/BS/270607-2/2007/SGP	Norovirus water/GI/Gy eonggi/H 14/2003/KOR
Norovirus Hu/**GI**/BS/270607-3/2007/SGP	Norovirus water/GI/Gy eonggi/Hl 5/2003/KOR
Norovirus Hu/GI/BS/290507- 1/2007/SGP	Norovirus water/GI/Gyeonggi/H2/2002/KOR
Norovirus Hu/GI/BS/290507-2/2007/SGP	Norovirus water/GI/Gy eonggi/H3/2 002/KOR
Norovirus Hu/GI/Cl-01 1106- 1/2006/SGP	Norovirus water/GI/Gy eonggi/H6/2 002/KOR
Norovirus Hu/GI/Cl-01 1106-2/2006/SGP	Norovirus water/GI/Gy eonggi/H7/2 002/KOR
Norovirus Hu/GI/Cl-1 11206/2006/SGP	Norovirus water/GI/Gy eonggi/H8/2002/KOR
Norovirus Hu/GI/C 1-150806/2006/SGP	Norovirus water/GI/Gy eonggi/H9/2002/KOR
Norovirus Hu/**GI**/Cl -201 106/2006/SGP	Norovirus water/GI/Gy eonggi/I14/2003/KOR
Norovirus Hu/GI/C 1-220606/2006/SGP	Norovirus water/GI/Gy eonggi/1 15/2003/KOR
Norovirus Hu/GI/C 1-240706- 1/2006/SGP	Norovirus water/GI/Gyeonggi/I2/2002/KOR
Norovirus Hu/GI/C 1-240706-2/2006/SGP	Norovirus water/GI/Gyeonggi/I8/2002/KOR
Norovirus Hu/GI/C 1-271 206/2006/SGP	Norovirus water/GI/Gy eonggi/S 1/2002/KOR
Norovirus Hu/GI/C2-230507/2007/SGP	Norovirus water/GI/Gyeonggi/S 10/2002/KOR
Norovirus Hu/GI/C7-157/2005/KOR	Norovirus water/GI/Gyeonggi/S 11/2002/KOR
Norovirus Hu/GI/C7-1 67/2005/KOR	Norovirus water/GI/Gy eonggi/S12/2002/KOR
Norovirus Hu/GI/Cardrona/2006/NZL	Norovirus water/GI/Gyeonggi/S14/2003/KOR
Norovirus Hu/GI/E-1 10407- 1/2007/SGP	Norovirus water/GI/Gyeonggi/S 15/2003/KOR

Norovirus Hu/GI/E-1 10407-2/2007/SGP Norovirus Hu/GI/E-140307/2007/SGP Norovirus Hu/GI/Eiken/5587/2002/NOR Norovirus Hu/GI/FH-A/2004/South Korea Norovirus Hu/GI/FH-B/2004/South Korea Norovirus Hu/GI/Furutangen/4200/2002/NOR Norovirus Hu/GI/GpN/2004/Irl Norovirus Hu/GI/Guadalajara/TDl Norovirus Hu/GI/Guadalajara/TD12 Norovirus Hu/GI/Guadalajara/TD7 Norovirus Hu/GI/Guadalajara/TD8 Norovirus Hu/GI/Guangxi/NN07230/2007/CFIN Norovirus Hu/GI/GuRIV/Caracas/2007/VEN Norovirus Hu/GI/GuRV/Caracas/2007/VEN Norovirus Hu/GI/GuRVII/Caracas/2008/VEN Norovirus Hu/GI/Hemsedal/1 14/2001/NOR Norovirus Hu/GI/Hiroshima/40-20/04/JP Norovirus Hu/GI/Hiroshima/6 1-1/05/JP Norovirus Hu/GI/HK/CU050 101/2005/CHN Norovirus Hu/GI/HK/CU0501 13/2005/CFIN Norovirus Hu/GI/HK/CU0502 10/2005/CFIN Norovirus Hu/GI/HK/CU050335/2005/CFIN Norovirus Hu/GI/HK/CU05043 1/2005/CFIN Norovirus Hu/GI/HK/CU050432/2005/CFIN Norovirus Hu/GI/HK/CU050448/2005/CHN	Norovirus water/GI/Gyeonggi/S3/2002/KOR Norovirus water/GI/Gyeonggi/S4/2002/KOR Norovirus water/GI/Gyeonggi/S7- 1/2002/KOR Norovirus water/GI/Gyeonggi/S7-2/2002/KOR Norovirus water/GI/Gyeonggi/S8/2002/KOR Norovirus water/GI/Gyeonggi/S9/2002/KOR Norovirus Hu/GI/ICBl 159/1996/Brazil Norovirus Hu/GI/ICB 1230/1 996/Brazil Norovirus Hu/GI/ICB 1242C2/1 996/Brazil Norovirus Hu/GI/ICB 1346C2/1 996/Brazil Norovirus Hu/GI/ICB 1436C2/1 996/Brazil Norovirus Hu/GI/ICB 1918/1 996/Brazil Norovirus Hu/GI/ICB 1969C2/1 997/Brazil Norovirus Hu/GI/ICB2484/l 998/Brazil Norovirus Hu/GI/Jeju-43/2007/KOR Norovirus Hu/GI/Jeju-50/2007/KOR Norovirus Hu/GI/KD125/2005/Iraq Norovirus Hu/GI/KD25/2005/Iraq Norovirus Hu/GI/KD88/2005/Iraq Norovirus Hu/GI/KE/2003 07-1/2007/SGP Norovirus Hu/GI/KE/2003 07-2/2007/SGP Norovirus Hu/GI/KE/23 0107- 1/2007/SGP Norovirus Hu/GI/KE/23 0107-2/2007/SGP Norovirus Hu/GI/KE/23 0107-3/2007/SGP
Norovirus genogroup GI.l	
Norovirus Env/GGI.l/679/2006/IT Norovirus Hu/GI-l/414003-3/2004/UK Norovirus Hu/GI. 1/2003/4529/Moscow/RUS Norovirus Hu/GI. 1/2003/4580/Moscow/RUS Norovirus Hu/GI. 1/2003/4602/Moscow/RUS Norovirus Hu/GI. 1/2003/4661/Moscow/RUS Norovirus Hu/GI. 1/2005/6067/Bishkek/RUS Norovirus Hu/GI. 1/2005/7685/Nizhny Novgorod/RUS Norovirus Hu/GI. 1/2005/8156/Moscow/RUS Norovirus Hu/GI. 1/2005/8227/St. Petersburg/RUS Norovirus Hu/GI.l/2006/10246/Odessa/RUS Norovirus Hu/GI.l/2006/10305/Odessa/RUS Norovirus Hu/GI. 1/2007/1 1580/Moscow/RUS Norovirus Hu/GI. 1/2007/2384/Moscow/RUS Norovirus Hu/GI. l/Beijing/45/2007 Norovirus Hu/GI. l/Cuernavaca/7 183/2007/MEX Norovirus Hu/GI. l/Dhaka234/2000/BGD Norovirus Hu/GI. 1/Mussels/M 10nov2004/Foto/Sweden Norovirus Hu/GI.l/Mussels/M127nov2004/Foto/Sweden Norovirus Hu/GI.l/Mussels/M28nov2004/Foto/Sweden	Norovirus Hu/GI.l/Mussels/M8nov2004/Foto/Sweden Norovirus Hu/GI.l/P2.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI. 1/P3.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P4.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI. 1/P5.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P6.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI. 1/P7-587/2007/Stromstad/Sweden Norovirus Hu/GI.l/P7.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI. 1/P715.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P725.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P726.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P738.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P774.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/P8.Delsjo2004/Gothenburg/Sweden Norovirus

	Hu/GI.l/P9.Delsjo2004/Gothenburg/Sweden Norovirus Hu/GI.l/PI.Delsjo2004/Gothenburg/Sweden Norovirus oyster/GI. 1/1 A/Stromstad/Sweden Norovirus oyster/GI. 1/lB/Stromstad/Sweden Norovirus oyster/GI. 1/2/Stromstad/Sweden
Norovirus genogroup GI.2	
Norovirus Env/GGI.2/671/2006/IT Norovirus Env/GGI.2/677/2006/IT Norovirus Env/GGI.2/680/2006/IT Norovirus Env/GGI.2/704/2006/IT Norovirus Hu/GGl-2/Berlin/90068.04-8-BA4/2004/DE Norovirus Hu/GG 1-2/Berlin/90405 .04- 1-BA1/2004/DE Norovirus Hu/GGl -2/Berlin/9096 1.04-2-BA1/2004/DE Norovirus Hu/GG l-2/Berlin/91 192.05-7-BA3/2004/DE Norovirus Hu/GGl -2/Berlin/9 1568.04-6-BA3/2004/DE	Norovirus Hu/GGI.2/patient M/2006/NLD Norovirus Hu/GGI.2/Southampton32609/2007/US Norovirus Hu/GI-2/4 14003 - 1/2004/UK Norovirus Hu/GI.2/13375/2007/RJ/BRA Norovirus Hu/GI.2/13397/2007/RJ/BRA Norovirus Hu/GI.2/Leuven/2003/BEL Norovirus Hu/GI.2/Mussels/M39nov2004/Foto/Sweden Norovirus septic system/GGI.2/Southampton3 1845/2007/US Norovirus well water/GGI.2/Southampton3 1818/2007/US
Norovirus genogroup GI.3	
Norovirus Hu/GI-3/512057-l/2005/UK Norovirus Hu/GI.3/1 3440/2007/RJ/BRA Norovirus Hu/GI.3/1 3484/2007/RJ/BRA Norovirus Hu/GI.3/Guadalajara/50074vl/2007/MEX Norovirus Hu/GI.3/JKPG_881/SWE/2007 Norovirus Hu/GI.3/JKPG_882/SWE/2007 Norovirus Hu/GI.3/JKPG_883/SWE/2007 Norovirus Hu/GI. 3/P 1.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P10.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/Pl 1.ASpen2004/Lerum/Sweden Norovirus	Norovirus Hu/GI.3/P14.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P15.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P16.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P17.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/Pl 8.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P2.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P3 .ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P4.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P5 .ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P7.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P8.ASpen2004/Lerum/Sweden Norovirus Hu/GI.3/P9.ASpen2004/Lerum/Sweden Hu/GI. 3/P 12.ASpen2 004/Lerum/Sweden Norovirus Hu/GI.3/P13.ASpen2004/Lerum/Sweden
Norovirus genogroup GI.4	
Norovirus Env/GGI.4/678/2006/IT Norovirus Hu/GGl -4/Berlin/9 1568.04-6-BA3/2004/DE Norovirus Hu/GGl -4/Berlin/926 17.04-3-BA2/2004/DE Norovirus Hu/GGl-4/Berlin/92672.04-4-BA2/2004/DE Norovirus Hu/GGl-4/Berlin/92674.04-5-BA2/2004/DE Norovirus Hu/GI-4/612057-l/2006/UK	Norovirus Hu/GI-4/E-l/2005/UK Norovirus Hu/GI-4/Inba/06 12 17/2006/JP Norovirus Hu/GI.4/1643/2008/US Norovirus Hu/GI.4/pa-nov/2009/FIN Norovirus oyster A clone 1/GGI.2/2006/NLD Norovirus raspberries/GI.4/be-nov/2009/FIN Norovirus sewage/GI.4/Toyama/SW0702-1/2007/JP Norovirus Hu/GI-4/612058-l/2006/UK Norovirus Hu/GI-4/714124-l/2007/UK
Norovirus genogroup GI.5	
Norovirus env/GGI.5/1 120/2007/ITA Norovirus env/GGI.5/1 130/2007/ITA Norovirus env/GGI.5/1 132/2007/ITA	Norovirus env/GGI.5/1 160/2007/ITA Norovirus Hu/GI-5/Newquay-l/2008/UK Norovirus

Norovirus env/GGI.5/1 136/2007/ITA	Hu/GI.5/Cuernavaca/7253/2007/MEX
Norovirus genogroup GI.6	
Norovirus Hu/GI-6/Q-l/2007/US	
Norovirus genogroup GI.7	
Norovirus Hu/GI.7/4349a/2008/ZAF Norovirus sewage/GI.7/Toyama/SW0702-11/2007/JP	Norovirus sewage/GI.7/Toyama/SW0703-10/2007/JP
Norovirus genogroup GI.8	
Norovirus Hu/GI-8/C6-48/South Korea Norovirus Hu/GI-8/C6-49/South Korea Norovirus Hu/GI-8/C6-52/South Korea Norovirus Hu/GI-8/C6-53/South Korea Norovirus Hu/GI-8/C7-157/South Korea Norovirus Hu/GI-8/C7-163/South Korea Norovirus Hu/GI-8/Kimitsu/060754/2006/JP Norovirus Hu/GI.8/2008890321/2008/US Norovirus Hu/GI.8/Cuernavaca/5 04 16/2 007/MEX Norovirus Hu/GI. 8/Cuernavaca/7 125/2007/MEX Norovirus Hu/GI. 8/Cuernavaca/7 145/2007/MEX	Norovirus Hu/GI. 8/Cuernavaca/71 62/2007/MEX Norovirus Hu/GI. 8/Cuernavaca/71 72/2007/MEX Norovirus Hu/GI.8/Guadalajara/50061/2007/MEX Norovirus Hu/GI.8/Guadalajara/50074v2/2008/MEX Norovirus Hu/GI. 8/Guadalajara/5 008 1/2007/MEX Norovirus Hu/GI.8/HME-394/2005/TWN Norovirus Hu/GI.8/HME-401/2005/TWN Norovirus Hu/GI.8/HME-406/2005/TWN Norovirus Hu/GI.8/HME-407/2005/TWN Norovirus Hu/GI.8/HME-419/2005/TWN Norovirus Hu/GI.8/HME-462/2005/TWN Norovirus Hu/GI.8/HME-468/2005/TWN Norovirus Hu/GI. 8/Cuernavaca/71 58/2007/MEX
Southampton virus	
Norovirus genogroup 2	
Lordsdale virus Norovirus genogroup Gil unidentified subgroup Human calcivirus NV/GII/Bollnas/IV6650/2003/SE Human calcivirus NV/GII/Falkoping/IV6744/2002/SE Human calcivirus NV/GII/Karlstad/IV12375/2002/SE Human calcivirus NV/GII/Lidkoping/IV6546/2003/SE Human calcivirus NV/GII/Mariestad/IVl 2677/2002/SE Human calcivirus NV/GII/Motala/IV3248/2002/SE Human calcivirus NV/GII/Nortalj e/IVl 2537/2002/SE Human calcivirus NV/GII/Norrtalje/IVl 382/2003/SE Human calcivirus NV/GII/Norrtalje/IVl 760/2002/SE Human calcivirus NV/GII/Norrtalj e/IV2 839/2 002/SE Human calcivirus NV/GII/Skovde/IV12503/2002/SE Human calcivirus NV/GII/Skovde/IV6547/2003/SE Human calcivirus NV/GII/Stockholm/IVl 0 18/200 1/SE Human calcivirus	Norovirus Hu/GII/Farsund/268 1/2002/NOR Norovirus Hu/GII/FH-A/2004/South Korea Norovirus Hu/GII/flagl /nursing home/Flagstaff/USA/2004 Norovirus Hu/GII/GI.3/P6.ASpen2004/Lerum/Sweden Norovirus Hu/GII/Goulburn Valley G5175 A/1983/AUS Norovirus Hu/GII/Goulburn Valley G5175 B/1983/AUS Norovirus Hu/GII/Goulburn Valley G5175 C/1983/AUS Norovirus Hu/GII/GpB/2004/Irl Norovirus Hu/GII/GpC/2004/Irl Norovirus Hu/GII/GpD/2004/Irl Norovirus Hu/GII/GpE/2003/4/Irl Norovirus Hu/GII/GpF/2004/Irl Norovirus Hu/GII/GpG/2004/Irl Norovirus Hu/GII/GpH/2003/4/Irl Norovirus Hu/GII/GPH56/l 999/Botswana Norovirus Hu/GII/GpI/2004/Irl Norovirus Hu/GII/GpJ/2004/Irl Norovirus Hu/GII/GpK/2004/Irl Norovirus Hu/GII/GpL/2004/Irl Norovirus Hu/GII/GpM/2004/Irl Norovirus Hu/GII/Guadalajara/TDII 1 Norovirus Hu/GII/GuRII/Caracas/2007/VEN Norovirus Hu/GII/GuRX/Caracas/2008/VEN Norovirus Hu/GII/GuRXI/Caracas/2008/VEN Norovirus Hu/GII/GuRXII/Caracas/2008/VEN

NV/**GII**/Stockholm/IVl 124/2003/SE	Norovirus Hu/GII/GuRXIII/Caracas/2008/VEN
Human calcivirus	Norovirus Hu/GII/GuRXIV/Caracas/2008/VEN
NV/**GII**/Stockholm/IVl 1320/2002/SE	Norovirus Hu/GII/GuRXV/Caracas/2008/VEN
Human calcivirus	Norovirus Hu/GII/GuRXVI/Caracas/2008/VEN
NV/**GII**/Stockholm/IVl 138/2003/SE	Norovirus Hu/GII/GuRXVII/Caracas/2008/VEN
Human calcivirus	Norovinis Hu/GII/GuRXVIII/Caracas/2008/VEN
NV/**GII**/Stockholm/**IV** 1142/2003/SE	Norovirus Hu/GII/GZ- 1/2008/CHN
Human calcivirus	Norovirus Hu/GII/GZ-2/2008/CHN
NV/**Gn** /Stockholm/IVl 163/2003/SE	Norovirus Hu/GII/GZ-3/2008/CHN
Human calcivirus	Norovirus Hu/GII/Hamburg/ l 6 14/2006/Ger
NV/GII/Stockholm/IVl 167/2003/SE	Norovirus Hu/GII/Hamburg/2 1407/2006/Ger
Human calcivirus	Norovirus Hu/GII/Hamburg/224 1/2006/Ger
NV/GII/Stockholm/IVl 1835/2002/SE	Norovirus Hu/GII/Hiroshima/2005/JP
Human calcivirus	Norovirus Hu/GII/Hiroshima/33-2/03/JP
NV/GII/Stockholm/I V 12 197/2002/SE	Norovirus Hu/GII/Hiroshima/39-6/03/JP
Human calcivirus	Norovims Hu/GII/Hiroshima/54-3/04/JP
NV/GII/Stockholm/IV 1229/2003/SE	Norovirus Hu/GII/Hiroshima/57 1- 1/05/JP
Human calcivirus	Norovirus Hu/GII/HK/CU04 1206/2004/CHN
NV/GII/Stockhohn/IV1259/2001/SE	Norovirus Hu/GII/HK/CU04 l 2 13/2004/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU04 l 220/2004/CHN
NV/GII/Stockholm/IV12699/2002/SE	Norovirus Hu/GII/HK/CU04 l 222/2004/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU04 l 225/2004/CHN
NV/GII/Stockholm/IV1273/2003/SE	Norovirus Hu/GII/HK/CU041245/2004/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU041 247/2004/CHN
NV/GII/Stockholm/IV 13229/2002/SE	Norovirus Hu/GII/HK/CU0501 06/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU0501 11/2005/CHN
NV/GII/Stockholm/IV 1342/2003/SE	Norovirus Hu/GII/HK/CU0501 13/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU0501 18/2005/CHN
NV/GII/Stockhohn/IV1464/2001/SE	Norovirus Hu/GII/HK/CU0501 19/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU050 128/2005/CHN
NV/GII/Stockholm/IV 1472/2 002/SE	Norovirus Hu/GII/HK/CU050 l 30/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU050 l 35/2005/CHN
NV/GII/Stockholm/IVl 5 13/2002/SE	Norovirus Hu/GII/HK/CU050 136/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU050 140/2005/CHN
NV/GII/Stockholm/IV 1526/200 1/SE	Norovirus Hu/GII/HK/CU050 14 1/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU050 149/2005/CHN
NV/GII/Stockholm/IV1678/2002/SE	Norovirus Hu/GII/HK/CU0501 52/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU05021 1/2005/CHN
NV/GII/Stockholm/iV1759/2002/SE	Norovirus Hu/GII/HK/CU0502 14/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU0502 17/2005/CHN
NV/GII/Stockholm/IV 1772/200 1/SE	Norovirus Hu/GII/HK/CU050227/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU050240/2005/CHN
NV/GII/Stockholm/IVl 813/2002/SE	Norovirus Hu/GII/HK/CU050403/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU05043 1/2005/CHN
NV/GII/Stockholm/IV2045/200 1/SE	Norovirus Hu/GII/HK/CU050476/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU050852/2005/CHN
NV/GII/Stockholm/IV2 168/200 1/SE	Norovirus Hu/GII/HK/CU05 10 13/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU05 1039/2005/CHN
NV/GII/Stockholm/IV2 180/200 1/SE	Norovirus Hu/GII/HK/CU05 1120/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU05 l 139/2005/CHN
NV/GII/Stockholm/IV2 182/200 1/SE	Norovirus Hu/GII/HK/CU05 l 146/2005/CHN
Human calcivirus	Norovirus Hu/GII/HK/CU05 l l49/2005/CHN
NV/GII/Stockholm/IV2546/200 1/SE	Norovirus Hu/GII/HK/CU05 1155/2005/CHN
Human calcivirus	Norovirus Hu/GII/Hokkaido/2004/JP
NV/GII/Stockholm/IV2682/200 1/SE	Norovirus Hu/GII/Hokushin/03/JP

Human calcivirus NV/GII/Stockholm/IV2763/2002/SE	Norovirus Hu/GII/HS66/2001/US
Human calcivirus NV/GII/Stockholm/IV2765/2002/SE	Norovirus Hu/GII/Il/JPN
Human calcivirus NV/GII/Stockholm/IV2859/2001/SE	Norovirus Hu/GII/I13/JPN
Human calcivirus NV/GII/Stockholm/IV2863/200 1/SE	Norovirus Hu/GII/I14/JPN
Human calcivirus NV/GII/Stockholm/IV2873/2002/SE	Norovirus Hu/GII/I7/JPN
Human calcivirus NV/GII/Stockholm/IV2877/2002/SE	Norovirus Hu/GII/IAl-C104/2004/BRA
Human calcivirus NV/GII/Stockholm/IV29 19/200 1/SE	Norovirus Hu/GII/IAL-Cl 12/2004/BRA
Human calcivirus NV/GII/Stockholm/IV2925/200 1/SE	Norovirus Hu/GII/IAl-C152/2005/BRA
Human calcivirus NV/GII/Stockholm/IV3307/2001/SE	Norovirus Hu/GII/IAL-Cl 6/1 995/BRA
Human calcivirus NV/GII/Stockholm/IV3355/2002/SE	Norovirus Hu/GII/IAl-C174/2005/BRA
Human calcivirus NV/GII/Stockholm/IV3400/2002/SE	Norovirus Hu/GII/IAl-C176/2005/BRA
Human calcivirus NV/GII/Stockholm/IV3480/2002/SE	Norovirus Hu/GII/IAl-C178/2005/BRA
Human calcivirus NV/GII/Stockholm/IV35 14/2002/SE	Norovirus Hu/GII/IAl-C 19/1 995/BRA
Human calcivirus NV/GII/Stockholm/IV3602/200 1/SE	Norovirus Hu/GII/IAl-C2 1/1 995/BRA
Human calcivirus NV/GII/Stockholm/IV3626/200 1/SE	Norovirus Hu/GII/IAl-C22/l 995/BRA
Human calcivirus NV/GII/Stockholm/IV3728/2001/SE	Norovirus Hu/GII/IAl-C65/l 995/BRA
Human calcivirus NV/GII/Stockholm/IV3837/2001/SE	Norovirus Hu/GII/IAl-C70/l 995/BRA
Human calcivirus NV/GII/Stockholm/IV3882/2001/SE	Norovirus Hu/GII/ICB 1200/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV391 1/200 1/SE	Norovirus Hu/GII/ICB 1207/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV4348/200 1/SE	Norovirus Hu/GII/ICB 1208/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV4724/200 1/SE	Norovirus Hu/GII/ICB 1235/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV478/200 1/SE	Norovirus Hu/GII/ICB 124 1/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV4884/2001/SE	Norovirus Hu/GII/ICB 1242C 1/l 996/Brazil
Human calcivirus NV/GII/Stockholm/IV4902/200 1/SE	Norovirus Hu/GII/ICB 1244/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV5350/2001/SE	Norovirus Hu/GII/ICB 1248/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV5366/2001/SE	Norovirus Hu/GII/ICB 1257/1 996/Brazil
Human calcivirus NV/GII/Stockholm/IV61 89/2002/SE	Norovirus Hu/GII/ICB 1258/1 996/Brazil
Human calcivirus	Norovirus Hu/GII/ICB 1261/1 996/Brazil
	Norovirus Hu/GII/ICB 1262/1 996/Brazil
	Norovirus Hu/GII/ICB 1263/1 996/Brazil
	Norovirus Hu/GII/ICB 1346C1/1 996/Brazil
	Norovirus Hu/GII/ICB 1429/1 996/Brazil
	Norovirus Hu/GII/ICB 1430/1 996/Brazil
	Norovirus Hu/GII/ICB 1431/1 996/Brazil
	Norovirus Hu/GII/ICB 1432/1 996/Brazil
	Norovirus Hu/GII/ICB 1434/1 996/Brazil
	Norovirus Hu/GII/ICB 1435/1 996/Brazil
	Norovirus Hu/GII/ICB 1436C1/1 996/Brazil
	Norovirus Hu/GII/ICB 1441/1 996/Brazil
	Norovirus Hu/GII/ICB 1443/1 996/Brazil
	Norovirus Hu/GII/ICB 1444/1 996/Brazil
	Norovirus Hu/GII/ICB 1445/1 996/Brazil
	Norovirus Hu/GII/ICB 1450/1 996/Brazil
	Norovirus Hu/GII/ICB 1454/1 996/Brazil
	Norovirus Hu/GII/ICB 1456/1 996/Brazil
	Norovirus Hu/GII/ICB 1467/1 996/Brazil
	Norovirus Hu/GII/ICB 1521/1 996/Brazil
	Norovirus Hu/GII/ICB 1529/1 996/Brazil
	Norovirus Hu/GII/ICB 1530/1 996/Brazil
	Norovirus Hu/GII/ICB 1912/1 996/Brazil
	Norovirus Hu/GII/ICB 1913/1 996/Brazil
	Norovirus Hu/GII/ICB 1915/1 996/Brazil
	Norovirus Hu/GII/ICB 1925/1 997/Brazil
	Norovirus Hu/GII/ICB 1928/1 997/Brazil
	Norovirus Hu/GII/ICB 1929/1 997/Brazil

NV/GII/Stockholm/IV62 0/200 1/SE	Norovirus Hu/GII/ICB 1932/1 997/Brazil
Human calcivirus	Norovirus Hu/GII/ICB 1963/1 997/Brazil
NV/GII/Stockholm/IV62 11/2002/SE	Norovirus Hu/GII/ICB 1969C 1/ 1997/Brazil
Human calcivirus	Norovirus Hu/GII/ICB 1977/1 997/Brazil
NV/GII/Stockholm/IV6253/2003/SE	Norovirus Hu/GII/ICB 1983/1 997/Brazil
Human calcivirus	Norovirus Hu/GII/ICBl 987C1/1 997/Brazil
NV/GII/Stockholm/IV627 1/2002/SE	Norovirus Hu/GII/ICB 1987C2/1 997/Brazil
Human calcivirus	Norovirus Hu/GII/ICB 1988/1 997/Brazil
NV/GII/Stockholm/IV6285/2002/SE	Norovirus Hu/GII/ICB2 l09/l 997/Brazil
Human calcivirus	Norovirus Hu/GII/ICB2 160/1 997/Brazil
NV/GII/Stockholm/IV63 12/2003/SE	Norovirus Hu/GII/ICB2 162/1 998/Brazil
Human calcivirus	Norovirus Hu/GII/ICB2230/l 998/Brazil
NV/GII/Stockholm/IV65 15/2002/SE	Norovirus Hu/GII/ICB2482/l 998/Brazil
Human calcivirus	Norovirus Hu/GII/ICB261 7/1 999/Brazil
NV/GII/Stockholm/IV68 19/2003/SE	Norovirus Hu/GII/ICB2620/l 999/Brazil
Human calcivirus	Norovirus Hu/GII/ICB2670/l 999/Brazil
NV/GII/Stockholm/IV6970/2003/SE	Norovirus Hu/GII/ICB2784/l 999/Brazil
Human calcivirus	Norovirus Hu/GII/ICB2785/l 999/Brazil
NV/GII/Stockhohn/IV6984/2003/SE	Norovirus Hu/GII/ICB2787/l 999/Brazil
Human calcivirus	Norovirus Hu/GII/ICB279 l/l 999/Brazil
NV/GII/Stockholm/IV6989/2002/SE	Norovirus Hu/GII/ICB2 89 1/1 999/Brazil
Human calcivirus	Norovirus Hu/GII/Ichimiya/04/JP
NV/GII/Stockholm/IV6998/2003/SE	Norovirus Hu/GII/Ina/02/JP
Human calcivirus	Norovirus Hu/GII/Jl/JPN
NV/GII/Stockholm/IV7 137/2002/SE	Norovirus Hu/GII/J2/JPN
Human calcivirus	Norovirus Hu/GII/Kl/JPN
NV/GII/Stockholm/IV76/2002/SE	Norovirus Hu/GII/K2/JPN
Human calcivirus	Norovirus Hu/GII/K3/JPN
NV/GII/Sundsvall/IV689 1/2002/SE	Norovirus Hu/GII/Kamo/03/JP
Human calcivirus	Norovirus Hu/GII/KD106/2005/Iraq
NV/GII/Uppsala/IV l348/2003/SE	Norovirus Hu/GII/KD142/2005/Iraq
Human calcivirus	Norovirus Hu/GII/KD180/2005/Iraq
NV/GII/Uppsala/IV6477/2003/SE	Norovirus Hu/GII/KD203/2005/Iraq
Human calicivirus HU/NLV/Bhaml32/95/UK	Norovirus Hu/GII/KD22/2005/Iraq
Human calicivirus HU/NLV/Borna 185/00/DE	Norovirus Hu/GII/KD244/2005/Iraq
Human calicivirus Hu/NLV/GII/MDlOl-2/1987/US	Norovirus Hu/GII/KD77/2005/Iraq
	Norovirus Hu/GII/KE/200307-l/2007/SGP
Human calicivirus Hu/NLV/GII/MD134-10/1987/US	Norovirus Hu/GII/KE/200307-2/2007/SGP
	Norovirus Hu/GII/KE/230 107/2007/SGP
Human calicivirus Hu/NLV/GII/MD134-7/1987/US	Norovirus Hu/GII/KE/230207- 1/2007/SGP
	Norovirus Hu/GII/KE/230207-2/2007/SGP
Human calicivirus Hu/NLV/GII/MD145-12/1987/US	Norovirus Hu/GII/KE/240407- 1/2007/SGP
	Norovirus Hu/GII/KE/240407-2/2007/SGP
Human calicivirus HU/NLV/Hillingdon/90/UK	Norovirus Hu/GII/KE/270607-l/2007/SGP
Human calicivirus HU/NLV/Leeds/90/UK	Norovirus Hu/GII/KE/270607-2/2007/SGP
Human calicivirus HU/NLV/Parkroyal/95/UK	Norovirus Hu/GII/KE/270607-3/2007/SGP
Human calicivirus HU/NLV/Seacroft/90/UK	Norovirus Hu/GII/KE/290507-l/2007/SGP
Human calicivirus HU/NLV/Symgreen/95/UK	Norovirus Hu/GII/KE/290507-2/2007/SGP
Human calicivirus NLV/Aichi/124-89/JP	Norovirus Hu/GII/KE/290507-3/2007/SGP
Human calicivirus NLV/Aichi/12A-94/JP	Norovirus Hu/GII/KE/290507-4/2007/SGP
Human calicivirus NLV/Aichi/12B-94/JP	Norovirus Hu/GII/Kongsvinger/1 793/2005/NOR
Human calicivirus NLV/Aichi/12C-94/JP	Norovirus Hu/GII/Kristiansand/1299/2001/NOR
Human calicivirus NLV/Aichi/12D-94/JP	Norovirus Hu/GII/KS/2003 07- 1/2007/SGP
Human calicivirus NLV/Aichi/12E-94/JP	Norovirus Hu/GII/KS/200307-2/2007/SGP
Human calicivirus NLV/Aichi/13A-95/JP	Norovirus Hu/GII/KS/2003 07-3/2007/SGP

Human calicivirus NLV/Aichi/15A-96/JP	Norovirus Hu/GII/KS/2301 07/2007/SGP
Human calicivirus NLV/Aichi/16A-96/JP	Norovirus Hu/GII/KS/230207-l/2007/SGP
Human calicivirus NLV/Aichi/4A-88/JP	Norovirus Hu/GII/KS/230207-2/2007/SGP
Human calicivirus NLV/Aichi/8A-90/JP	Norovirus Hu/GII/KS/240407/2007/SGP
Human calicivirus NLV/Beeskow/124/00/DE	Norovirus Hu/GII/KS/270607-l/2007/SGP
Human calicivirus NLV/Berlin/491/00/DE	Norovirus Hu/GII/KS/270607-2/2007/SGP
Human calicivirus NLV/Berlin/495/00/DE	Norovirus Hu/GII/KS/270607-3/2007/SGP
Human calicivirus	Norovirus Hu/GII/KS/2905 07- 1/2007/SGP
NLV/Chesterfield/434/1 997/US	Norovirus Hu/GII/KS/290507-2/2007/SGP
Human calicivirus NLV/DIJON171/96	Norovirus Hu/GII/KS/290507-3/2007/SGP
Human calicivirus NLV/Erfurt/007/OO/DE	Norovirus Hu/GII/KS/2905 07-4/2007/SGP
Human calicivirus NLV/Erfurt/546/00/DE	Norovirus Hu/GII/KSDA52/2006/Botswana
Human calicivirus	Norovirus Hu/GII/KSDA63/2006/Botswana
NLV/Frankfurt(Oder)/l 70/99/DE	Norovirus Hu/GII/KSDA74/2006/Botswana
Human calicivirus NLV/Idaho	Norovirus Hu/GII/Lla/JPN
Falls/378/1 996/US	Norovirus Hu/GII/Llb/JPN
Human calicivirus	Norovii-us Hu/GII/L3/JPN
NLV/Koenigswusterhausen/ 130/00/DE	Norovirus Hu/GII/L4/JPN
Human calicivirus	Norovirus Hu/GII/Leverkusen267/2005/DE
NLV/Ludwigslust/2 18/99/DE	Norovirus Hu/GII/Luckenwalde5 91/2002/DE
Human calicivirus	Norovirus Hu/GII/Maizuru/77 14/2007/JPN
NLV/Ludwigslust/22 1/99/DE	Norovirus Hu/GII/Maizuru/77 18/2007/JPN
Human calicivirus	Norovirus Hu/GII/Maizuru/77 19/2007/JPN
NLV/Oberschleissheim/1 12/99/DE	Norovirus Hu/GII/Maizuru/7723/2007/JPN
Human calicivirus NLV/Pima/1 10/00/DE	Norovirus Hu/GII/Maizuru/7724/2007/JPN
Human calicivirus	Norovirus Hu/GII/Maizuru/7725/2007/JPN
NLV/Wyoming/US/genogroup 2	Norovirus Hu/GII/Maizuru/7727/2007/JPN
Human calicivirus NV/Berlin029/02/DE	Norovirus Hu/GII/Maizuru/773 1/2007/JPN
Human calicivirus NV/Berlin040/02/DE	Norovirus Hu/GII/Maizuru/7732/2007/JPN
Human calicivirus NV/Berlinl31/01/DE	Norovirus Hu/GII/Maizum/7734/2007/JPN
Human calicivirus NV/Berlinl59/01/DE	Norovirus Hu/GII/Maizuru/7744/2007/JPN
Human calicivirus NV/Berlin245/01/DE	Norovirus Hu/GII/Maizuru/7748/2007/JPN
Human calicivirus NV/Berlin264/01/DE	Norovirus Hu/GII/Maizuru/7749/2007/JPN
Human calicivirus NV/Berlin376/01/DE	Norovirus Hu/GII/Maizuru/7752/2007/JPN
Human calicivirus NV/Berlin428/01/DE	Norovirus Hu/GII/Maizuru/7755/2007/JPN
Human calicivirus NV/Berlin642/01/DE	Norovirus Hu/GII/Maizuru/7759/2007/JPN
Human calicivirus NV/Berlin750/01/DE	Norovirus Hu/GII/Maizuru/7760/2007/JPN
Human calicivirus	Norovirus Hu/GII/Maizuru/776 1/2007/JPN
NV/GII/Avesta/1 817/2002/SE	Norovirus Hu/GII/Maizuru/7764/2007/JPN
Human calicivirus NV/GII/Bollnas/1999/SE	Norovirus Hu/GII/Maizuru/7768/2007/JPN
Human calicivirus	Norovirus Hu/GII/Maizuru/7770/2007/JPN
NV/GII/Boras/001 6/1 998/SE	Norovirus Hu/GII/Marina5 8/2003/Botswana
Human calicivirus	Norovirus Hu/GII/Melbourne/1 998-06/AU
NV/GII/Boras/0082/2003/SE	Norovirus Hu/GII/Melbourne/1 998-07/AU
Human calicivirus	Norovirus Hu/GII/Melboume/1 998-2 1/AU
NV/GII/Boras/2076/2000/SE	Norovirus Hu/GII/Melbourne/1 999- 13/AU
Human calicivirus	Norovirus Hu/GII/Melbourne/1 999-14/AU
NV/GII/Falun/00 19/1 998/SE	Norovirus Hu/GII/Melbourne/1999-15/AU
Human calicivirus	Norovirus Hu/GII/Melbourne/1999-1 8/AU
NV/GII/Falun/0036/2002/SE	Norovirus Hu/GII/Melbourne/2000-02/AU
Human calicivirus NV/GII/Goteborg/1 998/SE	Norovirus Hu/GII/Melbourne/2000-08/AU
Human calicivirus	Norovirus Hu/GII/Melboume/2000-1 0/AU
NV/GII/Hudiksvall/0330/2000/SE	Norovirus Hu/GII/Melboume/2000-1 2/AU
Human calicivirus	Norovirus Hu/GII/Melbourne/2000- 13/AU
NV/GII/Jonkoping/0026/2002/SE	Norovirus Hu/GII/Melbourne/200 1-0 1/AU

Human calicivirus NV/GII/Kalmar/0220/1 998/SE	Norovirus Hu/GII/Melbourne/200 1-13/AU
Human calicivirus NV/GII/Kristianstad/0553/2000/SE	Norovirus Hu/GII/Melbourne/200 1-25/AU
Human calicivirus NV/GII/Kristinehamn/0938/2001/SE	Norovirus Hu/GII/Melbourne/2002-3 3/AU
Human calicivirus NV/GII/Landskrona/0228/1 998/SE	Norovirus Hu/GII/Miyagi/03093/03/JP
Human calicivirus NV/GII/Linkoping/0227/1 997/SE	Norovirus Hu/GII/Miyagi/032 19/03/JP
Human calicivirus NV/GII/Linkoping/053 8/2000/SE	Norovirus Hu/GII/Miyagi/03375/03/JP
Human calicivirus NV/GII/Linkoping/1 020/1 998/SE	Norovirus Hu/GII/Moscow/1 05 14/2006/RUS
Human calicivirus NV/GII/Linkoping/1 999/0440/SE	Norovirus Hu/GII/Moscow/1 05 16/2006/RUS
Human calicivirus NV/GII/Ljusdal/125 1/1 997/SE	Norovirus Hu/GII/Moscow/1 0525/2006/RUS
Human calicivirus NV/GII/Ludvika/1 00 1/2002/SE	Norovirus Hu/GII/Moscow/1 0526/2006/RUS
Human calicivirus NV/GII/Malmo/0144/2000/SE	Norovirus Hu/GII/Moscow/1 0539/2006/RUS
Human calicivirus NV/GII/Malmo/1 229/1 999/SE	Norovirus Hu/GII/Moscow/1 0540/2006/RUS
Human calicivirus NV/GII/Malmo/4708/2002/SE	Norovirus Hu/GII/Moscow/1 0541/2006/RUS
Human calicivirus NV/GII/Malmo/5092/2002/SE	Norovirus Hu/GII/Moscow/1 0555/2006/RUS
Human calicivirus NV/GII/Molndal/1 65 1/1 997/SE	Norovirus Hu/GII/Moscow/1 0557/2006/RUS
Human calicivirus NV/GII/Mora/1 692/1 997/SE	Norovirus Hu/GII/Moscow/1 0579/2006/RUS
Human calicivirus NV/GII/Mora/1 999/SE	Norovirus Hu/GII/Moscow/1 0581/2006/RUS
Human calicivirus NV/GII/Norrkoping/0081/2002/SE	Norovirus Hu/GII/Moscow/1 0586/2006/RUS
Human calicivirus NV/GII/Norrkoping/0575/2001/SE	Norovirus Hu/GII/Moscow/1 0588/2006/RUS
Human calicivirus NV/GII/Ostersund/0983/1998/SE	Norovirus Hu/GII/Moscow/1 0598/2006/RUS
Human calicivirus NV/GII/Ostersund/142501/1999/SE	Norovirus Hu/GII/Moscow/1 0652/2006/RUS
Human calicivirus NV/GII/Sandviken/1 062/1 997/SE	Norovirus Hu/GII/Moscow/1 0654/2006/RUS
Human calicivirus NV/GII/Solleftea/0898/2002/SE	Norovirus Hu/GII/Moscow/1 0664/2006/RUS
Human calicivirus NV/GII/Stockholm/055 1/2001/SE	Norovirus Hu/GII/Moscow/6395/2005/RUS
Human calicivirus NV/GII/Stockholm/0686/200 1/SE	Norovirus Hu/GII/Moscow/7844/2005/RUS
Human calicivirus NV/GII/Stockholm/073 6/2003/SE	Norovirus Hu/GII/Moscow/797 1/2005/RUS
Human calicivirus NV/GII/Stockholm/0849/1 997/SE	Norovirus Hu/GII/Moscow/855 8/2005/RUS
Human Calicivirus NV/GII/Stockholm/2032/1 999/SE	Norovirus Hu/GII/Moscow/9062/2006/RUS
	Norovirus Hu/GII/Moscow/9088/2006/RUS
	Norovirus Hu/GII/Moscow/9 156/2006/RUS
	Norovirus Hu/GII/Mussels/M 10mar2004/Foto/Sweden
	Norovirus Hu/GII/Mussels/M2mar2004/Foto/Sweden
	Norovirus Hu/GII/Mussels/M5mar2004/Foto/Sweden
	Norovirus Hu/GII/Mussels/M7mar2004/Foto/Sweden
	Norovirus Hu/GII/Mussels/M8Amar2004/Foto/Sweden
	Norovirus Hu/GII/Mussels/M8Bmar2004/Foto/Sweden
	Norovirus Hu/GII/Mussels/M9mar2004/Foto/Sweden
	Norovirus Hu/GII/N147/2004/Irl
	Norovirus Hu/GII/N162/2004/Irl
	Norovirus Hu/GII/N176/2004/Irl
	Norovirus Hu/GII/N189/2004/Irl
	Norovirus Hu/GII/N26/2003/Irl
	Norovirus Hu/GII/N314/2004/Irl
	Norovirus Hu/GII/N36/2003/Irl
	Norovirus Hu/GII/N390/2004/Irl
	Norovirus Hu/GII/N430/2004/Irl
	Norovirus Hu/GII/N438/2004/Irl
	Norovirus Hu/GII/N477/2004/Irl

Human calicivirus NV/GII/Stockholm/8260 1/1 999/SE	Norovirus Hu/GII/N79/2004/Irl
Human calicivirus NV/GII/Trollhattan/0847/2002/SE	Norovirus Hu/GII/N97/2004/Irl
Human calicivirus NV/GII/Uddevalla/0032/2002/SE	Norovirus Hu/GII/Nagano/2004/H/JP
Human calicivirus NV/GII/Uppsala/0979/2002/SE	Norovirus Hu/GII/Nagano/2004/JP
Human calicivirus NV/GII/Vara/1582/1997/SE	Norovirus Hu/GII/Nagasaki/2004/H/Hokkaido/JP
Human calicivirus NV/GII/Vaxjo/0 157/1 998/SE	Norovirus Hu/GII/New Delhi/1 83/IND
Human calicivirus NV/GII/Vaxjo/0394/2000/SE	Norovirus Hu/GII/New Delhi/209/IND
Human calicivirus strain MclOO	Norovirus Hu/GII/New Delhi/22 8/IND
Human calicivirus strain Mcl24	Norovirus Hu/GII/NFL26-2VR7/03-2005/CAN
Human calicivirus strain Mcl7	Norovirus Hu/GII/Niimegen-Lourdes/8 102 1-26069/2008/NLD
Human calicivirus strain Mc24	Norovirus Hu/GII/Nizhny Novgorod/7691/2005/RUS
Human calicivirus strain Mc37	Norovirus Hu/GII/Nizhny Novgorod/7692/2005/RUS
Human calicivirus strain Mc52	Norovirus Hu/GII/Nizhny Novgorod/8252/2005/RUS
Human calicivirus strain Mc99	Norovirus Hu/GII/Nizhny Novgorod/8261//2005RUS
Human calicivirus strain Melksham	Norovirus Hu/GII/NoV296/2004/CAN
Human calicivirus strain Stl	Norovirus Hu/GII/NoV355/2004/CAN
Norovirus ark clam/GII/YanTai/ZY3 19/China/2008	Norovirus Hu/GII/NoV64/2004/CAN
Norovirus bo/GII/CE-M-06-0532/2006/CAN	Norovirus Hu/GII/NoV750/2004/CAN
Norovirus clam/GII/Shijimil/JPN	Norovirus Hu/GII/NoV752/2004/CAN
Norovirus clam/GII/ShijimilOa/JPN	Norovirus Hu/GII/NoV784/2004/CAN
Norovirus clam/GII/ShijimilOb/JPN	Norovirus Hu/GII/NoV79/2004/CAN
Norovirus clam/GII/ShijimilOc/JPN	Norovirus Hu/GII/NoV793/2004/CAN
Norovirus clam/GII/Shijimil3/JPN	Norovirus Hu/GII/NoV804/2004/CAN
Norovirus clam/GII/Shijimil4/JPN	Norovirus Hu/GII/NoV809/2004/CAN
Norovirus clam/GII/Shij imi15/JPN	Norovirus Hu/GII/NSC042/PA/1993/BRA
Norovirus clam/GII/Shij imi 16a/JPN	Norovirus Hu/GII/NSC053/PA/l 993/BRA
Norovirus clam/GII/Shij imi 16b/JPN	Norovirus Hu/GII/NSC076/PA/l 993/BRA
Norovirus clam/GII/Shijimil6c/JPN	Norovirus Hu/GII/NSC081/PA/1993/BRA
Norovirus clam/GII/Shij imi 17a/JPN	Norovirus Hu/GII/NSC141/PA/1993/BRA
Norovirus clam/GII/Shij imi 17b/JPN	Norovirus Hu/GII/NSC183/PA/l 993/BRA
Norovirus clam/GII/Shij imi 18/JPN	Norovirus Hu/GII/NSC185/PA/l 993/BRA
Norovirus clam/GII/Shij imi19/JPN	Norovirus Hu/GII/NSC225/PA/l 993/BRA
Norovirus clam/GII/Shij imi2/JPN	Norovirus Hu/GII/NSC253/PA/l 993/BRA
Norovirus clam/GII/Shij imi22/JPN	Norovirus Hu/GII/NSC281/PA/1993/BRA
Norovirus clam/GII/Shij imi24/JPN	Norovirus Hu/GII/Nsk-688/2005/RUS
Norovirus clam/GII/Shijimi25/JPN	Norovirus Hu/GII/Nsk-701/2005/RUS
Norovirus clam/GII/Shijimi26/JPN	Norovirus Hu/GII/Nsk-K14/2006/RUS
Norovirus clam/GII/Shijimi27/JPN	Norovirus Hu/GII/Nsk-K15/2006/RUS
Norovirus clam/GII/Shij imi28a/JPN	Norovirus Hu/GII/Nucci/2005/CO/US
Norovirus clam/GII/Shijimi28b/JPN	Norovirus Hu/GII/nursing home flag2/Flagstaff/2004/USA
Norovirus clam/GII/Shij imi28c/JPN	Norovirus Hu/GII/Ol/JPN
Norovirus clam/GII/Shijimi28d/JPN	Norovirus Hu/GII/03a/JPN
Norovirus clam/GII/Shijimi29/JPN	Norovirus Hu/GII/03b/JPN
Norovirus clam/GII/Shijimi3/JPN	Norovirus Hu/GII/Osaka659/2006/JPN
Norovirus clam/GII/Shij imi30/JPN	Norovirus Hu/GII/Oslo/1 024/2000/NOR
Norovirus clam/GII/Shijimi4a/JPN	Norovirus Hu/GII/Oslo/ 148/2005/NOR
Norovirus clam/GII/Shij imi4b/JPN	Norovirus Hu/GII/Oslo/164/2004/NOR
Norovirus clam/GII/Shijimi6/JPN	Norovirus Hu/GII/Oslo/2202/200 1/NOR
	Norovirus Hu/GII/Oslo/3 52/200 1/NOR

Norovirus clam/GII/Shijimi7a/JPN	Norovirus Hu/GII/Oslo/477/2005/NOR
Norovirus clam/GII/Shijimi7b/JPN	Norovirus Hu/GII/Oslo/6498/2000/NOR
Norovirus clam/GII/Shijimi8a/JPN	Norovirus Hu/GII/Oslo/7 85/2005/NOR
Norovirus clam/GII/Shijimi8b/JPN	Norovirus
Norovirus clam/GII/Shijimi8c/JPN	Hu/GII/P 1.Confectionary 2004/Gothenburg/Sweden
Norovirus clam/GII/Shijimi8d/JPN	Norovirus
Norovirus clam/GII/Shijimi8e/JPN	Hu/GII/P2.Confectionary2004/Gothenburg/Sweden
Norovirus clam/GII/Shijimi9a/JPN	Norovirus Hu/GII/P2/JPN
Norovirus clam/GII/Shijimi9b/JPN	Norovirus
Norovirus	Hu/GII/P3.Confectionary2004/Gothenburg/Sweden
clam/GII/WeiHai/SD279/China/2008	Norovirus Hu/GII/P3/JPN
Norovirus Cor/Gunma/Apr- 1/GII/2004/JP	Norovirus
Norovirus Cor/Gunma/Apr-2/GII/2004/JP	Hu/GII/P4.Confectionary2004/Gothenburg/Sweden
Norovirus Cor/Gunma/Aug- 1/GII/2004/JP	Norovirus
Norovirus Cor/Gunma/Aug-2/GII/2004/JP	Hu/GII/P5.Confectionary2004/Gothenburg/Sweden
Norovirus Cor/Gunma/Dec- 1/GII/2004/JP	Norovirus Hu/GII/P5/JPN
Norovirus Cor/Gunma/Dec-2/GII/2004/JP	Norovirus
Norovirus Cor/Gunma/Dec-3/GII/2004/JP	Hu/GII/P6.Confectionary2004/Gothenburg/Sweden
Norovirus Cor/Gunma/Dec-4/GII/2004/JP	Norovirus
Norovirus Cor/Gunma/Feb- 1/GII/2004/JP	Hu/GII/P7.Confectionary2004/Gothenburg/Sweden
Norovirus Cor/Gunma/Feb-3/GII/2004/JP	Norovirus Hu/GII/PC 12/2006/Botswana
Norovirus Cor/Gunma/Feb-4/GII/2004/JP	Norovii-us Hu/GII/PC23/2006/Botswana
Norovirus Cor/Gunma/Feb-5/GII/2004/JP	Norovirus Hu/GII/PC28/2006/Botswana
Norovirus Cor/Gunma/Jan- 1/GII/2004/JP	Norovirus Hu/GII/PC5/2006/Botswana
Norovirus Cor/Gunma/Jan-2/GII/2004/JP	Norovirus Hu/GII/Penza/ l 0625/2006/RUS
Norovirus Cor/Gunma/Jul- 1/GII/2004/JP	Norovirus Hu/GII/Penza/10630/2006/RUS
Norovirus Cor/Gunma/Jul-2/GII/2004/JP	Norovirus Hu/GII/Penza/ l 063 1/2006/RUS
Norovirus Cor/Gunma/Jul-3/GII/2004/JP	Norovirus Hu/GII/Podolsk/1 0604/2006/RUS
Norovirus Cor/Gunma/Jul-4/GII/2004/JP	Norovirus Hu/GII/Podolsk/1 0609/2006/RUS
Norovirus Cor/Gunma/Jun-l/GII/2004/JP	Norovirus Hu/GII/Podolsk/1 0620/2006/RUS
Norovirus Cor/Gunma/Jun-2/GII/2004/JP	Norovirus Hu/GII/RlD-1 11206/2006/SGP
Norovirus Cor/Gunma/Mar-2/GII/2004/JP	Norovirus Hu/GII/Rl D-l 50806/2006/SGP
Norovirus Cor/Gunma/May- 1/GII/2004/JP	Norovirus Hu/GII/RlD-201 106/2006/SGP
Norovirus Cor/Gunma/May-2/GII/2004/JP	Norovirus Hu/GII/Rl D-220606/2006/SGP
Norovirus Cor/Gunma/May-3/GII/2004/JP	Norovirus Hu/GII/Rl D-27 l 206/2006/SGP
Norovirus Cor/Gunma/May-4/GII/2004/JP	Norovirus Hu/GII/RlU-01 l 106/2006/SGP
Norovirus Cor/Gunma/Nov-2/GII/2004/JP	Norovirus Hu/GII/RlU-03 l 006/2006/SGP
Norovirus Cor/Gunma/Oct-l/GII/2004/JP	Norovirus Hu/GII/RlU-1 11206/2006/SGP
Norovirus Cor/Gunma/Oct-2/GII/2004/JP	Norovirus Hu/GII/RlU-1 50806-1/2006/SGP
Norovirus Cor/Gunma/Oct-3/GII/2004/JP	Norovirus Hu/GII/RlU-1 50806-2/2006/SGP
Norovirus Env/GGII/670/2006/IT	Norovirus Hu/GII/RlU-201 106/2006/SGP
Norovirus GII/103/2005/RJ/BRA	Norovirus Hu/GII/R2D-01 1106/2006/SGP
Norovirus GII/105/2005/RJ/BRA	Norovirus Hu/GII/R2D-03 l 006/2006/SGP
Norovirus GII/107/2005/RJ/BRA	Norovirus Hu/GII/R2D-l l 1206/2006/SGP
Norovirus GII/58/2005/RJ/BRA	Norovirus Hu/GII/R2D-l 50806/2006/SGP
Norovirus GII/60/2005/RJ/BRA	Norovirus Hu/GII/R2D-201 106/2006/SGP
Norovirus GII/70/2005/RJ/BRA	Norovirus Hu/GII/R2D-240706-l/2006/SGP
Norovirus GII/71/2005/RJ/BRA	Norovirus Hu/GII/R2D-240706-2/2006/SGP
Norovirus GII/Lopburi020/2006/THA	Norovirus Hu/GII/R2U-01 1106/2006/SGP
Norovirus GII/Lopburi026/2006/THA	Norovirus Hu/GII/R2U-03 1006/2006/SGP
Norovirus GII/Lopburi043/2006/THA	Norovirus Hu/GII/R2U-l 11206-1/2006/SGP
Norovirus GII/Lopburi084/2006/THA	Norovirus Hu/GII/R2U-l l 1206-2/2006/SGP
Norovirus GII/Lopburi085/2006/THA	Norovirus Hu/GII/R2U-l l 1206-3/2006/SGP
Norovirus GII/Lopburi095/2006/THA	Norovirus Hu/GII/R2U-l 50806/2006/SGP
Norovirus GII/Lopburil02/2006/THA	Norovirus Hu/GII/R2U-201 106-1/2006/SGP

Norovirus GII/Lopburil03/2006/THA	Norovirus Hu/GII/R2U-201 106-2/2006/SGP
Norovirus GII/Lopburil09/2006/THA	Norovirus Hu/GII/R2U-201 106-3/2006/SGP
Norovirus GII/Lopburil 17/2006/THA	Norovirus Hu/GII/R2U-240706/2006/SGP
Norovirus GII/Lopburil 27/2006/THA	Norovirus Hu/GII/R2U-271206/2006/SGP
Norovirus GII/Lopburil 46/2006/THA	Norovirus Hu/GII/R3D-25 1006/2006/SGP
Norovirus GII/Lopburil 47/2006/THA	Norovirus Hu/GII/R3U-200607/2007/SGP
Norovirus GII/Lopburil 55/2006/THA	Norovirus Hu/GII/R3U-25 1006/2006/SGP
Norovirus GII/Lopburil 59/2006/THA	Norovirus Hu/GII/Ramotswa73/2006/Botswana
Norovirus groundwater/GII/Busan/BUO 1-04/2008/KOR	Norovirus Hu/GII/Ramotswa92/2006/Botswana
	Norovirus Hu/GII/Rjukan/5577/2002/NOR
Norovirus groundwater/GII/Busan/BUO 1-08/2008/KOR	Norovirus Hu/GII/S 10/JPN
	Norovirus Hu/GII/Sl 1/JPN
Norovirus groundwater/GII/Changwon/BUO 1-38/2008/KOR	Norovirus Hu/GII/S 12a/JPN
	Norovirus Hu/GII/S 12b/JPN
Norovirus groundwater/GII/Cheorwon/KAOl - 19/2008/KOR	Norovirus Hu/GII/S2/JPN
	Norovirus Hu/GII/S3/JPN
Norovirus groundwater/GII/Geochang/BUO 1-42/2008/KOR	Norovirus Hu/GII/S4/JPN
	Norovirus Hu/GII/S5/JPN
Norovirus groundwater/GII/Goseong/KAO 1-28/2008/KOR	Norovirus Hu/GII/S 8/JPN
	Norovirus Hu/GII/S9/JPN
Norovirus groundwater/GII/Gyeongju/BUOl - 30/2008/KOR	Norovirus Hu/GII/Salvador/B02/2006/BRA
	Norovirus Hu/GII/Salvador/B07/2006/BRA
Norovirus groundwater/GII/Gyeongsan/BUO 1-12/2008/KOR	Norovirus Hu/GII/Salvador/D07/2006/BRA
	Norovirus Hu/GII/Salvador/E04/2006/BRA
Norovirus groundwater/GII/Hapcheon/BUO 1-45/2008/KOR	Norovirus Hu/GII/Salvador/F02/2006/BRA
	Norovirus Hu/GII/Salvador/F05/2006/BRA
Norovirus groundwater/GII/JI-a- 1/2007/KOR	Norovirus Hu/GII/Seoul0006/2007/KR
Norovirus groundwater/GII/JI-a/2007/KOR	Norovirus Hu/GII/Seoul0009/2007/KR
Norovirus groundwater/GII/Pohang/BUOl - 21/2008/KOR	Norovirus Hu/GII/Seoul0012/2007/KR
	Norovirus Hu/GII/Seoul0022/2007/KR
Norovirus groundwater/GII/Uiry eong/BUO 1-15/2008/KOR	Norovirus Hu/GII/Seoul003 1/2007/KR
	Norovirus Hu/GII/Seoul0032/2007/KR
Norovirus groundwater/GII/Uiryeong/BUO 1-16/2008/KOR	Norovirus Hu/GII/Seoul0033/2007/KR
	Norovims Hu/GII/Seoul0034/2007/KR
Norovirus groundwater/GII/Ulj in/BUO 1-23/2008/KOR	Norovirus Hu/GII/Seoul0037/2007/KR
	Norovirus Hu/GII/Seoul0038/2007/KR
Norovirus groundwater/GII/Ulju/BUO 1-34/2008/KOR	Norovirus Hu/GII/Seoul0042/2007/KR
	Norovirus Hu/GII/Seoul0044/2007/KR
Norovirus groundwater/GII/Y eongcheon/BUOl-19/2008/KOR	Norovirus Hu/GII/Seoul0046/2007/KR
	Norovirus Hu/GII/Seoul0048/2007/KR
	Norovirus Hu/GII/Seoul0049/2007/KR
Norovirus groundwater/GII/Y eongcheon/BUO 1-20/2008/KOR	Norovirus Hu/GII/Seoul0052/2007/KR
	Norovirus Hu/GII/Seoul0055/2007/KR
	Norovirus Hu/GII/Seoul0056/2007/KR
Norovirus Han River/GII/Dukpoong/Apr01/2006/KOR	Norovirus Hu/GII/Seoul0058/2008/KR
	Norovims Hu/GII/Seoul0070/2008/KR
Norovirus Han River/GII/Dukpoong/Apr02/2006/KOR	Norovirus Hu/GII/Seoul0071/2008/KR
	Norovirus Hu/GII/Seoul0072/2008/KR
Norovirus Han River/GII/Dukpoong/Apr03/2006/KOR	Norovirus Hu/GII/Seoul0073/2008/KR
	Norovirus Hu/GII/Seoul0077/2008/KR
Norovirus Han River/GII/Dukpoong/Aug01/2005/KOR	Norovirus Hu/GII/Seoul0079/2008/KR
	Norovirus Hu/GII/Seoul0088/2008/KR
Norovirus Han River/GII/Dukpoong/Aug02/2005/KOR	Norovirus Hu/GII/Seoul0089/2008/KR
	Norovirus Hu/GII/Seoul0090/2008/KR
Norovirus Han	Norovirus Hu/GII/Seoul0125/2008/KR

River/GII/Dukpoong/Aug03/2005/KOR Norovirus Han	Norovirus Hu/GII/Seoul0148/2008/KR
River/GII/Dukpoong/Aug04/2005/KOR Norovirus Han	Norovirus Hu/GII/SeoulOl 50/2008/KR
River/GII/Dukpoong/Aug05/2005/KOR Norovirus Han	Norovirus Hu/GII/SeoulOl 66/2008/KR
River/GII/Dukpoong/JanO 1/2006/KOR Norovirus Han	Norovirus Hu/GII/SeoulOl 84/2007/KR
River/GII/Dukpoong/Jan02/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0201/2007/KR
River/GII/Dukpoong/Jan03/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0203/2007/KR
River/GII/Dukpoong/Jan04/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0204/2007/KR
River/GII/Dukpoong/Mar01/2006/KOR Norovirus Han	Norovims Hu/GII/Seoul0208/2007/KR
River/GII/Dukpoong/Mar02/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul02 11/2007/KR
River/GII/Dukpoong/May01/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul02 12/2007/KR
River/GII/Dukpoong/May02/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul02 13/2007/KR
River/GII/Dukpoong/Oct01/2005/KOR Norovirus Han	Norovirus Hu/GII/Seoul02 14/2007/KR
River/GII/Jamsil/JanO 1/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul02 16/2007/KR
River/GII/Jamsil/OctO 1/2005/KOR Norovirus Han	Norovirus Hu/GII/Seoul02 19/2007/KR
River/GII/Jamsil/Oct02/2005/KOR Norovirus Han	Norovirus Hu/GII/Seoul0220/2007/KR
River/GII/Kyoungan/AprO 1/2006/KOR Norovirus Han	Norovims Hu/GII/Seoul0222/2007/KR
River/GII/Kyoungan/Apr02/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0223/2007/KR
River/GII/Kyoungan/Jan01/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0224/2007/KR
River/GII/Kyoungan/Jan02/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0225/2007/KR
River/GII/Kyoungan/MarO 1/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0226/2008/KR
River/GII/Kyoungan/MayO 1/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0227/2008/KR
River/GII/Kyoungan/May02/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul023 1/2008/KR
River/GII/Kyoungan/May03/2006/KOR Norovirus Han	Norovirus Hu/GII/Seoul0232/2008/KR
River/GII/Kyoungan/May04/2006/KOR Norovirus Han	Norovims Hu/GII/Seoul0235/2008/KR
River/GII/Kyoungan/Oct01/2005/KOR Norovirus Han	Norovims Hu/GII/Seoul0236/2008/KR
River/GII/Kyoungan/Oct02/2005/KOR Norovirus Han	Norovims Hu/GII/Seoul0238/2008/KR
River/GII/Kyoungan/Oct03/2005/KOR Norovirus Han	Norovims Hu/GII/Seoul0239/2008/KR
River/GII/Paldang/Oct01/2005/KOR	Norovims Hu/GII/Seoul0240/2008/KR
	Norovims Hu/GII/Seoul0241/2008/KR
	Norovims Hu/GII/Seoul0242/2008/KR
	Norovims Hu/GII/Seoul0243/2008/KR
	Norovims Hu/GII/Seoul 0505/2 007/KR
	Norovims Hu/GII/Seoul0506/2007/KR
	Norovims Hu/GII/Seoul0507/2007/KR
	Norovims Hu/GII/Seoul0508/2007/KR
	Norovims Hu/GII/Seoul0509/2007/KR
	Norovims Hu/GII/Seoul05 10/2007/KR
	Norovims Hu/GII/Seoul05 11/2007/KR
	Norovims Hu/GII/Seoul05 12/2007/KR
	Norovims Hu/GII/Seoul05 13/2007/KR
	Norovims Hu/GII/Seoul05 14/2007/KR
	Norovims Hu/GII/Seoul05 15/2007/KR
	Norovims Hu/GII/Seoul05 16/2007/KR
	Norovims Hu/GII/Seoul05 17/2007/KR
	Norovims Hu/GII/Seoul05 18/2007/KR
	Norovims Hu/GII/Seoul05 19/2007/KR
	Norovims Hu/GII/Seoul0520/2007/KR
	Norovims Hu/GII/Seoul052 1/2007/KR
	Norovims Hu/GII/Seoul0522/2007/KR
	Norovims Hu/GII/Seoul0523/2007/KR
	Norovims Hu/GII/Seoul0524/2007/KR
	Norovims Hu/GII/Seoul0525/2007/KR
	Norovims Hu/GII/Seoul0526/2007/KR
	Norovims Hu/GII/Seoul0527/2007/KR
	Norovims Hu/GII/Seoul0528/2007/KR

Norovirus Han River/GII/Paldang/Oct02/2005/KOR	Norovirus Hu/GII/Seoul0529/2007/KR
	Norovirus Hu/GII/Seoul0530/2007/KR
Norovirus Han River/GII/Sungnae/Apr01/2006/KOR	Norovirus Hu/GII/Seoul053 1/2007/KR
	Norovirus Hu/GII/Seoul0532/2007/KR
Norovirus Han River/GII/Sungnae/JanO1/2006/KOR	Norovirus Hu/GII/Seoul0533/2007/KR
	Norovirus Hu/GII/Seoul0534/2007/KR
Norovirus Han River/GII/Sungnae/Jan02/2006/KOR	Norovirus Hu/GII/Seoul0535/2007/KR
	Norovirus Hu/GII/Seoul0536/2007/KR
Norovirus Han River/GII/Sungnae/Jan03/2006/KOR	Norovirus Hu/GII/Seoul0537/2007/KR
	Norovirus Hu/GII/Seoul05 38/2007/KR
Norovirus Han River/GII/Sungnae/Mar01/2006/KOR	Norovirus Hu/GII/Seoul0539/2007/KR
	Norovirus Hu/GII/Seoul0540/2007/KR
Norovirus Han River/GII/Sungnae/Mar02/2006/KOR	Norovirus Hu/GII/Seoul0541/2007/KR
	Norovirus Hu/GII/Seoul0542/2007/KR
Norovirus Han River/GII/Sungnae/Mar03/2006/KOR	Norovirus Hu/GII/Seoul0543/2007/KR
	Norovirus Hu/GII/Seoul0544/2007/KR
Norovirus Han River/GII/Sungnae/MayO1/2006/KOR	Norovirus Hu/GII/Seoul0545/2007/KR
	Norovirus Hu/GII/Seoul0546/2007/KR
Norovirus Han River/GII/Sungnae/May02/2006/KOR	Norovirus Hu/GII/Seoul0547/2007/KR
	Norovirus Hu/GII/Seoul0548/2007/KR
Norovirus Han River/GII/Sungnae/OctO1/2005/KOR	Norovirus Hu/GII/Seoul0549/2007/KR
	Norovirus Hu/GII/Seoul0550/2007/KR
Norovirus Han River/GII/Wangsuk/AprO1/2006/KOR	Norovirus Hu/GII/Seoul055 1/2008/KR
	Norovirus Hu/GII/Seoul0552/2007/KR
Norovirus Han River/GII/Wangsuk/Apr02/2006/KOR	Norovirus Hu/GII/SewCCI/Caracas/2007/VEN
	Norovirus Hu/GII/SewCI/2007/VEN
Norovirus Han River/GII/Wangsuk/Apr03/2006/KOR	Norovirus Hu/GII/SewCIX/Caracas/2008/VEN
	Norovirus Hu/GII/SewIvicI/Caracas/2007/VEN
Norovirus Han River/GII/Wangsuk/AugO1/2005/KOR	Norovirus Hu/GII/SewVill/Caracas/2007/VEN
	Norovirus Hu/GII/SH18/2005/CA
Norovirus Han River/GII/Wangsuk/Aug02/2005/KOR	Norovirus Hu/GII/SH19/2005/CA
	Norovirus Hu/GII/SH20/2005/CA
Norovirus Han River/GII/Wangsuk/JanO1/2006/KOR	Norovirus Hu/GII/SH23/2005/CA
	Norovirus Hu/GII/SH24/2005/CA
Norovirus Han River/GII/Wangsuk/Jan02/2006/KOR	Norovirus Hu/GII/SH25/2005/CA
	Norovirus Hu/GII/SH26/2005/CA
Norovirus Han River/GII/Wangsuk/Jan03/2006/KOR	Norovirus Hu/GII/SH27/2005/CA
	Norovirus Hu/GII/SH28/2005/CA
Norovirus Han River/GII/Wangsuk/MarO1/2006/KOR	Norovirus Hu/GII/SH29/2005/CA
	Norovirus Hu/GII/SH30/2005/CA
Norovirus Han River/GII/Wangsuk/MayO1/2006/KOR	Norovirus Hu/GII/SH31/2005/CA
	Norovirus Hu/GII/SH32/2005/CA
Norovirus Han River/GII/Wangsuk/May02/2006/KOR	Norovirus Hu/GII/Shandong/TQ24/China
	Norovirus Hu/GII/Shandong/TQ3/China
Norovirus Han River/GII/Wangsuk/OctO1/2005/KOR	Norovirus Hu/GII/Shandong/TQ33/China
	Norovirus Hu/GII/Shandong/TQ36/China
Norovirus Han River/GII/Wangsuk/Oct02/2005/KOR	Norovirus Hu/GII/Shandong/TQ8/China
	Norovirus Hu/GII/Shandong/TR2 8/China
Norovirus Han River/GII/Wangsuk/Oct03/2005/KOR	Norovirus Hu/GII/Shandong/TR86/China
	Norovirus Hu/GII/Shandong/TR8 8/China
Norovirus Hu/5032/2001/Bra	Norovirus Hu/GII/Shandong/TR92/China
Norovirus Hu/5037/2001/Bra	Norovirus Hu/GII/Shandong/TT 138/China
Norovirus Hu/5046/2001/Bra	Norovirus Hu/GII/Shandong/TT 147/China
Norovirus Hu/5049/2001/Bra	Norovirus Hu/GII/Shandong/TT 170/China
Norovirus Hu/5095/2001/Bra	Norovirus Hu/GII/Shandong/TT 19/China

Norovirus Hu/51 12/2001/Bra	Norovirus Hu/GII/Shandong/TT 197/China
Norovirus Hu/51 18/2001/Bra	Norovirus Hu/GII/Shandong/TT37/China
Norovirus Hu/Billings/2006/USA	Norovirus Hu/GII/Shandong/TT40/China
Norovirus Hu/CL-CS/2006/USA	Norovirus Hu/GII/Shandong/TT50/China
Norovirus Hu/Cumberland/2004/USA	Norovirus Hu/GII/Shandong/TT62/China
Norovirus Hu/Duan/Beijing/2006/China	Norovirus Hu/GII/Shandong/TT66/China
Norovirus Hu/FL04/2004/USA	Norovirus Hu/GII/Shandong/TT7/China
Norovirus Hu/G2/1737/2006 **/BRA**	Norovirus Hu/GII/Shandong/TT89/China
Norovirus Hu/G2/2 762/2**006/BRA**	Norovirus Hu/GII/Shandong/TT99/China
Norovirus Hu/G2/2810/2006 **/BPvA**	Norovirus Hu/GII/Shizuoka/2005/JP
Norovirus Hu/G2/9 16/2**006/BRA**	Norovirus Hu/GII/Sinaloa/Mexico/M 1/2007
Norovirus Hu/G2/Fin-Beng/1 998/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NVl/2006
Norovirus Hu/G2/Fin-Hank/2003/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NVl 0/2007
Norovirus Hu/G2/Fin-Jana/2002/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NVl 1/2007
Norovirus Hu/G2/Fin-Keur2/1 998/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NV12/2007
Norovirus Hu/G2/Fin-Korp/2002/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NVl 3/2007
Norovirus Hu/G2/Fin-Nauv/2003/Finland	Norovims Hu/GII/Sinaloa/Mexico/NVl 6/2007
Norovirus Hu/G2/Fin-Pyha/2000/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NVl 7/2007
Norovirus Hu/G2/Fin-Pyha2/2000/Finland	Norovirus Hu/GII/Sinaloa/Mexico/N V 19/2007
Norovirus Hu/G2/Fin-Savi/ 1999/Finland	Norovirus Hu/GII/Sinaloa/Mexico/NV2/2007
Norovirus Hu/GA04/2004/USA	Norovirus Hu/GII/Sinaloa/Mexico/NV20/2006
Norovirus Hu/GCanyon/2002/USA	Norovirus Hu/GII/Sinaloa/Mexico/NV20/2007
Norovirus Hu/GGI/Hamburg/744/2008/DEU	Norovirus Hu/GII/Sinaloa/Mexico/NV2 1/2007
Norovirus Hu/GGII/New Delhi/209/01/IND	Norovirus Hu/GII/Sinaloa/Mexico/NV22/2007
Norovirus Hu/GGII/NL19990014/1999/NL	Norovirus Hu/GII/Sinaloa/Mexico/NV23/2007
Norovirus Hu/GGII/NL20000047/2000/NL	Norovirus Hu/GII/Sinaloa/Mexico/NV24/2007
Norovirus Hu/GII.ne/Gothenburg/2005/SWE	Norovirus Hu/GII/Sinaloa/Mexico/NV25/2007
Norovirus Hu/**GII**/l/JPN	Norovirus Hu/GII/Sinaloa/Mexico/NV3/2007
Norovirus Hu/**GII**/10/JPN	Norovirus Hu/GII/Sinaloa/Mexico/NV4/2007
Norovirus Hu/GII/10015/2004/BRA	Norovirus Hu/GII/Sinaloa/Mexico/NV5/2007
Norovirus Hu/GII/10070/2004/BRA	Norovirus Hu/GII/Sinaloa/Mexico/NV6/2007
Norovirus Hu/GII/10076/2004/BRA	Norovirus Hu/GII/Sinaloa/Mexico/NV9/2007
Norovirus Hu/GII/10079/2004/BRA	Norovirus Hu/GII/Sinsiro/97/JP
Norovirus Hu/GII/101/JPN	Norovirus Hu/GII/SL4452/2005/Arg
Norovirus Hu/GII/103/JPN	Norovirus Hu/GII/Sofia 166/2007/BGR
Norovirus Hu/GII/106/JPN	Norovirus Hu/GII/Sofia663/2007/BGR
Norovirus Hu/GII/10B/2004/South Korea	Norovirus Hu/GII/St Petersburg/6296/2006/RUS
Norovirus **Hu/GII**/l 1/JPN	Norovirus Hu/GII/St Petersburg/9092/2006/RUS
Norovirus Hu/GII/1 10/JPN	Norovirus Hu/GII/St Petersburg/9 102/2006/RUS
Norovirus Hu/GII/1 l 1/JPN	Norovirus Hu/GII/Stavanger/285 1/2002/NOR
Norovirus Hu/GII/1 12/JPN	Norovirus Hu/GII/T4/JPN
Norovirus Hu/GII/114/JPN	Norovirus Hu/GII/Tahara/04/JP
Norovirus Hu/GII/1 15/JPN	Norovirus Hu/GII/TF4618/2006/Arg
Norovirus Hu/GII/1 18/JPN	Norovirus Hu/GII/Tianjin/l/2008/CHN
Norovirus Hu/GII/1 1B/2004/South Korea	Norovirus Hu/GII/Tianjin/5 10/2009/CHN
Norovirus Hu/GII/1 2/JPN	Norovirus Hu/GII/Tianjin/53/2008/CHN
Norovirus Hu/GII/1 27/JPN	Norovirus Hu/GII/Toronto/SK/2002/CAN
Norovirus Hu/GII/1 3l/2004/HK	Norovirus Hu/GII/Toronto/SK/2005/CAN
Norovirus Hu/GII/1 329/2006/Ghana	Norovirus Hu/GII/Toyama/ l06/2007/JP
Norovirus Hu/GII/1 333/2006/Ghana	Norovirus Hu/GII/Toyama/ l08/2007/JP
Norovirus Hu/GII/1 36/JPN	Norovirus Hu/GII/Toyama/ l 14/2007/JP
Norovirus Hu/GII/1 364/2006/Ghana	Norovirus Hu/GII/Toyama/ 115/2007/JP
Norovirus Hu/GII/1 367/2006/Ghana	Norovirus Hu/GII/Toyama/409/2006/JP
Norovirus Hu/GII/1 407/2006/Ghana	Norovirus Hu/GII/Toyama/52/2007/JP
Norovirus Hu/GII/1 43/JPN	Norovims Hu/GII/Toyama/54/2007/JP

Norovirus Hu/GII/1443/2006/Ghana	Norovirus Hu/GII/Toyama/55/2007/JP
Norovirus Hu/GII/147/JPN	Norovirus Hu/GII/Toyama/56/2007/JP
Norovirus Hu/GII/148/JPN	Norovirus Hu/GII/Toyama/58/2007/JP
Norovirus Hu/GII/1495/2006/Ghana	Norovirus Hu/GII/Toyama/59/2007/JP
Norovirus Hu/GII/15/JPN	Norovirus Hu/GII/Toyama/60/2007/JP
Norovirus Hu/GII/150/JPN	Norovirus Hu/GII/Toyama/61/2007/JP
Norovirus Hu/GII/1517/2006/Ghana	Norovinis Hu/GII/Toyama/64/2007/JP
Norovirus Hu/GII/153/JPN	Norovii-us Hu/GII/Toyama/93/2007/JP
Norovirus Hu/GII/1559/2006/Ghana	Norovirus Hu/GII/Toyama/98/2007/JP
Norovirus Hu/GII/156/JPN	Norovirus Hu/GII/Toyama/99/2007/JP
Norovirus Hu/GII/1566/2006/Ghana	Norovirus Hu/GII/Tromso/4266/2003/NOR
Norovirus Hu/GII/161/JPN	Norovirus Hu/GII/Tromso/4398/2002/NOR
Norovirus Hu/GII/17/JPN	Norovirus Hu/GII/Tromso/4469/2003/NOR
Norovirus Hu/GII/173/JPN	Norovirus Hu/GII/TSPC 18/2006/Botswana
Norovirus Hu/GII/174/JPN	Norovirus Hu/GII/TSPC 19/2006/Botswana
Norovirus Hu/GII/175/JPN	Norovirus Hu/GII/TSPC22/2006/Botswana
Norovirus Hu/GII/177/JPN	Norovirus Hu/GII/TSPC29/2006/Botswana
Norovirus Hu/GII/195/JPN	Norovirus Hu/GII/Tynset/41 17/2003/NOR
Norovirus Hu/GII/196/JPN	Norovirus Hu/GII/Tyumen/9825/2006/RUS
Norovirus Hu/GII/197/JPN	Norovirus Hu/GII/Tyumen/9830/2006/RUS
Norovirus Hu/GII/lB/2004/South Korea	Norovirus Hu/GII/UE/200307- 1/2007/SGP
Norovirus Hu/GII/2002/2064/Moscow/RUS	Norovirus Hu/GII/UE/200307-2/2007/SGP
Norovirus Hu/GII/2002/2325/Moscow/RUS	Norovirus Hu/GII/UE/200307-3/2007/SGP
Norovirus Hu/GII/2003/3464/Moscow/RUS	Norovirus Hu/GII/UE/230 107- 1/2007/SGP
Norovirus Hu/GII/2003/3 60 1/Moscow/RUS	Norovirus Hu/GII/UE/230 107-2/2007/SGP
Norovirus Hu/GII/2005/5 844/Moscow/RUS	Norovirus Hu/GII/UE/230207- 1/2007/SGP
Norovirus	Norovirus Hu/GII/UE/230207-2/2007/SGP
Hu/GII/2005/6082/Chelyabinsk/RUS	Norovirus Hu/GII/UE/230207-3/2007/SGP
Norovirus Hu/GII/2005/6297/St.	Norovirus Hu/GII/UE/240407- 1/2007/SGP
Petersburg/RUS	Norovirus Hu/GII/UE/240407-2/2007/SGP
Norovirus Hu/GII/2005/6300/St.	Norovirus Hu/GII/UE/270607- 1/2007/SGP
Petersburg/RUS	Norovirus Hu/GII/UE/270607-2/2007/SGP
Norovirus Hu/GII/2005/6315/St.	Norovirus Hu/GII/UE/270607-3/2007/SGP
Petersburg/RUS	Norovirus Hu/GII/UE/290507- 1/2007/SGP
Norovirus Hu/GII/2005/6316/St.	Norovirus Hu/GII/UE/290507-2/2007/SGP
Petersburg/RUS	Norovirus Hu/GII/UE/290507-3/2007/SGP
Norovirus Hu/GII/2005/6336/Moscow/RUS	Norovirus Hu/GII/US/2003 07-1 /2007/SGP
Norovirus Hu/GII/2005/63 73/Moscow/RUS	Norovirus Hu/GII/US/2003 07-2/2007/SGP
Norovirus Hu/GII/2005/6442/Nizhny	Norovirus Hu/GII/US/2003 07-3/2007/SGP
Novgorod/RUS	Norovirus Hu/GII/US/230 107- 1/2007/SGP
Norovirus Hu/GII/2005/6451/Nizhny	Norovirus Hu/GII/US/23 0107-2/2007/SGP
Novgorod/RUS	Norovirus Hu/GII/US/23 0207- 1/2007/SGP
Norovirus Hu/GII/2005/6455/Nizhny	Norovirus Hu/GII/US/230207-2/2007/SGP
Novgorod/RUS	Norovirus Hu/GII/US/230207-3/2007/SGP
Norovirus Hu/GII/2005/6457/Nizhny	Norovirus Hu/GII/US/240407- 1/2007/SGP
Novgorod/RUS	Norovirus Hu/GII/US/240407-2/2007/SGP
Norovirus Hu/GII/2005/6463/Nizhny	Norovirus Hu/GII/US/270607/2007/SGP
Novgorod/RUS	Norovirus Hu/GII/US/290507-l/2007/SGP
Norovirus	Norovirus Hu/GII/US/2905 07-2/2007/SGP
Hu/GII/2005/6640/Chelyabinsk/RUS	Norovirus Hu/GII/Vagedalen/3 14/2004/NOR
Norovirus	Norovirus Hu/GII/VN10/2002/VNM
Hu/GII/2005/6655/Chelyabinsk/RUS	Norovirus Hu/GII/VN190/2002/VNM
Norovirus	Norovirus Hu/GII/VN207/2003/VNM
Hu/GII/2005/6667/Chelyabinsk/RUS	Norovirus Hu/GII/VN3/2002/VNM
Norovirus	Norovirus Hu/GII/VN433/2003/VNM

Hu/GII/2005/6670/Chelyabinsk/RUS	Norovirus Hu/GII/VN799/2003/VNM
Norovirus	Norovirus Hu/GII/VN800/2003/VNM
Hu/GII/2005/667 1/Chelyabinsk/RUS	Norovirus Hu/GII/VN862/2003/VNM
Norovirus	Norovirus Hu/GII/VN915/2003/VNM
Hu/GII/2005/6672/Chelyabinsk/RUS	Norovirus Hu/GII/VN981/2003/VNM
Norovirus	Norovirus Hu/GII/Water-A/2004/South Korea
Hu/GII/2005/6675/Chelyabinsk/RUS	Norovirus Hu/GII/Water-B/2004/South Korea
Norovirus	Norovirus Hu/GII/Yamaguchi/2003/JP
Hu/GII/2005/6727/Chelyabinsk/RUS	Norovirus Hu/GII/Yamaguchi/2005/JP
Norovirus	Norovirus Hu/Gunma/l/GII/JP
Hu/GII/2005/6733/Chelyabinsk/RUS	Norovirus Hu/Gunma/2/GII/JP
Norovirus	Norovirus Hu/Gunma/6/GII/JP
Hu/GII/2005/6742/Chelyabinsk/RUS	Norovirus Hu/Houston/1995/USA
Norovirus	Norovirus Hu/Lonaconing/2001/USA
Hu/GII/2005/6743/Chelyabinsk/RUS	Norovirus Hu/Mashhadl/GGII/Iran
Norovirus	Norovirus Hu/Mashhad2/GGII/Iran
Hu/GII/2005/6808/Chelyabinsk/RUS	Norovirus Hu/Mashhad3/GGII/Iran
Norovirus	Norovirus Hu/Minato/N 1/1 0/99/JP
Hu/GII/2005/6894/Chelyabinsk/RUS	Norovirus Hu/Minato/N 1/14/99/JP
Norovirus Hu/GII/2005/7 137/Moscow/RUS	Norovirus Hu/Minato/N 1/3 3/99/JP
Norovirus Hu/GII/2005/7579/Moscow/RUS	Norovirus Hu/Minato/N 1/6/99/JP
Norovirus Hu/GII/2005/75 86/Moscow/RUS	Norovirus Hu/Mississip/2006/USA
Norovirus Hu/GII/2005/7594/Moscow/RUS	Norovirus Hu/MT01/2006/USA
Norovirus Hu/GII/2005/7601/Nizhny	Norovirus Hu/NLV/GII/Neustrelitz260/2000/DE
Novgorod/RUS	Norovirus Hu/NLV/II/Hualien/DY/2003/TW
Norovirus Hu/GII/2005/7679/Nizhny	Norovirus Hu/NLV/VannesLl 69/2000/France
Novgorod/RUS	Norovirus Hu/OSD-CS/2006/USA
Norovirus Hu/GII/2005/7718/Moscow/RUS	Norovirus Hu/Pune/OPDO 1/2007/India
Norovirus Hu/GII/2005/7725/Moscow/RUS	Norovirus Hu/Pune/OPD02/2007/India
Norovirus Hu/GII/2005/7748/Moscow/RUS	Norovirus Hu/Pune/OPD03/2007/India
Norovirus Hu/GII/2005/7749/Moscow/RUS	Norovirus Hu/QM2-CS/2004/USA
Norovirus Hu/GII/2005/7764/Moscow/RUS	Norovirus Hu/Richmond/1994/USA
Norovirus Hu/GII/2005/7821/Odessa/RUS	Norovirus Hu/Ryndam/2005/USA
Norovirus	Norovirus Hu/Warren/2002/USA
Hu/GII/2005/8093/Chelyabinsk/RUS	Norovirus NV/GII/Chiba 1/2004/JP
Norovirus Hu/GII/2005/8159/St.	Norovims NV/GII/Shizuoka3 1/2005/JP
Petersburg/RUS	Norovims NV/GII/Yamaguchi 13/2005/JP
Norovirus Hu/GII/2005/8162/St.	Norovims NV/GII/Yamaguchi 17/2003/JP
Petersburg/RUS	Norovims NV/GII/Yamaguchi 18/2004/JP
Norovirus Hu/GII/2005/8254/Nizhny	Norovims NV/GII/Yamaguchi2 1/2004/JP
Novgorod/RUS	Norovims NV/GII/Yamaguchi25/2005/JP
Norovirus Hu/GII/2005/8256/Nizhny	Norovims NV/GII/Yamaguchi9/2003/JP
Novgorod/RUS	Norovims NVA1
Norovirus	Norovims NVA3
Hu/GII/2005/8433/Chelyabinsk/RUS	Norovims NVM2
Norovirus Hu/GII/2006/1 0584/Moscow/RUS	Norovims NVM3
Norovirus Hu/GII/2006/8292/Moscow/RUS	Norovims NVM5
Norovirus Hu/GII/2006/8791/Tyumen/RUS	Norovims NVN1
Norovirus	Norovims NVN2
Hu/GII/2006/9442/Chelyabinsk/RUS	Norovims NVN3
Norovirus	Norovims NVN5
Hu/GII/2006/9563/Chelyabinsk/RUS	Norovims NVNOV1
Norovirus	Norovims NVNOV4
Hu/GII/2006/9607/Chelyabinsk/RUS	Norovims NV03
Norovirus Hu/GII/2006/9895/St.	Norovims NV05

Petersburg/RUS	Norovirus oyster A clone 2/GGII.2/2006/NLD
Norovirus	Norovirus oyster/cultured/GII/Is/Dec05/05/JP
Hu/GII/2006/9942/Makhachkala/RUS	Norovirus oyster/cultured/GII/ISDec05b/05/JP
Norovirus	Norovirus oyster/cultured/GII/ISDec05d/05/JP
Hu/GII/2007/1 1976/Chelyabinsk/RUS	Norovirus oyster/cultured/GII/ISJan06a/06/JP
Norovirus Hu/GII/204/JPN	Norovirus oyster/cultured/GII/ISJan06b/06/JP
Norovirus Hu/GII/209/JPN	Norovirus oyster/cultured/GII/ISJan06c/06/JP
Norovirus Hu/GII/21/JPN	Norovirus oyster/cultured/GII/ISJan06d/06/JP
Norovirus Hu/GII/2 10/JPN	Norovirus oyster/cultured/GII/ISJan06e/06/JP
Norovirus Hu/GII/2 13/JPN	Norovirus oyster/cultured/GII/ISMar06a/06/JP
Norovirus Hu/GII/224/JPN	Norovirus oyster/cultured/GII/ISMar06b/06/JP
Norovirus Hu/GII/229/JPN	Norovirus oyster/cultured/GII/MAApr05a/05/JP
Norovirus Hu/GII/233/JPN	Norovirus oyster/cultured/GII/MAApr05b/05/JP
Norovirus Hu/GII/234/JPN	Norovirus oyster/cultured/GII/MADec05a/05/JP
Norovirus Hu/GII/235/JPN	Norovirus oyster/cultured/GII/MADec05b/05/JP
Norovirus Hu/GII/2 36/JPN	Norovirus oyster/cultured/GII/MAFeb05/05/JP
Norovirus Hu/GII/237/JPN	Norovirus oyster/cultured/GII/MAJan06c/06/JP
Norovirus Hu/GII/239/JPN	Norovirus oyster/cultured/GII/MAJan06d/06/JP
Norovirus Hu/GII/241/JPN	Norovims oyster/cultured/GII/MAJan06f/06/JP
Norovirus Hu/GII/25 1/JPN	Norovirus oyster/cultured/GII/MAMar05a/05/JP
Norovirus Hu/GII/25 6/JPN	Norovirus oyster/cultured/GII/MAMar05b/05/JP
Norovirus Hu/GII/2 60/JPN	Norovirus oyster/cultured/GII/MAMar05d/05/JP
Norovirus Hu/GII/268/JPN	Norovirus oyster/cultured/GII/MAMar05f/05/JP
Norovirus Hu/GII/27/JPN	Norovirus oyster/cultoed/GII/MAMar06a/06/JP
Norovirus Hu/GII/2 76/JPN	Norovirus oyster/cultured/GII/MAMar06b/06/JP
Norovirus Hu/GII/277/JPN	Norovirus oyster/cultured/GII/MAMar06c/06/JP
Norovirus Hu/GII/28/JPN	Norovirus oyster/cultured/GII/MAMar06e/06/JP
Norovirus Hu/GII/281/2006/HKG	Norovirus oyster/cultured/GII/ON/Dec05/05/JP
Norovirus Hu/GII/2 81/JPN	Norovirus oyster/cultured/GII/ON/Jan06/06/JP
Norovirus Hu/GII/2 83/JPN	Norovirus oyster/GII/Aomori/ 1-1/03/JP
Norovirus Hu/GII/2 88/JPN	Norovirus oyster/GII/Aomori/ 1-2/03/JP
Norovirus Hu/GII/290/JPN	Norovirus oyster/GII/Aomori/l-3/03/JP
Norovirus Hu/GII/292/JPN	Norovirus oyster/GII/Aomori/ 1-4/03/JP
Norovirus Hu/GII/293/JPN	Norovirus oyster/GII/Aomori/ 10-1/03/JP
Norovirus Hu/GII/299/JPN	Norovirus oyster/GII/Aomori/ 10-2/03/JP
Norovirus Hu/GII/2B/2004/South Korea	Norovirus oyster/GII/Aomori/1 1-3/04/JP
Norovirus Hu/GII/3/8165/2004/BRA	Norovirus oyster/GII/Aomori/ 12-1/04/JP
Norovirus Hu/GII/300/JPN	Norovirus oyster/GII/Aomori/ 12-2/04/JP
Norovirus Hu/GII/304/JPN	Norovirus oyster/GII/Aomori/ 13-1/04/JP
Norovirus Hu/GII/3 13/JPN	Norovirus oyster/GII/Aomori/ 13-2/04/JP
Norovirus Hu/GII/3 15/JPN	Norovirus oyster/GII/Aomori/ 13-3/04/JP
Norovirus Hu/GII/32/JPN	Norovirus oyster/GII/Aomori/1 8/02/JP
Norovirus Hu/GII/33/JPN	Norovirus oyster/GII/Aomori/2-3/03/JP
Norovirus Hu/GII/37/JPN	Norovirus oyster/GII/Aomori/3-3/03/JP
Norovirus Hu/GII/39/JPN	Norovirus oyster/GII/Aomori/4- 1/03/JP
Norovirus Hu/GII/3 B/2004/South Korea	Norovirus oyster/GII/Aomori/4-2/03/JP
Norovirus Hu/GII/4/1 0076/2004/BRA	Norovirus oyster/GII/Aomori/43/02/JP
Norovirus Hu/GII/4/1 0840/2005/BRA	Norovims oyster/GII/Aomori/5- 1/03/JP
Norovirus Hu/GII/4/10842/2005/BRA	Norovirus oyster/GII/Aomori/5-3/03/JP
Norovirus Hu/GII/4/9491/2004/BRA	Norovirus oyster/GII/Aomori/7- 1/03/JP
Norovirus Hu/GII/4/9546/2004/BRA	Norovirus oyster/GII/Aomori/7-2/03/JP
Norovirus Hu/GII/40 1/JPN	Norovirus oyster/GII/Aomori/7-3/03/JP
Norovirus Hu/GII/402/JPN	Norovirus oyster/GII/Aomori/8- 1/03/JP
Norovirus Hu/GII/403/JPN	Norovirus oyster/GII/Aomori/8-2/03/JP
Norovirus Hu/GII/404/JPN	Norovirus oyster/GII/FP55H/2004/CAN

Norovirus Hu/GII/407/JPN	Norovirus oyster/GII/FP68G/2004/CAN
Norovirus Hu/GII/410/JPN	Norovirus oyster/GII/FP69A/2004/CAN
Norovirus Hu/GII/41 1/JPN	Norovirus oyster/GII/Hiroshimacity/1 22/03/JP
Norovirus Hu/GII/41 3/JPN	Norovirus oyster/GII/Hiroshimacity/35/03/JP
Norovirus Hu/GII/41 9/JPN	Norovirus oyster/GII/Osakacity/15-3/02/JP
Norovirus Hu/GII/420/JPN	Norovirus oyster/GII/Osakacity/4-3/02/JP
Norovirus Hu/GII/427/JPN	Norovirus oyster/GII/Osakacity/OY05 1-2/02/JP
Norovirus Hu/GII/428/JPN	Norovirus oyster/GII/Osakacity/OY302-l/03/JP
Norovirus Hu/GII/430/JPN	Norovirus oyster/GII/Osakacity/OY3 19-1/03/JP
Norovirus Hu/GII/486/2004/HK	Norovirus oyster/GII/QingDao/CS327/China/2008
Norovirus Hu/GII/4B/2004/South Korea	Norovirus oyster/GII/Saitama/S3/03/JP
Norovirus Hu/GII/52/JPN	Norovirus oyster/GII/Saitama/S4/03/JP
Norovirus Hu/GII/53/JPN	Norovirus oyster/GII/Saitama/S5/03/JP
Norovirus Hu/GII/56/JPN	Norovirus oyster/GII/Saitama/S7-2/03/JP
Norovirus Hu/GII/57/JPN	Norovirus oyster/GII/Saitama/S7/03/JP
Norovirus Hu/GII/5B/2004/South Korea	Norovirus oyster/GII/Saitama/S 8/03/JP
Norovirus Hu/GII/6/8169/2004/BRA	Norovirus oyster/GII/Y amaguchi/24B/02/JP
Norovirus Hu/GII/67/JPN	Norovirus oyster/GII/Yamaguchi/24C/02/JP
Norovirus Hu/GII/6B/2004/South Korea	Norovirus oyster/GII/Y amaguchi/34A/03/JP
Norovirus Hu/GII/70/JPN	Norovirus oyster/GII/Y amaguchi/34C/03/JP
Norovirus Hu/GII/733/2006/HKG	Norovirus oyster/GII/Yamaguchi/3 8B/03/JP
Norovirus Hu/GII/74/JPN	Norovirus oyster/GII/Yamaguchi/3 8C/03/JP
Norovirus Hu/GII/75/JPN	Norovirus oyster/GII/Y amaguchi/43 A/03/JP
Norovirus Hu/GII/77/JPN	Norovirus oyster/GII/Y amaguchi/46A/03/JP
Norovirus Hu/GII/7886/2004/BRA	Norovirus oyster/GII/Yamaguchi/Hl 7-97B/05/JP
Norovirus Hu/GII/79/JPN	Norovirus oyster/GII/Yamaguchi/Hl 7-97C/05/JP
Norovirus Hu/GII/7B/2004/South Korea	Norovirus oyster/wild/GII/SSTlMar05b/05/JP
Norovirus Hu/GII/80/JPN	Norovirus oyster/wild/GII/SST 1Mar05c/05/JP
Norovirus Hu/GII/8040/2004/BRA	Norovirus oyster/wild/GII/SST lMar05e/05/JP
Norovirus Hu/GII/8 1/JPN	Norovirus oyster/wild/GII/SSTlMar05g/05/JP
Norovirus Hu/GII/8 165/2004/BRA	Norovirus oyster/wild/GII/SSTlMar05h/05/JP
Norovirus Hu/GII/8 169/2004/BRA	Norovirus oyster/wild/GII/SST 1Mar05i/05/JP
Norovirus Hu/GII/8 187/2004/BRA	Norovirus oyster/wild/GII/SST2Mar05a/05/JP
Norovirus Hu/GII/8 193/2004/BRA	Norovirus oyster/wild/GII/SST2Mar05b/05/JP
Norovirus Hu/GII/8 195/2004/BRA	Norovirus oyster/wild/GII/SST2Mar05i/05/JP
Norovirus Hu/GII/8 198/2004/BRA	Norovirus oyster/wild/GII/SST3Apr05a/05/JP
Norovirus Hu/GII/821 1/2004/BPvA	Norovirus oyster/wild/GII/SST3Apr05b/05/JP
Norovirus Hu/GII/83/JPN	Norovirus oyster/wild/GII/SST3Apr05c/05/JP
Norovirus Hu/GII/84/JPN	Norovirus oyster/wild/GII/SST3Apr05d/05/JP
Norovirus Hu/GII/8405/2004/BRA	Norovirus oyster/wild/GII/SST3Dec05a/05/JP
Norovirus Hu/GII/8489/2004/BRA	Norovirus oyster/wild/GII/SST3Dec05b/05/JP
Norovirus Hu/GII/85/JPN	Norovirus oyster/wild/GII/SST3Dec05 c/05/JP
Norovirus Hu/GII/86/JPN	Norovirus oyster/wild/GII/SST3Feb06a/06/JP
Norovirus Hu/GII/8618/2004/BRA	Norovirus oyster/wild/GII/SST3Feb06b/06/JP
Norovirus Hu/GII/8619/2004/BRA	Norovirus oyster/wild/GII/SST3Feb06d/06/JP
Norovirus Hu/GII/8626/2004/BRA	Norovirus oyster/wild/GII/SST3Feb06e/06/JP
Norovirus Hu/GII/8632/2004/BRA	Norovii-us oyster/wild/GII/SST3Feb06f/06/JP
Norovirus Hu/GII/8740/2004/BRA	Norovirus oyster/wild/GII/SST3Feb06g/06/JP
Norovirus Hu/GII/8B/2004/South Korea	Norovirus oyster/wild/GII/SST3Jan06a/06/JP
Norovirus Hu/GII/9/JPN	Norovirus oyster/wild/GII/SST3Jan06d/06/JP
Norovirus Hu/GII/90/JPN	Norovirus oyster/wild/GII/SST3Jan06e/06/JP
Norovirus Hu/GII/92/JPN	Norovirus oyster/wild/GII/SST3Jan06f/06/JP
Norovirus Hu/GII/9275/2004/BRA	Norovirus oyster/wild/GII/SST3Jan06g/06/JP
Norovirus Hu/GII/93/JPN	Norovirus oyster/wild/GII/SST3Jan06h/06/JP
Norovirus Hu/GII/94/JPN	Norovirus oyster/wild/GII/SST3Mar05a/05/JP

Norovirus Hu/GII/9475/2004/BRA	Norovirus oyster/wild/GII/SST3Mar05b/05/JP
Norovirus Hu/GII/949 1/2004/BRA	Norovirus oyster/wild/GII/SST3Mar05c/05/JP
Norovirus Hu/GII/9546/2004/BRA	Norovirus oyster/wild/GII/SST3Mar05d/05/JP
Norovirus Hu/GII/9547/2004/BRA	Norovirus oyster/wild/GII/SST3Mar05e/05/JP
Norovirus Hu/GII/97/JPN	Norovirus oyster/wild/GII/SST3Mar06b/06/JP
Norovirus Hu/GII/9739/2004/BRA	Norovirus oyster/wild/GII/SST3Mar06d/06/JP
Norovirus Hu/GII/9740/2004/BRA	Norovirus razor
Norovirus Hu/GII/9B/2004/South Korea	clam/GII/LaiZhou/LZ271/China/2008
Norovirus Hu/GII/AH040/2006/UK	Norovirus scallop/GII/RiZhao/RZ276/China/2008
Norovirus Hu/GII/AH050/2006/UK	Norovirus sewage/GII/Toyama/Apr/2006/JP
Norovirus Hu/GII/AH097/2006/UK	Norovirus sewage/GII/Toyama/Apr/2007/JP
Norovirus Hu/GII/AH 107/2006/UK	Norovirus sewage/GII/Toyama/Aug-4a/2006/JP
Norovirus Hu/GII/AH109/2006/UK	Norovirus sewage/GII/Toyama/Aug-6/2006/JP
Norovirus Hu/GII/AH1 87/2006/UK	Norovirus sewage/GII/Toyama/Aug/2007/JP
Norovirus Hu/GII/AH192/2006/UK	Norovirus sewage/GII/Toyama/Dec/2006/JP
Norovims Hu/GII/AH225/2006/UK	Norovirus sewage/GII/Toyama/Dec/2007/JP
Norovirus Hu/GII/AH387/2006/UK	Norovirus sewage/GII/Toyama/Feb/2007/JP
Norovirus Hu/GII/AH395/2006/UK	Norovirus sewage/GII/Toyama/Feb/2008/JP
Norovirus Hu/GII/AH397/2006/UK	Norovirus sewage/GII/Toyama/Jan/2007/JP
Norovirus Hu/GII/AH402/2006/UK	Norovirus sewage/GII/Toyama/Jan/2008/JP
Norovirus Hu/GII/AH406/2006/UK	Norovirus sewage/GII/Toyama/Jul-3/2006/JP
Norovirus Hu/GII/AH408/2006/UK	Norovirus sewage/GII/Toyama/Jul-4a/2006/JP
Norovirus Hu/GII/AH41 0/2006/UK	Norovirus sewage/GII/Toyama/Jul-4b/2006/JP
Norovirus Hu/GII/AH448/2007/UK	Norovirus sewage/GII/Toyama/Jul/2006/JP
Norovirus Hu/GII/AH509/2007/UK	Norovirus sewage/GII/Toyama/Jul/2007/JP
Norovirus Hu/GII/AH5 17/2007/UK	Norovirus sewage/GII/Toyama/Jun- 1/2006/JP
Norovirus Hu/GII/AH525/2007/UK	Norovirus sewage/GII/Toyama/Jun-2/2006/JP
Norovirus Hu/GII/AH55 1/2007/UK	Norovirus sewage/GII/Toyama/Jun-P 1/2006/JP
Norovirus Hu/GII/AH570/2007/UK	Norovirus sewage/GII/Toyama/Jun/2007/JP
Norovirus Hu/GII/AH57 1/2007/UK	Norovirus sewage/GII/Toyama/Mar/2007/JP
Norovirus Hu/GII/AH579/2007/UK	Norovirus sewage/GII/Toyama/Mar/2 008/JP
Norovii-us Hu/GII/AH590/2007/UK	Norovirus sewage/GII/Toyama/May/2006/JP
Norovirus Hu/GII/AH602/2007/UK	Norovirus sewage/GII/Toyama/May/2007/JP
Norovirus Hu/GII/AH604/2007/UK	Norovirus sewage/GII/Toyama/Nov/2006/JP
Norovirus Hu/GII/AH61 1/2007/UK	Norovirus sewage/GII/Toyama/Nov/2007/JP
Norovirus Hu/GII/AH612/2007/UK	Norovirus sewage/GII/Toyama/Oct- 14/2006/JP
Norovirus Hu/GII/AH61 6/2007/UK	Norovirus sewage/GII/Toyama/Oct/2006/JP
Norovirus Hu/GII/AH61 9/2007/UK	Norovirus sewage/GII/Toyama/Oct/2007/JP
Norovirus Hu/GII/AH623/2007/UK	Norovirus sewage/GII/Toyama/Sep-3/2006/JP
Norovirus Hu/GII/AH633/2007/UK	Norovirus sewage/GII/Toyama/Sep-4b/2006/JP
Norovirus Hu/GII/AH642/2007/UK	Norovirus sewage/GII/Toyama/Sep-7/2006/JP
Norovirus Hu/GII/AH643/2007/UK	Norovirus sewage/GII/Toyama/Sep/2007/JP
Norovirus Hu/GII/AH65 1/2007/UK	Norovirus spinach/GII/Hanam/2007/KOR
Norovirus Hu/GII/AH653/2007/UK	Norovirus sw/GII/CE-06-0036/2006/CAN
Norovirus Hu/GII/AH654/2007/UK	Norovirus sw/GII/CE-M-05-0047/2005/CAN
Norovirus Hu/GII/Algard/886/2001/NOR	Norovirus sw/GII/CE-M-05-0076/2005/CAN
Norovirus Hu/GII/AM39/2005/BRA	Norovirus sw/GII/CE-M-05-01 08/2005/CAN
Norovirus Hu/GII/Arrowparkl B/2008/UK	Norovirus sw/GII/CE-M-05-01 11/2005/CAN
Norovirus Hu/GII/Athlonel 1/2006/Botswana	Norovims sw/GII/CE-M-05-01 12/2005/CAN
Norovirus Hu/GII/Athlone24/2006/Botswana	Norovirus sw/GII/CE-M-05-0 l 16/2005/CAN
Norovirus Hu/GII/Athlone64/2006/Botswana	Norovirus sw/GII/CE-M-06-0003/2006/CAN
Norovirus Hu/GII/Athlone75/2006/Botswana	Norovirus sw/GII/CE-M-06-001 1/2006/CAN
Norovii-us Hu/GII/Athlone79/2006/Botswana	Norovirus sw/GII/CE-M-06-00 16/2006/CAN
Norovirus Hu/GII/BA452 1/2005/Arg	Norovirus sw/GII/CE-M-06-0020/2006/CAN
Norovirus Hu/GII/BC728/07-2007/CAN	Norovirus sw/GII/CE-M-06-0028/2006/CAN

Norovirus Hu/GII/BCCDC03008/2003/CAN	Norovirus swine/GII/MI-QW48/02/US
Norovirus Hu/GII/BCCDC0301 3/2003/CAN	Norovirus swine/GII/OH-QWl 01/03/US
Norovirus Hu/**GII**/BCCDC03020/2004/CAN	Norovirus swine/GII/OH-QW 125/03/US
Norovirus Hu/GII/BCCDC03 032/2003/CAN	Norovirus swine/GII/OH-QW 170/03/US
Norovirus Hu/GII/BCCDC04002/2004/CAN	Norovirus swine/GII/OH-QW2 18/03/US
Norovirus Hu/GII/BCCDC04006/2004/CAN	Norovirus swine/GII/rj 14008/2007/BRA
Norovirus Hu/GII/BCCDC04007/2004/CAN	Norovirus Sydney 22 12
Norovirus Hu/GII/BE/200307- 1/2007/SGP	Norovirus water/GII/Gy eonggi/Al 1/2002/KOR
Norovirus Hu/GII/BE/200307-2/2007/SGP	Norovirus water/GII/Gyeonggi/Al 2/2002/KOR
Norovirus Hu/**GII**/BE/2301 07-1/2007/SGP	Norovirus water/GII/Gy eonggi/Al 3/2003/KOR
Norovirus Hu/GII/BE/230 107-2/2007/SGP	Norovirus water/GII/Gy eonggi/Al 4/2003/KOR
Norovirus Hu/GII/BE/2301 07-3/2007/SGP	Norovirus water/GII/Gy eonggi/Al 5/2003/KOR
Norovirus Hu/GII/BE/230207-l/2007/SGP	Norovirus water/GII/Gy eonggi/A8/2 002/KOR
Norovirus Hu/GII/BE/230207-2/2007/SGP	Norovirus water/GII/Gy eonggi/A9/2 002/KOR
Norovirus Hu/GII/BE/230207-3/2007/SGP	Norovirus water/GII/Gy eonggi/H 12-1/2 002/KOR
Norovirus Hu/GII/BE/240407/2007/SGP	Norovirus water/GII/Gyeonggi/H12-2/2002/KOR
Norovirus Hu/GII/BE/270607-l/2007/SGP	Norovirus water/GII/Gy eonggi/H 13/2003/KOR
Norovirus Hu/GII/BE/270607-2/2007/SGP	Norovirus water/GII/Gyeonggi/H14/2003/KOR
Norovirus Hu/GII/BE/270607-3/2007/SGP	Norovirus water/GII/Gy eonggi/H 15/2003/KOR
Norovirus Hu/GII/BE/2905 07- 1/2007/SGP	Norovirus water/GII/Gyeonggi/H8/2002/KOR
Norovirus Hu/GII/BE/290507-2/2007/SGP	Norovirus water/GII/Gy eonggi/H9/2 002/KOR
Norovirus Hu/GII/BE/290507-3/2007/SGP	Norovirus water/GII/Gyeonggi/1 12/2 002/KOR
Norovirus Hu/GII/BE/290507-4/2007/SGP	Norovirus water/GII/Gyeonggi/I14/2003/KOR
Norovirus Hu/GII/Beijing/0 1/2004/CHN	Norovirus water/GII/Gy eonggi/Il 5/2003/KOR
Norovirus Hu/GII/Beij ing/06/2005/CHN	Norovirus water/GII/Gyeonggi/I5/2002/KOR
Norovirus Hu/GII/Beijing/07/2005/CHN	Norovirus water/GII/Gyeonggi/S 10/2002/KOR
Norovirus Hu/GII/Beijing/07/2006/CHN	Norovirus water/GII/Gyeonggi/Sl 1-1/2002/KOR
Norovirus Hu/GII/Beijing/lO/2005/CHN	Norovirus water/GII/Gyeonggi/Sl 1-2/2002/KOR
Norovirus Hu/GII/Beijing/lO/2006/CHN	Norovirus water/GII/Gyeonggi/S 12/2002/KOR
Norovirus Hu/GII/Beij ing/1 01/2005/CHN	Norovirus water/GII/Gyeonggi/S 14/2003/KOR
Norovirus Hu/GII/Beij ing/1 01/2007/CHN	Norovirus water/GII/Gyeonggi/S 15/2003/KOR
Norovirus Hu/GII/Beijing/1 02/2005/CHN	Norovirus water/GII/Gyeonggi/S4/2002/KOR
Norovirus Hu/GII/Beij ing/1 15/2004/CHN	Norovirus water/GII/Gyeonggi/S5/2002/KOR
Norovirus Hu/GII/Beij ing/1 16/2007/CHN	Norovirus water/GII/Gyeonggi/S8/2002/KOR
Norovirus Hu/GII/Beij ing/1 25/2007/CHN	Norovirus water/GII/Gyeonggi/S9/2002/KOR
Norovirus Hu/GII/Beij ing/1 27/2007/CHN	Norovirus Hu/GII/C3-040407/2007/SGP
Norovirus Hu/GII/Beij ing/1 33/2005/CHN	Norovirus Hu/GII/C4- 19/2005/KOR
Norovirus Hu/GII/Beij ing/1 33/2007/CHN	Norovims Hu/GII/C5-59/2006/KOR
Norovirus Hu/GII/Beij ing/1 39/2005/CHN	Norovirus Hu/GII/C6-39/2005/KOR
Norovirus Hu/GII/Beij ing/ 14/2006/CHN	Norovirus Hu/GII/C6-80/2006/KOR
Norovirus Hu/GII/Beij ing/1 48/2005/CHN	Norovirus Hu/GII/C7- 130/2005/KOR
Norovirus Hu/GII/Beij ing/1 48/2007/CHN	Norovirus Hu/GII/C7-171/2005/KOR
Norovirus Hu/GII/Beij ing/1 53/2005/CHN	Norovirus Hu/GII/C7-1 82/2005/KOR
Norovirus Hu/GII/Beij ing/1 56/2007/CHN	Norovirus Hu/GII/C7-2 12/2005/KOR
Norovirus Hu/GII/Beij ing/1 62/2007/CHN	Norovirus Hu/GII/C7-307/2006/KOR
Norovirus Hu/GII/Beij ing/1 65/2004/CHN	Norovirus Hu/GII/C7-394/2006/KOR
Norovirus Hu/GII/Beij ing/ 169/2005/CHN	Norovirus Hu/GII/Carlow/2002/Ire
Norovirus Hu/GII/Beij ing/1 75/2004/CHN	Norovirus Hu/GII/CE-M-05-0045/2005/C AN
Norovirus Hu/GII/Beij ing/1 78/2004/CHN	Norovirus Hu/GII/CE-Rl -06-027/2006/CAN
Norovirus Hu/GII/Beij ing/1 78/2005/CHN	Norovirus Hu/GII/Chelyabinsk/8020/2005/RUS
Norovirus Hu/GII/Beijing/19/2004/CHN	Norovirus Hu/GII/Chelyabinsk/803 1/2005/RUS
Norovirus Hu/GII/Beij ing/1 91/2005/CHN	Norovirus Hu/GII/Chelyabinsk/8361/2005/RUS
Norovirus Hu/GII/Beijing/1 96/2007/CHN	Norovirus Hu/GII/Chelyabinsk/8398/2005/RUS
Norovirus Hu/GII/Beij ing/ 197/2005/CHN	Norovirus Hu/GII/Chelyabinsk/891 9/2006/RUS
Norovirus Hu/GII/Beijing/208/2006/CHN	Norovirus Hu/GII/Chelyabinsk/941 8/2006/RUS

Norovirus Hu/GII/Beijing/2 15/2005/CHN	Norovirus Hu/GII/Chelyabinsk/9425/2006/RUS
Norovirus Hu/GII/Beijing/2 2 1/2005/CHN	Norovirus Hu/GII/Chelyabinsk/9459/2006/RUS
Norovirus Hu/GII/Beijing/228/2005/CHN	Norovirus Hu/GII/Chelyabinsk/947 1/2006/RUS
Norovirus Hu/GII/Beijing/229/2005/CHN	Norovirus Hu/GII/Chelyabinsk/9475/2006/RUS
Norovirus Hu/GII/Beijing/235/2006/CHN	Norovirus Hu/GII/Chelyabinsk/9479/2006/RUS
Norovirus Hu/GII/Beijing/248/2006/CHN	Norovirus Hu/GII/Chelyabinsk/9548/2006/RUS
Norovirus Hu/GII/Beijing/259/2005/CHN	Norovirus Hu/GII/Chiba/2004/JP
Norovirus Hu/GII/Beijing/26/2006/CHN	Norovirus Hu/GII/CL4006-l 309/2006/SGP
Norovirus Hu/GII/Beijing/262/2007/CHN	Norovirus Hu/GII/CL4007-l 409/2006/SGP
Norovirus Hu/GII/Beijing/266/2006/CHN	Norovirus Hu/GII/CL4008-l 309/2006/SGP
Norovirus Hu/GII/Beijing/27/2004/CHN	Norovirus Hu/GII/CL4009-l 309/2006/SGP
Norovirus Hu/GII/Beijing/2 7 1/2007/CHN	Norovirus Hu/GII/CL40 10-1 409/2006/SGP
Norovirus Hu/GII/Beijing/274/2005/CHN	Norovirus Hu/GII/CL4015-2909/2006/SGP
Norovirus Hu/GII/Beijing/275/2005/CHN	Norovirus Hu/GII/CL40 16-2909/2006/SGP
Norovirus Hu/GII/Beijing/275/2007	Norovirus Hu/GII/CL40 18-2909/2006/SGP
Norovirus Hu/GII/Beijing/277/2005/CHN	Norovirus Hu/GII/CL402 1-03 10/2006/SGP
Norovirus Hu/GII/Beijing/282/2005/CHN	Norovirus Hu/GII/CL4025-03 10/2006/SGP
Norovirus Hu/GII/Beijing/289/2005/CHN	Norovirus Hu/GII/CL4029-03 10/2006/SGP
Norovirus Hu/GII/Beijing/290/2007/CHN	Norovirus Hu/GII/CL403 1-061 0/2006/SGP
NoiOvinis Hu/GII/Beijing/30/2004/CHN	Norovirus Hu/GII/CL4033-061 0/2006/SGP
Norovirus Hu/GII/Beijing/300/2007/CHN	Norovirus Hu/GII/CL4035-061 0/2006/SGP
Norovirus Hu/GII/Beijing/303/2007/CHN	Norovirus Hu/GII/CL4056-l 110/2006/SGP
Norovirus Hu/GII/Beijing/307/2005/CHN	Norovirus Hu/GII/CL4095-2010/2006/SGP
Norovirus Hu/GII/Beijing/308/2005/CHN	Norovirus Hu/GII/CL4096-201 0/2006/SGP
Norovirus Hu/GII/Beijing/3 10/2007/CHN	Norovirus Hu/GII/CL4097-201 0/2006/SGP
Norovirus Hu/GII/Beijing/3 13/2007/CHN	Norovirus Hu/GII/CL4097-3 108/2006/SGP
Norovirus Hu/GII/Beijing/321/2007/CHN	Norovirus Hu/GII/CL4098-3 108/2006/SGP
Norovirus Hu/GII/Beijing/323/2007/CHN	Norovirus Hu/GII/CL4099-3 108/2006/SGP
Norovirus Hu/GII/Beijing/33/2006/CHN	Norovirus Hu/GII/CUHK3020/2008/HKG
Norovirus Hu/GII/Beijing/334/2007/CHN	Norovirus Hu/GII/CUHK3205/2008/HKG
Norovirus Hu/GII/Beijing/34/2006/CHN	Norovirus Hu/GII/CUHK32 14/2008/HKG
Norovirus Hu/GII/Beijing/352/2007/CHN	Norovirus Hu/GII/CUHK3229/2008/HKG
Norovirus Hu/GII/Beijing/3 52/2008	Norovirus Hu/GII/CUHK3286/2008/HKG
Norovirus Hu/GII/Beijing/357/2008	Norovirus Hu/GII/CUHK3 330/2008/HKG
Norovirus Hu/GII/Beijing/3 6 1/2007/CHN	Norovirus Hu/GII/CUHK33 83/2008/HKG
Norovirus Hu/GII/Beijing/362/2007/CHN	Norovirus Hu/GII/CUHK3452/2008/HKG
Norovirus Hu/GII/Beijing/371/2007/CHN	Norovirus Hu/GII/CUHK3469/2008/HKG
Norovirus Hu/GII/Beijing/374/2007/CHN	Norovirus Hu/GII/CUHK3497/2008/HKG
Norovirus Hu/GII/Beijing/375/2005/CHN	Norovirus Hu/GII/CUHK3540/2008/HKG
Norovirus Hu/GII/Beijing/377/2007/CHN	Norovirus Hu/GII/CUHK3578/2008/HKG
Norovirus Hu/GII/Beijing/38/2006/CHN	Norovirus Hu/GII/CUHK3723/2008/HKG
Norovirus Hu/GII/Beijing/39/2004/CHN	Norovirus Hu/GII/CUHK3895/2008/HKG
Norovirus Hu/GII/Beijing/398/2008	Norovirus Hu/GII/CUHK391 8/2008/HKG
Norovirus Hu/GII/Beijing/401/2005/CHN	Norovirus Hu/GII/CUHK3925/2008/HKG
Norovirus Hu/GII/Beijing/402/2005/CHN	Norovirus Hu/GII/CUHK407 1/2008/HKG
Norovirus Hu/GII/Beijing/430/2005/CHN	Norovirus Hu/GII/CUHK4372/2008/HKG
Norovirus Hu/GII/Beijing/439/2005/CHN	Norovirus Hu/GII/CUHK4389/2008/HKG
Norovirus Hu/GII/Beijing/45/2004/CHN	Norovirus Hu/GII/CUHK4577/2008/HKG
Norovirus Hu/GII/Beijing/45/2005/CHN	Norovirus Hu/GII/CUHK4636/2008/HKG
Norovirus Hu/GII/Beijing/455/2005/CHN	Norovirus Hu/GII/CUHK4785/2008/HKG
Norovirus Hu/GII/Beijing/46/2005/CHN	Norovirus Hu/GII/CUHK4844/2008/HKG
Norovirus Hu/GII/Beijing/466/2005/CHN	Norovirus Hu/GII/CUHK4850/2008/HKG
Norovirus Hu/GII/Beijing/479/2005/CHN	Norovirus Hu/GII/CUHK4870/2008/HKG
Norovirus Hu/GII/Beijing/48/2005/CHN	Norovirus Hu/GII/CUHK4877/2008/HKG
Norovirus Hu/GII/Beijing/48/2007/CHN	Norovirus Hu/GII/CUHK5054/2008/HKG

Norovirus Hu/GII/Beijing/484/2005/CHN	Norovirus Hu/GII/CUHK5079/2008/HKG
Norovirus Hu/GII/Beijing/49/2007/CHN	Norovirus Hu/GII/CUHK5 120/2008/HKG
Norovirus Hu/GII/Beijing/492/2005/CHN	Norovirus Hu/GII/CUHK5200/2008/HKG
Norovirus Hu/GII/Beijing/493/2005/CHN	Norovirus Hu/GII/CUHK5324/2008/HKG
Norovirus Hu/GII/Beijing/495/2005/CHN	Norovirus Hu/GII/CUHK5330/2008/HKG
Norovirus Hu/GII/Beijing/496/2005/CHN	Norovirus Hu/GII/CUHK5355/2008/HKG
Norovirus Hu/GII/Beijing/498/2005/CHN	Norovirus Hu/GII/CUHK5550/2008/HKG
Norovirus Hu/GII/Beijing/509/2005/CHN	Norovirus Hu/GII/CUHK5573/2008/HKG
Norovirus Hu/GII/Beijing/5 18/2005/CHN	Norovirus Hu/GII/CUHK5761/2008/HKG
Norovirus Hu/GII/Beijing/55/2004/CHN	Norovirus Hu/GII/CUHK5 8 15/2008/HKG
Norovirus Hu/GII/Beijing/57/2005/CHN	Norovirus Hu/GII/CUHK5822/2008/HKG
Norovirus Hu/GII/Beijing/5 89/2008	Norovirus Hu/GII/CUHK5987/2008/HKG
Norovirus Hu/GII/Beijing/63/2007/CHN	Norovirus Hu/GII/CUHK6075/2008/HKG
Norovirus Hu/GII/Beijing/66/2005/CHN	Norovirus Hu/GII/CUHK6202/2008/HKG
Norovirus Hu/GII/Beijing/7 1/2007/CHN	Norovirus Hu/GII/CUHK6252/2008/HKG
Norovirus Hu/GII/Beijing/74/2004/CHN	Norovirus Hu/GII/CUHK6346/2008/HKG
Norovirus Hu/GII/Beijing/74/2007/CHN	Norovirus Hu/GII/CUHK64 12/2008/HKG
Norovirus Hu/GII/Beijing/79/2004/CHN	Norovirus Hu/GII/CUHK6501/2008/HKG
Norovirus Hu/GII/Beijing/82/2004/CHN	Norovirus Hu/GII/CUHK65 18/2008/HKG
Norovirus Hu/GII/Beijing/88/2004/CHN	Norovirus Hu/GII/CUHK6581/2008/HKG
Norovirus Hu/GII/Beijing/90/2004/CHN	Norovirus Hu/GII/CUHK6766/2008/HKG
Norovirus Hu/GII/Beijing/95/2005/CHN	Norovirus Hu/GII/E-090507/2007/SGP
Norovirus Hu/GII/Beijing/96/2007/CHN	Norovirus Hu/GII/E-1 40307/2007/SGP
Norovirus Hu/GII/Bergen/7 105/2002/NOR	Norovims Hu/GII/Ehime/2005/JP
Norovirus Hu/GII/BHL44/2000/Botswana	Norovirus Hu/GII/Elverum/4 167/2003/NOR
Norovirus Hu/GII/Brisbane/0 1/2004/AU	
Norovirus Hu/GII/BS/200307-l/2007/SGP	
Norovirus Hu/GII/BS/200307-2/2007/SGP	
Norovirus Hu/GII/BS/230107-l/2007/SGP	
Norovirus Hu/GII/BS/230107-2/2007/SGP	
Norovirus Hu/GII/BS/230207/2007/SGP	
Norovirus Hu/GII/BS/240407-l/2007/SGP	
Norovirus Hu/GII/BS/240407-2/2007/SGP	
Norovirus Hu/GII/BS/270607-l/2007/SGP	
Norovirus Hu/GII/BS/270607-2/2007/SGP	
Norovirus Hu/GII/BS/290507-l/2007/SGP	
Norovirus Hu/GII/BS/290507-2/2007/SGP	
Norovirus Hu/GII/Cl-01 1106/2006/SGP	
Norovirus Hu/GII/C 1-040706/2006/SGP	
Norovirus Hu/GII/C 1- 111206/2006/SGP	
Norovirus Hu/GII/C 1- 120/2006/KOR	
Norovirus Hu/GII/C 1- 143/2006/KOR	
Norovirus Hu/GII/C 1- 144/2006/KOR	
Norovirus Hu/GII/C 1- 149/2006/KOR	
Norovirus Hu/GII/C 1- 150806/2006/SGP	
Norovirus Hu/GII/C 1- 180706/2006/SGP	
Norovirus Hu/GII/C 1-201 106/2006/SGP	
Norovirus Hu/GII/C 1-220606/2006/SGP	
Norovirus Hu/GII/C 1-240706/2006/SGP	
Norovirus Hu/GII/C 1-263/2006/KOR	
Norovirus Hu/GII/C 1-271 206/2006/SGP	
Norovirus Hu/GII/C 1-307/2005/KOR	
Norovirus Hu/GII/C2-230507/2007/SGP	
Norovirus Hu/GII/C2-55/2006/KOR	
Norovirus genogroup GII.l	

Norovirus env/GGI.2/958/2007/ITA Norovirus Hu/GII-l/FNl-Newc/2006/UK Norovirus Hu/GII-12/Inba/060839/2006/JP Norovirus Hu/GII.l/03155665/2003/AUS Norovirus Hu/GII.1/041 13024/2004/AUS Norovirus Hu/GII.1/041 13825/2004/AUS Norovirus Hu/GII.1/041 16150/2004/AUS Norovirus Hu/GII.l/04144544/2004/AUS	Norovirus Hu/GII. 1/3445/2008/ZAF Norovirus Hu/GII. 1/873 8/2008/ZAF Norovirus Hu/GII. 1/CanteenA/Pirkanmaa-15/2006/FIN Norovirus Hu/GII. 1/CanteenB/Pirkanmaa-19/2006/FIN Norovirus Hu/GII. 1/CanteenC/Pirkanmaa-18/2006/FIN Norovirus Hu/GII. 13/Miyagi/26/2006/JP Norovirus Hu/GII. 13/Miyagi/4/2007/JP
Norovirus genogroup GII.11	
Norovirus pig/GII-1 1/ABl 17/CAN Norovirus pig/GII-1 1/F12-8/05/CAN Norovirus pig/GII-1 1/F12-8/CAN	Norovirus pig/GII-1 1/F16-8/CAN Norovirus pig/GII-1 1/F18-10/05/CAN Norovirus pig/GII-1 1/Fl 8-10/CAN
Norovirus genogroup GII.13	
Norovirus Hu/GII. 13/04 150102/2004/AUS Norovirus Hu/GII. 13/8434/Maizuru/2007/JPN Norovirus Hu/GII. 13/8533/Maizuru/2008/JPN Norovirus Hu/GII. 13/8542/Maizuru/2008/JPN Norovirus Hu/GII. 13/8559/Maizuru/2008/JPN Norovirus Hu/GII. 13/8560/Maizuru/2008/JPN	Norovirus Hu/GII. 13/8591/Maizuru/2008/JPN Norovirus Hu/GII. 13/8594/Maizuru/2008/JPN Norovirus Hu/GII. 13/8599/Maizuru/2008/JPN Norovirus Hu/GII. 13/95 13/2008/ZAF Norovirus sewage/GII.13/Toyama/SW0703-6/2007/JP Norovirus sewage/GII. 13/Toyama/SW0709-11/2007/JP
Norovirus genogroup GII.14	
Norovirus Hu/GII-14/ES071/2003/BRA Norovirus Hu/GII.14/13436/2007/BRA Norovirus Hu/GII.14/13453/2007/BRA	Norovirus Hu/GII.14/13501/2007/BRA Norovirus Hu/GII.14/3607/2008/ZAF
Norovirus genogroup GII.16	
Norovirus Hu/GII. 16/4349b/2008/ZAF	Norovirus Hu/GII. 16/Nsk-4 10/2005/RUS
Norovirus genogroup GII.17	
Norovirus Hu/GGII. 17/696Nica/2005	
Norovirus genogroup GII.18	
Norovirus Hu/GGII. 18/ 166Nica/2005 Norovirus Hu/GGII. 18/1 86Nica/2005 Norovirus Hu/GGII. 18/2 13Nica/2005 Norovirus Hu/GGII. 18/23 lNica/2005	Norovirus Hu/GGII. 18/36Nica/2005 Norovirus pig/GII- 18/F15-1 Onv/CAN Norovirus swine/GII. 18/rj 14008/2007/BR
Norovirus genogroup GII.2	
Norovirus env/GGI.2/1044/2007/ITA Norovirus env/GGI.2/1046/2007/ITA Norovirus env/GGI.2/1052/2007/ITA Norovirus env/GGI.2/1054/2007/ITA Norovirus env/GGI.2/1056/2007/ITA Norovirus env/GGI.2/1084/2007/ITA Norovirus env/GGI.2/1088/2007/ITA Norovirus env/GGI.2/1092/2007/ITA Norovirus env/GGI.2/1 110/2007/ITA Norovirus env/GGI.2/1 112/2007/ITA Norovirus env/GGI.2/1 134/2007/ITA Norovirus env/GGI.2/1 138/2007/ITA Norovirus env/GGI.2/1 158/2007/ITA Norovirus env/GGI.2/950/2007/ITA Norovirus env/GGI.2/952/2007/ITA Norovirus env/GGI.2/954/2007/ITA	Norovirus Hu/GII-3/ES203/2003/BRA Norovirus Hu/GII-3/ES265/2003/BRA Norovirus Hu/GII-3/food handler 2/OB1/2007/UK Norovirus Hu/GII-3/food handler 6/OB1/2007/UK Norovirus Hu/GII-3/Morriston/2007/UK Norovirus Hu/GII-3/NMH/2007/UK Norovirus Hu/GII-3/Patient 1-01/2007/UK Norovirus Hu/GII-3/Patient 2-01/2007/UK Norovirus Hu/GII-3/Patientl -01/2007/UK Norovirus Hu/GII-3/Patientl -02/2007/UK Norovirus Hu/GII-3/Patientl -05/2007/UK Norovirus Hu/GII-3/Patient2-0 1/2007/UK Norovirus Hu/GII-3/Patient2-02/2007/UK Norovirus Hu/GII-3/Patient2-05/2007/UK Norovirus Hu/GII.3/02 10818 1/2002/AUS Norovirus Hu/GII.3/02 115422/2002/AUS

Norovirus env/GGI.2/964/2007/ITA	Norovirus Hu/GII.3/02 115428/2002/AUS
Norovirus env/GGI.2/968/2007/ITA	Norovirus Hu/GII.3/02 11544 1/2002/AUS
Norovirus env/GGI.2/976/2007/ITA	Norovirus Hu/GII.3/03 157 163/2003/AUS
Norovirus env/GGI.2/980/2007/ITA	Norovirus Hu/GII.3/03 1571 69/2003/AUS
Norovirus env/GGI.2/982/2007/ITA	Norovirus Hu/GII.3/04 107624/2004/AUS
Norovirus env/GGI.2/984/2007/ITA	Norovirus Hu/GII.3/041 55699/2004/AUS
Norovirus env/GGI.2/986/2007/ITA	Norovirus Hu/GII.3/05 100687/2004/AUS
Norovirus env/GGI.2/992/2007/ITA	Norovirus Hu/GII.3/05 143926/2005/AUS
Norovirus env/GGI.2/994/2007/ITA	Norovirus Hu/GII.3/1 508/l/2008/RJ/BRA
Norovirus Hu/GGI.2/oyster84910B/7735 1/FR	Norovirus Hu/GII.3/	5645/2008/RJ/BRA
Norovirus Hu/GGII.2/32Nica/2005	Norovirus Hu/GII.3/	5737/2008/RJ/BRA
Norovirus Hu/GII-2/Cl-263/South Korea	Norovirus Hu/GII.3/Cuernavaca/503 17/2007/MEX
Norovirus Hu/GII-2/Cl-268/South Korea	Norovirus Hu/GII.3/Cuernavaca/735 8/2008/MEX
Norovirus Hu/GII-2/Kashiwa/06077 1/2006/JP	Norovirus Hu/GII.3/Cuernavaca/7360/2008/MEX
Norovirus Hu/GII-2/teacher 1/OB4/2007/UK	Norovirus Hu/GII.3/GE29/IRN
Norovirus Hu/GII.2/10488/2004/IRL	Norovirus Hu/GII.3/Novosibirsk/s2835/2007/Ru
Norovirus Hu/GII.2/4447/2007/IRL	Norovirus Hu/GII.3/Novosibirsk/s2842/2007/Ru
Norovirus Hu/GII.2/Coevorden 19 1S/1 999/NL	Norovirus Hu/GII.3/Novosibirsk/s890/2006/Ru
Norovirus	Norovirus Hu/GII.3/Novosibirsk/s89 1/2006/Ru
Hu/GII.2/Cuernavaca/5003 1/2007/MEX	Norovirus Hu/GII.3/Nsk-l 58/2005/RUS
Norovirus Hu/GII.2/Delft48M/2000/NL	Norovirus Hu/GII.3/Nsk-28/2005/RUS
Norovirus Hu/GII.2/DenHaag37/2000/NL	Norovirus Hu/GII.3/Nsk-2870/2008/RUS
Norovirus Hu/GII.2/Esslingen/3878/05/DE	Norovirus Hu/GII.3/Nsk-2872/2008/RUS
Norovirus Hu/GII.2/Goes28/2005/NL	Norovirus Hu/GII.3/Nsk-2877/2008/RUS
Norovirus Hu/GIL2/Heerlen7E/2002/NL	Norovirus Hu/GII.3/Nsk-2887/2008/RUS
Norovirus Hu/GII.2/Heidenheim/3478/05/DE	Norovirus Hu/GII.3/Nsk-2891/2008/RUS
Norovirus Hu/GII.2/Kuenzelsau/3 870/05/DE	Norovirus Hu/GII.3/Nsk-2987/2008/RUS
Norovirus Hu/GII.2/Leeuwarden 15/200 1/NL	Norovirus Hu/GII.3/Nsk-30 18/2008/RUS
Norovirus Hu/GII.2/Leeuwarden7 1/2003/NL	Norovirus Hu/GII.3/Nsk-3071/2008/RUS
Norovirus Hu/GII.2/Mannheim/3343/05/DE	Norovirus Hu/GII.3/Nsk-3076/2008/RUS
Norovirus	Norovirus Hu/GII.3/Nsk-3077/2008/RUS
Hu/GII.2/Mussels/M 12nov2004/Foto/Sweden	Norovirus Hu/GII.3/Nsk-3203/2008/RUS
Norovirus	Norovirus Hu/GII.3/Nsk-3290/2008/RUS
Hu/GII.2/Mussels/M40nov2004/Foto/Sweden	Norovirus Hu/GII.3/Nsk-34 18/2008/RUS
Norovirus Hu/GII.2/OC080306/2008/JPN	Norovirus Hu/GII.3/Nsk-3489/2008/RUS
Norovirus Hu/GII.2/Rotterdam39E/2002/NL	Norovirus Hu/GII.3/Nsk-3501/2008/RUS
Norovirus Hu/GII.2/Sigmaringen/3 669/05/DE	Norovirus Hu/GII.3/Nsk-35 15/2008/RUS
Norovirus Hu/GII.2/Vaals87/2005/NL	Norovirus Hu/GII.3/Nsk-76/2005/RUS
Norovirus Hu/GII.2/Waiblingen/3853/05/DE	Norovirus Hu/GII.3/Nsk-B69/2009/RUS
Norovirus Hu/GII.2/Wertheim/350 1/05/DE	Norovirus Hu/GII.3/Nsk-B93/2009/RUS
Norovirus Hu/GII.2/Zwolle25E/2001/NL	Norovirus Hu/GII.3/Nsk-B94/2009/RUS
Norovirus genogroup GII.3	Norovirus Hu/GII.3/Nsk-Dl 38/2009/RUS
Norovirus Env/GGII.3/699/2006/IT	Norovirus Hu/GII.3/Nsk-D175/2009/RUS
Norovirus env/GGII.3/972/2007/ITA	Norovirus Hu/GII.3/Nsk-D195/2009/RUS
Norovirus environmental/GII-3/O04-HBT/2008/UK	Norovirus Hu/GII.3/Nsk-D204/2009/RUS
	Norovirus Hu/GII.3/Nsk-D2 18/2009/RUS
Norovirus environmental/GII-3/Ol 8-TDH/2008/UK	Norovirus Hu/GII.3/Nsk-D2 19/2009/RUS
	Norovirus Hu/GII.3/Nsk-D224/2009/RUS
Norovirus environmental/GII-3/02 8-TFH/2008/UK	Norovirus Hu/GII.3/Nsk-D229/2009/RUS
	Norovirus Hu/GII.3/Nsk-D256/2009/RUS
Norovirus environmental/GII-3/03 1-HBT/2008/UK	Norovirus Hu/GII.3/Nsk-D277/2009/RUS
	Norovirus Hu/GII.3/Nsk-D89/2009/RUS
Norovirus Hu/GGII.3/691/2006/IT	Norovirus Hu/GII.3/Nsk-H276/2004/RUS
Norovirus Hu/GII-3/61 3104/2006/UK	Norovirus Hu/GII.3/Nsk-H379/2004/RUS
Norovirus Hu/GII-3/6479/2007/UK	Norovirus Hu/GII.3/Nsk-H41 8/2004/RUS

Norovirus Hu/GII-3/6482/2007/UK	Norovirus Hu/GII.3/Nsk-H425/2004/RUS
Norovirus Hu/GII-3/71 3092-3/2007/UK	Norovirus Hu/GII.3/Nsk-H470/2004/RUS
Norovirus Hu/GII-3/Awa/060890/2006/JP	Norovirus Hu/GII.3/Nsk-H487/2004/RUS
Norovirus Hu/GII-3/B73 16/2007/UK	Norovirus Hu/GII.3/Nsk-H538/2004/RUS
Norovirus Hu/**GII**-3/Batch 1-Swab 10/2007/UK	Norovirus Hu/**GII**.3/Nsk-H573/2004/RUS
Norovirus Hu/GII-3/Batch 1-Swab 19/2007/UK	Norovirus Hu/GII.3/Nsk-H580/2004/RUS
Norovirus Hu/GII-3/Batch2-Swab06/2007/UK	Norovirus Hu/GII.3/Nsk-H61 7/2004/RUS
Norovirus Hu/GII-3/Batch2-Swabl2/2007/UK	Norovirus Hu/GII.3/Nsk-H677/2004/RUS
Norovirus Hu/GII-3/Batch2-Swab 16/2007/UK	Norovirus Hu/GII.3/O450/2008/RUS
Norovirus Hu/GII-3/Batch2-Swab20/2007/UK	Norovirus Hu/GII.3/RotterdamPlD0/2006/NL
Norovirus Hu/GII-3/Batch4-Swab03/2007/UK	Norovirus Hu/GII.3/RotterdamPlD88/2006/NL
Norovirus Hu/GII-3/Batch4-Swab 10/2007/UK	Norovinis Hu/GII.3/RotterdamP5D0/2005/NL
Norovirus Hu/GII-3/Batch4-Swab 15/2007/UK	Norovirus Hu/**GII**.3/RotterdamP8D0/2006/NL
Norovirus Hu/GII-3/Batch4-Swab 16/2007/UK	Norovirus Hu/GII.3/RotterdamP8D3 1/2006/NL
Norovirus Hu/GII-3/Batch4-Swab20/2007/UK	Norovirus Hu/GII.3/Salvador/B 10/2006/BRA
Norovirus Hu/GII-3/Batch5-Swabl4/2007/UK	Norovirus Hu/GII.3/Salvador/C08/2006/BRA
Norovirus Hu/GII-3/Batch5-Swab 15/2007/UK	Norovirus Hu/GII.3/Salvador/Dl 0/2006/BRA
Norovirus Hu/GII-3/Batch5-Swab20/2007/UK	Norovirus Hu/GII.3/Salvador/G06/2006/BRA
Norovirus Hu/GII-3/Batch5-Swab23/2007/UK	Norovirus Hu/GII.3/Salvador/Gl 0/2006/BRA
Norovirus Hu/GII-3/Batch6-Swab03/2007/UK	Norovinis Hu/GII.3/Salvador/H02/2006/BRA
Norovirus Hu/GII-3/Batch6-Swab 10/2007/UK	Norovirus Hu/GII.3/Salvador/H08/2006/BRA
Norovirus Hu/GII-3/Batch6-Swab 13/2007/UK	Norovirus Hu/GII.3/Salvador/Hl 0/2006/BRA
Norovirus Hu/GII-3/Cl-139/South Korea	Norovirus Hu/GII3/49 167/Henan/06/CHN
Norovirus Hu/GII-3/Chosei/060920/2006/JP	Norovirus Hu/GII3/52088/Shanghai/06/CHN
Norovirus Hu/GII-3/customer 1/OB 1/2007/UK	Norovirus Hu/GII3/52403/Jilin/07/CHN
Norovirus Hu/GII-3/customer 1/OB2/2007/UK	Norovirus oyster/GII.3/4/Stromstad/Sweden
Norovirus Hu/GII-3/customer 1/OB3/2007/UK	Norovirus Hu/GII-3/ES 149/2003/BRA
Norovirus Hu/**GII**-3/customer 2/OB 1/2006/UK	Norovirus Hu/**GII**-3/ES 180/2003/BRA
Norovirus Hu/GII-3/ES096/2003/BRA	Norovirus Hu/GII-3/ES 198/2003/BRA
Norovirus Hu/GII-3/ES130/2003/BRA	
Norovirus genogroup GII.4	
Norovirus env/GGII.4/1 034/2007/ITA	Norovirus Hu/GII.4/Hiroshima/9 1/2006/JPN
Norovirus env/GGII.4/1 162a/2007/ITA	Norovirus Hu/GII.4/Hiroshima/92/2006/JPN
Norovirus Env/GGII.4/645/2005/IT	Norovirus Hu/GII.4/HK/CU09Nl 0/2009/CHN
Norovirus Env/GGII.4/649/2005/IT	Norovinis Hu/GII.4/HK/CU09Nl 1/2009/CHN
Norovirus Env/GGII.4/650/2005/IT	Norovirus Hu/GII.4/HK/CU09N 12/2009/CHN
Norovirus Env/GGII.4/67 1/2006/IT	Norovirus Hu/GII.4/HK/CU09N24/2009/CHN
Norovirus Env/GGII.4/672/2006/IT	Norovirus Hu/GII.4/HK/CU09N4/2009/CHN
Norovirus Env/GGII.4/677/2006	Norovirus Hu/GII.4/HK/CU09N5/2009/CHN
Norovirus Env/GGII.4/677/2006/IT	Norovirus Hu/GII.4/HK/CU09N6/2009/CHN
Norovirus Env/GGII.4/680/2006/IT	Norovirus Hu/GII.4/HK/CU09N7/2009/CHN
Norovirus Env/GGII.4/704/2006/IT	Norovirus Hu/GII.4/HK/CU09N8/2009/CHN
Norovirus env/GGII.4/954/2007/ITA	Norovirus Hu/GII.4/HK/CU09N9/2009/CHN
Norovirus env/GGII.4/956/2007/ITA	Norovirus Hu/GII.4/HK/CU09S42/2009/CHN
Norovirus env/GGII.4/960/2007/ITA	Norovirus Hu/GII.4/HK/CU09Tl 0/2009/CHN
Norovirus env/GGII.4/968/2007/ITA	Norovirus Hu/GII.4/HK/CU09T12/2009/CHN
Norovirus env/GGII.4/976/2007/ITA	Norovirus Hu/GII.4/HME-407/2005/TWN
Norovirus env/GGII.4/980/2007/ITA	Norovirus Hu/GII.4/HME-41 7/2005/TWN
Norovirus env/GGII.4/992/2007/ITA	Norovirus Hu/GII.4/HME-434/2005/TWN
Norovirus env/GGII.4/994/2007/ITA	Norovirus Hu/GII.4/HME-465/2005/TWN
Norovirus env/GGII.4/996/2007/ITA	Norovirus Hu/GII.4/HME-467/2005/TWN
Norovirus environmental/GII-4/OO1-FDH/2008/UK	Norovirus Hu/GII.4/HME-61 8/2006/TWN
	Norovirus Hu/GII.4/HME-620/2006/TWN
Norovirus environmental/GII-4/O01 - HBT/2008/UK	Norovirus Hu/GII.4/HME-622/2006/TWN
	Norovirus Hu/GII.4/HME-624/2006/TWN

Norovirus environmental/GII-4/O04-TDH/2008/UK	Norovirus Hu/GII.4/HME-627/2006/TWN
Norovirus environmental/GII-4/Ol 0-TFH/2008/UK	Norovirus Hu/GII.4/HME-631/2006/TWN
Norovirus environmental/GII-4/Ol 9-HBT/2008/UK	Norovirus Hu/GII.4/HME-633/2006/TWN
Norovirus environmental/GII-4/027-TFH/2008/UK	Norovirus Hu/GII.4/HS194/2009/US
Norovirus environmental/GII-4/03 1-TDH/2008/UK	Norovirus Hu/GII.4/Hunter 284E/04O/AU
Norovirus Hu/GGI.4/17350B/7735 1/FR	Norovirus Hu/GII.4/Hunter 532D/04O/AU
Norovirus Hu/GGI.4/oysterl 7350A/7735 1/FR	Norovirus Hu/GII.4/Hunterl20A/04O/AU
Norovirus Hu/GGII-4/Alzira/l 695/06/Sp	Norovirus Hu/GII.4/Hunter273C/04O/AU
Norovirus Hu/GGII-4/Badalona/l 586/BNM_05/06/Sp	Norovirus Hu/GII.4/Hunter4288/04S/AU
Norovirus Hu/GGII-4/Banyoles/1474/Gi_l 0/06/Sp	Norovirus Hu/GII.4/Hunter504D/04O/AU
Norovirus Hu/GGII-4/Barcelona/1258/BNM_08/05	Norovirus Hu/GII.4/Hunter882M/04S/AU
Norovirus Hu/GGII-4/Benicarlo/l 226/04	Norovirus Hu/GII.4/Hunter913K/04O/AU
Norovirus Hu/GGII-4/Benidorm/1222/05	Norovirus Hu/GII.4/Hunter956S/04O/AU
Norovirus Hu/GGII-4/Benidorm/l 680/06	Norovirus Hu/GII.4/Hunter990O/04O/AU
Norovirus Hu/GGII-4/Benidorm/l 707/06/Sp	Norovirus Hu/GII.4/I/2006/FIN
Norovirus Hu/GGII-4/Blanes/1483/Gi_22/06/Sp	Norovirus Hu/GII.4/II/2006/FIN
Norovirus Hu/GGII-4/Cabrera/l 590/RCSP_01/Sp	Norovirus Hu/GII.4/III/2006/FIN
Norovirus Hu/GGII-4/Calonge/Gi_03/12 16/05	Norovirus Hu/GII.4/Iseharal/2006/JP
Norovirus Hu/GGII-4/Cambrils/l 105/TA_l 0/05	Norovirus Hu/GII.4/Isehara2/2006/JP
Norovirus Hu/GGII-4/Corbera/RCSP_68/l 134/04	Norovirus Hu/GII.4/Jannali611C/04O/AU
Norovirus Hu/GGII-4/Els_Pallers/l 617/TA_02/06/Sp	Norovirus Hu/GII.4/Jannali670H/04O/AU
Norovirus Hu/GGII-4/Peniscola/1227/05	Norovirus Hu/GII.4/Kobe034/2006/JP
Norovirus Hu/GGII-4/Rosas/l 078/Gi59/04	Norovirus Hu/GII.4/Kogarah393H/04O/AU
Norovirus Hu/GGII-4/Roses/1491/Gi_23/06/Sp	Norovirus Hu/GII.4/Kogarah4006/04O/AU
Norovirus Hu/GGII-4/Sabadell/l 196/RC94_04/04	Norovirus Hu/GII.4/Longbay/00O/AU
Norovirus Hu/GGII-4/Sabadell/1236/RC_08/05	Norovirus Hu/GII.4/Manly388P/04O/AU
Norovirus Hu/GGII-4/Sabadell/l 510/RC_02/06/Sp	Norovirus Hu/GII.4/ManlyVale098M/04O/AU
Norovirus Hu/GGII-4/Sant_Cugat/l 527/RC_06/06/Sp	Norovirus Hu/GII.4/Mcl7/2002/Th
Norovirus Hu/GGII-4/Sant_Quirze/l 092/RC_80/04	Norovirus Hu/GII.4/MD-2004/2004/US
Norovirus Hu/GGII-4/Sant_Sadurni/l 087/RC_84/04	Norovirus Hu/GII.4/Miyagi/l/2006/JP
Norovirus Hu/GGII-4/Tarragona/ 1613/TA_0 1/06/Sp	Norovirus Hu/GII.4/Miyagi/l/2007/JP
Norovirus Hu/GGII-4/Tarragona/l 624/TA_03/06/Sp	Norovirus Hu/GII.4/Miyagi/10/2006/JP
Norovirus Hu/GGII-	Norovirus Hu/GII.4/Miyagi/1 1/2006/JP
	Norovirus Hu/GII.4/Miyagi/12/2006/JP
	Norovirus Hu/GII.4/Miyagi/13/2006/JP
	Norovirus Hu/GII.4/Miyagi/14/2006/JP
	Norovirus Hu/GII.4/Miyagi/15/2006/JP
	Norovirus Hu/GII.4/Miyagi/16/2006/JP
	Norovirus Hu/GII.4/Miyagi/17/2006/JP
	Norovirus Hu/GII.4/Miyagi/18/2006/JP
	Norovirus Hu/GII.4/Miyagi/19/2006/JP
	Norovirus Hu/GII.4/Miyagi/2/2006/JP
	Norovirus Hu/GII.4/Miyagi/2/2007/JP
	Norovirus Hu/GII.4/Miyagi/20/2006/JP
	Norovirus Hu/GII.4/Miyagi/2 1/2006/JP
	Norovirus Hu/GII.4/Miyagi/22/2006/JP
	Norovirus Hu/GII.4/Miyagi/23/2006/JP
	Norovirus Hu/GII.4/Miyagi/24/2006/JP
	Norovirus Hu/GII.4/Miyagi/3/2006/JP
	Norovirus Hu/GII.4/Miyagi/3/2007/JP
	Norovirus Hu/GII.4/Miyagi/4/2007/JP
	Norovirus Hu/GII.4/Miyagi/5/2006/JP
	Norovirus Hu/GII.4/Miyagi/5/2007/JP
	Norovirus Hu/GII.4/Miyagi/6/2006/JP
	Norovirus Hu/GII.4/Miyagi/6/2007/JP

4/Tarragona/l 636/TA_05/06/Sp	Norovirus Hu/GII.4/Miyagi/7/2006/JP
Norovirus Hu/GGII-	Norovirus Hu/GII.4/Miyagi/7/2007/JP
4/Tremp/l 567/Lleida_03/06/Sp	Norovirus Hu/GII.4/Miyagi/8/2006/JP
Norovirus Hu/GGII-4/Valencia_HCUV/5 93/02	Norovirus Hu/GII.4/Miyagi/8/2007/JP
Norovirus Hu/GGII-	Norovirus Hu/GII.4/Miyagi/9/2006/JP
4/Vall_de_Bianya/l 477/Gi_l 9/06/Sp	Norovirus Hu/GII.4/Miyagi/9/2007/JP
Norovirus Hu/GGII-4/Villareal/l 669/06	Norovinis Hu/GII.4/Miyagi/HM050413/2005/JP
Norovirus Hu/GGII.4/0029A/69787/2006/NLD	Norovirus Hu/GII.4/Miyagi/HM050426/2005/JP
Norovirus Hu/GGII.4/0029B/69787/2006/NLD	Norovirus Hu/GII.4/Miyagi/HM0505 11/2005/JP
Norovirus Hu/GGII.4/05 18B/68592/2006/NLD	Norovirus Hu/GII.4/Miyagi/HM050525/2005/JP
Norovirus Hu/GGII.4/190Nica/2005	Norovirus
Norovirus Hu/GGII.4/256Nica/2005	Hu/GII.4/Mussels/M29nov2004/Foto/Sweden
Norovirus Hu/GGII.4/2639B/66430/2006/NLD	Norovirus
Norovirus Hu/GGII.4/2936A/66430/2006/NLD	Hu/GII.4/Mussels/M33nov2004/Foto/Sweden
Norovirus Hu/GGII.4/322Nica/2005	Norovirus Hu/GII.4/New Orleansl500/2008/USA
Norovirus Hu/GGII.4/324Nica/2005	Norovirus Hu/GII.4/Nijmegen/2007/NL
Norovirus Hu/GGII.4/330Nica/2005	Norovinis Hu/GII.4/Nijmegen/8 1230-R/2008/NLD
Norovirus Hu/GGII.4/3474A/2006/NLD	Norovinis Hu/GII.4/Nijmegen/90 106-
Norovirus Hu/GGII.4/3474Ab/2006/NLD	42472/2008/NLD
Norovirus Hu/GGII.4/355Nica/2005	Norovirus Hu/GII.4/Nijmegenl 15/2006/NL
Norovirus Hu/GGII.4/380Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 12 18/2006/Ru
Norovirus Hu/GGII.4/382Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 14 16/2006/Ru
Norovirus Hu/GGII.4/392Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1475/2006/Ru
Norovirus Hu/GGII.4/410Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 16/2005/Ru
Norovirus Hu/GGII.4/413Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 164/2005/Ru
Norovirus Hu/GGII.4/414Nica/2005	Norovirus Hu/GII.4/Novosibirsk/sl 640/2006/Ru
Norovirus Hu/GGII.4/42Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1735/2006/Ru
Norovirus Hu/GGII.4/432Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s l 744/2007/Ru
Norovirus Hu/GGII.4/448Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1747/2007/Ru
Norovirus Hu/GGII.4/482Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1764/2007/Ru
Norovirus Hu/GGII.4/4992A/65902/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s 1768/2007/Ru
Norovirus Hu/GGII.4/4992B/65902/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s 1770/2007/Ru
Norovirus Hu/GGII.4/5357A/67071/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s 1784/2007/Ru
Norovirus Hu/GGII.4/5 357B/6707 1/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s 1792/2007/Ru
Norovirus Hu/GGII.4/539 1A/66878/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s 1795/2007/Ru
Norovirus Hu/GGII.4/5391B/66878/2006/NLD	Norovinis Hu/GII.4/Novosibirsk/s 1798/2007/Ru
Norovirus Hu/GGII.4/567Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1830/2007/Ru
Norovirus Hu/GGII.4/577Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1837/2007/Ru
Norovirus Hu/GGII.4/5 86Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1843/2007/Ru
Norovirus Hu/GGII.4/593Nica/2005	Norovirus Hu/GII.4/Novosibirsk/sl 862/2007/Ru
Norovirus Hu/GGII.4/623Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 19 18/2007/Ru
Norovirus Hu/GGII.4/6282A/69479/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s 1925/2007/Ru
Norovirus Hu/GGII.4/634Nica/2005	Norovirus Hu/GII.4/Novosibirsk/s 1985/2007/Ru
Norovirus Hu/GGII.4/668/2006/IT	Norovirus Hu/GII.4/Novosibirsk/s2085/2007/Ru
Norovirus Hu/GGII.4/669/2006/IT	Norovirus Hu/GII.4/Novosibirsk/s2093/2007/Ru
Norovirus Hu/GGII.4/692/2006/IT	Norovirus Hu/GII.4/Novosibirsk/s2 184/2007/Ru
Norovirus Hu/GGII.4/720Nica/2006	Norovirus Hu/GII.4/Novosibirsk/s23/2005/Ru
Norovirus Hu/GGII.4/723Nica/2006	Norovirus Hu/GII.4/Novosibirsk/s2369/2007/Ru
Norovirus Hu/GGII.4/729Nica/2006	Norovirus Hu/GII.4/Novosibirsk/s2629/2007/Ru
Norovirus Hu/GGII.4/735Nica/2006	Norovirus Hu/GII.4/Novosibirsk/s2862/2008/Ru
Norovirus Hu/GGII.4/7366A/63808/NLD	Norovirus Hu/GII.4/Novosibirsk/s290/2005/Ru
Norovirus Hu/GGII.4/7366B/63808/NLD	Norovirus Hu/GII.4/Novosibirsk/s2980/2008/Ru
Norovirus Hu/GGII.4/8956A/66842/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s3 17/2005/Ru
Norovirus Hu/GGII.4/9893B/678 14/2006/NLD	Norovirus Hu/GII.4/Novosibirsk/s345/2005/Ru
Norovirus Hu/GGII.4/Almelo039/2004/NL	Norovirus Hu/GII.4/Novosibirsk/s383/2005/Ru

Norovirus Hu/GGII.4/Apeldoom023/2003/NL	Norovirus Hu/GII.4/Novosibirsk/s4 16/2005/Ru
Norovirus Hu/GGII.4/Bl/2002/DNK	Norovirus Hu/GII.4/Novosibirsk/s625/2005/Ru
Norovirus Hu/GGII.4/Bl 1/2003/DNK	Norovirus Hu/GII.4/Nsk-l/2005/RUS
Norovirus Hu/GGII.4/B 12/2003/DNK	Norovirus Hu/GII.4/Nsk-1973/2007/RUS
Norovirus Hu/GGII.4/B 13/2002/DNK	Norovirus Hu/GII.4/Nsk-21 11/2007/RUS
Norovirus Hu/GGII.4/BlO/2003/DNK	Norovirus Hu/GII.4/Nsk-25 01/2007/RUS
Norovirus Hu/GGII.4/B2/2002/DNK	Norovirus Hu/GII.4/Nsk-25 18/2007/RUS
Norovirus Hu/GGII.4/B3/2002/DNK	Norovirus Hu/GII.4/Nsk-2523/2007/RUS
Norovirus Hu/GGII.4/B4/2002/DNK	Norovirus Hu/GII.4/Nsk-2578/2007/RUS
Norovirus Hu/GGII.4/B5/2002/DNK	Norovinis Hu/GII.4/Nsk-2853/2008/RUS
Norovirus Hu/GGII.4/B6/2002/DNK	Norovirus Hu/GII.4/Nsk-2862/2008/RUS
Norovirus Hu/GGII.4/B7/2003/DNK	Norovirus Hu/GII.4/Nsk-2980/2008/RUS
Norovirus Hu/GGII.4/B8/2002/DNK	Norovirus Hu/GII.4/Nsk-3096/2008/RUS
Norovirus Hu/GGII.4/B9/2002/DNK	Norovirus Hu/GII.4/Nsk-3 147/2008/RUS
Norovirus Hu/GGII.4/Cairo 1/2006/EGY	Norovirus Hu/GII.4/Nsk-3 175/2008/RUS
Norovirus Hu/GGII.4/Cairo 10/2007/EGY	Norovirus Hu/GII.4/Nsk-3255/2008/RUS
Norovirus Hu/GGII.4/Cairo2/2006/EGY	Norovirus Hu/GIL4/Nsk-3288/2008/RUS
Norovirus Hu/GGII.4/Cairo3/2006/EGY	Norovirus Hu/GII.4/Nsk-33 15/2008/RUS
Norovirus Hu/GGII.4/Cairo4/2006/EGY	Norovirus Hu/GII.4/Nsk-3363/2008/RUS
Norovirus Hu/GGII.4/Cairo5/2006/EGY	Norovirus Hu/GII.4/Nsk-3392/2008/RUS
Norovirus Hu/GGII.4/Cairo6/2006/EGY	Norovirus Hu/GII.4/Nsk-3396/2008/RUS
Norovirus Hu/GGII.4/Cairo7/2007/EGY	Norovirus Hu/GII.4/Nsk-3412/2008/RUS
Norovirus Hu/GGII.4/Cairo8/2007/EGY	Norovirus Hu/GII.4/Nsk-3445/2008/RUS
Norovirus Hu/GGII.4/Cairo9/2007/EGY	Norovirus Hu/GII.4/Nsk-3469/2008/RUS
Norovirus Hu/GGII.4/DenBosch028/2004/NL	Norovirus Hu/GII.4/Nsk-348 1/2008/RUS
Norovirus Hu/GGII.4/DenHaag00 1/2003/NL	Norovirus Hu/GII.4/Nsk-38/2005/RUS
Norovirus Hu/GGII.4/DenHaagO 15/2000/NL	Norovirus Hu/GII.4/Nsk-6/2005/RUS
Norovirus Hu/GGII.4/DenHelder003/2004/NL	Norovirus Hu/GII.4/Nsk-B20/2009/RUS
Norovirus Hu/GGII.4/Dijon-El 057/2002/FRA	Norovirus Hu/GII.4/Nsk-B30/2009/RUS
Norovirus Hu/GGII.4/Dijon-El 267/2006/FRA	Norovirus Hu/GII.4/Nsk-B3 8/2009/RUS
Norovirus Hu/GGII.4/Dijon-El 501/2006/FRA	Norovirus Hu/GIL4/Nsk-B42/2009/RUS
Norovirus Hu/GGII.4/Dijon-E2703/2008/FRA	Norovirus Hu/GII.4/Nsk-B67/2009/RUS
Norovirus Hu/GGII.4/El/2002/DNK	Norovirus Hu/GII.4/Nsk-B8/2009/RUS
Norovirus Hu/GGII.4/E2/2002/DNK	Norovirus Hu/GII.4/Nsk-Dl 18/2009/RUS
Norovirus Hu/GGII.4/E3/2002/DNK	Norovirus Hu/GII.4/Nsk-D173/2009/RUS
Norovirus Hu/GGII.4/E4/2003/DNK	Norovirus Hu/GII.4/Nsk-Dl 83/2009/RUS
Norovirus Hu/GGII.4/E5/2003/DNK	Norovirus Hu/GII.4/Nsk-Dl 86/2009/RUS
Norovirus Hu/GGII.4/E6/2003/DNK	Norovirus Hu/GII.4/Nsk-D 191/2009/RUS
Norovirus Hu/GGII.4/E7/2003/DNK	Norovirus Hu/GII.4/Nsk-D2 11/2009/RUS
Norovirus Hu/GGII.4/E8/2003/DNK	Norovirus Hu/GII.4/Nsk-D270/2009/RUS
Norovirus Hu/GGII.4/E9/2003/DNK	Norovirus Hu/GII.4/Nsk-D43/2009/RUS
Norovirus Hu/GGII.4/ElslooO 12/2004/NL	Norovirus Hu/GII.4/Nsk-D45/2009/RUS
Norovirus Hu/GGII.4/EmmenE006/2002/NL	Norovirus Hu/GII.4/Nsk-H445/2004/RUS
Norovirus Hu/GGII.4/Haarlem457/2003/NL	Norovirus Hu/GII.4/Nsk-H472/2004/RUS
Norovirus Hu/GGII.4/Heerlen003/2003/NL	Norovirus Hu/GII.4/Nsk-H486/2004/RUS
Norovirus Hu/GGII.4/Leeuwarden043/2000/NL	Norovirus Hu/GII.4/Nsk-K17/2005/RUS
Norovirus Hu/GGII.4/Liempde048/2004/NL	Norovirus Hu/GII.4/Nsk-K25/2005/RUS
Norovirus Hu/GGII.4/Middelburg007/2004/NL	Norovirus Hu/GII.4/NSW001P/2008/AU
Norovirus Hu/GGII.4/New Delhi/150/02/IND	Norovirus Hu/GII.4/NSW017I/2008/AU
Norovirus Hu/GGII.4/New Delhi/ 188/01/IND	Norovirus Hu/GII.4/NSW023C/2008/AUS
Norovirus Hu/GGII.4/New Delhi/203/01/IND	Norovirus Hu/GII.4/NSW042H/2008/AU
Norovirus Hu/GGII.4/New Delhi/2 19/01/IND	Norovirus Hu/GII.4/NSW07 11/2008/AU
Norovirus Hu/GGII.4/Nijmegen083/2004/NL	Norovirus Hu/GII.4/NSW088L/2007/AUS
Norovirus Hu/GGII.4/OA1/2002/DNK	Norovirus Hu/GII.4/NSW132C/2007/AU
	Norovirus Hu/GII.4/NSW137F/2007/AU

Norovirus Hu/GGII.4/OA2/2002/DNK	Norovirus Hu/GII.4/NSWl 46P/2007/AU
Norovirus Hu/GGII.4/OA3/2002/DNK	Norovirus Hu/GII.4/NSW161F/2007/AU
Norovirus Hu/GGII.4/OA4/2002/DNK	Norovirus Hu/GII.4/NSW199U/2008/AU
Norovirus Hu/GGII.4/OCl/2002/DNK	Norovirus Hu/GII.4/NSW22 18/2008/AU
Norovirus Hu/GGII.4/OG1/2002/DNK	Norovirus Hu/GII.4/NSW227C/2006/AU
Norovirus Hu/GGII.4/OG2/2002/DNK	Norovirus Hu/GII.4/NSW252E/2007/AU
Norovirus Hu/GGII.4/OG3/2002/DNK	Norovirus Hu/GII.4/NSW264P/2007/AU
Norovirus Hu/GGII.4/OG4/2002/DNK	Norovirus Hu/GII.4/NSW287R/2007/AUS
Norovirus Hu/GGII.4/OG5/2002/DNK	Norovirus Hu/GII.4/NSW3639/2008/AU
Norovirus Hu/GGII.4/OG6/2002/DNK	Norovirus Hu/GII.4/NSW3645/2008/AU
Norovirus Hu/GGII.4/OL1/2002/DNK	Norovirus Hu/GII.4/NSW3722/2008/AU
Norovirus Hu/GGII.4/OMl 1/2003/DNK	Norovirus Hu/GII.4/NSW390I/2008/AU
Norovirus Hu/GGII.4/OM12/2003/DNK	Norovirus Hu/GII.4/NSW401B/2008/AU
Norovirus Hu/GGII.4/OM 13/2003/DNK	Norovirus Hu/GII.4/NSW4140/2008/AU
Norovirus Hu/GGII.4/OM 14/2002/DNK	Norovirus Hu/GII.4/NSW422H/2008/AU
Norovirus Hu/GGII.4/OM15/2003/DNK	Norovirus Hu/GII.4/NSW505G/2007/AU
Norovirus Hu/GGII.4/OM2/2002/DNK	Norovirus Hu/GII.4/NSW5 15L/2007/AU
Norovirus Hu/GGII.4/OM3/2002/DNK	Norovirus Hu/GII.4/NSW519M/2008/AU
Norovirus Hu/GGII.4/OM4/2002/DNK	Norovirus Hu/GII.4/NSW522G/2008/AU
Norovirus Hu/GGII.4/OM5/2002/DNK	Norovirus Hu/GII.4/NSW523R/2007/AU
Norovirus Hu/GGII.4/OM6/2003/DNK	Norovirus Hu/GII.4/NSW536S/2008/AU
Norovirus Hu/GGII.4/OM7/2003/DNK	Norovirus Hu/GII.4/NSW544K/2008/AUS
Norovirus Hu/GGII.4/OM8/2003/DNK	Norovirus Hu/GII.4/NSW5 87V/2007/AU
Norovirus Hu/GGII.4/ON1/2002/DNK	Norovirus Hu/GII.4/NSW609H/2007/AU
Norovirus Hu/GGII.4/OOl/2002/DNK	Norovirus Hu/GII.4/NSW61 8P/2008/AU
Norovirus Hu/GGII.4/OO2/2002/DNK	Norovirus Hu/GII.4/NSW625N/2008/AU
Norovirus Hu/GGII.4/OO4/2002/DNK	Norovirus Hu/GII.4/NSW647Q/2007/AU
Norovirus Hu/GGII.4/OO5/2002/DNK	Norovims Hu/GII.4/NSW682R/2007/AU
Norovirus Hu/GGII.4/patient F/2006/NLD	Norovirus Hu/GII.4/NSW710L/2007/AU
Norovirus Hu/GGII.4/Sl/2002/DNK	Norovims Hu/GII.4/NSW743L/2008/AUS
Norovirus Hu/GGII.4/S2/2003/DNK	Norovims Hu/GII.4/NSW774W/2007/AU
Norovirus Hu/GGII.4/S3/2003/DNK	Norovims Hu/GII.4/NSW806J/2008/AU
Norovirus Hu/GGII.4/S4/2003/DNK	Norovims Hu/GII.4/NSW8891/2007/AU
Norovirus Hu/GGII.4/S5/2003/DNK	Norovims Hu/GII.4/NSW889Z/2007/AU
Norovirus Hu/GGII.4/S7/2003/DNK	Norovirus Hu/GII.4/NSW9282/2008/AU
Norovirus Hu/GGII.4/S8/2003/DNK	Norovirus Hu/GII.4/NSW96 1W/2007/AU
Norovirus Hu/GGII.4/SchiedamO 18/200 1/NL	Norovims Hu/GII.4/OC090053/2009/JPN
Norovirus Hu/GGII.4/Tiel001/1 995/NL	Norovims Hu/GII.4/PAl/2004/IT
Norovirus Hu/GGII.4/Tilburg059/2004/NL	Norovims Hu/GII.4/PAl 18/2006/IT
Norovirus Hu/GGII.4/Utrecht05 8/200 1/NL	Norovims Hu/GII.4/PAl 18R-/2004/IT
Norovirus Hu/GGII.4/V10/2003/DNK	Norovirus Hu/GII.4/PA121/2006/IT
Norovirus Hu/GGII.4/Vl 1/2003/DNK	Norovirus Hu/GII.4/PA125R-/2004/IT
Norovirus Hu/GGII.4/V12/2002/DNK	Norovims Hu/GII.4/PAl 28R-/2004/IT
Norovirus Hu/GGII.4/Vl 3/2003/DNK	Norovims Hu/GII.4/PA129R-/2004/IT
Norovirus Hu/GGII.4/V15/2002/DNK	Norovims Hu/GII.4/PA130R-/2004/IT
Norovirus Hu/GGII.4/V4/2002/DNK	Norovims Hu/GII.4/PA133/2006/IT
Norovirus Hu/GGII.4/V5/2003/DNK	Norovims Hu/GII.4/PA134R-/2004/IT
Norovirus Hu/GGII.4/V8/2003/DNK	Norovirus Hu/GII.4/PA135R-/2004/IT
Norovirus Hu/GGII.4/Valencia/2004/ES	Norovims Hu/GII.4/PAl 38R-/2004/IT
Norovirus Hu/GGII.4/Waddinxveen01 6/2000/NL	Norovims Hu/GII.4/PA14/2006/IT
Norovirus Hu/GGII.4/WeertE022/2002/NL	Norovims Hu/GII.4/PA143/2005/IT
Norovirus Hu/GII-4 vUC/M/2006/US	Norovims Hu/GII.4/PA147/2006/IT
Norovirus Hu/GII-4/10641/2005/Bra	Norovims Hu/GII.4/PA148/2006/IT
Norovirus Hu/GII-4/10668/2005/Bra	Norovirus Hu/GII.4/PA15R-/2002/IT
	Norovirus Hu/GII.4/PAl 63/2006/IT

Norovirus Hu/GII-4/10689/2005/Bra	Norovirus Hu/GII.4/PA173/2006/IT
Norovirus Hu/GII-4/10831/2005/Bra	Norovirus Hu/GII.4/PA175/2006/IT
Norovirus Hu/GII-4/10942/2005/Bra	Norovirus Hu/GII.4/PA178/2006/IT
Norovirus Hu/GII-4/123027/2001/UK	Norovirus Hu/GII.4/PAl 79/2006/IT
Norovirus Hu/GII-4/414055/2004/UK	Norovirus Hu/GIL4/PA180/2006/IT
Norovirus Hu/GII-4/422031/2004/UK	Norovirus Hu/GII.4/PA189/2006/IT
Norovirus Hu/GII-4/588/2008/UK	Norovirus Hu/GII.4/PA2/2005/IT
Norovirus Hu/GII-4/613123/2006/UK	Norovirus Hu/GII.4/PA29R-/2002/IT
Norovirus Hu/GII-4/614025/2006/UK	Norovirus Hu/GII.4/PA31/2006/IT
Norovirus Hu/GII-4/AC3-l/2006/UK	Norovirus Hu/GII.4/PA37/2006/IT
Norovirus Hu/GII-4/Aichi3/2006/JP	Norovirus Hu/GII.4/PA39/2005/IT
Norovirus Hu/GII-4/Aichi4/2006/JP	Norovirus Hu/GII.4/PA53/2006/IT
Norovirus Hu/GII-4/Akital/2006/JP	Norovirus Hu/GII.4/PA56/2005/IT
Norovirus Hu/GII-4/Akita2/2006/JP	Norovirus Hu/GII.4/PA57/2004/IT
Norovirus Hu/GII-4/Akita4/2006/JP	Norovirus Hu/GII.4/PA58R-/2004/IT
Norovirus Hu/GII-4/Akita5/2006/JP	Norovirus Hu/GII.4/PA71/2006/IT
Norovirus Hu/GII-4/AN6-Newc/2005/UK	Norovirus Hu/GII.4/PA9R-/2004/IT
Norovirus Hu/GII-4/Aomoril/2006/JP	Norovirus Hu/GII.4/Parma/l 875/2008/ITA
Norovirus Hu/GII-4/Aomori2/2006/JP	Norovirus Hu/GII.4/Parma/l 896/2008/ITA
Norovirus Hu/GII-4/Aomori4/2006/JP	Norovirus Hu/GII.4/Picton037/03O/AU
Norovirus Hu/GII-4/Aomori5/2006/JP	Norovirus Hu/GII.4/Picton08 1/03O/AU
Norovirus Hu/GII-4/Aqualand/l 015/04	Norovirus Hu/GII.4/Ramsgate336I/04O/AU
Norovirus Hu/GII-4/Awa/040354/2004/JP	Norovirus Hu/GII.4/Rhyl440/2005/UK
Norovirus Hu/GII-4/Awa/061288/2006/JP	Norovirus Hu/GII.4/RIS/2006/USA
Norovirus Hu/GII-4/Barcelona/985/03	Norovirus Hu/GII.4/Riviera 1590/2008/US
Norovirus Hu/GII-4/Beijing/hl/2005/CHN	Norovirus Hu/GII.4/Riviera 1635/2008/US
Norovirus Hu/GII-4/Beijingl45/2007/China	Norovirus Hu/GII.4/RotterdamP2D0/2005/NL
Norovirus Hu/GII-4/Beijingl 51/2007/China	Norovirus Hu/GII.4/RotterdamP2Dl 82/2005/NL
Norovirus Hu/GII-4/Beijingl 57/2007/China	Norovirus Hu/GII.4/RotterdamP3D0/2006/NL
Norovirus Hu/GII-4/Benidorm/8 12/02/Sp	Norovirus Hu/GII.4/RotterdamP3D2 1/2006/NL
Norovirus Hu/GII-4/BenidonTi/858/02/Sp	Norovirus Hu/GII.4/RotterdamP4D0/2006/NL
Norovirus Hu/GII-4/Benidomi/901/03/Sp	Norovirus Hu/GII.4/RotterdamP4D33/2006/NL
Norovirus Hu/GII-4/Berga/759/02/Sp	Norovirus Hu/GII.4/RotterdamP5 D36/2005/NL
Norovirus Hu/GII-4/Berga/RC69_02/926/03/Sp	Norovirus Hu/GII.4/RotterdamP5D5 1/2005/NL
	Norovirus Hu/GII.4/RotterdamP6D0/2006/NL
Norovirus Hu/GII-4/Brynhaven/2003/UK	Norovirus Hu/GII.4/RotterdamP6D33/2006/NL
Norovirus Hu/GII-4/Cl-158/South Korea	Norovirus Hu/GII.4/RotterdamP7D0/2006/NL
Norovirus Hu/GII-4/Cl-163/South Korea	Norovirus Hu/GII.4/RotterdamP7Dl 19/2007/NL
Norovirus Hu/GII-4/Cl-164/South Korea	Norovirus Hu/GII.4/RotterdamP8D65/2006/NL
Norovirus Hu/GII-4/Cl-183/South Korea	Norovirus Hu/GII.4/Salvador/A0 1/2006/BRA
Norovirus Hu/GII-4/Cl-184/South Korea	Norovirus Hu/GIL4/Salvador/A02/2006/BRA
Norovirus Hu/GII-4/Cl-185/South Korea	Norovirus Hu/GII.4/Salvador/A05/2006/BRA
Norovirus Hu/GII-4/Cl-186/South Korea	Norovirus Hu/GII.4/Salvador/A09/2006/BRA
Norovirus Hu/GII-4/Cl-188/South Korea	Norovirus Hu/GII.4/Salvador/Al 0/2006/BRA
Norovirus Hu/GII-4/Cl-198/South Korea	Norovirus Hu/GII.4/Salvador/Al 1/2006/BRA
Norovirus Hu/GII-4/Cl-199/South Korea	Norovirus Hu/GII.4/Salvador/Al 2/2006/BRA
Norovirus Hu/GII-4/Cl-200/South Korea	Norovirus Hu/GII.4/Salvador/B01/2006/BRA
Norovirus Hu/GII-4/Cl-258/South Korea	Norovirus Hu/GII.4/Salvador/B06/2006/BRA
Norovirus Hu/GII-4/Cl-275/South Korea	Norovirus Hu/GII.4/Salvador/B08/2006/BRA
Norovirus Hu/GII-4/Cl-307/South Korea	Norovirus Hu/GII.4/Salvador/B09/2006/BRA
Norovirus Hu/GII-4/Cl-308/South Korea	Norovirus Hu/GII.4/Salvador/B 11/2006/BRA
Norovirus Hu/GII-4/Cl-309/South Korea	Norovirus Hu/GII.4/Salvador/B 12/2006/BRA
Norovirus Hu/GII-4/C3-89/South Korea	Norovirus Hu/GII.4/Salvador/C01/2006/BRA
Norovirus Hu/GII-4/C3-92/South Korea	Norovirus Hu/GII.4/Salvador/C02/2006/BRA
Norovirus Hu/GII-4/C4-26/South Korea	Norovirus Hu/GII.4/Salvador/C03/2006/BRA

Norovirus Hu/GII-4/C5-105/South Korea	Norovirus Hu/GII.4/Salvador/C04/2006/BRA
Norovirus Hu/GII-4/C5-107/South Korea	Norovirus Hu/GII.4/Salvador/C06/2006/BRA
Norovirus Hu/GII-4/C5-l 13/South Korea	Norovirus Hu/GII.4/Salvador/C07/2006/BRA
Norovirus Hu/GII-4/C5-150/South Korea	Norovirus Hu/GII.4/Salvador/C09/2006/BRA
Norovirus Hu/GII-4/C5-159/South Korea	Norovirus Hu/GII.4/Salvador/C 10/2006/BRA
Norovirus Hu/GII-4/C5-76/South Korea	Norovirus Hu/GII.4/Salvador/Cl 1/2006/BRA
Norovirus Hu/GII-4/C6-107/South Korea	Norovirus Hu/GII.4/Salvador/C12/2006/BRA
Norovirus Hu/GII-4/C6-108/South Korea	Norovirus Hu/GII.4/Salvador/D0 1/2006/BRA
Norovirus Hu/GII-4/C7-429/South Korea	Norovirus Hu/GII.4/Salvador/D02/2006/BRA
Norovirus Hu/GII-4/c7-446/South Korea	Norovirus Hu/GII.4/Salvador/D03/2006/BRA
Norovirus Hu/GII-4/C7-48 1/South Korea	Norovirus Hu/GII.4/Salvador/D04/2006/BRA
Norovirus Hu/GII-4/C7-486/South Korea	Norovirus Hu/GII.4/Salvador/D05/2006/BRA
Norovirus Hu/GII-4/C7-487/South Korea	Norovirus Hu/GII.4/Salvador/D08/2006/BRA
Norovirus Hu/GII-4/Can_Sans/787/02/Sp	Norovirus Hu/GII.4/Salvador/D09/2006/BRA
Norovirus Hu/GII-4/Centelles/RC05-03/909/03	Norovirus Hu/GII.4/Salvador/Dl 1/2006/BRA
Norovirus Hu/GII-4/Chester/2006/UK	Norovirus Hu/GII.4/Salvador/D12/2006/BRA
Norovirus Hu/GII-4/Chiba/040095/2003/JP	Norovirus Hu/GII.4/Salvador/E0 1/2006/BRA
Norovirus Hu/GII-4/Chiba/040974/2004/JP	Norovirus Hu/GII.4/Salvador/E02/2006/BRA
Norovirus Hu/GII-4/Chosei/061333/2006/JP	Norovirus Hu/GII.4/Salvador/E03/2006/BRA
Norovirus Hu/GII-4/CUK-3/2008/KR	Norovirus Hu/GII.4/Salvador/E06/2006/BRA
Norovirus Hu/GII-4/EAUS Wd/2008/UK	Norovirus Hu/GII.4/Salvador/E09/2006/BRA
Norovirus Hu/GII-4/Ehimel/2006/JP	Norovirus Hu/GII.4/Salvador/El 0/2006/BRA
Norovirus Hu/GII-4/Ehime2/2006/JP	Norovirus Hu/GII.4/Salvador/F0 1/2006/BRA
Norovirus Hu/GII-4/Ehime5/2006/JP	Norovirus Hu/GII.4/Salvador/F06/2006/BRA
Norovirus Hu/GII-4/ES001/2003/BRA	Norovirus Hu/GII.4/Salvador/F08/2006/BRA
Norovirus Hu/GII-4/ES003/2003/BRA	Norovirus Hu/GII.4/Salvador/F09/2006/BRA
Norovirus Hu/GII-4/ES008/2003/BRA	Norovirus Hu/GII.4/Salvador/F 10/2006/BRA
Norovirus Hu/GII-4/ES014/2003/BRA	Norovirus Hu/GII.4/Salvador/Fl 1/2006/BRA
Norovirus Hu/GII-4/ES017/2003/BRA	Norovirus Hu/GII.4/Salvador/F 12/2006/BRA
Norovirus Hu/GII-4/ES020/2003/BRA	Norovirus Hu/GII.4/Salvador/G0 1/2006/BRA
Norovirus Hu/GII-4/ES029/2003/BRA	Norovirus Hu/GII.4/Salvador/G02/2006/BRA
Norovirus Hu/GII-4/ES035/2003/BRA	Norovirus Hu/GII.4/Salvador/G03/2006/BRA
Norovirus Hu/GII-4/ES040/2003/BRA	Norovirus Hu/GII.4/Salvador/G05/2006/BRA
Norovirus Hu/GII-4/ES272/2003/BRA	Norovirus Hu/GII.4/Salvador/G07/2006/BRA
Norovirus Hu/GII-4/FUMI/2010/JP	Norovirus Hu/GII.4/Salvador/G08/2006/BRA
Norovirus Hu/GII-4/Funabashi/05060 1/2005/JP	Norovirus Hu/GII.4/Salvador/G09/2006/BRA
Norovirus Hu/GII-4/Funabashi/060548/2006/JP	Norovirus Hu/GII.4/Salvador/H05/2006/BRA
Norovirus Hu/GII-4/He Wd/2008/UK	Norovirus Hu/GII.4/Salvador/H06/2006/BRA
Norovirus Hu/GII-4/Hiroshimal/2006/JP	Norovirus Hu/GII.4/Salvador/H07/2006/BRA
Norovirus Hu/GII-4/Hiroshima2/2006/JP	Norovirus Hu/GII.4/Salvador/H09/2006/BRA
Norovirus Hu/GII-4/Ho Wd/2008/UK	Norovirus Hu/GII.4/Salvador/Hl 1/2006/BRA
Norovirus Hu/GII-4/Hokkaido 1/2006/JP	Norovirus Hu/GII.4/Salvador/H12/2006/BRA
Norovirus Hu/GII-4/Hokkaido2/2006/JP	Norovirus Hu/GII.4/Samokovl72/2007/BGR
Norovirus Hu/GII-4/Hokkaido3/2006/JP	Norovirus Hu/GII.4/Seoul/00 15/2007/KOR
Norovirus Hu/GII-4/Hokkaido4/2006/JP	Norovirus Hu/GII.4/Seoul/00 17/2007/KOR
Norovirus Hu/GII-4/Hokkaido5/2006/JP	Norovirus Hu/GII.4/Seoul/0023/2007/KOR
Norovirus Hu/GII-4/Ichikawa/050701/2005/JP	Norovirus Hu/GII.4/Seoul/0039/2007/KOR
Norovirus Hu/GII-4/Ichikawa/060832/2006/JP	Norovirus Hu/GII.4/Seoul/0040/2007/KOR
Norovirus Hu/GII-4/Ichikawa/061 159/2006/JP	Norovirus Hu/GII.4/Seoul/0045/2007/KOR
Norovirus Hu/GII-4/Inba/05 0590/2005/JP	Norovirus Hu/GII.4/Seoul/0053/2007/KOR
Norovirus Hu/GII-4/Inba/060946/2006/JP	Norovirus Hu/GII.4/Seoul/0059/2008/KOR
Norovirus Hu/GII-4/Inba/060966/2006/JP	Norovirus Hu/GII.4/Seoul/0065/2008/KOR
Norovirus Hu/GII-4/Inba/06 1099/2006/JP	Norovirus Hu/GII.4/Seoul/0066/2008/KOR
	Norovirus Hu/GII.4/Seoul/0068/2008/KOR
	Norovirus Hu/GII.4/Seoul/0074/2008/KOR

Norovirus Hu/GII-4/Inba/061224/2006/JP	Norovirus Hu/GII.4/Seoul/0093/2008/KOR
Norovirus Hu/GII-4/Inba/06 1365/2006/JP	Norovirus Hu/GII.4/Seoul/0097/2008/KOR
Norovirus Hu/GII-4/Inba/06 1367/2006/JP	Norovirus Hu/GII.4/Seoul/01 04/2008/KOR
Norovirus Hu/GII-4/Inba/06142 1/2006/JP	Norovirus Hu/GII.4/Seoul/01 06/2008/KOR
Norovirus Hu/GII-4/Isumi/060936/2006/JP	Norovirus Hu/GII.4/Seoul/01 20/2008/KOR
Norovirus Hu/GII-4/Jeju- 1/2007/KOR	Norovirus Hu/GII.4/Seoul/01 34/2008/KOR
Norovirus Hu/GII-4/Jeju-l 0/2007/KOR	Norovirus Hu/GII.4/Seoul/01 36/2008/KOR
Norovirus Hu/GII-4/Jeju-l 1/2007/KOR	Norovirus Hu/GIL4/Seoul/01 76/2008/KOR
Norovirus Hu/GII-4/Jeju- 12/2007/KOR	Norovirus Hu/GII.4/Seoul/0183/2008/KOR
Norovirus Hu/GII-4/Jeju- 14/2007/KOR	Norovirus Hu/GII.4/Seoul/0199/2007/KOR
Norovirus Hu/GII-4/Jeju- 15/2007/KOR	Norovirus Hu/GII.4/Seoul/0200/2007/KOR
Norovirus Hu/GII-4/Jeju-l 6/2007/KOR	Norovirus Hu/GII.4/Seoul/0202/2007/KOR
Norovirus Hu/GII-4/Jeju-l 9/2007/KOR	Norovirus Hu/GII.4/Seoul/0205/2007/KOR
Norovirus Hu/GII-4/Jeiu-2/2007/KOR	Norovirus Hu/GII.4/Seoul/0206/2007/KOR
Norovirus Hu/GII-4/Jeiu-2 1/2007/KOR	Norovirus Hu/GII.4/Seoul/0207/2007/KOR
Norovirus Hu/GII-4/Jeju-22/2007/KOR	Norovirus Hu/GII.4/Seoul/0209/2007/KOR
Norovirus Hu/GII-4/Jeju-27/2007/KOR	Norovirus Hu/GII.4/Seoul/02 10/2007/KOR
Norovirus Hu/GII-4/Jeju-29/2007/KOR	Norovirus Hu/GII.4/Seoul/02 15/2007/KOR
Norovirus Hu/GII-4/Jeju-32/2007/KOR	Norovirus Hu/GII.4/Seoul/02 17/2007/KOR
Norovirus Hu/GII-4/Jeju-34/2007/KOR	Norovirus Hu/GII.4/Seoul/02 18/2007/KOR
Norovirus Hu/GII-4/Jeju-4/2007/KOR	Norovirus Hu/GII.4/Seoul/022 1/2007/KOR
Norovirus Hu/GII-4/Jeju-4 1/2007/KOR	Norovirus Hu/GII.4/Seoul/0228/2008/KOR
Norovirus Hu/GII-4/Jeju-47/2007/KOR	Norovirus Hu/GII.4/Seoul/0229/2008/KOR
Norovirus Hu/GII-4/Jeiu-9/2007/KOR	Norovirus Hu/GII.4/Seoul/0230/2008/KOR
Norovirus Hu/GII-4/JN 15-Newc/2006/UK	Norovirus Hu/GII.4/Seoul/0233/2008/KOR
Norovirus Hu/GII-4/JN3-Newc/2006/UK	Norovirus Hu/GII.4/Seoul/0234/2008/KOR
Norovirus Hu/GII-4/Kaiso/030556/2003/JP	Norovirus Hu/GII.4/Seoul/0237/2008/KOR
Norovirus Hu/GII-4/Kaiso/060848/2006/JP	Norovirus Hu/GII.4/Seoul/0244/2008/KOR
Norovirus Hu/GII-4/Kaiso/06 1318/2006/JP	Norovirus Hu/GII.4/Seoul/0245/2008/KOR
Norovirus Hu/GII-4/Kashiwa/060802/2006/JP	Norovirus Hu/GII.4/Shenzhenl 04-06/2006/CHN
Norovirus Hu/GII-4/Kashiwa/06 1256/2006/JP	Norovirus Hu/GII.4/Shenzhen 12-06/2006/CHN
Norovirus Hu/GII-4/Katori/041 008/2004/JP	Norovirus Hu/GII.4/Shenzhenl20-06/2006/CHN
Norovirus Hu/GII-4/Katori/061 002/2006/JP	Norovirus Hu/GII.4/Shenzhenl22-06/2006/CHN
Norovirus Hu/GII-4/Katori/06 1492/2006/JP	Norovirus Hu/GII.4/Shenzhen 124-06/2006/CHN
Norovirus Hu/GII-4/Kimitsu/04 1440/2005/JP	Norovirus Hu/GII.4/Shenzhenl 66-06/2006/CHN
Norovirus Hu/GII-4/Kimitsu/061 146/2006/JP	Norovirus Hu/GII.4/Shenzhenl 72-06/2006/CHN
Norovirus Hu/GII-4/Kimitsu/061 427/2006/JP	Norovirus Hu/GII.4/Shenzhenl 73-06/2006/CHN
Norovirus Hu/GII-4/Kumamoto 1/2006/JP	Norovirus Hu/GII.4/Shenzhenl 76-06/2006/CHN
Norovirus Hu/GII-4/Kumamoto2/2006/JP	Norovirus Hu/GII.4/Shenzhenl 78-06/2006/CHN
Norovirus Hu/GII-4/Kumamoto3/2006/JP	Norovirus Hu/GII.4/Shenzhenl 79-06/2006/CHN
Norovirus Hu/GII-4/Kumamoto4/2006/JP	Norovirus Hu/GII.4/Shenzhenl 81-06/2006/CHN
Norovirus Hu/GII-4/Kumamoto5/2006/JP	Norovirus Hu/GII.4/Shenzhenl 96-06/2006/CHN
Norovirus Hu/GII-4/Lincoln House/2006/UK	Norovirus Hu/GIL4/Shenzhen2 1-06/2006/CHN
Norovirus Hu/GII-4/Manresa/8 1_02/914/02/Sp	Norovirus Hu/GII.4/Shenzhen27-06/2006/CHN
Norovirus Hu/GII-4/Matsudo/02 107 1/2002/JP	Norovirus Hu/GII.4/Shenzhen44-06/2006/CHN
Norovirus Hu/GII-4/Matsudo/060907/2006/JP	Norovirus Hu/GII.4/Shenzhen63-06/2006/CHN
Norovirus Hu/GII-4/Matsudo/061442/2006/JP	Norovirus Hu/GII.4/Shenzhen66-06/2006/CHN
Norovirus Hu/GII-4/Matsudo/06 1495/2006/JP	Norovirus Hu/GII.4/Shenzhen76-06/2006/CHN
Norovirus Hu/GII-4/Miyagi2/2006/JP	Norovirus Hu/GII.4/Shenzhen79-06/2006/CHN
Norovirus Hu/GII-4/Miyagi4/2006/JP	Norovirus Hu/GII.4/Shenzhen85-06/2006/CHN
Norovirus Hu/GII-4/Miyagi5/2006/JP	Norovirus Hu/GII.4/Shenzhen95-06/2006/CHN
Norovirus Hu/GII-4/Morella/867/03/Sp	Norovirus Hu/GII.4/SHZH004/2007/CHN
Norovirus Hu/GII-4/Narashino/060903/2006/JP	Norovirus Hu/GII.4/SHZH009/2007/CHN
Norovirus Hu/GII-	Norovirus Hu/GII.4/SHZH01 2/2007/CHN
	Norovirus Hu/GII.4/SHZH 154/2007/CHN

4/Narashino/061281/2006/JP	Norovirus Hu/GII.4/SHZH 166/2007/CHN
Norovirus Hu/GII-4/NFL-l 602VR88/02-2005/CAN	Norovirus Hu/GII.4/SHZH 168/2007/CHN
	Norovirus Hu/GII.4/SSCS/2005/USA
Norovirus Hu/GII-4/NFL1903/VR13/02-2005/CAN	Norovirus Hu/GII.4/Stockholm/19865/2008/SE
	Norovirus Hu/GII.4/Su2445/03O/AU
Norovirus Hu/GII-4/Noda/061 126/2006/JP	Norovirus Hu/GII.4/Sydneyl 145/98S/AU
Norovirus Hu/GII-4/OM06213/2006/UK	Norovirus Hu/GII.4/Sydney 1347/98 S/AU
Norovirus Hu/GII-4/Osaka/1998/JPN	Norovirus Hu/GII.4/Sydney 1696/98 S/AU
Norovirus Hu/GII-4/passenger 1/OB6/2007/UK	Norovirus Hu/GII.4/Sydney 198N/04S/AU
	Norovirus Hu/GII.4/Sydney2086/98S/AU
Norovirus Hu/GII-4/Patientl/2004/UK	Norovirus Hu/GII.4/Sydney2 113/98S/AU
Norovirus Hu/GII-4/Patientl 0/2007/UK	Norovirus Hu/GII.4/Sydney2 145/980/AU
Norovirus Hu/GII-4/Patientl 1/2007/UK	Norovirus Hu/GII.4/Sydney267J/04S/AU
Norovirus Hu/GII-4/Patient2-l/2006/UK	Norovirus Hu/GII.4/Sydney284/97S/AU
Norovirus Hu/GII-4/Patient2-4/2006/UK	Norovirus Hu/GII.4/Sydney348/970/AU
Norovirus Hu/GII-4/Patient5/2006/UK	Norovirus Hu/GII.4/Sydney40 12/02 S/AU
Norovirus Hu/GII-4/Patient6/2006/UK	Norovirus Hu/GII.4/Sydney4134/01 S/AU
Norovirus Hu/GII-4/Patient7-l/2006/UK	Norovirus Hu/GII.4/Sydney4136/01 S/AU
Norovirus Hu/GII-4/Patient7-2/2006/UK	Norovirus Hu/GII.4/Sydney4209/01 S/AU
Norovirus Hu/GII-4/Patient8/2006/UK	Norovirus Hu/GII.4/Sydney4237/01 S/AU
Norovirus Hu/GII-4/Patient9/2006/UK	Norovirus Hu/GII.4/ Sydney4262/0 1S/AU
Norovirus Hu/GII-4/Peniscola/5 83/02/Sp	Norovirus Hu/GII.4/Sydney 4264/0 1S/AU
Norovirus Hu/GII-4/Peniscola/852/02/Sp	Norovirus Hu/GII.4/Sydney4266/0 1S/AU
Norovirus Hu/GII-4/Pineda_de_Mar/792/02/Sp	Norovirus Hu/GII.4/Sydney4288/02 S/AU
Norovirus Hu/GII-4/Portsmouth/2004/UK	Norovirus Hu/GII.4/Sydney433 7/02 S/AU
Norovirus Hu/GII-4/Res._S.Patricio/757/02/Sp	Norovirus Hu/GII.4/Sydney4360/02S/AU
Norovirus Hu/GII-4/Res_Enbellpuig/793/02/Sp	Norovirus Hu/GII.4/Sydney43 84/02 S/AU
	Norovirus Hu/GII.4/Sydney441 6/02 S/AU
Norovirus Hu/GII-4/RH488/2008/UK	Norovirus Hu/GII.4/Sydney4477/02 S/AU
Norovirus Hu/GII-4/Rhyl-FCH/2008/UK	Norovirus Hu/GII.4/Sydney4480/02S/AU
Norovirus Hu/GII-4/Rhyl440/2004/UK	Norovirus Hu/GII.4/Sydney591/97S/AU
Norovirus Hu/GII-4/Sagal/2006/JP	Norovirus Hu/GII.4/Sydney625K/04O/AU
Norovirus Hu/GII-4/Saga4/2006/JP	Norovirus Hu/GII.4/Sydney642/97S/AU
Norovirus Hu/GII-4/Saga5/2006/JP	Norovirus Hu/GII.4/Sydney715D/04S/AU
Norovirus Hu/GII-4/Sakai2/2006/JP	Norovirus Hu/GII.4/Sydney740C/2006/AUS
Norovirus Hu/GII-4/Sakai3/2006/JP	Norovirus Hu/GII.4/Sydney755/97S/AU
Norovirus Hu/GII-4/Sakai4/2006/JP	Norovirus Hu/GII.4/Sydney762I/04S/AU
Norovirus Hu/GII-4/Sallent/RC_73_02/92 1/02/Sp	Norovirus Hu/GII.4/Sydney776/990/AU
	Norovirus Hu/GII.4/Sydney 812J/02O/AU
Norovirus Hu/GII-4/Sanbu/050878/2006/JP	Norovirus Hu/GII.4/Sydney9 17J/02O/AU
Norovirus Hu/GII-4/STDGH/2008/UK	Norovirus Hu/GII.4/Taipei-AB/06/TW
Norovirus Hu/GII-4/Tarrasa/772/02/Sp	Norovirus Hu/GII.4/Taipei-AD/06/TW
Norovirus Hu/GII-4/Toyamal/2006/JP	Norovirus Hu/GII.4/Taipei-AE/06/TW
Norovirus Hu/GII-4/Toyama4/2006/JP	Norovirus Hu/GII.4/Taipei-AN/06/TW
Norovirus Hu/GII-4/Toyama5/2006/JP	Norovirus Hu/GII.4/Taipei-ANl/06/TW
Norovirus Hu/GII-4/U/2004/UK	Norovirus Hu/GII.4/Taipei-AP/06/TW
Norovirus Hu/GII-4/Valencia/530i/01/Sp	Norovirus Hu/GII.4/Taipei-AR/06/TW
Norovirus Hu/GII-4/Vilanova/767/02/Sp	Norovirus Hu/GII.4/Taipei-AS/06/TW
Norovirus Hu/GII.4/10468/2005/BRA	Norovirus Hu/GII.4/Taipei-AW/06/TW
Norovirus Hu/GII.4/10513/2005/BRA	Norovirus Hu/GII.4/Taipei-AZ/06/TW
Norovirus Hu/GII.4/10526/2004/IRL	Norovirus Hu/GII.4/Taipei-BB/06/TW
Norovirus Hu/GII.4/10624/2005/BRA	Norovirus Hu/GII.4/Taipei-BD/06/TW
Norovirus Hu/GII.4/10641/2005/BRA	Norovirus Hu/GII.4/Taipei-BG/06/TW
Norovirus Hu/GII.4/10661/2005/BRA	Norovirus Hu/GII.4/Taipei-D/06/TW
Norovirus Hu/GII.4/10668/2005/BRA	Norovirus Hu/GII.4/Taipei-U/06/TW

Norovirus Hu/GII.4/10801/2005/BRA	Norovinis Hu/GII.4/Taipei-V/06/TW
Norovirus Hu/GII.4/10852/2005/BRA	Norovirus Hu/GII.4/Terneuzen70/2006/NL
Norovirus Hu/GII.4/10897/2005/BRA	Norovirus Hu/GII.4/Tianjin/2/2008/CHN
Norovirus Hu/GII.4/10942/2005/BRA	Norovirus Hu/GII.4/Tianjin/26/2008/CHN
Norovirus Hu/GII.4/10962/2005/BRA	Norovirus Hu/GII.4/Tianjin/27/2008/CHN
Norovirus Hu/GII.4/11779/2005/BRA	Norovirus Hu/GII.4/Tianjin/28/2008/CHN
Norovirus Hu/GII.4/11869/2006/BRA	Norovirus Hu/GII.4/Tianjin/29/2008/CHN
Norovirus Hu/GII.4/1 1952/2006/BRA	Norovirus Hu/GII.4/Tianjin/30/2008/CHN
Norovirus Hu/GII.4/120 16/2006/BRA	Norovirus Hu/GII.4/Tianjin/3 1/2008/CHN
Norovirus Hu/GII.4/12044/2006/BRA	Norovirus Hu/GII.4/Tianjin/33/2008/CHN
Norovirus Hu/GII.4/12079/2006/BRA	Norovirus Hu/GII.4/Tianjin/34/2008/CHN
Norovirus Hu/GII.4/12090/2006/BRA	Norovirus Hu/GII.4/Tianjin/36/2008/CHN
Norovirus Hu/GII.4/12091/2006/BRA	Norovirus Hu/GII.4/Tianjin/42/2008/CHN
Norovirus Hu/GII.4/12098/2006/BRA	Norovirus Hu/GII.4/Tianjin/50/2008/CHN
Norovirus Hu/GII.4/12 103/2006/BRA	Norovirus Hu/GII.4/Tianjin/55/2008/CHN
Norovirus Hu/GII.4/12 155/2006/BRA	Norovirus Hu/GII.4/Tianjin/62/2008/CHN
Norovirus Hu/GII.4/12 161/2006/BRA	Norovirus Hu/GII.4/Tianjin/66/2008/CHN
Norovirus Hu/GII.4/1 22/1 7/2006/RJ/BRA	Norovirus Hu/GII.4/Tianjin/68/2008/CHN
Norovirus Hu/GII.4/124/12/2006/RJ/BRA	Norovirus Hu/GII.4/Tianjin/72/2008/CHN
Norovirus Hu/GII.4/124/1 6/2006/RJ/BRA	Norovirus Hu/GII.4/Tianjin/75/2008/CHN
Norovirus Hu/GII.4/1 30/1 3/2006/RJ/BRA	Norovmis Hu/GII.4/Tianjin/9/2008/CHN
Norovirus Hu/GII.4/13370/2007/BRA	Norovirus Hu/GII.4/Tianjin/90/2008/CHN
Norovirus Hu/GII.4/1 3473/2007/BRA	Norovirus Hu/GII.4/Tianjin/9 1/2008/CHN
Norovirus Hu/GII.4/13504/2007/BRA	Norovirus Hu/GII.4/Turramurra597U/04O/AU
Norovirus Hu/GII.4/13531/2007/BRA	Norovirus Hu/GII.4/Turramurra604J/04O/AU
Norovirus Hu/GII.4/13563/2007/BRA	Norovirus Hu/GII.4/VIC0682/2007/AU
Norovirus Hu/GII.4/13693/2007/BRA	Norovirus Hu/GII.4/VIC3850/2007/AU
Norovirus Hu/GII.4/13707/2007/BRA	Norovirus Hu/GII.4/VIC3 852/2007/AU
Norovirus Hu/GII.4/1 3822/2007/BRA	Norovirus Hu/GII.4/VIC3863/2007/AU
Norovirus Hu/GII.4/1 3827/2007/BRA	Norovirus Hu/GII.4/VIC4670/2007/AU
Norovirus Hu/GII.4/13930/2007/BRA	Norovirus Hu/GII.4/VIC468 1/2007/AU
Norovirus Hu/GII.4/13945/2007/BRA	Norovirus Hu/GII.4/VIC4906/2007/AU
Norovirus Hu/GII.4/1 4/1/1 9/2007/RJ/BRA	Norovirus Hu/GII.4/VIC491 1/2007/AU
Norovirus Hu/GII.4/14013/2007/BRA	Norovirus Hu/GII.4/VIC8 188/2007/AU
Norovirus Hu/GII.4/14865/2008/RJ/BRA	Norovirus Hu/GII.4/VIC8193/2007/AU
Norovirus Hu/GII.4/2004/NL	Norovirus Hu/GII.4/WA001D/2007/AU
Norovirus Hu/GII.4/2006b/AS2/2007/CHN	Norovirus Hu/GII.4/WA080B/2008/AU
Norovirus Hu/GII.4/2006b/AS6/2007/CHN	Norovirus Hu/GII.4/WA125C/2007/AU
Norovirus Hu/GII.4/2006b/AS7/2007/CHN	Norovirus Hu/GII.4/WA178J/2007/AU
Norovirus Hu/GII.4/2006b/BX7/2007/CHN	Norovirus Hu/GII.4/WA229F/2007/AU
Norovirus Hu/GII.4/2006b/DD6/2007/CHN	Norovirus Hu/GII.4/WA432N/2007/AU
Norovirus Hu/GII.4/2006b/DD9/2007/CHN	Norovirus Hu/GII.4/WA476G/2007/AU
Norovirus Hu/GII.4/2006b/DL2/2007/CHN	Norovirus Hu/GII.4/WA530G/2007/AU
Norovirus Hu/GII.4/2006b/DL4/2007/CHN	Norovirus Hu/GII.4/WA670N/2007/AU
Norovirus Hu/GII.4/2006b/FS7/2007/CHN	Norovirus Hu/GII.4/WA971W/2007/AU
Norovirus Hu/GII.4/2006b/FX2/2007/CHN	Norovirus Hu/GII.4/WA988N/2007/AU
Norovirus Hu/GII.4/2006b/FX3/2007/CHN	Norovirus Hu/GII.4/Wellington/l 995/USA
Norovirus Hu/GII.4/2006b/FX8/2007/CHN	Norovirus Hu/GII.4/Yerseke3 8/2006/NL
Norovirus Hu/GII.4/2006b/JZ7/2007/CHN	Norovirus Hu/GII.4a/Sofia367/2007/BGR
Norovirus Hu/GII.4/2006b/JZ8/2007/CHN	Norovirus Hu/GII4/47836/Hainan/06/CHN
Norovirus Hu/GII.4/2006b/LYl 0/2007/CHN	Norovirus Hu/GII4/47847/Hainan/06/CHN
Norovirus Hu/GII.4/2006b/LY2/2007/CHN	Norovirus Hu/GII4/47925/Hebei/06/CHN
Norovirus Hu/GII.4/2006b/LY4/2007/CHN	Norovirus Hu/GII4/48 178/Shanxi/06/CHN
Norovirus Hu/GII.4/2006b/LY6/2007/CHN	Norovirus Hu/GII4/496 13/Shaanxi/06/CHN
Norovirus Hu/GII.4/2006b/LY7/2007/CHN	Norovirus Hu/GII4/50 143/Jilin/06/CHN

Norovirus Hu/GII.4/2006b/PJ4/2007/CHN	Norovirus Hu/GII4/503 18/Hebei/06/CHN
Norovirus Hu/GII.4/2006b/SY2/2007/CHN	Norovirus Hu/GII4/50483/Jilin/06/CHN
Norovirus Hu/GII.4/4336/2007/IRL	Norovirus Hu/GII4/50496/Jilin/06/CHN
Norovirus Hu/GII .4/754	Norovirus Hu/GII4/50503/Jilin/06/CHN
N.Novgorod/2008/RUS	Norovirus Hu/GII4/505 10/Jilin/0 6/CHN
Norovirus Hu/GII.4/7883/2006/IRL	Norovirus Hu/GII4/5051 l/Jilin/06/CHN
Norovirus Hu/GII.4/866	Norovirus Hu/GII4/505 12/Jilin/06/CHN
N.Novgorod/2008 /PvUS	Norovirus Hu/GII4/505 14/Jilin/06/CHN
Norovirus Hu/GII.4/884	Norovirus Hu/GII4/505 15/Jilin/06/CHN
N.Novgorod/2008/RUS	Norovirus Hu/GII4/505 16/Jilin/06/CHN
Norovirus Hu/GII.4/8854/2004/IRL	Norovirus Hu/GII4/50523/Jilin/06/CHN
Norovirus Hu/GII.4/Apeldoom3 17/2007/NL	Norovirus Hu/GII4/50524/Jilin/06/CHN
Norovirus Hu/GII.4/Beijing/167/2007	Norovirus Hu/GII4/50535/Jilin/06/CHN
Norovirus Hu/GII. 4/Beijing/l 70/2007	Norovirus Hu/GII4/50540/Jilin/06/CHN
Norovirus Hu/GII. 4/Beijing/l 94/2007	Norovirus Hu/GII4/50559/Jilin/06/CHN
Norovirus Hu/GII. 4/Beijing/2 12/2007	Norovirus Hu/GII4/50562/Jilin/06/CHN
Norovirus Hu/GII.4/Beijing/222/2007	Norovirus Hu/GII4/50564/Jilin/06/CHN
Norovirus Hu/GII.4/Beijing/225/2007	Norovirus Hu/GII4/50566/Jilin/06/CHN
Norovirus Hu/GII.4/BJl 72/2007/CHN	Norovirus Hu/GII4/50567/Jilin/06/CHN
Norovirus Hu/GII.4/BJ222/2008/CHN	Norovirus Hu/GII4/50569/Jilin/06/CHN
Norovirus Hu/GII.4/BJ225/2008/CHN	Norovirus Hu/GII4/50580/Jilin/06/CHN
Norovirus Hu/GII.4/BJ226/2008/CHN	Norovirus Hu/GII4/5 1002/Jilin/06/CHN
Norovirus Hu/GII.4/BJ228/2008/CHN	Norovirus Hu/GII4/5 103 l/Jilin/06/CHN
Norovirus Hu/GII.4/BJ231/2008/CHN	Norovims Hu/GII4/5 1074/Jilin/06/CHN
Norovirus Hu/GII.4/BJ238/2008/CHN	Norovirus Hu/GII4/5 1078/Jilin/06/CHN
Norovirus Hu/GII.4/BJ240/2008/CHN	Norovirus Hu/GII4/5 1079/Jilin/06/CHN
Norovirus Hu/GII.4/BJ244/2008/CHN	Norovirus Hu/GII4/5 1267/Anhui/06/CHN
Norovirus Hu/GII.4/BJ245/2008/CHN	Norovirus Hu/GII4/5 1268/Anhui/06/CHN
Norovirus Hu/GII.4/BJ299/2008/CHN	Norovirus Hu/GII4/5 1270/Anhui/06/CHN
Norovirus Hu/GII.4/Boxmeer/90 104-42217/2009/NLD	Norovirus Hu/GII4/5 1273/Anhui/06/CHN
	Norovirus Hu/GII4/5 1275/Anhui/06/CHN
Norovirus Hu/GII.4/CHDC2094/1974/US	Norovirus Hu/GII4/5 1850/Hebei/07/CHN
Norovirus Hu/GII.4/CHDC3967/1988/US	Norovirus Hu/GII4/5 1856/Hebei/07/CHN
Norovirus Hu/GII.4/CHDC4108/1987/US	Norovirus Hu/GII4/5 1873/Hebei/07/CHN
Norovirus Hu/GII.4/CHDC4871 /1977/US	Norovirus Hu/GII4/5 1875/Hebei/07/CHN
Norovirus Hu/GII.4/CHDC5 191/1 974/US	Norovirus Hu/GII4/52066/Shanghai/06/CHN
Norovirus Hu/GII.4/Chungnam(1-32)/2008/Kor	Norovirus Hu/GII4/522 17/ Shanghai/0 6/CHN
	Norovirus Hu/GII4/52240/Shanghai/06/CHN
Norovirus Hu/GII.4/Chungnam(10-70)/2008/Kor	Norovirus Hu/GII4/52398/Jilin/07/CHN
	Norovirus Hu/GII4/5241 5/Jilin/07/CHN
Norovirus Hu/GII.4/Chungnam(10-88)/2008/Kor	Norovirus Hu/GII4/5241 6/Jilin/07/CHN
	Norovirus Hu/GII4/5242 l/Jilin/07/CHN
Norovirus Hu/GII.4/Chungnam(11-100)/2008/Kor	Norovirus Hu/GII4/52422/Jilin/07/CHN
	Norovirus Hu/Houston/TCHl 86/2002/US
Norovirus Hu/GII.4/Chungnam(l 1-104)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Cegledl603/2002/HUN
Norovirus Hu/GII. 4/Chungnam(l 1-91)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Dunaujvaros2477/2006/HUN
Norovirus Hu/GII.4/Chungnam(11-94)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Gyor2872/2006/HUN
Norovirus Hu/GII.4/Chungnam(12-107)/2008/Kor	Norovims Hu/Norovirus/GII-4/Kapuvar3 029/2007/HUN
Norovirus Hu/GII.4/Chungnam(12-170)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Kiskunhalasl264/2002/HUN
Norovirus Hu/GII.4/Chungnam(12-	Norovirus Hu/Norovirus/GII-

176)/2008/Kor	4/Mohacs 1147/2002/HUN
Norovirus Hu/GII.4/Chungnam(12-77)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Mosonmagyarovar2 594/2 006/HUN
Norovirus Hu/GII.4/Chungnam(4-29)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Nagykoru2098/2004/HUN
Norovirus Hu/GII.4/Chungnam(6-85)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Ocsa923/2002/HUN
Norovirus Hu/GII.4/Chungnam(9-34)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Pecs2967/2007/HUN
Norovirus Hu/GII.4/Chungnam(out-ag5)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Sopron 1562/2 002/HUN
Norovirus Hu/GII.4/Chungnam(out-as6)/2008/Kor	Norovirus Hu/Norovirus/GII-4/Tiszatelek982/2002/HUN
Norovirus Hu/GII.4/Chungnam(out-brl)/2008/Kor	Norovirus oyster/GII.4/2007/USA
Norovirus Hu/GII.4/Chungnam(out-brl5)/2008/Kor	Norovirus sea water/GII.4/HME-371/TWN
Norovirus Hu/GII.4/Chungnam(out-brl7)/2008/Kor	Norovirus sea water/GII.4/HME-493/TWN
Norovirus Hu/GII.4/Chungnam(out-br25)/2008/Kor	Norovirus sea water/GII.4/HME-527/TWN
Norovirus Hu/GII.4/Chungnam(out-ns9)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW061 0-1/2006/JP
Norovirus Hu/GII.4/Chungnam(out-sc8)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW061 1-1/2006/JP
Norovirus Hu/GII.4/Chungnam(out-sc9)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW0612-7/2006/JP
Norovirus Hu/GII.4/Chungnam(out-ssl3)/2008/Kor	Norovirus sewage/GII.4/Toyama/S W070 1-5/2007/JP
Norovirus Hu/GII.4/Chungnam(out-ss20)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW0702-4/2007/JP
Norovirus Hu/GII.4/Chungnam(out-ss23)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW0703-1/2007/JP
Norovirus Hu/GII.4/Chungnam(out-ss33)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW0704-2/2007/JP
Norovirus Hu/GII.4/Chungnam(out-ss38)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW0706-1/2007/JP
Norovirus Hu/GII.4/Chungnam(out-sshl)/2008/Kor	Norovirus sewage/GII.4/Toyama/SW0707-1/2007/JP
Norovirus Hu/GII.4/cruise ship/VS122/2006/USA	Norovirus sewage/GII.4/Toyama/SW0708-19/2007/JP
Norovirus Hu/GII.4/cruiseship/2007/ZAF	Norovirus sewage/GII.4/Toyama/SW071 0-1/2007/JP
Norovirus Hu/GII.4/Cuernavaca/503 18/2007/MEX	Norovirus sewage/GII.4/Toyama/SW071 1-10/2007/JP
Norovirus Hu/GII.4/Cuernavaca/50320/2007/MEX	Norovirus sewage/GII.4/Toyama/SW0712-13/2007/JP
Norovirus Hu/GII.4/Cuernavaca/7366/2008/MEX	Norovirus Hu/GII.4/Hiroshima/l 15/2007/JPN
Norovirus Hu/GII.4/Cuemavaca/7366v4/2008/MEX	Norovirus Hu/GII.4/Hiroshima/ 129/2007/JPN
Norovirus Hu/GII.4/Cuernavaca/8030/2008/MEX	Norovirus Hu/GII.4/Hiroshima/l 34/2007/JPN
Norovirus Hu/GII.4/Cuernavaca/8034/2008/MEX	Norovirus Hu/GII.4/Hiroshima/l 39/2007/JPN
Norovirus Hu/GII.4/DenHaag54/2006/NL	Norovirus Hu/GII.4/Hiroshima/l 51/2008/JPN
	Norovirus Hu/GII.4/Hiroshima/l 54/2008/JPN
	Norovinis Hu/GII.4/Hiroshima/l 9/200 1/JPN
	Norovirus Hu/GII.4/Hiroshima/42/2004/JPN
	Norovirus Hu/GII.4/Hiroshima/44/2004/JPN
	Norovirus Hu/GII.4/Hiroshima/48/2004/JPN
	Norovirus Hu/GII.4/Hiroshima/55/2005/JPN
	Norovirus Hu/GII.4/Hiroshima/56/2005/JPN
	Norovirus Hu/GII.4/Hiroshima/57/2005/JPN

Norovirus Hu/GII.4/DenHaag89/2006/NL Norovirus Hu/GII.4/Dhaka8/2004/BGD Norovirus Hu/GII.4/Dijon/E872/2002/FRA Norovirus Hu/GII.4/DilwichHill203D/04O/AU Norovirus Hu/GII.4/Dongen46/2006/NL Norovirus Hu/GII.4/DulwichHill 190I/04O/AU Norovirus Hu/GII.4/DulwichHill 194M/04O/AU Norovirus Hu/GII.4/DulwichHill 197P/04O/AU Norovirus Hu/GII.4/GE14/IRN Norovirus Hu/GII.4/GE28/IRN Norovirus Hu/GII.4/GE3/IRN Norovirus Hu/GII.4/GE31/IRN Norovirus Hu/GII.4/GE44/IRN Norovirus Hu/GII.4/GE8/IRN Norovirus Hu/GII.4/GE9/IRN Norovirus Hu/GII.4/Henry/2000/USA Norovirus Hu/GII.4/Hiroshima/l 08/2007/JPN Norovirus Hu/GII.4/Hiroshima/l 09/2007/JPN Norovirus Hu/GII.4/Hiroshima/l 10/2007/JPN	Norovirus Hu/GII.4/Hiroshima/5 8/2005/JPN Norovirus Hu/GII.4/Hiroshima/59/2005/JPN Norovirus Hu/GII.4/Hiroshima/63/2006/JPN Norovirus Hu/GII.4/Hiroshima/67/2006/JPN Norovirus Hu/GII.4/Hiroshima/68/2006/JPN Norovirus Hu/GII.4/Hiroshima/69/2006/JPN Norovirus Hu/GII.4/Hiroshima/74/2006/JPN
Norovirus genogroup GII.5	
Norovirus Hu/GII.5/Cuernavaca/8039/2008/MEX	Norovirus Hu/GII. 5/Guadalajara/5005 1/2007/MEX
Norovirus genogroup GII.6	
Norovirus Hu/GII-6/ES315/2003/BRA Norovirus Hu/GII-6/ES332/2003/BRA Norovirus Hu/GII.6/13573/2007/PJ/BRA Norovirus Hu/GII.6/46048/2006/IRL Norovirus Hu/GII.6/47747/2006/IRL	Norovirus Hu/GII.6/Cuernavaca/50335/2007/MEX Norovirus Hu/GII.6/Dhaka233/2000/BGD Norovirus sewage/GII.6/Toyama/SW070 1-35/2007/JP Norovirus sewage/GII.6/Toyama/SW0705-2/2007/JP
Norovirus genogroup GII.7	
Norovirus Hu/GII-8/ES343/2003/BRA Norovirus	Norovirus Hu/GII.8/Cuernavaca/50364v2/2007/MEX Hu/GII.8/Cuernavaca/50364vl/2007/MEX
Norovirus genogroup GII.8	
Norovirus Hu/GII-8/ES343/2003/BRA Norovirus	Norovirus Hu/GII.8/Cuernavaca/50364v2/2007/MEX Hu/GII.8/Cuernavaca/50364vl/2007/MEX
Norovirus genogroup GII.9	
Norovirus Hu/GII.9/10775/2005/BRA Norovirus Hu/GII.9/Alingsas/p 1/2009/SWE Norovirus Hu/GII.9/Cuernavaca/73 15/2007/MEX Norovirus Hu/GII.9/Salvador/A04/2006/BRA Norovirus Hu/GII.9/Salvador/A06/2006/BRA	Norovirus Hu/GII.9/Salvador/A07/2006/BRA Norovirus Hu/GII.9/Salvador/A08/2006/BRA Norovirus Hu/GII.9/Salvador/B03/2006/BRA Norovirus Hu/GII.9/Salvador/B04/2006/BRA Norovirus Hu/GII.9/Salvador/B05/2006/BRA Norovirus Hu/GII.9/Salvador/F03/2006/BRA
Norovirus genogroup GILb	
Human calicivirus NLV/Gourdon78/2000/France Norovirus env/GGII.b/1036/2007/ITA Norovirus env/GGII.b/1 161a/2007/ITA Norovirus env/GGII.b/1 161b/2007/ITA Norovirus env/GGII.b/1 162b/2007/ITA Norovirus Env/GGII.b/678/2006/IT Norovirus Env/GGII.b/679/2006/IT	Norovirus Hu/GIIb/021 15441/2002/AUS Norovirus Hu/GIIb/031 55665/2003/AUS Norovirus Hu/GIIb/031 57163/2003/AUS Norovirus Hu/GIIb/031 57169/2003/AUS Norovirus Hu/GIIb/041 07624/2004/AUS Norovirus Hu/GIIb/041 13824/2004/AUS Norovirus Hu/GIIb/041 13843/2004/AUS Norovirus Hu/GIIb/041 14779/2004/AUS

Norovirus Hu/GGII.b/670/2006/IT Norovirus Hu/GGIIb/oysterl7350A/7735 1/FR Norovirus Hu/GGIIb/oysterl7860A/7735 1/FR Norovirus Hu/GII.b/50602/2006/IRL Norovirus Hu/GII.b/8503/2007/IRL Norovirus Hu/**GII**.b/9590/2004/IRL Norovirus Hu/**GII**.b/9614/2004/IRL Norovirus Hu/GIIb/02 106590/2002/AUS Norovirus Hu/GIIb/02 115422/2002/AUS	Norovirus Hu/GIIb/04 12 1605/2004/AUS Norovims Hu/GIIb/041 34701/2004/AUS Norovirus Hu/GIIb/04 144544/2004/AUS Norovirus Hu/GIIb/04 1501 02/2004/AUS Norovirus Hu/GIIb/041 55699/2004/AUS Norovirus Hu/GIIb/05 100687/2004/AUS Norovirus Hu/GIIb/05 143926/2005/AUS
Snow Mountain virus	
Norovirus genogroup 3	
Norovirus Bo/GIII.l/Aba-Z5/2002/HUN Norovirus Bo/GIII.l/Norsewood/2006/NZL Norovirus Bo/GIII.2/Aba-4736/2008/HUN Norovirus Bo/GIII.2/Aba-Z2/2002/HUN Norovirus bovine/GIII.2/2 16_0114/2006/NOR Norovirus bovine/GIII.2/240 _0243/2005/NOR Norovirus bovine/GIII.2/300 _0250/2006/NOR Norovirus bovine/GIII.2/3 12_0529/2006/NOR Norovirus bovine/GIII.2/340_1235/2006/NOR Norovirus bovine/GIII.2/471_0790/2005/NOR	Norovirus bovine/GIII.2/541_0448/2005/NOR Norovirus bovine/GIII.2/584_3248/2005/NOR Norovirus bovine/GIII.2/670 _0799/2006/NOR Norovirus bovine/GIII.2/71 8_0785/2006/NOR Norovirus bovine/GIII/chimeric/107_0485/2005/NOR Norovims bovine/GIII/chimeric/661_1 570/2006/NOR Norovims bovine/GIII/chimeric/752_3024/2006/NOR Norovims bovine/GIII/chimeric/785_0449/2006/NOR Norovirus Hu/G3/C5-1 06/South Korea
Norovirus genogroup 4	
Human calcivirus NV/GIV/Stockholm/IV1680/2002/SE Norovirus dog/1 70/07/Ita	Norovims dog/GIV.2/Bari/9 1/2007/ITA Norovims Hu/GIV. l/Italy/980/2007/ITA Norovims lion/GGIV.2/Pistoia/3 87/06/ITA
Norovirus isolates	
Human calicivirus Hu/NLV/Berlin/226/0 1/DE Human calicivirus Hu/NLV/Bitburg/289/0 1/DE Human calicivirus Hu/NLV/Leverkusen45 1/2000/DE Human calicivirus Hu/NLV/Leverkusen476/2000/DE Human calicivirus Hu/NLV/Oxford/B5 S22/2003/UK Human calicivirus Hu/NLV/Queen's Arms/Leeds/92/UK Human calicivirus Hu/SaV4895/200 1/Bra Human calicivirus MclO Human calicivirus NLV/1 157-01/SWE Human calicivirus NLV/13 12-01/SWE Human calicivirus NLV/1464-01/SWE Human calicivirus NLV/158 1-00/SWE Human calicivims NLV/158 1-01/SWE Human calicivims NLV/1 86-01/SWE Human calicivims NLV/1937-00/SWE Human calicivims NLV/2004-00/SWE Human calicivims NLV/21 02-00/SWE Human calicivims NLV/21 15-00/SWE Human calicivims NLV/21 97-00/SWE	Norovims Hu/NFLV464 l/Terre-Neuve/06-2004/CAN Norovims Hu/NLV/BA423 1/2004/Arg Norovims Hu/NLV/Banbury/B9S23/2003/UK Norovims Hu/NLV/ChippingNorton/2003/UK Norovims Hu/NLV/Didcot/B9S2/2003/UK Norovims Hu/NLV/DjiboutiVdG5/2003/Djibouti Norovims Hu/NLV/DjiboutiVdG50/2003/Djibouti Norovims Hu/NLV/DjiboutiVdG66/2003/Djibouti Norovims Hu/NLV/Dresdenl 74/pUS-NorII/1 997/GE Norovims Hu/NLV/E3/1997/Crete Norovims Hu/NLV/ER4424/2004/Arg Norovims Hu/NLV/ER4426/2004/Arg Norovims Hu/NLV/II/Hualien/2004/TW Norovims Hu/NLV/LP4392/2004/Arg Norovims Hu/NLV/LP4395/2004/Arg Norovims Hu/NLV/NE4208/2004/Arg Norovims Hu/NLV/Oxford/Bl S1/2002/UK Norovims Hu/NLV/Oxford/Bl SI 1/2002/UK Norovirus Hu/NLV/Oxford/B l S l 2/2002/UK Norovirus Hu/NLV/Oxford/B 1S16/2002/UK Norovims Hu/NLV/Oxford/Bl S2/2002/UK Norovims Hu/NLV/Oxford/B 1S2 1/2002/UK

Human calicivirus NLV/2366-00/SWE	Norovirus Hu/NLV/Oxford/Bl S4/2002/UK
Human calicivirus NLV/500-01/SWE	Norovirus Hu/NLV/Oxford/B2Sl 0/2002/UK
Human calicivirus NLV/Albacete70/01/SP	Norovirus Hu/NLV/Oxford/B2Sl 1/2002/UK
Human calicivirus NLV/Altenkirchen 140/01/DE	Norovirus Hu/NLV/Oxford/B2 Sl4/2002/UK
	Norovirus Hu/NLV/Oxford/B2S l5/2002/UK
Human calicivirus NLV/Avilal 12/02/SP	Norovirus Hu/NLV/Oxford/B2Sl 6/2002/UK
Human calicivirus NLV/BA1026	Norovirus Hu/NLV/Oxford/B2Sl 7/2002/UK
Human calicivirus NLV/Bacsborsod/1 542/2002/HUN	Norovirus Hu/NLV/Oxford/B2Sl 8/2002/UK
	Norovirus Hu/NLV/Oxford/B2S20/2002/UK
Human calicivirus NLV/Bad Berleburg/477/01	Norovirus Hu/NLV/Oxford/B2S23/2002/UK
Human calicivirus NLV/Balatonlelle/680/2001/HUN	Norovirus Hu/NLV/Oxford/B2 S24/2002/UK
	Norovirus Hu/NLV/Oxford/B2S25/2002/UK
Human calicivirus NLV/Basel/2001/CH	Norovirus Hu/NLV/Oxford/B2S26/2002/UK
Human calicivirus NLV/Batonyterenye/1436/2002/HUN	Norovirus Hu/NLV/Oxford/B3 S16/2003/UK
	Norovirus Hu/NLV/Oxford/B3Sl 8/2003/UK
Human calicivirus NLV/Beijing/cr840/China	Norovirus Hu/NLV/Oxford/B3 S19/2003/UK
Human calicivirus NLV/Benetusser/453/2002/Sp	Norovirus Hu/NLV/Oxford/B3 S20/2003/UK
	Norovirus Hu/NLV/Oxford/B3 S4/2003/UK
Human calicivirus NLV/Berlin 146/2000/DE	Norovirus Hu/NLV/Oxford/B4S 1/2002/UK
Human calicivirus NLV/Berlin 210-1/1999/DE	Norovirus Hu/NLV/Oxford/B4S2/2002/UK
Human calicivirus NLV/Berlin 210-2/1999/DE	Norovirus Hu/NLV/Oxford/B4S4/2002/UK
Human calicivirus NLV/Berlin 211-l/1999/DE	Norovirus Hu/NLV/Oxford/B4S5/2002/UK
Human calicivirus NLV/Berlin 211-2/1999/DE	Norovirus Hu/NLV/Oxford/B4S6/2002/UK
Human calicivirus NLV/Berlin 248/1999/DE	Norovirus Hu/NLV/Oxford/B4S7/2002/UK
Human calicivirus NLV/Berlin 348/2000/DE	Norovirus Hu/NLV/Oxford/B5 S1/22002/UK
Human calicivirus NLV/Berlin 363/2000/DE	Norovirus Hu/NLV/Oxford/B5 SI0/2002/UK
Human calicivirus NLV/Berlin 385/2000/DE	Norovirus Hu/NLV/Oxford/B5Sl 3/2002/UK
Human calicivirus NLV/Berlin/159/98/DE	Norovirus Hu/NLV/Oxford/B5 S19/2002/UK
Human calicivirus NLV/Berlin/238/98/DE	Norovirus Hu/NLV/Oxford/B5 S23/2003/UK
Human calicivirus NLV/Berne/2001/CH	Norovirus Hu/NLV/Oxford/B5 S7/2002/UK
Human calicivirus NLV/Bicske/1 225/2002/HUN	Norovirus Hu/NLV/Oxford/B5 S8/2002/UK
	Norovirus Hu/NLV/Oxford/B5 S9/2002/UK
Human calicivirus NLV/Boxer/2001/US	Norovirus Hu/NLV/Oxford/B6S2/2003/UK
Human calicivirus NLV/Brandenburg 40/1999/DE	Norovirus Hu/NLV/Oxford/B6S3/2003/UK
	Norovirus Hu/NLV/Oxford/B6S4/2003/UK
Human calicivirus NLV/Budapest/1 095/2002/HUN	Norovirus Hu/NLV/Oxford/B6S5/2003/UK
	Norovirus Hu/NLV/Oxford/B6S6/2003/UK
Human calicivirus NLV/Budapest/HUNs 1/1997/HUN	Norovirus Hu/NLV/Oxford/B8S5/2002/UK
	Norovirus Hu/NLV/Pont de Roide 671/2004/France
Human calicivirus NLV/C59/99	Norovirus Hu/NLV/Pont de Roide 673/2004/France
Human calicivirus NLV/Castell/2001/Sp	Norovirus Hu/NLV/RN4372/2004/Arg
Human calicivirus NLV/Coruna90/02/SP	Norovirus Hu/NLV/RN4379/2004/Arg
Human calicivirus NLV/Csakvar/877/200 1/HUN	Norovirus Hu/NLV/S63/1999/France
	Norovirus Hu/NLV/SAG4237/2004/Arg
Human calicivirus NLV/Csanadapaca/1 868/2003/HUN	Norovirus Hu/NLV/SAG4238/2004/Arg
	Norovirus Hu/NLV/SAG4241/2004/Arg
Human calicivirus NLV/Debrecen/1 721/2003/HUN	Norovirus Hu/NLV/SF4413/2004/Arg
	Norovirus Hu/NLV/SF4420/2004/Arg
Human calicivirus NLV/Debrecen/897/200 1/HUN	Norovirus Hu/NLV/VannesL23/l 999/France
	Norovirus Hu/NLV/Witney/B7S2/2003/UK
Human calicivirus NLV/Dillingen 259/01/DE	Norovirus Hu/Noguchi-l/2000/GH
Human calicivirus NLV/Dillingen 391/01/DE	Norovirus Hu/Noguchi-10/2000/GH
Human calicivirus NLV/Egeln 399/1999/DE	Norovirus Hu/Noguchi-2/2000/GH
Human calicivirus NLV/Eger/1650/2002/HUN	Norovirus Hu/Noguchi-3/2000/GH
Human calicivirus	Norovirus Hu/Noguchi-4/2000/GH

NLV/Eger/HUNs 19/2000/HUN	Norovirus Hu/Noguchi-5/2000/GH
Human calicivirus	Norovirus Hu/Noguchi-6/2000/GH
NLV/Eger/HUNs6/2000/HUN	Norovirus Hu/Noguchi-7/2000/GH
Human calicivirus NLV/Erd/967/2002/HUN	Norovirus Hu/Noguchi-8/2000/GH
Human calicivirus NLV/Erfurt 007/2000/DE	Norovirus Hu/Noguchi-9/2000/GH
Human calicivirus NLV/Erfurt 232/2000/DE	Norovirus Hu/Noshiro/l/2007/JP
Human calicivirus NLV/Erlangen	Norovirus Hu/NoV/01/2004/SE
155/2000/DE	Norovirus Hu/NoV/02/2002/SE
Human calicivirus NLV/Frankfurt(Oder)	Norovirus Hu/NoV/02/2006/SE
168/1 999/DE	Norovirus Hu/NoV/03/2002/SE
Human calicivirus NLV/Frankfurt(Oder)	Norovirus Hu/NoV/03/2004/SE
170/1 999/DE	Norovirus Hu/NoV/03/2006/SE
Human calicivirus NLV/Frankfurt(Oder)	Norovirus Hu/NoV/04/2004/SE
176/1 999/DE	Norovirus Hu/NoV/04/2005/SE
Human calicivirus	Norovirus Hu/NoV/04/2006/SE
NLV/FrankfurtO.3 86/1 999/DE	Norovirus Hu/NoV/05/2004/SE
Human calicivirus	Norovirus Hu/NoV/05/2005/SE
NLV/Fuzesabony/1253/2002/HUN	Norovirus Hu/NoV/05/2006/SE
Human calicivirus NLV/Geesthacht	Norovirus Hu/NoV/05 _1/2002/SE
410/2000/DE	Norovirus Hu/NoV/05_2/2002/SE
Human calicivirus NLV/Gelsenkirchen	Norovirus Hu/NoV/06/2002/SE
468/2000/DE	Norovirus Hu/NoV/06/2004/SE
Human calicivirus NLV/GGII/NDV1/99/IND	Norovirus Hu/NoV/06/2005/SE
Human calicivirus NLV/GGII/NDV2/99/IND	Norovirus Hu/NoV/06/2006/SE
Human calicivirus NLV/GGII/NDV3/99/IND	Norovirus Hu/NoV/07/2002/SE
Human calicivirus	Norovirus Hu/NoV/07/2004/SE
NLV/GII/Langenl061/2002/DE	Norovirus Hu/NoV/07/2006/SE
Human calicivirus	Norovirus Hu/NoV/07 _1/2005/SE
NLV/Gothenburgl/200 1/Sweden	Norovirus Hu/NoV/07_2/2005/SE
Human calicivirus NLV/Granada60i/02/SP	Norovirus Hu/NoV/08/2002/SE
Human calicivirus	Norovirus Hu/NoV/08/2003/SE
NLV/Gyongyos/1255/2002/HUN	Norovirus Hu/NoV/08/2004/SE
Human calicivirus	Norovirus Hu/NoV/08/2005/SE
NLV/Gyongyos/1 467/2002/HUN	Norovirus Hu/NoV/08/2006/SE
Human calicivirus NLV/Gyor/1734/2003/HUN	Norovirus Hu/NoV/09/2002/SE
Human calicivirus	Norovirus Hu/NoV/09/2003/SE
NLV/Hajmasker/487/200 1/HUN	Norovirus Hu/NoV/09/2004/SE
Human calicivirus NLV/Halle 445/1 999/DE	Norovirus Hu/NoV/09/2005/SE
Human calicivirus NLV/Hamburg	Norovirus Hu/NoV/09/2006/SE
347/2000/DE	Norovirus Hu/NoV/10/2003/SE
Human calicivirus NLV/Herzberg 385/01/DE	Norovirus Hu/NoV/10/2004/SE
Human calicivirus NLV/Ibiza67/01/SP	Norovirus Hu/NoV/10_l/2006/SE
Human calicivirus	Norovirus Hu/NoV/10 _2/2006/SE
NLV/Intahaza/1 62 1/2003/HUN	Norovirus Hu/NoV/1 1/2002/SE
Human calicivirus NLV/J23/1999/US	Norovirus Hu/NoV/1 1/2003/SE
Human calicivirus	Norovirus Hu/NoV/1 1/2006/SE
NLV/Kaposvar/1 505/2002/HUN	Norovirus Hu/NoV/12/2002/SE
Human calicivirus	Norovirus Hu/NoV/12/2003/SE
NLV/Kecskemet/1 657/2003/HUN	Norovirus Hu/NoV/12/2004/SE
Human calicivirus	Norovirus Hu/NoV/13/2002/SE
NLV/Kiskunhalas/HUNo2/ 1999/HUN	Norovirus Hu/NoV/13/2004/SE
Human calicivirus	Norovirus Hu/NoV/13/2005/SE
NLV/Kisujbanya/650/2001/HUN	Norovirus Hu/NoV/1 3_1/2006/SE
Human calicivirus NLV/Koblenz 229/2000/DE	Norovirus Hu/NoV/13_2/2006/SE
Human calicivirus NLV/Laucha 403/1 999/DE	Norovirus Hu/NoV/14/2002/SE

Human calicivirus NLV/Leon55/00/SP	Norovirus Hu/NoV/15/2002/SE
Human calicivirus NLV/LesBorges/3 19/200 1/Sp	Norovirus Hu/NoV/15/2003/SE
Human calicivirus NLV/Lleida/327/2001/Sp	Norovirus Hu/NoV/15/2004/SE
Human calicivirus NLV/Lugo37i/00/SP	Norovirus Hu/NoV/15/2006/SE
Human calicivirus NLV/Lugo73i/02/SP	Norovirus Hu/NoV/16/2002/SE
Human calicivirus NLV/M7/1999/US	Norovirus Hu/NoV/16/2003/SE
Human calicivirus NLV/Madridl 06/02/SP	Norovirus Hu/NoV/17/2002/SE
Human calicivirus NLV/Madrid33/00/SP	Norovirus Hu/NoV/17/2006/SE
Human calicivirus NLV/Madrid36i/01/SP	Norovirus Hu/NoV/18/2002/SE
Human calicivirus NLV/Madrid63/01/SP	Norovirus Hu/NoV/18/2004/SE
Human calicivirus NLV/Madrid79/00/SP	Norovirus Hu/NoV/18/2006/SE
Human calicivirus NLV/Madrid94/02/SP	Norovirus Hu/NoV/19/2002/SE
Human caliciviras NLV/Magdeburg 171/1999/DE	Norovirus Hu/NoV/19/2006/SE
Human calicivirus NLV/Magdeburg 225/1 999/DE	Norovirus Hu/NoV/21/2002/SE
Human calicivirus NLV/Magdeburg 401/2000/DE	Norovirus Hu/NoV/21/2006/SE
Human calicivirus NLV/Magdeburg 460/1 999/DE	Norovirus Hu/NoV/22/2002/SE
Human calicivirus NLV/Magdeburg 514/1 999/DE	Norovirus Hu/NoV/22_l/2006/SE
Human calicivirus NLV/Magdeburg 548/1 999/DE	Norovirus Hu/NoV/22_2/2006/SE
Human calicivirus NLV/Magdeburg 62/1 999/DE	Norovirus Hu/NoV/23/2002/SE
Human caliciviras NLV/Mallorca43/00/SP	Norovirus Hu/NoV/23_l/2006/SE
Human calicivirus NLV/Meliana/230/2001/Sp	Norovirus Hu/NoV/23 _2/2006/SE
Human calicivirus NLV/Mex7076/1999	Norovirus Hu/NoV/24/2002/SE
Human calicivirus NLV/Mogy oroska/67 1/200 1/HUN	Norovirus Hu/NoV/24/2006/SE
Human calicivirus NLV/MOH/99	Norovirus Hu/NoV/25/2002/SE
Human calicivirus NLV/Mohacs/1 064/2002/HUN	Norovirus Hu/NoV/25/2006/SE
Human calicivirus NLV/Montblanc/2 87/200 1/Sp	Norovirus Hu/NoV/26/2002/SE
Human calicivirus NLV/Mora/97/SE	Norovirus Hu/NoV/26/2006/SE
Human calicivirus NLV/Murcial03/02/SP	Norovirus Hu/NoV/27/2002/SE
Human calicivirus NLV/Murcia60/00/SP	Norovirus Hu/NoV/28/2002/SE
Human calicivirus NLV/Nagykovacsi/1 918/2003/HLTN	Norovirus Hu/NoV/29/2002/SE
Human calicivirus NLV/Nagykozar/623/200 1/HUN	Norovirus Hu/NoV/Dover/2000/UK
Human calicivirus NLV/Nemesgulacs/4 18/200 1/HUN	Norovirus Hu/NR2176/1998/US
Human calicivirus NLV/Neustrelitz 163/1 999/DE	Norovirus Hu/NR2210/1998/US
Human calicivirus NLV/Nyiradony/793/200 1/HUN	Norovirus Hu/NR2225/1999/US
Human caliciviras NLV/Nyiregyhaza/1 057/2002/HUN	Norovirus Hu/NR2342/1997/US
Human calicivirus NLV/Oberhausen 455/0 1/DE	Norovirus Hu/NR2443/1998/US
Human calicivirus	Norovirus Hu/NR2459/1998/US
	Norovirus Hu/NR2482/1998/US
	Norovirus Hu/NR2486/1999/US
	Norovirus Hu/NR2512/1999/US
	Norovirus Hu/NR2531/1999/US
	Norovirus Hu/NR2552/1999/US
	Norovirus Hu/NSW021E/2006/AUS
	Norovirus Hu/NSW022G/2006/AUS
	Norovirus Hu/NSW027B/2006/AUS
	Norovirus Hu/NSW036B/2006/AUS
	Norovirus Hu/NSW065F/2006/AUS
	Norovirus Hu/NSW072D/2006/AUS
	Norovirus Hu/NSW095B/2006/AUS
	Norovirus Hu/NSW108C/2006/AUS
	Norovirus Hu/NSW138H/2006/AUS
	Norovirus Hu/NSW147I/2006/AUS
	Norovirus Hu/NSW159U/2006/AUS
	Norovirus Hu/NSW162I/2006/AUS
	Norovirus Hu/NSW176K/2006/AUS

NLV/Paks/HUNo4/ 1999/HUN	Norovirus Hu/NSW182K/2006/AUS
Human calicivirus NLV/Palencia69i/02/SP	Norovirus Hu/NSW193M/2006/AUS
Human calicivirus NLV/Papa/1476/2002/HUN	Norovirus Hu/NSW195L/2006/AUS
Human calicivirus NLV/Papa/1576/2002/HUN	Norovirus Hu/NSW203I/2006/AUS
Human calicivirus	Norovirus Hu/NSW212E/2006/AUS
NLV/Patalom/HUNol 0/2000/HUN	Norovirus Hu/NSW216C/2006/AUS
Human calicivirus	Norovii-us Hu/NSW220I/2006/AUS
NLV/Patapoklosi/HUNs3/ 1999/HUN	Norovirus Hu/NSW248Q/2006/AUS
Human calicivirus	Norovirus Hu/NSW287S/2006/AUS
NLV/Pecel/1 779/2003/HUN	Norovirus Hu/NSW304I/2006/AUS
Human calicivirus NLV/Pecs/571/2001/HUN	Norovirus Hu/NSW306G/2006/AUS
Human calicivirus	Norovirus Hu/NSW3137/2006/AUS
NLV/Pecs/HUNs4/l 999/HUN	Norovirus Hu/NSW322H/2006/AUS
Human calicivirus NLV/Peleliu/1999	Norovirus Hu/NSW324J/2006/AUS
Human calicivirus NLV/Pfaffenhofen	Norovirus Hu/NSW330F/2006/AUS
028/2000/DE	Norovirus Hu/NSW340C/2006/AUS
Human calicivirus NLV/Potsdam 196/2000/DE	Norovirus Hu/NSW346E/2006/AUS
Human calicivirus NLV/Potsdam 384/2000/DE	Norovirus Hu/NSW356Q/2006/AUS
Human calicivirus	Norovirus Hu/NSW397R/2006/AUS
NLV/Rarospuszta/778/2001/HUN	Norovirus Hu/NSW4138/2006/AUS
Human calicivirus NLV/Rostock 039/2000/DE	Norovirus Hu/NSW415F/2006/AUS
Human calicivirus NLV/Sagunt/1 16/2000/Sp	Norovirus Hu/NSW415N/2006/AUS
Human calicivirus NLV/Sagunt/181/2001/Sp	Norovirus Hu/NSW419Q/2006/AUS
Human calicivirus NLV/Sagunt/222/2001/Sp	Norovims Hu/NSW426I/2006/AUS
Human calicivirus NLV/Sagunt/258/2001/Sp	Norovims Hu/NSW432F/2006/AUS
Human calicivirus NLV/Sagunt/364/2001/Sp	Norovims Hu/NSW453O/2006/AUS
Human calicivirus	Norovims Hu/NSW510G/2006/AUS
NLV/Sarospatak/1 172/2002/HUN	Norovims Hu/NSW517Q/2006/AUS
Human calicivirus NLV/Schwerin	Norovims Hu/NSW527Q/2006/AUS
002/2000/DE	Norovims Hu/NSW555L/2006/AUS
Human calicivirus NLV/Schwerin 003/00/DE	Norovims Hu/NSW608R/2006/AUS
Human calicivirus NLV/Schwerin	Norovims Hu/NSW61 1K/2006/AUS
218/1999/DE	Norovims Hu/NSW627Q/2006/AUS
Human calicivirus NLV/Segovia53i/02/SP	Norovirus Hu/NSW629R/2006/AUS
Human calicivirus NLV/Segovia97/02/SP	Norovims Hu/NSW659Y/2006/AUS
Human calicivirus	Norovims Hu/NSW689S/2006/AUS
NLV/Sopron/1 137/2002/HUN	Norovims Hu/NSW689Y/2006/AUS
Human calicivirus	Norovirus Hu/NSW695Q/2006/AUS
NLV/Sopron/1 562/2002/HUN	Norovims Hu/NSW696T/2006/AUS
Human calicivirus	Norovims Hu/NSW700I/2006/AUS
NLV/Sopron/952/2002/HUN	Norovims Hu/NSW710H/2006/AUS
Human calicivirus NLV/St.Feliu/255/2001/Sp	Norovirus Hu/NSW716H/2006/AUS
Human calicivirus	Norovims Hu/NSW717P/2006/AUS
NLV/Steinbach/EG/2 001/CA	Norovims Hu/NSW725O/2006/AUS
Human calicivirus NLV/Stockholm/genotype	Norovims Hu/NSW751J/2006/AUS
GGIIb	Norovirus Hu/NSW763N/2006/AUS
Human calicivirus NLV/Suria/31 2/200 1/Sp	Norovirus Hu/NSW768Y/2006/AUS
Human calicivirus	Norovims Hu/NSW776R/2006/AUS
NLV/Szava/HUNs 13/2000/HUN	Norovims Hu/NSW779W/2006/AUS
Human calicivirus NLV/Szeged-	Norovirus Hu/NSW779Y/2006/AUS
Algyo/HUNo 1/1998/HUN	Norovirus Hu/NSW782O/2006/AUS
Human calicivirus	Norovims Hu/NSW821N/2006/AUS
NLV/Szeged/1237/2002/HUN	Norovims Hu/NSW827U/2006/AUS
Human calicivirus	Norovims Hu/NSW855V/2006/AUS
NLV/Szekesfehervar/1 85 1/2003/HUN	Norovirus Hu/NSW857X/2006/AUS

Human calicivirus NLV/Szigetvar/HUNs7/2000/HUN	Norovirus Hu/NSW870K/2006/AUS
Human calicivirus NLV/Szoc/806/2001/HUN	Norovirus Hu/NSW890Q/2006/AUS
Human calicivirus NLV/Szolnok/1 904/2003/HUN	Norovirus Hu/NSW892Q/2006/AUS
Human calicivirus NLV/Szombathely/4 13/200 1/HUN	Norovirus Hu/NSW897Z/2006/AUS
Human calicivirus NLV/Tapioszentmarton/1909/2003/HUN	Norovirus Hu/NSW944I/2006/AUS
Human calicivirus NLV/Tarrag/238/2001/Sp	Norovirus Hu/NSW953I/2006/AUS
Human calicivirus NLV/Tata/1525/2002/HUN	Norovirus Hu/NSW974O/2006/AUS
Human calicivirus NLV/Tenerife41i/01/SP	Norovirus Hu/Nursing-home_A/28- 12-200 1/NL
Human calicivirus NLV/Tiefwarensee 304/1 999/DE	Norovirus Hu/Nursing-home_B/05-05-2002/NL
Human calicivirus NLV/Tiefwarensee 305/1 999/DE	Norovirus Hu/Nursing-home_C/06-06-2002/NL
Human calicivirus NLV/Toddin 242/1 999/DE	Norovirus Hu/Nursing-home_D/l 9-1 1-2002/NL
Human calicivirus NLV/Toledo35/00/SP	Norovirus Hu/Nursing-home_E_pat_l/08-01 - 2003/NL/
Human calicivirus NLV/Totkomlos/1 798/2003/HUN	Norovirus Hu/Nursing-home_E_pat_2/l 0-01 - 2003/NL
Human calicivirus NLV/Utiel/371/2001/Sp	Norovirus Hu/Nursing-home_F/22-01 -2003/NL
Human calicivirus NLV/VA497/1 999/US	Norovirus Hu/Nursing-home_G/27-01 -2003/NL
Human calicivirus NLV/VA97207/1997	Norovirus Hu/Nursing-home_H/03-02 -2003/NL
Human calicivirus NLV/VA981 15/1998	Norovirus Hu/NV/Hokkaido/1 18/2002/JP
Human calicivirus NLV/VA983 87/1 998	Norovirus Hu/NV/Hokkaido/1 27/2002/JP
Human calicivirus NLV/Valencia/123/2000/Sp	Norovirus Hu/NV/Hokkaido/1 30/2002/JP
Human calicivirus NLV/Valencia/213/2001/Sp	Norovirus Hu/NV/Hokkaido/1 35/2003/JP
Human calicivirus NLV/Valencia/256/2001/Sp	Norovirus Hu/NV/Hokkaido/1 83/2004/JP
Human calicivirus NLV/Valencia/261/2001/Sp	Norovirus Hu/NV/Hokkaido/1 86/2004/JP
Human calicivirus NLV/Valencia/426/2002/Sp	Norovirus Hu/NV/Hokkaido/1 92/2004/JP
Human calicivirus NLV/Varalja/1 898/2003/HUN	Norovirus Hu/NV/Hokkaido/1 94/2004/JP
Human calicivirus NLV/Veszprem/1 023/2002/HUN	Norovirus Hu/NV/Hokkaido/1 98/2004/JP
Human calicivirus NLV/Veszprem/HUNo 1la/2000/HUN	Norovirus Hu/NV/Hokkaido/222/2004/JP
Human calicivirus NLV/Veszprem/HUNo 1lb/2000/HUN	Norovirus Hu/NV/Hokkaido/23 1/2004/JP
Human calicivirus NLV/Vilafranca/269/200 1/Sp	Norovirus Hu/NV/Hokkaido/2 84/2004/JP
Human calicivirus NLV/Wiesbaden 294/0 1/DE	Norovirus Hu/NV/Hokkaido/2 86/2005/JP
Human calicivirus NLV/Zaragoza77/00/SP	Norovirus Hu/NV/Hokkaido/3 00/2005/JP
Human calicivirus NLV/Zaragoza80/01/SP	Norovirus Hu/NV/Hokkaido/3 06/2005/JP
Human calicivirus NLV/Zaragoza83/01/SP	Norovirus Hu/NV/Hokkaido/3 07/2005/JP
Human calicivirus NV/Aubel/H252/2002/Be	Norovirus Hu/NV/Hokkaido/3 22/2005/JP
Human calicivirus NV/Beaufays/H3 61/2002/Be	Norovirus Hu/NV/Hokkaido/3 32/2005/JP
Human calicivirus NV/BQT648/2000/VE	Norovirus Hu/NV/Hokkaido/44/2000/JP
Human calicivirus NV/CCS1 14/1996/VE	Norovirus Hu/NV/Hokkaido/47/2000/JP
Human calicivirus NV/CCS14/1997/VE	Norovirus Hu/NV/Osaka/F140/2006/JP
Human calicivirus NV/CCS17/1997/VE	Norovirus Hu/NV/Weymouth/2004/UK
Human calicivirus NV/CCS207/1995/VE	Norovirus Hu/NZ176/2006/NZL
Human calicivirus NV/CCS2 1/1 997/VE	Norovirus Hu/NZ186/2006/NZL
Human calicivirus NV/CCS215/1996/VE	Norovirus Hu/NZ225/2006/NZL
Human calicivirus NV/CCS227/1998/VE	Norovirus Hu/NZ309/2006/NZL
	Norovirus Hu/NZ313/2006/NZL
	Norovirus Hu/NZ327/2006/NZL
	Norovirus Hu/NZ330/2006/NZL
	Norovirus Hu/NZ373/2005/NZL
	Norovirus Hu/NZ460/2006/NZL
	Norovirus Hu/NZ467/2006/NZL
	Norovirus Hu/NZ500/2006/NZL
	Norovirus Hu/NZ51/2006/NZL
	Norovirus Hu/NZ530/2006/NZL
	Norovirus Hu/NZ535/2006/NZL
	Norovirus Hu/NZ536/2006/NZL

Human calicivirus NV/CCS39/1 998/VE	Norovirus Hu/NZ587/2006/NZL
Human calicivirus NV/Gentbrugge/ H496/2003/Be	Norovirus Hu/Ol/JPN
	Norovirus Hu/02a/JPN
Human calicivirus NV/Gentbrugge/H494/2003/Be	Norovirus Hu/02b/JPN
	Norovirus Hu/Oberschleissheim 102/1 999/DE
Human calicivirus NV/Gentbrugge/H497/2003/Be	Norovirus Hu/Oberschleissheim 108/1 999/DE
	Norovirus Hu/Oberschleissheim 112/1 999/DE
Human calicivirus NV/Grace-Hollogne/H384/2002/Be	Norovirus Hu/Oberschleissheim 149/1 999/DE
	Norovirus Hu/Oberschleissheim 92/1 999/DE
Human calicivirus NV/Grivegnee/H5 01ι2003/Be	Norovirus Hu/OCOl 243/200 1/JP
	Norovirus Hu/OC02012/2002/JP
Human calicivirus NV/H01 1/2002/Be	Norovirus Hu/OC02022/2002/JP
Human calicivirus NV/H325/2002/Be	Norovirus Hu/OC02 198/2002/JP
Human calicivirus NV/Heusden/H492/2 003/Be	Norovirus Hu/OC02202/2002/JP
Human calicivirus NV/Kristianstad-Pat/2001/SE	Norovirus Hu/OC03 199- l/2003/JP
	Norovirus Hu/OC03 199-2/2003/JP
Human calicivirus NV/Kristianstad-Ras/2001/SE	Norovirus Hu/OC04038/2004/JP
	Norovirus Hu/OC04039/2004/JP
Human calicivirus NV/Liege/H302/2002/Be	Norovirus Hu/OC04042/2004/JP
Human calicivirus NV/Lontzen/H556/2003/Be	Norovirus Hu/OC04043/2004/JP
Human calicivirus NV/Mariakerke/H5 14/2003/Be	Norovirus Hu/OC04056-l/2004/JP
	Norovirus Hu/OC04056-2/2004/JP
Human calicivirus NV/Oupeye/H007/2002/Be	Norovirus Hu/OC04059/2004/JP
Human calicivirus NV/Romsee/H0 l0/2002/Be	Norovirus Hu/OC04067/2004/JP
Human calicivirus NV/Schoten/H473/2003/Be	Norovirus Hu/OC04071/2004/JP
Human calicivirus NV/Sint Amanddeg/H493/2003/Be	Norovirus Hu/OC04073/2004/JP
	Norovirus Hu/OC04075/2004/JP
Human calicivirus NV/St Nicolas/H367/2002/Be	Norovirus Hu/OC04076/2004/JP
	Norovirus Hu/OC04169/2004/JP
Human calicivirus NV/Tilff/H479/2003/Be	Norovirus Hu/OC0501 0/2005/JP
Human calicivirus NV/Zelzate/H495/2003/Be	Norovirus Hu/OC07138/07/JP
Human calicivirus strain Arg320	Norovirus Hu/OC08086/08/JP
Human calicivirus strain BAV/2. 1/98/DEU	Norovirus Hu/OC97007/97/JP
Human calicivirus strain BRA/2. 1/98/DEU	Norovirus Hu/OC97049/1 997/JP
Human calicivirus strain HSS/2/98/DEU	Norovirus Hu/OCS0005 64/200 1/JP
Human calicivirus strain Hu/NLV/Amsterdam/98- 18/1 998/NET	Norovirus Hu/OCS020289/2002/JP
	Norovirus Hu/OCS030697/2004/JP
Human calicivirus strain Hu/SLV/Stockholm/3 18/97/SE	Norovirus Hu/OCS040035/2004/JP
	Norovirus Hu/OCS0401 00/2004/JP
Human norovirus CHN38 109/SZ03	Norovirus Hu/OCS980705/1 998/JP
Human norovirus CHN38 111/SZ03	Norovirus Hu/Odate/l/06/JP
Human norovirus CHN38 112/SZ03	Norovirus Hu/Odate/2/2006/JP
Human norovirus CHN38 113/SZ03	Norovirus Hu/Odate/3/2006/JP
Human norovirus CHN38 114/SZ03	Norovirus Hu/Offenburgl 0550/2002/DE
Human norovirus CHN4841/SZ03	Norovirus Hu/Offenburgl 155/2004/DE
Human norovirus Hu/NV/I/Hualien/CYC/2003/TW	Norovirus Hu/Offenburg2 16/2003/DE
	Norovirus Hu/Offenburg2620/2002/DE
Maryland calicivirus 6	Norovirus Hu/Offenburg4224/2004/DE
Norovirus Bo/Aulendorf20/2003/DE	Norovirus Hu/Offenburg726/02/DE/2002/DE
Norovirus Bo/Aulendorf22/2003/DE	Norovirus Hu/OLHSC-l/IRL
Norovirus Bo/DijonA1 73/2006/FR	Norovirus Hu/OLHSC-1 0/IRL
Norovirus Bo/DijonA247/2007/FR	Norovirus Hu/OLHSC-1 1/IRL
Norovirus Bo/DijonA273/2007/FR	Norovirus Hu/OLHSC-1 2/IRL
Norovirus Bo/DijonA344/2007/FR	Norovirus Hu/OLHSC-1 3/IRL
Norovirus Bo/DijonA428/2008/FR	Norovirus Hu/OLHSC-1 4/IRL

Norovirus Bo/DijonA430/2008/FR	Norovirus Hu/OLHSC-15/IRL
Norovirus Bo/Newbury2/1976/UK	Norovirus Hu/OLHSC-16/IRL
Norovirus Bochum024/1998/GE	Norovirus Hu/OLHSC-2/IRL
Norovirus Bochum026/1997/GE	Norovirus Hu/OLHSC-3/IRL
Norovirus Bochum031/1997/GE	Norovirus Hu/OLHSC-4/IRL
Norovirus Bochuml08/1997/GE	Norovirus Hu/OLHSC-5/IRL
Norovirus Bochuml36/1998/GE	Norovirus Hu/OLHSC-6/IRL
Norovirus Bochum220/1997/GE	Norovirus Hu/OLHSC-7/IRL
Norovirus Bochum224/1998/GE	Norovirus Hu/OLHSC-8/IRL
Norovirus Bochum272/1998/GE	Norovirus Hu/OLHSC-9/IRL
Norovirus Bochum339/1997/GE	Norovirus Hu/Omonogawa/l/1993/JP
Norovirus bovine/1 25/2005/SVN	Norovirus Hu/Osaka/00032 1/2000/JP/3006
Norovirus bovine/Belgium/B 102/2002/Be	Norovirus Hu/Osaka/010203/2001/JP/361 1
Norovirus bovine/Belgium/B 128/2002/Be	Norovirus Hu/Osaka/0 10203/200 1/JP/36 12
Norovirus bovine/Belgium/B 164/2002/Be	Norovirus Hu/Osaka/0 1022 8/2001 /JP/3625
Norovirus bovine/Belgium/B 173/2003/Be	Norovirus Hu/Osaka/0 10314/2001 /JP/3634
Norovirus bovine/B elgium/B 307/2003/Be	Norovirus Hu/Osaka/03-132/2003/JP
Norovirus bovine/B elgium/B 309/2003/Be	Norovirus Hu/Osaka/05-1059/2006/JP
Norovirus bovine/B elgium/B 52/2002/B e	Norovirus Hu/Osaka/05- 1086/2006/JP
Norovirus bovine/BVl 19/2007/BEL	Norovirus Hu/Osaka/05- 1180/2006/JP
Norovirus bovine/BVl 20/2007/BEL	Norovirus Hu/Osaka/05-365/2005/JP
Norovirus bovine/BVl 29/2007/BEL	Norovirus Hu/Osaka/101/05/JP
Norovirus bovine/BVl 33/2007/BEL	Norovirus Hu/Osaka/1 10/05/JP
Norovirus bovine/BVl 5/2007/BEL	Norovirus Hu/Osaka/133/05/JP
Norovirus bovine/BVl 8/2007/BEL	Norovirus Hu/Osaka/137/05/JP
Norovirus bovine/BV24/2007/BEL	Norovirus Hu/Osaka/146/05/JP
Norovirus bovine/BV52/2007/BEL	Norovirus Hu/Osaka/161/05/JP
Norovirus bovine/BV9/2007/BEL	Norovirus Hu/Osaka/177/04/JP
Norovirus bovine/BV99/2007/BEL	Norovirus Hu/Osaka/189/04/JP
Norovirus bovine/Corroy/B37/2002/Be	Norovirus Hu/Osaka/337/04/JP
Norovirus bovine/Dalhem/B2 14/2003/Be	Norovirus Hu/Osaka/36/05/JP
Norovirus bovine/Florennes/B242/2003/Be	Norovirus Hu/Osaka/49/05/JP
Norovirus bovine/KT17/2004/SVN	Norovirus Hu/Osaka/52/05/JP
Norovirus bovine/Mohiville/B 123/2002/Be	Norovirus Hu/Osaka/61/05/JP
Norovirus bovine/Wasma/B 199/2003/Be	Norovirus Hu/Osaka/7075/2005/JP
Norovirus bovine/Wasme/B 199/2003/Be	Norovirus Hu/Osaka/7107/2006/JP
Norovirus bovine/Wasme/B200/2003/Be	Norovirus Hu/Osaka/724/04/JP
Norovirus caiTot/Offenbui-g/2004/DE	Norovirus Hu/Osaka/786/04/JP
Norovirus cattle/BV416/2008/BEL	Norovirus Hu/Osaka/840/04/JP
Norovirus Chanthaburi-75/Thailand	Norovirus Hu/OsakaNI/2004/JP
Norovirus clam/Shimane/Asaril-DT/Jun2008/JP	Norovirus Hu/oysters/CRl 7F2000/France
	Norovirus Hu/oysters/CR91NL2000/Netherlands
Norovirus clam/Shimane/Asaril-Liquid/Jun2008/JP	Norovirus Hu/oysters/O04-l 6/2004/NL
	Norovirus Hu/oysters/O04-45/2004/NL
Norovirus clam/Shimane/Asari3-DT/Jun2008/JP	Norovirus Hu/oysters/O6NL2002/Netherlands
	Norovirus Hu/oysters/oes 16NL2001/Netherlands
Norovirus cleaning rag/Enzkofen40942/2007/DEU	Norovirus Hu/Pl-l/2000/SWE
	Norovirus Hu/Pl-10/2000/SWE
Norovirus cow/125/2005/SVN	Norovirus Hu/Pl-1 1/2000/SWE
Norovirus cow/KT17/2004/SVN	Norovirus Hu/Pl-12/2000/SWE
Norovirus Dhaka/1 67/2004/BGD	Norovirus Hu/Pl-13/2000/SWE
Norovirus Dhaka/1 76/2004/BGD	Norovirus Hu/Pl-14/2000/SWE
Norovirus Dhaka/1 96/2004/BGD	Norovirus Hu/Pl-15/2000/SWE
Norovirus Dhaka/262/2004/BGD	Norovirus Hu/P 1-16/2000/SWE
Norovirus Dhaka/267/2004/BGD	Norovirus Hu/Pl-17/2000/SWE

Norovirus Dhaka/270/2004/BGD	Norovirus Hu/Pl -18/2000/SWE
Norovirus Dhaka/289/2005/BGD	Norovirus Hu/Pl -19/2000/SWE
Norovirus Dhaka/295/2005/BGD	Norovirus Hu/Pl -20/2000/SWE
Norovirus Dhaka/305/2005/BGD	Norovirus Hu/Pl -3/2000/SWE
Norovirus Dhaka/335/2005/BGD	Norovirus Hu/Pl -6/2000/SWE
Norovirus Dhaka/361/2005/BGD	Norovirus Hu/Pl -7/2000/SWE
Norovirus Dhaka/367/2005/BGD	Norovirus Hu/Pl -8/2000/SWE
Norovirus Dhaka/373/2005/BGD	Norovirus Hu/Pl -9/2000/SWE
Norovirus Dhaka/389/2005/BGD	Norovirus Hu/PlO/JPN
Norovirus Dhaka/401/2005/BGD	Norovirus Hu/Pll-10/2001/SWE
Norovirus Dhaka/415/2005/BGD	Norovirus Hu/Pl 1-12/2001/SWE
Norovirus Dhaka/417/2005/BGD	Norovirus Hu/Pl 1-13/2001/SWE
Norovirus Dhaka/423/2005/BGD	Norovirus Hu/Pl 1-14/2001/SWE
Norovirus Dhaka/427/2005/BGD	Norovirus Hu/Pl 1-16/2001/SWE
Norovirus Dhaka/455/2005/BGD	Norovirus Hu/Pl 1-19/2001/SWE
Norovirus Dhaka/471/2005/BGD	Norovirus Hu/Pl 1-2/2001/SWE
Norovirus Dhaka/473/2005/BGD	Norovirus Hu/Pl 1-20/2001/SWE
Norovirus Dhaka/478/2005/BGD	Norovirus Hu/Pl 1-21/2001/SWE
Norovirus Dhaka/481/2005/BGD	Norovirus Hu/Pl 1-211/2001/SWE
Norovirus Dhaka/493/2005/BGD	Norovirus Hu/Pl 1-23/2001/SWE
Norovirus Dhaka/497/2005/BGD	Norovirus Hu/Pl 1-24/2001/SWE
Norovirus Dhaka/501/2005/BGD	Norovirus Hu/Pl 1-25/2001/SWE
Norovirus Dhaka/503/2005/BGD	Norovirus Hu/Pl 1-26/2001/SWE
Norovirus Dhaka/527/2005/BGD	Norovirus Hu/Pl 1-27/2001/SWE
Norovirus Dhaka/617/2005/BGD	Norovirus Hu/Pl 1-3/2001/SWE
Norovirus Dhaka/665/2005/BGD	Norovirus Hu/Pl 1-5/2001/SWE
Norovirus Dhaka/717/2005/BGD	Norovirus Hu/Pl 1-7/2001/SWE
Norovirus Dhaka/750/2005/BGD	Norovirus Hu/Pl 3-1/2001/SWE
Norovirus Dhaka/759/2005/BGD	Norovirus Hu/P13-10/2001/SWE
Norovirus Dhaka/767/2005/BGD	Norovirus Hu/P13-11/2001/SWE
Norovirus Dhaka/791/2005/BGD	Norovirus Hu/P13-12/2001/SWE
Norovirus Dhaka/817/2005/BGD	Norovirus Hu/P13-13/2001/SWE
Norovirus Dhaka/861/2005/BGD	Norovirus Hu/P13-14/2001/SWE
Norovirus Dhaka/881/2005/BGD	Norovirus Hu/P13-15/2001/SWE
Norovirus Dhaka/893/2005/BGD	Norovirus Hu/P13-16/2001/SWE
Norovirus Dhaka/904/2005/BGD	Norovirus Hu/P13-17/2001/SWE
Norovirus dog/C33/Viseu/2007/PRT	Norovirus Hu/P13-19/2001/SWE
Norovirus dog/Thessaloniki/30/2008/GRC	Norovirus Hu/P13-2/2001/SWE
Norovirus Dresdenl53/1997/GE	Norovirus Hu/Pl 3-3/2001/SWE
Norovirus Dresden245/1997/GE	Norovirus Hu/Pl 3-4/2001/SWE
Norovirus Dresden267/1997/GE	Norovirus Hu/P13-6/2001/SWE
Norovirus Dresden319/1997/GE	Norovirus Hu/P13-7/2001/SWE
Norovirus Erlangenl95/1997/GE	Norovirus Hu/P13-8/2001/SWE
Norovirus Freiburg024/1997/GE	Norovirus Hu/P13-9/2001/SWE
Norovirus Freiburg057/1997/GE	Norovirus Hu/P14/JPN
Norovirus Freiburg253/1998/GE	Norovirus Hu/Pl 5-1/2001/SWE
Norovirus Hamburg048/1997/GE	Norovirus Hu/P15-10/2001/SWE
Norovirus Hamburgl35/1998/GE	Norovirus Hu/P15-12/2001/SWE
Norovirus Hamburgl37/1997/GE	Norovirus Hu/P15-14/2001/SWE
Norovirus Hamburgl39/1997/GE	Norovirus Hu/P15-15/2001/SWE
Norovirus Hamburgl80/1997/GE	Norovirus Hu/P15-18/2001/SWE
Norovirus Hamburgl89/1997/GE	Norovirus Hu/P15-2/2001/SWE
Norovirus Hamburg236/1997/GE	Norovirus Hu/P15-22/2001/SWE
Norovirus Hamburg316/1998/GE	Norovirus Hu/P15-25/2001/SWE
Norovirus Hu/01/05/DR	Norovirus Hu/P15-3/2001/SWE

Norovirus Hu/0137/2004/NL	Norovirus Hu/P15-30/2001/SWE
Norovirus Hu/0672HA/2004/NL	Norovirus Hu/P15-5/2001/SWE
Norovirus Hu/1064A/73292/2007/NLD	Norovirus Hu/P15-6/2001/SWE
Norovirus Hu/1064B/73292/2007/NLD	Norovirus Hu/P15-9/2001/SWE
Norovirus Hu/1968/US	Norovirus Hu/P17-l/2003/SWE
Norovirus Hu/4476A/64317/2006/NLD	Norovirus Hu/P17-10/2003/SWE
Norovirus Hu/5013/JPN	Norovirus Hu/P17-1 1/2003/SWE
Norovirus Hu/5014/JPN	Norovirus Hu/P17-12/2003/SWE
Norovirus Hu/5015/JPN	Norovirus Hu/P17-13/2003/SWE
Norovirus Hu/5017.34/2003/JPN	Norovirus Hu/P17-14/2003/SWE
Norovirus Hu/5069/JPN	Norovirus Hu/P17-15/2003/SWE
Norovirus Hu/5128/JPN	Norovirus Hu/P17-17/2003/SWE
Norovirus Hu/5722/JPN	Norovirus Hu/P17-18/2003/SWE
Norovirus Hu/5723/JPN	Norovirus Hu/P17-19/2003/SWE
Norovirus Hu/5735/2004/JPN	Norovirus Hu/P17-2/2003/SWE
Norovirus Hu/5740/JPN	Norovirus Hu/P17-20/2003/SWE
Norovirus Hu/5828/JPN	Norovirus Hu/P17-3/2003/SWE
Norovirus Hu/6136/JPN	Norovirus Hu/P17-6/2003/SWE
Norovirus Hu/6819/2005/JPN	Norovirus Hu/P17-8/2003/SWE
Norovirus Hu/6820/2005/JPN	Norovirus Hu/P17-9/2003/SWE
Norovirus Hu/6822/2005/JPN	Norovirus Hu/Pla/JPN
Norovirus Hu/6824/2005/JPN	Norovirus Hu/Plb/JPN
Norovirus Hu/6825/2005/JPN	Norovirus Hu/P2/JPN
Norovirus Hu/6828/2005/JPN	Norovirus Hu/P3-10/2000/SWE
Norovirus Hu/6892/2005/JPN	Norovirus Hu/P3-1 1/2000/SWE
Norovirus Hu/6960/2005/JPN	Norovirus Hu/P3-14/2000/SWE
Norovirus Hu/7300/2005/JPN	Norovirus Hu/P3-15/2000/SWE
Norovirus Hu/771/2005/IRL	Norovirus Hu/P3-16/2000/SWE
Norovirus Hu/78/04/Ru	Norovirus Hu/P3-17/2000/SWE
Norovirus Hu/8533/Maizuru/08/JPN	Norovirus Hu/P3-18/2000/SWE
Norovirus Hu/Aalen2506/2003/DE	Norovirus Hu/P3-19/2000/SWE
Norovirus Hu/Accra/2000/GH	Norovirus Hu/P3-2/2000/SWE
Norovirus Hu/Afyon/14/2007/TR	Norovirus Hu/P3-20/2000/SWE
Norovirus Hu/Afyon/22/2007/TR	Norovirus Hu/P3-3/2000/SWE
Norovirus Hu/Afyon/34/2007/TR	Norovirus Hu/P3-4/2000/SWE
Norovirus Hu/Afyon/44/2007/TR	Norovirus Hu/P3-5/2000/SWE
Norovirus Hu/Afyon/49/2007/TR	Norovirus Hu/P3-6/2000/SWE
Norovirus Hu/Afyon/65/2007/TR	Norovirus Hu/P3-7/2000/SWE
Norovims Hu/Afyon/7/2007/TR	Norovirus Hu/P3-8/2000/SWE
Norovirus Hu/Afyon/70/2007/TR	Norovirus Hu/P3-9/2000/SWE
Norovirus Hu/Afyon/72/2007/TR	Norovirus Hu/P4a/JPN
Norovirus Hu/Afyon/74/2007/TR	Norovirus Hu/P4b/JPN
Norovirus Hu/Afyon/79/2007/TR	Norovirus Hu/P5- 1/2000/SWE
Norovirus Hu/Afyon/88/2007/TR	Norovirus Hu/P5-1 1/2000/SWE
Norovirus Hu/Ahm/PC03/2006/India	Norovirus Hu/P5-14/2000/SWE
Norovirus Hu/Akabane/990206/1 999/JP/2087	Norovirus Hu/P5-15/2000/SWE
Norovirus Hu/Akabane/99 1130/1 999/JP/225 8	Norovirus Hu/P5-16/2000/SWE
Norovirus Hu/Akita-City/l/2006/JP	Norovirus Hu/P5-18/2000/SWE
Norovirus Hu/Akita-City/l/2007/JP	Norovirus Hu/P5-19/2000/SWE
Norovirus Hu/Akita-City/l/2008/JP	Norovirus Hu/P5-2/2000/SWE
Norovirus Hu/Akita-City/2/2008/JP	Norovirus Hu/P5-20/2000/SWE
Norovirus Hu/Akita-City/3/2008/JP	Norovirus Hu/P5-3/2000/SWE
Norovirus Hu/Akita-City/4/2008/JP	Norovirus Hu/P5-4/2000/SWE
Norovirus Hu/Aur/A822/2006/India	Norovirus Hu/P5-5/2000/SWE
Norovims Hu/Aur/A832/2006/India	Norovirus Hu/P5-7/2000/SWE

Norovirus Hu/Balingen2573/2004/DE	Norovirus Hu/P5-8/2000/SWE
Norovirus Hu/Balingen633/2002/DE	Norovirus Hu/P7-1 0/200 1/SWE
Norovirus Hu/Beijing/06/2005/CHN	Norovirus Hu/P7-1 1/200 l/SWE
Norovirus Hu/Beijing/148/2005/CHN	Norovirus Hu/P7- 12/200 1/SWE
Norovirus Hu/Beijing/169/2005/CHN	Norovirus Hu/P7- 14/200 1/SWE
Norovirus Hu/Beijing/375/2005/CHN	Norovirus Hu/P7- 15/2001/SWE
Norovirus Hu/Beijing/48/2005/CHN	Norovirus Hu/P7- 16/200 1/SWE
Norovirus Hu/Beijing/B J1/2002/CHN	Norovirus Hu/P7- 17/200 1/SWE
Norovirus Hu/Beijing/BJ12/2002/CHN	Norovirus Hu/P7- 18/200 1/SWE
Norovirus Hu/Beijing/BJ14/2002/CHN	Norovirus Hu/P7- 19/2001/SWE
Norovirus Hu/Beijing/BJ21/2002/CHN	Norovirus Hu/P7-2/2001/SWE
Norovirus Hu/Beijing/CR2905/2004/CHN	Norovirus Hu/P7-20/2001/SWE
Norovirus Hu/Beijing/CR2932/2004/CHN	Norovirus Hu/P7-3/2001/SWE
Norovirus Hu/Beijing/CR2987/2004/CHN	Norovirus Hu/P7-4/2001/SWE
Norovirus Hu/Berlin/1 1/03/Germany	Norovirus Hu/P7-5/2001/SWE
Norovirus Hu/Boeblingenl3203/2002/DE	Norovirus Hu/P7-6/2001/SWE
Norovirus Hu/Boeblingen 13295/2002/DE	Norovirus Hu/P7-7/2001/SWE
Norovirus Hu/Boeblingen2 108/2003/DE	Norovirus Hu/P9-1/2001/SWE
Norovirus Hu/Briancon870/2004/France	Norovirus Hu/P9- 10/2001/SWE
Norovirus Hu/C 14/2002/AU	Norovirus Hu/P9-1 1/200 1/SWE
Norovirus Hu/Calwl 327 12/2002/DE	Norovirus Hu/P9- 12/200 1/SWE
Norovirus Hu/Calwl 3843/2002/DE	Norovirus Hu/P9- 18/200 l/SWE
Norovirus Hu/Calwl 452/2003/DE	Norovirus Hu/P9-2/2001/SWE
Norovirus Hu/Calw2169/2003/DE	Norovirus Hu/P9-2 1/200 1/SWE
Norovirus Hu/Calw2563/2003/DE	Norovirus Hu/P9-23/2001/SWE
Norovirus Hu/Calw3453/2002/DE	Norovirus Hu/P9-24/2001/SWE
Norovirus Hu/Calw5 194/2002/DE	Norovirus Hu/P9-26/2001/SWE
Norovirus Hu/Caterer _Company_l_pat_ 1/10-04-2003/NL	Norovirus Hu/P9-2 7/200 1/SWE
Norovirus Hu/Caterer _Company _l_pat_ 2/10-04-2003/NL	Norovirus Hu/P9-3 0/200 l/SWE
Norovirus Hu/Caterer _Company _2_pat_ 1/12-04-2003/NL	Norovirus Hu/P9-5/2001/SWE
Norovirus Hu/Caterer_ Company _2_pat_ 2/12-04-2003/NL	Norovirus Hu/P9-6/2001/SWE
Norovirus Hu/Caterer_personel_l/16 -04-2003/NL	Norovirus Hu/P9-7/2001/SWE
Norovirus Hu/Caterer_personel_2/16 -04-2003/NL	Norovirus Hu/P9-8/2001/SWE
Norovirus Hu/Caterer_personel_3/l 6-04-2003/NL	Norovirus Hu/P9-9/2001/SWE
Norovirus Hu/Caterer_personel_4/16 -04-2003/NL	Norovirus Hu/Picton/2003/AU
Norovirus Hu/Caterer_personel_5/16 -04-2003/NL	Norovirus Hu/PontdeRoide682/2004/France
Norovirus Hu/Chatellerault709/2004/France	Norovirus Hu/ptAdam/64815/2006/NLD
Norovirus Hu/Chiba/0000 10/2000/JP	Norovirus Hu/ptAdam/648 15b/2006/NLD
Norovirus Hu/Chiba/0000 16G1/1 999/JP	Norovirus Hu/Pune/OPD04/2007/India
Norovirus Hu/Chiba/0000 16G2/1 999/JP	Norovirus Hu/Pune/OPD05/2007/India
Norovirus Hu/Chiba/000022/2000/JP	Norovirus Hu/Pune/PCO 1/2005/India
Norovirus Hu/Chiba/000325/2000/JP	Norovirus Hu/Pune/PC02/2006/India
Norovirus Hu/Chiba/000335/2000/JP	Norovirus Hu/Pune/PC04/2005/India
Norovirus Hu/Chiba/000336/2000/JP	Norovirus Hu/Pune/PC05/2005/India
Norovirus Hu/Chiba/000337/2000/JP	Norovirus Hu/Pune/PC06/2005/India
Norovirus Hu/Chiba/000344/2000/JP	Norovirus Hu/Pune/PC07/2005/India
	Norovirus Hu/Pune/PC08/2005/India
	Norovirus Hu/Pune/PC09/2005/India
	Norovirus Hu/Pune/PC 10/2005/India
	Norovirus Hu/Pune/PCll/2006/India
	Norovirus Hu/Pune/PC12/2006/India
	Norovirus Hu/Pune/PC 13/2006/India
	Norovirus Hu/Pune/PC 14/2006/India
	Norovirus Hu/Pune/PC 15/2006/India
	Norovirus Hu/Pune/PC 16/2006/India

Norovirus Hu/Chiba/000459/2000/JP	Norovirus Hu/Pune/PC 17/2006/India
Norovirus Hu/Chiba/000468/2000/JP	Norovirus Hu/Pune/PC 18/2006/India
Norovirus Hu/Chiba/000485/2000/JP	Norovirus Hu/Pune/PC 19/2006/India
Norovirus Hu/Chiba/0005 16/2000/JP	Norovirus Hu/Pune/PC20/2006/India
Norovirus Hu/Chiba/000520/2000/JP	Norovirus Hu/Pune/PC2 1/2006/India
Norovirus Hu/Chiba/000600/2000/JP	Norovirus Hu/Pune/PC22/2006/India
Norovirus Hu/Chiba/00066 1/2000/JP	Norovirus Hu/Pune/PC23/2006/India
Norovirus Hu/Chiba/000782/2000/JP	Norovirus Hu/Pune/PC24/2006/India
Norovirus Hu/Chiba/001049/2000/JP	Norovirus Hu/Pune/PC25/2006/India
Norovirus Hu/Chiba/00 1080/2000/JP	Norovirus Hu/Pune/PC26/2006/India
Norovirus Hu/Chiba/0 10006/200 1/JP	Norovirus Hu/Pune/PC27/2006/India
Norovirus Hu/Chiba/0 10045/200 1/JP	Norovirus Hu/Pune/PC28/2006/India
Norovirus Hu/Chiba/0 10105/200 1/JP	Norovirus Hu/Pune/PC29/2006/India
Norovirus Hu/Chiba/0 10108/200 1/JP	Norovirus Hu/Pune/PC30/2007/India
Norovirus Hu/Chiba/0 10390/200 1/JP	Norovirus Hu/Pune/PC3 1/2007/India
Norovirus Hu/Chiba/0 10433/200 1/JP	Norovirus Hu/Pune/PC32/2007/India
Norovirus Hu/Chiba/0 10442/200 1/JP	Norovirus Hu/Pune/PC33/2007/India
Norovirus Hu/Chiba/01 0465/2001/JP	Norovirus Hu/Pune/PC34/2007/India
Norovirus Hu/Chiba/0 105 10/200 1/JP	Norovirus Hu/Pune/PC35/2007/India
Norovirus Hu/Chiba/010522/2001/JP	Norovirus Hu/Pune/PC36/2007/India
Norovirus Hu/Chiba/010526/2001/JP	Norovirus Hu/Pune/PC37/2007/India
Norovirus Hu/Chiba/01 0539/2001/JP	Norovirus Hu/Pune/PC38/2007/India
Norovirus Hu/Chiba/0 10587/200 1/JP	Norovirus Hu/Pune/PC39/2007/India
Norovirus Hu/Chiba/0 1062 1/200 1/JP	Norovirus Hu/Pune/PC40/2007/India
Norovirus Hu/Chiba/0 1075 1/200 1/JP	Norovirus Hu/Pune/PC4 1/2007/India
Norovirus Hu/Chiba/0 10998/200 1/JP	Norovirus Hu/Pune/PC42/2007/India
Norovirus Hu/Chiba/0200 15/2002/JP	Norovirus Hu/Pune/PC43/2007/India
Norovirus Hu/Chiba/020040/2002/JP	Norovirus Hu/Pune/PC44/2007/India
Norovirus Hu/Chiba/020042/2002/JP	Norovirus Hu/Pune/PC45/2007/India
Norovirus Hu/Chiba/020062/2002/JP	Norovirus Hu/Pune/PC46/2007/India
Norovirus Hu/Chiba/020096G 1/2002/JP	Norovirus Hu/Pune/PC47/2007/India
Norovirus Hu/Chiba/020096G2/2002/JP	Norovirus Hu/Pune/PC48/2007/India
Norovirus Hu/Chiba/020097/2002/JP	Norovirus Hu/Pune/PC49/2007/India
Norovirus Hu/Chiba/0201 98/2002/JP	Norovirus Hu/Pune/PC50/2007/India
Norovirus Hu/Chiba/020247/2002/JP	Norovirus Hu/Pune/PC5 1/2007/India
Norovirus Hu/Chiba/020250/2002/JP	Norovirus Hu/Pune/PC52/2007/India
Norovirus Hu/Chiba/02025 1/2002/JP	Norovirus Hu/Pune/PC53/2007/India
Norovirus Hu/Chiba/020267/2002/JP	Norovirus Hu/Pune/PC54/2007/India
Norovirus Hu/Chiba/02030 1/2002/JP	Norovirus Hu/Pune/PC55/2007/India
Norovirus Hu/Chiba/020475/2002/JP	Norovirus Hu/Pune/PC56/2007/India
Norovii-us Hu/Chiba/020555/2002/JP	Norovirus Hu/Pune/PC57/2007/India
Norovirus Hu/Chiba/020984/2002/JP	Norovirus Hu/Pune/PC58/2007/India
Norovirus Hu/Chiba/02 1022/2002/JP	Norovirus Hu/QLD059/2006/AUS
Norovirus Hu/Chiba/02 1026/2002/JP	Norovirus Hu/QLD466/2006/AUS
Norovirus Hu/Chiba/02 1050/2002/JP	Norovirus Hu/QLD497/2006/AUS
Norovirus Hu/Chiba/02 1068/2002/JP	Norovirus Hu/QLD900/2006/AUS
Norovirus Hu/Chiba/02 1071/2002/JP	Norovirus Hu/QLD946/2006/AUS
Norovirus Hu/Chiba/030100/2003/JP	Norovirus Hu/QLD987/2006/AUS
Norovirus Hu/Chiba/03 0305/2003/JP	Norovirus Hu/Rl/JPN
Norovirus Hu/Chiba/03 0308/2003/JP	Norovirus Hu/R2/JPN
Norovirus Hu/Chiba/030322/2003/JP	Norovirus Hu/R3/JPN
Norovirus Hu/Chiba/030335/2003/JP	Norovirus Hu/Rastatt724/2003/DE
Norovirus Hu/Chiba/03 0358/2003/JP	Norovirus Hu/Ravensburg 12859/2001/DE
Norovirus Hu/Chiba/03 0360/2003/JP	Norovirus Hu/Ravensburg6690/200 1/DE
Norovirus Hu/Chiba/03 0399/2003/JP	Norovirus Hu/reference/2000/SWE

Norovirus Hu/Chiba/030403/2003/JP	Norovirus Hu/RemsMurr3910/2002/DE
Norovirus Hu/Chiba/030412/2003/JP	Norovirus Hu/Reutlingenl 302/2002/DE
Norovirus Hu/Chiba/03 0429/2003/JP	Norovirus Hu/Reutlingen 1402/2 002/DE
Norovirus Hu/Chiba/03 0474/2003/JP	Norovirus Hu/Reutlingen2844/2002/DE
Norovirus Hu/Chiba/030486/2003/JP	Norovirus Hu/River_Cruising_ship_l/l 6-05-2001/NL
Norovirus Hu/Chiba/03 05 10/2003/JP	
Norovirus Hu/Chiba/03 05 17/2003/JP	Norovirus Hu/River_Cruising_Ship_2/08-04-2003/NL
Norovirus Hu/Chiba/030522/2003/JP	
Norovirus Hu/Chiba/030541/2003/JP	Norovirus Hu/Sl/JPN
Norovirus Hu/Chiba/030542/2003/JP	Norovirus Hu/SlO/JPN
Norovirus Hu/Chiba/030546/2003/JP	Norovirus Hu/S12a/JPN
Norovirus Hu/Chiba/030547Gl/2003/JP	Norovirus Hu/S12b/JPN
Norovirus Hu/Chiba/030547G2/2003/JP	Norovirus Hu/S14/JPN
Norovirus Hu/Chiba/030556/2003/JP	Norovirus Hu/S2/JPN
Norovirus Hu/Chiba/03 0603/2003/JP	Norovirus Hu/S4/JPN
Norovirus Hu/Chiba/03 0654/2003/JP	Norovirus Hu/S6/JPN
Norovirus Hu/Chiba/03 065 8/2003/JP	Norovirus Hu/S7/JPN
Norovirus Hu/Chiba/03 09 10/2003/JP	Norovirus Hu/S8/JPN
Norovirus Hu/Chiba/03 0968/2003/JP	Norovirus Hu/Saarbruecken/04/03/Germany
Norovirus Hu/Chiba/03 098 1/2003/JP	Norovirus Hu/Saga/0003 13/2000/JP/2876
Norovirus Hu/Chiba/03 1038/2003/JP	Norovirus Hu/Saga/00 12 15/2000/JP/3 10 1
Norovirus Hu/Chiba/04- 1008/2004/JP	Norovirus Hu/Saga/5424/03/JP
Norovirus Hu/Chiba/04- 1050/2005/JP	Norovirus Hu/Sakai/04-179/2005/JP
Norovirus Hu/Chiba/04-899/2004/JP	Norovirus Hu/Samokov414/2007/BGR
Norovirus Hu/Chiba/04-974/2004/JP	Norovirus Hu/SchwaebischHall 11120/2002/DE
Norovirus Hu/Chiba/04000 1/2004/JP	Norovirus Hu/Serian/GE0241/2001/MYS
Norovirus Hu/Chiba/040002/2004/JP	Norovirus Hu/Serian/GE043 1/200 1/MYS
Norovirus Hu/Chiba/040003/2004/JP	Norovirus Hu/Serian/GE0433/200 1/MYS
Norovirus Hu/Chiba/040045/2004/JP	Norovirus Hu/Serian/GE086 1/200 1/MYS
Norovirus Hu/Chiba/040092/2004/JP	Norovirus Hu/Shaanxi/49576/2006/CHN
Norovirus Hu/Chiba/040096/2004/JP	Norovirus Hu/Shaanxi/49586/2006/CHN
Norovirus Hu/Chiba/0401 10/2004/JP	Norovirus Hu/Shaanxi/49595/2006/CHN
Norovirus Hu/Chiba/040 140/2004/JP	Norovirus Hu/Shaanxi/49596/2006/CHN
Norovirus Hu/Chiba/040230/2004/JP	Norovirus Hu/Shaanxi/49597/2006/CHN
Norovirus Hu/Chiba/040252/2004/JP	Norovirus Hu/Shaanxi/49598/2006/CHN
Norovirus Hu/Chiba/040277/2004/JP	Norovirus Hu/Shaanxi/49599/2006/CHN
Norovirus Hu/Chiba/040300/2004/JP	Norovirus Hu/Shaanxi/49600/2006/CHN
Norovirus Hu/Chiba/0403 09/2004/JP	Norovirus Hu/Shaanxi/49601/2006/CHN
Norovirus Hu/Chiba/0403 11/2004/JP	Norovirus Hu/Shaanxi/49606/2006/CHN
Norovirus Hu/Chiba/040493/2004/JP	Norovirus Hu/Shaanxi/49607/2006/CHN
Norovirus Hu/Chiba/040500/2004/JP	Norovirus Hu/Shaanxi/4961 0/2006/CHN
Norovirus Hu/Chiba/0405 01/2004/JP	Norovirus Hu/Shaibah-l/2007/IRQ
Norovirus Hu/Chiba/040502/2004/JP	Norovirus Hu/Shaibah-2/2007/IRQ
Norovirus Hu/Chiba/040545/2004/JP	Norovirus Hu/Shanghai/49798/2006/CHN
Norovirus Hu/Chiba/0405 54/2004/JP	Norovirus Hu/Shanghai/49800/2006/CHN
Norovirus Hu/Chiba/0405 89/2004/JP	Norovirus Hu/Shanghai/49803/2006/CHN
Norovirus Hu/Chiba/990897/1 999/JP	Norovirus Hu/Shanxi/49709/2006/CHN
Norovirus Hu/Chiba/990900/1 999/JP	Norovirus Hu/Shanxi/497 16/2006/CHN
Norovirus Hu/Chiba/990969/1 999/JP	Norovirus Hu/Shanxi/50106/2006/CHN
Norovirus Hu/Chiba/99 1012/1 999/JP	Norovirus Hu/Shimane/D 17 12-A-a/Jun2008/JP
Norovirus Hu/Chiba/99 1013/1 999/JP	Norovirus Hu/Shimane/Dl 7 12-A-b/Jun2008/JP
Norovirus Hu/Chiba/99 l 118/1 999/JP	Norovirus Hu/Shimane/D1714-B/Jun2008/JP
Norovirus Hu/Chiba/99 1120/1 999/JP	Norovirus Hu/Shimane/D 1715-B-a/Jun2008/JP
Norovirus Hu/Chiba/99 1173/1 999/JP	Norovirus Hu/Shimane/Dl 7 15-B-b/Jun2008/JP
Norovirus Hu/Chiba/99 1180/1 999/JP	Norovirus Hu/Shimane/Dl 7 16-B/Jun2008/JP

Norovirus Hu/CHN21 19/CC99	Norovirus Hu/Shimane/D 1725/Jun2008/JP
Norovirus Hu/CHN2121/CC99	Norovirus Hu/Shimane/D1730-A/Jun2008/JP
Norovirus Hu/CHN2122/CC99	Norovirus Hu/Shimane/D 173 1-A/Jun2008/JP
Norovirus Hu/CHN2127/CC99	Norovirus Hu/Shimane/D 1734-D/Jun2008/JP
Norovirus Hu/CHN2136/CC99	Norovirus Hu/Shimane/D 1739-A/Jun2008/JP
Norovirus Hu/CHN2139/CC99	Norovirus Hu/Shimane/D 1741 -D-a/Jun2008/JP
Norovirus Hu/CHN2140/CC99	Norovirus Hu/Shimane/D 1741 -D-b/Jun2008/JP
Norovirus Hu/CHN2168/LL99	Norovirus Hu/Shimane/D 1742-D/Jun2008/JP
Norovirus Hu/CHN2183/LL99	Norovirus Hu/Shimane/D 1743 -D/Jun2008/JP
Norovirus Hu/CHN2514/HN99	Norovirus Hu/Shinshiro/l/2006/JP
Norovirus Hu/CHN2553/HN99	Norovirus Hu/Showa/l/05/JP
Norovirus Hu/CHN2576/HN99	Norovirus Hu/SI001386/Slovenia
Norovirus Hu/CHN2625/GZH99	Norovirus Hu/Sigmaringen 13187/2002/DE
Norovirus Hu/CHN2749/GZH99	Norovirus Hu/Sigmaringen4557/200 1/DE
Norovirus Hu/CHN2792/LZH99	Norovirus Hu/Sigmaringen687/2003/DE
Norovirus Hu/CHN2799/LZH99	Norovirus Hu/Sofial56/2007/BGR
Norovirus Hu/CHN2807/KM00	Norovirus Hu/Sofia578/2007/BGR
Norovirus Hu/CHN2809/KM00	Norovirus Hu/Sofia661/2007/BGR
Norovirus Hu/CHN2841/KM99	Norovirus Hu/Sommieres 1203/2006/France
Norovirus Hu/CHN2842/KM99	Norovirus Hu/SteColette65 8/2004/France
Norovirus Hu/CHN2844/KM99	Norovirus Hu/Stuttgart021 84/2002/DE
Norovirus Hu/CHN2851/KM99	Norovirus Hu/Stuttgart7528/2002/DE
Norovirus Hu/CHN2929/GZH00	Norovirus Hu/T2a/JPN
Norovirus Hu/CHN302/BJ99	Norovirus Hu/T2b/JPN
Norovirus Hu/CHN3055/FJ99	Norovirus Hu/T3/JPN
Norovirus Hu/CHN3 111/FJ99	Norovirus Hu/T4/JPN
Norovirus Hu/CHN3156/FJ99	Norovirus Hu/Taipei-l/04/TW
Norovirus Hu/CHN3181/HZH99	Norovirus Hu/Taipei-ll/04/TW
Norovirus Hu/CHN3191/HZH99	Norovirus Hu/Taipei-24/04/TW
Norovirus Hu/CHN3 198/HZH99	Norovirus Hu/Taipei-32/04/TW
Norovirus Hu/CHN3202/HZH99	Norovirus Hu/Taipei-33/04/TW
Norovirus Hu/CHN3241/HZH99	Norovirus Hu/Taipei-52/04/TW
Norovirus Hu/CHN3256/HZH99	Norovirus Hu/Taipei-53/04/TW
Norovirus Hu/CHN3258/HZH99	Norovirus Hu/Taipei-57/04/TW
Norovirus Hu/CHN3263/HZH99	Norovirus Hu/Taipei-63/04/TW
Norovirus Hu/CHN3275/HZH99	Norovirus Hu/Taipei-69/04/TW
Norovirus Hu/CHN3298/HZH99	Norovirus Hu/Taipei-70/04/TW
Norovirus Hu/CHN3299/HZH99	Norovirus Hu/Taipei-73/04/TW
Norovirus Hu/CHN3309/HZH99	Norovirus Hu/Taipei-76/04/TW
Norovirus Hu/CHN3477/LL00	Norovirus Hu/Taipei-78/04/TW
Norovirus Hu/CHN360/BJ99	Norovirus Hu/Taipei-81/04/TW
Norovirus Hu/CHN3755/CC00	Norovirus Hu/Taipei-82/04/TW
Norovirus Hu/CHN3786/CC00	Norovirus Hu/Taipei-84/04/TW
Norovirus Hu/CHN3787/CC00	Norovirus Hu/Taipei-91/04/TW
Norovirus Hu/CHN3822/CC00	Norovirus Hu/Taipei-93GI/04/TW
Norovirus Hu/CHN3824/CC99	Norovirus Hu/Taipei-93GII/04/TW
Norovirus Hu/CHN3826/CC99	Norovirus Hu/Takanosu/l/2008/JP
Norovirus Hu/CHN3838/LL00	Norovirus Hu/Tamagawa/l/05/JP
Norovirus Hu/CHN38456/BJ04	Norovirus Hu/Tamagawa/l/06/JP
Norovirus Hu/CHN3852/LL00	Norovirus Hu/Tamagawa/2/05/JP
Norovirus Hu/CHN38588/BJ04	Norovirus Hu/Tamagawa/2/2006/JP
Norovirus Hu/CHN38791/XJ04	Norovirus Hu/Tauberbischofsheim 14175/200 1/DE
Norovirus Hu/CHN388/BJ00	Norovirus Hu/Tauberbischofsheim6245/2002/DE
Norovirus Hu/CHN38812/XJ04	Norovirus Hu/TE5/2003/ITA
Norovirus Hu/CHN38816/XJ04	Norovirus Hu/Texas/TCH04-577/2004/US

Norovirus Hu/CHN3898/KM00	Norovirus Hu/TL206/1999/MEX
Norovirus Hu/CHN39186/CC04	Norovirus Hu/TL24/1998/MEX
Norovirus Hu/CHN39240/CC04	Norovirus Hu/TL354/2000/MEX
Norovirus Hu/CHN39246/CC04	Norovirus Hu/Tokyo/lSe/2005/JPN
Norovirus Hu/CHN39280/CC04	Norovirus Hu/Tokyo/216DCC/2005/JPN
Norovirus Hu/CHN3931/KM00	Norovirus Hu/Tokyo/272DCC/2006/JPN
Norovirus Hu/CHN39386/SZ04	Norovirus Hu/Tokyo/276DCC/2006/JPN
Norovirus Hu/CHN39428/SZ04	Norovirus Hu/Tokyo/285DCC/2006/JPN
Norovirus Hu/CHN39462/SZ04	Norovirus Hu/Tokyo/286DCC/2006/JPN
Norovirus Hu/CHN39540/SZ04	Norovii-us Hu/Tokyo/2Se/2006/JPN
Norovirus Hu/CHN3963/LL00	Norovirus Hu/Tokyo/3 06DCC/2006/JPN
Norovirus Hu/CHN3973/LL00	Norovirus Hu/Tokyo/3 90DCC/2006/JPN
Norovirus Hu/CHN40048/KM04	Norovirus Hu/Tokyo/3 91DCC/2006/JPN
Norovirus Hu/CHN40078/KM04	Norovii-us Hu/Tokyo/3 92DCC/2006/JPN
Norovirus Hu/CHN40092/KM04	Norovirus Hu/Tokyo/393DCC/2006/JPN
Norovirus Hu/CHN401/BJ00	Norovirus Hu/Tokyo/3 96DCC/2006/JPN
Norovirus Hu/CHN40182/KM04	Norovirus Hu/Tokyo/3 98DCC/2006/JPN
Norovirus Hu/CHN40482/SH04	Norovirus Hu/Tokyo/3 Se/2006/JPN
Norovirus Hu/CHN40496/SH04	Norovirus Hu/Tokyo/400DCC/2006/JPN
Norovirus Hu/CHN40538/SH04	Norovirus Hu/Tokyo/401DCC/2006/JPN
Norovirus Hu/CHN40600/SH04	Norovirus Hu/Tokyo/402DCC/2006/JPN
Norovirus Hu/CHN40656/CZ04	Norovirus Hu/Tokyo/403DCC/2006/JPN
Norovirus Hu/CHN40685/CZ04	Norovirus Hu/Tokyo/405DCC/2006/JPN
Norovirus Hu/CHN40737/CZ04	Norovirus Hu/Tokyo/406DCC/2006/JPN
Norovirus Hu/CHN40763/CZ04	Norovirus Hu/Tokyo/411DCC/2006/JPN
Norovirus Hu/CHN40896/SZ04	Norovirus Hu/Tokyo/414DCC/2006/JPN
Norovirus Hu/CHN40998/SZ04	Norovirus Hu/Tokyo/4 18DCC/2006/JPN
Norovirus Hu/CHN41779/XJ04	Norovirus Hu/Tokyo/419DCC/2006/JPN
Norovirus Hu/CHN41808/LL04	Norovirus Hu/Tokyo/51Se/2005/JPN
Norovirus Hu/CHN42018/LL05	Norovirus Hu/Tokyo/56Se/2005/JPN
Norovirus Hu/CHN42164/CC04	Norovirus Hu/Tokyo/6 1Se/2005/JPN
Norovirus Hu/CHN42224/LL05	Norovirus Hu/Tokyo/6602St/2005/JPN
Norovirus Hu/CHN42269/LL05	Norovirus Hu/Tokyo/6789St/2006/JPN
Norovirus Hu/CHN4253/LL01	Norovirus Hu/Tokyo/6801St/2006/JPN
Norovirus Hu/CHN42548/LL05	Norovirus Hu/Tokyo/7391 St/2005/JPN
Norovirus Hu/CHN42572/LL05	Norovirus Hu/Tokyo/7395St/2005/JPN
Norovirus Hu/CHN42814/CZ04	Norovirus Hu/Tokyo/7403St/2005/JPN
Norovirus Hu/CHN42846/CZ04	Norovirus Hu/Tokyo/7860/2007/JPN
Norovirus Hu/CHN42936/CZ04	Norovirus Hu/Tokyo/7882/2007/JPN
Norovirus Hu/CHN42951/CZ05	Norovirus Hu/Tsushima/l/2006/JP
Norovirus Hu/CHN42973/CZ05	Norovirus Hu/Tuebingen4259/2002/DE
Norovirus Hu/CHN42982/XJ05	Norovirus Hu/Tuebingen7827/200 1/DE
Norovirus Hu/CHN4300/LL01	Norovirus Hu/Tuebingen926 1/200 1/DE
Norovirus Hu/CHN43098/CC05	Norovirus Hu/UKl 1/1998/GBR
Norovirus Hu/CHN43 160/CC05	Norovirus Hu/UKl 2/200 1/GBR
Norovims Hu/CHN43 172/CC05	Norovirus Hu/UK14/1998/GBR
Norovirus Hu/CHN43202/LZ04	Norovirus Hu/Ulm2451/2002/DE
Norovirus Hu/CHN43262/LZ05	Norovirus Hu/Ulm70/2003/DE
Norovirus Hu/CHN43266/LZ05	Norovirus Hu/V1607/06/IND
Norovirus Hu/CHN43283/LZ05	Norovirus Hu/V1622/06/IND
Norovirus Hu/CHN43301/LZ05	Norovims Hu/V1628/06/IND
Norovirus Hu/CHN43303/LZ05	Norovims Hu/V1656/06/IND
Norovirus Hu/CHN43320/LZ05	Norovims Hu/V1668/06/IND
Norovirus Hu/CHN43321/LZ05	Norovims Hu/V1682/07/IND
Norovirus Hu/CHN43324/LZ05	Norovims Hu/V1699/07/IND

Norovirus Hu/CHN43330/LZ05	Norovirus Hu/V1702/07/IND
Norovirus Hu/CHN43332/LZ05	Norovirus Hu/V1706/07/IND
Norovirus Hu/CHN43338/LZ05	Norovirus Hu/V1707/07/IND
Norovirus Hu/CHN43342/LZ05	Norovirus Hu/V17 14/07/IND
Norovirus Hu/CHN43364/LZ04	Norovirus Hu/V1737/07/IND
Norovirus Hu/CHN43367/LZ04	Norovirus Hu/V1749/07/IND
Norovirus Hu/CHN43466/SH04	Norovirus Hu/V1 750/07/IND
Norovirus Hu/CHN43502/SH04	Norovirus Hu/V1760/07/IND
Norovirus Hu/CHN435 12/SH05	Norovirus Hu/V1766/07/IND
Norovirus Hu/CHN43552/SH05	Norovirus Hu/V1 772/07/IND
Norovirus Hu/CHN43568/SH05	Norovirus Hu/V1774/07/IND
Norovirus Hu/CHN4359/LL01	Norovirus Hu/V1776/07/IND
Norovirus Hu/CHN43594/SH05	Norovirus Hu/V1 783/07/IND
Norovirus Hu/CHN4369/LL01	Norovirus Hu/VC l92/2000/MEX
Norovirus Hu/CHN43949/LZ04	Norovirus Hu/VC1 93/2000/MEX
Norovirus Hu/CHN43964/LZ04	Norovirus Hu/VC66/1 999/MEX
Norovirus Hu/CHN43989/LZ04	Norovirus Hu/Vesoul576/2003/France
Norovirus Hu/CHN44 l 1/CCOl	Norovirus Hu/VIC080/2006/AUS
Norovirus Hu/CHN4412/CC01	Norovirus Hu/VIC248/2006/AUS
Norovirus Hu/CHN441 23/LZ05	Norovirus Hu/VIC397/2006/AUS
Norovirus Hu/CHN441 24/LZ05	Norovirus Hu/VIC399/2006/AUS
Norovirus Hu/CHN441 26/LZ05	Norovirus Hu/VIC458/2006/AUS
Norovirus Hu/CHN441 28/LZ05	Norovirus Hu/VIC534/2006/AUS
Norovirus Hu/CHN44 l34/LZ05	Norovirus Hu/VIC544/2006/AUS
Norovirus Hu/CHN441 36/LZ05	Norovirus Hu/VIC545/2006/AUS
Norovirus Hu/CHN44692/KM04	Norovirus Hu/VIC584/2006/AUS
Norovirus Hu/CHN4474/CC0 l	Norovirus Hu/VIC595/2006/AUS
Norovirus Hu/CHN448 12/LZ05	Norovirus Hu/VIC644/2006/AUS
Norovirus Hu/CHN4482 1/LZ05	Norovirus Hu/VIC647/2006/AUS
Norovirus Hu/CHN44858/KM04	Norovirus Hu/VIC885/2006/AUS
Norovirus Hu/CHN44898/KM04	Norovirus Hu/VIC886/2006/AUS
Norovirus Hu/CHN459/BJ00	Norovirus Hu/Vigneuxl 379/2006/France
Norovirus Hu/CHN46 17/CCOO	Norovirus Hu/Villingen2309/2004/DE
Norovirus Hu/CHN462/BJ00	Norovirus Hu/Villingen3 11/2003/DE
Norovirus Hu/CHN465/BJ00	Norovirus Hu/VNl/2006/VNM
Norovirus Hu/CHN4709/LL01	Norovirus Hu/VN26/2006/VNM
Norovirus Hu/CHN47 l 1/LLOl	Norovirus Hu/VN41/2006/VNM
Norovirus Hu/CHN4748/LL01	Norovirus Hu/VN59/2006/VNM
Norovims Hu/CHN4789/LL01	Norovirus Hu/VN73/2006/VNM
Norovirus Hu/CHN5450/KM0 l	Norovirus Hu/VN74/2006/VNM
Norovirus Hu/CHN553 1/KM01	Norovirus Hu/VN75/2006/VNM
Norovirus Hu/CMHOOl/03/2003/THA	Norovirus Hu/VN77/2006/VNM
Norovirus Hu/CMH002/05/2005/THA	Norovirus Hu/VN78/2006/VNM
Norovirus Hu/CMH005/05/2005/THA	Norovirus Hu/VN79/2006/VNM
Norovirus Hu/CMH006/04/2004/THA	Norovirus Hu/VN80/2006/VNM
Norovirus Hu/CMHO l0/00/2000/THA	Norovirus Hu/VN82/2006/VNM
Norovirus Hu/CMHOl 0/05/2005/THA	Norovirus Hu/VN84/2006/VNM
Norovirus Hu/CMHOl 1/02/2002/THA	Norovirus Hu/VN85/2006/VNM
Norovirus Hu/CMHOl 1/04/2004/THA	Norovirus Hu/VN87/2006/VNM
Norovirus Hu/CMHOl 5/03/2003/THA	Norovirus Hu/VN88/2006/VNM
Norovirus Hu/CMHOl 8/04/2 004/THA	Norovirus Hu/VN89/2006/VNM
Norovirus Hu/CMH02 5/04/2 004/THA	Norovirus Hu/VN9/2006/VNM
Norovirus Hu/CMH028/03/2003/THA	Norovirus Hu/VN95/2006/VNM
Norovirus Hu/CMH034/03/2003/THA	Norovirus Hu/Waiblingen26/2003/DE
Norovims Hu/CMH034/04/2004/THA	Norovirus Hu/Waiblingen5 14 1/2002/DE

Norovirus Hu/CMH037/00/2000/THA	Norovirus Hu/Waiblingen6509/200 1/DE
Norovirus Hu/CMH03 7/04/2 004/THA	Norovirus Hu/Waldshut5564/2003/DE
Norovirus Hu/CMH038/02/2002/THA	Norovirus Hu/Waldshut7877/2002/DE
Norovirus Hu/CMH038/04/2004/THA	Norovirus Hu/WKDHaussach8968/2003/DE
Norovirus Hu/CMH040/02/2002/THA	Norovirus Hu/Yokohama/y 04- 161-16/2 004/JP
Norovirus Hu/CMH04 1/02/2002/THA	Norovirus Hu/Yokohama/y04-l 98-1 3/2005/JP
Norovirus Hu/CMH042/02/2002/THA	Norovirus Hu/Yokohama/y04-200-l 1/2005/JP
Norovirus Hu/CMH042/05/2005/THA	Norovirus Hu/Yokohama/y04-208- 1/2005/JP
Norovirus Hu/CMH043/02/2002/THA	Norovirus Hu/Yokohama/y04-V l0- 1/2005/JP
Norovirus Hu/CMH043/03/2003/THA	Norovirus Hu/Yokohama/y05-l 53-40/2005/JP
Norovirus Hu/CMH045/04/2004/THA	Norovirus Hu/Yokohama/y05-Vl 4-5/2005/JP
Norovirus Hu/CMH049/04/2004/THA	Norovirus Hu/Yokohama/y05-Vl 7-8/2005/JP
Norovirus Hu/CMH052/0 1/200 1/THA	Norovirus Hu/Yokohama/y06-Vl 10-5/2007/JP
Norovirus Hu/CMH063/04/2004/THA	Norovirus Hu/Yokohama/y06-Vl 11-3/2007/JP
Norovirus Hu/CMH064/04/2004/THA	Norovirus Hu/Yokohama/y06-Vl 14-14/2007/JP
Norovirus Hu/CMH068/01/2001/THA	Norovirus Hu/Yokohama/y06-Vl 17-2/2007/JP
Norovirus Hu/CMH076/04/2004/THA	Norovirus Hu/Yokohama/y06-V34-5/2006/JP
Norovirus Hu/CMH076/05/2005/THA	Norovirus Hu/Yokohama/y06-V37-21/2006/JP
Norovirus Hu/CMH079/04/2004/THA	Norovirus Hu/Yokohama/y06-V44-2/2006/JP
Norovirus Hu/CMH083/05/2005/THA	Norovirus Hu/Yokohama/y06-V55-3/2006/JP
Norovirus Hu/CMH090/04/2004/THA	Norovirus Hu/Yokohama/y06-V67-5/2006/JP
Norovirus Hu/CMH091/01/2001/THA	Norovirus Hu/Yokohama/y06-V82-2/2007/JP
Norovirus Hu/CMH091/04/2004/THA	Norovirus Hu/Yokote/l/2008/JP
Norovirus Hu/CMH092/04/2004/THA	Norovirus Hu/Yokote/2/2008/JP
Norovirus Hu/CMH096/0 1/2 00 1/THA	Norovirus Hu/Yokote/3/2008/JP
Norovirus Hu/CMH097/0 1/200 1/THA	Norovirus Hu/Yonaizawa/l/05/JP
Norovirus Hu/CMH104/05/2005/THA	Norovirus Hu/Yuri/l/2007/JP
Norovirus Hu/CMHl 12/0 1/2 00 1/THA	Norovirus Hu/Zuerich/P3dl/2006
Norovirus Hu/CMHl 13/05/2005/THA	Norovirus Hu/Zuerich/P3d683/2008
Norovirus Hu/CMHl 20/0 1/2 00 1/THA	Norovirus Hu/Zuerich/P4dl/2007
Norovirus Hu/CMHl 26/0 1/2 00 1/THA	Norovirus Hu/Zuerich/P4d28 1/2007
Norovirus Hu/CMH133/04/2004/THA	Norovirus Hu/Zuerich/P5dl/2008
Norovirus Hu/CMHl 38/04/2 004/THA	Norovirus Hu/Zuerich/P5dl61/2009
Norovirus Hu/CMHl 39/04/2 004/THA	Norovirus Hu/Zuerich/P7dl/2008
Norovirus Hu/CMHl 40/04/2004/THA	Norovirus Hu/Zuerich/P7d3 84/2009
Norovirus Hu/CMHl 42/05/2005/THA	Norovirus human feces/CIT N002/IRL
Norovirus Hu/CMHl 45/04/2004/THA	Norovirus human feces/CIT N005/IRL
Norovirus Hu/CMHl 45/05/2005/THA	Norovirus human feces/CIT N008/IRL
Norovirus Hu/CMHl 48/0 1/2 00 1/THA	Norovirus human feces/CIT N018/IRL
Norovirus Hu/CMHl 53/04/2 004/THA	Norovirus human feces/CIT N030/IRL
Norovirus Hu/CMHl 58/04/2 004/THA	Norovirus human feces/CIT N032/IRL
Norovirus Hu/CMH 159/04/2 004/THA	Norovirus human feces/CIT N034/IRL
Norovirus Hu/CMHl 83/00/2000/THA	Norovirus human feces/CIT N073/IRL
Norovirus Hu/CMH241/01/2001/THA	Norovirus human feces/CIT N078/IRL
Norovirus Hu/CMH247/01/2001/THA	Norovirus Kandy/101/2005/LKA
Norovirus Hu/CMH251/01/2001/THA	Norovirus Kandy/108/2005/LKA
Norovirus Hu/CMH2 62/0 1/2 00 1/THA	Norovirus Kandy/1 15/2005/LKA
Norovirus Hu/CMH2 98/0 1/2001 /THA	Norovirus Kandy/1 17/2005/LKA
Norovirus Hu/CMH3 08/01/2001 /THA	Norovirus Kandy/1 3 1/2005/LKA
Norovirus Hu/CMH309/01/2001/THA	Norovirus Kandy/1 33/2005/LKA
Norovirus Hu/CMH3 23/02/2 002/THA	Norovirus Kandy/1 40/2005/LKA
Norovirus Hu/CMH3 29/02/2 002/THA	Norovirus Kandy/1 42/2005/LKA
Norovirus Hu/CMH344/02/2002/THA	Norovirus Kandy/1 45/2005/LKA
Norovirus Hu/CMH357/00/2000/THA	Norovirus Kandy/1 48/2005/LKA
Norovirus Hu/CMH359/00/2000/THA	Norovirus Kandy/1 52/2005/LKA

Norovirus Hu/CN244/1998/US	Norovirus Kandy/159/2005/LKA
Norovirus Hu/CN2686/1997/US	Norovirus Kandy/174/2005/LKA
Norovirus Hu/CN2693/1997/US	Norovirus Kandy/180/2005/LKA
Norovirus Hu/CN2694/1997/US	Norovirus Kandy/185/2005/LKA
Norovirus Hu/CN2716/1998/US	Norovirus Kandy/193/2005/LKA
Norovirus Hu/CN2753/1998/US	Norovirus Kandy/197/2005/LKA
Norovirus Hu/CN2765/1998/US	Norovirus Kandy/20/2005/LKA
Norovirus Hu/CN2819/1998/US	Norovirus Kandy/209/2005/LKA
Norovirus Hu/CN2841/1998/US	Norovirus Kandy/210/2005/LKA
Norovirus Hu/CN2849/1998/US	Norovirus Kandy/213/2005/LKA
Norovirus Hu/CN2856/1998/US	Norovirus Kandy/221/2005/LKA
Norovirus Hu/CN2887/1998/US	Norovirus Kandy/234/2005/LKA
Norovirus Hu/CN2957/1998/US	Norovirus Kandy/239/2005/LKA
Norovirus Hu/CN2976/1998/US	Norovirus Kandy/245/2005/LKA
Norovirus Hu/CN2982/1998/US	Norovirus Kandy/258/2005/LKA
Norovirus Hu/CN2990/1998/US	Norovirus Kandy/270/2005/LKA
Norovirus Hu/CN2996/1998/US	Norovirus Kandy/280/2005/LKA
Norovirus Hu/CN3015/1998/US	Norovirus Kandy/298/2005/LKA
Norovirus Hu/CN3016/1998/US	Norovirus Kandy/326/2005/LKA
Norovirus Hu/CN3038/1998/US	Norovirus Kandy/332/2005/LKA
Norovirus Hu/CN3041/1998/US	Norovirus Kandy/341/2005/LKA
Norovirus Hu/CN3044/1998/US	Norovirus Kandy/353/2005/LKA
Norovirus Hu/CN3050/1998/US	Norovirus Kandy/354/2005/LKA
Norovirus Hu/CN3052/1998/US	Norovirus Kandy/362/2005/LKA
Norovirus Hu/CN3071/1998/US	Norovirus Kandy/369/2005/LKA
Norovirus Hu/CN3108/1999/US	Norovirus Kandy/370/2005/LKA
Norovirus Hu/CN3 117/1 999/US	Norovirus Kandy/4/2005/LKA
Norovirus Hu/CN3135/1999/US	Norovirus Mex7076/1999
Norovirus Hu/CN3 147/1 999/US	Norovirus minced meat/Stuttgart554/2007/DEU
Norovirus Hu/CN3 171/1 999/US	Norovirus mouse/Hannover 1/2007/DEU
Norovirus Hu/CN3202/1 999/US	Norovirus mouse/TW2006/TWN
Norovirus Hu/CN3204/1 999/US	Norovirus mouse/TW2007/TWN
Norovirus Hu/CN3221/1999/US	Norovirus mussels/Korntal8335/2007/DEU
Norovirus Hu/CN3244/1 999/US	Norovirus Nagano/7-29/Apr2008/JPN
Norovirus Hu/CN3246/1999/US	Norovirus Nagasaki/03/JP
Norovirus Hu/CN3260/1 999/US	Norovirus Nizhny Novgorod/1 4072/RUS/2006
Norovirus Hu/CN3273/1999/US	Norovirus Nizhny Novgorod/1 4342/RUS/2006
Norovirus Hu/CN3321/1999/US	Norovirus Nizhny Novgorod/1 4726/RUS/2007
Norovirus Hu/CN3341/1 999/US	Norovirus Nizhny Novgorod/1 4780/RUS/2007
Norovirus Hu/CN43 8/1 999/US	Norovirus Nizhny Novgorod/14995/RUS/2007
Norovirus Hu/CN88/1998/US	Norovirus Nizhny Novgorod/2461/RUS/2007
Norovirus Hu/cockles/KOKlQNL/2000/Netherlands	Norovirus Nizhny Novgorod/2549/RUS/2007
Norovirus Hu/Daycare-center_A/2 1-02-2002/NL	Norovirus Nizhny Novgorod/2557/RUS/2007
Norovirus Hu/Daycare-center_B/ 12-12-2002/NL	Norovirus NLV/BUDS/2002/USA
Norovirus Hu/DC2022-Madag04/2004/MDG	Norovirus NLV/IF1998/2003/Iraq
Norovirus Hu/DC2048-Madag04/2004/MDG	Norovirus NLV/IF2036/2003/Iraq
Norovirus Hu/DC2054-Madag04/2004/MDG	Norovirus NLV/Paris Island/2003/USA
Norovirus Hu/DG6003-Madag04/2004/MDG	Norovirus NongKhai-22/Thailand
Norovirus Hu/DG6004-Madag04/2004/MDG	Norovirus NongKhai-5 1/Thailand
Norovirus Hu/DG6020-Madag04/2004/MDG	Norovirus noodle salad/Stuttgart21334/2006/DEU
Norovirus Hu/Diner_Amsterdam/08-07-2002/NL	Norovirus NV/aomori/C13/03/JP
	Norovirus NV/ehime/Cl 1/04/JP
	Norovirus NV/ehime/C3/02/JP
	Norovirus NV/Futatsui/l/05/JP
	Norovirus NV/hiroshima/Cl/03/JP

Norovirus Hu/DM4025-Madag05/2005/MDG	Norovirus NV/hokkaido/C37/04/JP
Norovirus Hu/DROOl l-Madag04/2004/MDG	Norovirus NV/hokkaido/C38/04/JP
Norovirus Hu/DR0023-Madag04/2004/MDG	Norovirus NV/kagoshima/C20/03/JP
Norovirus Hu/DR0025-Madag04/2004/MDG	Norovirus NV/kagoshima/C3 1/03/JP
Norovirus Hu/DR0045-Madag04/2004/MDG	Norovirus NV/kagoshima/C6/04/JP
Norovirus Hu/DR0046-Madag04/2004/MDG	Norovirus NV/kanagawa/C10/03/JP
Norovirus Hu/DT 1020-Magad04/2004/MDG	Norovirus NV/kanagawa/C36/04/JP
Norovirus Hu/DT 1032-Madag04/2004/MDG	Norovinis NV/mie/Cl 8/03/JP
Norovirus Hu/Ehime/05-30/2005/JP	Norovirus NV/mie/C27/04/JP
Norovirus Hu/Emmendingen l 3 186/2002/DE	Norovirus NV/mie/C33/03/JP
Norovirus Hu/Emmendingen 13848/2002/DE	Norovirus NV/mie/C4/03/JP
Norovirus Hu/Emmendingen 154/2003/DE	Norovirus NV/nagano/C14/03/JP
Norovirus Hu/Esslingen5 79 1/2003/DE	Norovinis NV/nagano/C 17/03/JP
Norovirus Hu/Freiburg3308/2002/DE	Norovirus NV/nagano/C22/03/JP
Norovirus Hu/Freudenstadtl 3 147/200 1/DE	Norovirus NV/nagano/C5/03/JP
Norovirus Hu/Freudenstadt201 1/2004/DE	Norovirus NV/nagano/C9/03/JP
Norovirus Hu/Friedrichshafen 1104/2004/DE	Norovinis NV/sediment/Maracaibo 1/2003/VE
Norovirus Hu/Friedrichshafen8054/2002/DE	Norovirus NV/shizuoka/C30/04/JP
Norovirus Hu/Fuj ian/4973 7/2006/CHN	Norovirus NV/water/Maracaibo 1/2003/VE
Norovirus Hu/Fujian/49745/2006/CHN	Norovirus NV/yamaguchi/C16/03/JP
Norovirus Hu/Fujian/49747/2006/CHN	Norovirus NV/Yuri/l/95/JP
Norovirus Hu/Fujian/50255/2006/CHN	Norovinis oyster clone
Norovinis Hu/Fujian/50257/2006/CHN	A/Mannheim 11815/2 006/DEU
Norovirus Hu/Fujian/50260/2006/CHN	Norovirus oyster clone
Norovirus Hu/Fujian/50264/2006/CHN	B/Mannheiml 1815/2006/DEU
Norovirus Hu/G2/Fin-Upinniemi/1 998/Finland	Norovinis oyster/44330/643 17/2006/FR
Norovirus Hu/Ghana-l/2000/GH	Norovinis oyster/GII-4/BC-12/2009/CAN
Norovirus Hu/Ghana-2/2000/GH	Norovirus oyster/GII-4/BC- 13/2009/CAN
Norovirus Hu/GI/New Delhi/ 120/IND	Norovirus oyster/GII-4/H-149/2008/CAN
Norovirus Hu/GI/Otofuke/1979/JP	Norovirus oyster/Guangzhou 2/CHN
Norovirus Hu/GII/Hannovei-20 132624/2006/DE	Norovinis oyster/oes7/648 15b/2006/FR
Norovirus Hu/GM245/2000/MEX	Norovinis oyster/oes8a/648 15/2006/FR
Norovirus Hu/GM260/2000/MEX	Norovirus oyster/oes8b/648 15/2006/FR
Norovirus Hu/GM268/2000/MEX	Norovirus oyster/Zhuhai 5/CHN
Norovirus Hu/GM272/2000/MEX	Norovirus pasta/Waldshutl 1487/2007/DEU
Norovirus Hu/GM93/1999/MEX	Norovinis pig/30/2004/SVN
Norovirus Hu/Goeppingen l 2959/2002/DE	Norovinis pig/3 1/2004/SVN
Norovirus Hu/Goeppingen425 1/2003/DE	Norovirus pig/36/2004/SVN
Norovirus Hu/Graz/lO/03/Austria	Norovirus pig/AB 169/CAN
Norovirus Hu/Groetzingen995/2003/DE	Norovirus pig/AB276/CAN
Norovirus Hu/Guangzhou/NV-VPl/2006/China	Norovinis pig/F15-7/CAN
Norovirus Hu/Guangzhou/NV-VP2/2006/China	Norovinis pig/F16-8/CAN
Norovirus Hu/Guangzhou/NVgzOl/CHN	Norovirus pig/F16-9/CAN
Norovinis Hu/Gunma/1 1-01/2005/JP	Norovirus pig/F18-8/CAN
Norovirus Hu/Gunma/12-02/2006/JP	Norovinis pig/F18-9/CAN
Norovirus Hu/Gunma/8-01/2004/JP	Norovinis pig/KT7/2004/SVN
Norovirus Hu/Gunma/9-01/2004/JP	Norovirus pig/P15_2/2004/SVN
Norovirus Hu/Hl/JPN	Norovirus pig/Vetl0-S08108/DNK
Norovirus Hu/H2/JPN	Norovirus pig/Vetl4-S08257/DNK
Norovirus Hu/H3/JPN	Norovinis pig/Vetl8-S08131/DNK
Norovirus Hu/Hainan/47840/2006/CHN	Norovinis pig/Vet41-S08288/DNK
Norovirus Hu/Hainan/47841/2006/CHN	Norovinis pig/Vet53-S08140/DNK
	Norovirus pig/ZP-071 1/2007/NZL
	Norovirus potato/Boeblingen/2003/DE
	Norovinis raw sewage/Monastir/14/2005/TUN

Norovirus Hu/HCMC131/2006/VNM	Norovirus raw sewage/Monastir/15/2006/TUN
Norovirus Hu/HCMC204/2006/VNM	Norovirus raw sewage/Monastir/25/2004/TUN
Norovirus Hu/HCMC298/2006/VNM	Norovirus raw sewage/Monastir/29/2005/TUN
Norovirus Hu/HCMC31 1/2006/VNM	Norovirus raw sewage/Monastir/32/2006/TUN
Norovirus Hu/HCMC318/2006/VNM	Norovirus raw sewage/Monastir/64/2005/TUN
Norovirus Hu/HCMC9 1/2006/VNM	Norovirus raw sewage/Monastir/9/2006/TUN
Norovirus Hu/Hebei/47931/2006/CHN	Norovirus rice/Stuttgart7008/2006/DEU
Norovirus Hu/Hebei/48574/2006/CHN	Norovirus SaKaeo-14/Thailand
Norovirus Hu/Hebei/48578/2006/CHN	Norovirus SaKaeo-52/Thailand
Norovirus Hu/Hebei/48580/2006/CHN	Norovirus SaKaeo-53/Thailand
Norovirus Hu/Hebei/48588/2006/CHN	Norovirus SaKaeo-54/Thailand
Norovirus Hu/Hebei/48962/2006/CHN	Norovirus SaKaeo-57/Thailand
Norovirus Hu/Hebei/48963/2006/CHN	Norovirus SaKaeo-61 /Thailand
Norovirus Hu/Hebei/48966/2006/CHN	Norovirus salami/ Wiesental405 2 1/2007/DEU
Norovirus Hu/Hebei/50033/2006/CHN	Norovirus schnitzel/Stuehlingen371 12/2007/DEU
Norovirus Hu/Hebei/50034/2006/CHN	Norovirus shashlik/Stuttgart76/2007/DEU
Norovirus Hu/Hebei/50036/2006/CHN	Norovirus sheep/Norsewoodl 1/2007/NZL
Norovirus Hu/Hebei/50038/2006/CHN	Norovirus sheep/Norsewood3 0/2007/NZL
Norovirus Hu/Hebei/50039/2006/CHN	Norovii-us shellfish/Monastir/3/2003/TUN
Norovirus Hu/Hebei/50040/2006/CHN	Norovirus Songkhla-34/Thailand
Norovirus Hu/Hebei/50302/2006/CHN	Norovirus Songkhla-36/Thailand
Norovirus Hu/Hebei/50307/2006/CHN	Norovirus Songklila-37/Thailand
Norovirus Hu/Hebei/50316/2006/CHN	Norovirus Suminoe oyster/Beibu Gulf/2004/China
Norovirus Hu/Hebei/50322/2006/CHN	Norovirus Sw/PC23/2007/BEL
Norovirus Hu/Heidelbergl 3373/2002/DE	Norovirus Sw/PC26/2007/BEL
Norovirus Hu/Heidelbergl 3908/2002/DE	Norovirus swab/Rottenburg/40728/2005/DE
Norovirus Hu/Heidelbergl 884/2003/DE	Norovirus swab/Stuttgart/3 8663/2006/DE
Norovirus Hu/Heidenheim3796/2002/DE	Norovirus swine/IV-2/2005/HUN
Norovirus Hu/Heilbronn2647/2004/DE	Norovirus swine/K5/JP
Norovirus Hu/Heilbronn2 846/2002/DE	Norovirus Tak-62/Thailand
Norovirus Hu/Heilbronn4983/2001/DE	Norovirus Tak-69/Thailand
Norovirus Hu/Henan/49166/2006/CHN	Norovirus treated sewage/Monastir/24/2005/TUN
Norovirus Hu/Henan/49189/2006/CHN	Norovirus treated sewage/Monastir/28/2005/TUN
Norovirus Hu/Hiroshima/20-5 07/200 1/JP	Norovirus treated sewage/Monastir/48/2005/TUN
Norovirus Hu/Hiroshima/2 1-51 7/2002/JP	Norovirus treated sewage/Monastir/60/2005/TUN
Norovirus Hu/Hiroshima/25-5 83/2002/JP	Noi-walk virus (Hu/NLV/OC00003/2000/JP)
Norovirus Hu/Hiroshima/26-623/2002/JP	Norwalk virus (Hu/NLV/OC00018/2000/JP)
Norovirus Hu/Hiroshima/32-754/2003/JP	Norwalk virus (Hu/NLV/OC00019/2000/JP)
Norovirus Hu/Hiroshima/38-840/2003/JP	Norwalk virus (Hu/NLV/OC96065/1996/JP)
Norovirus Hu/Hiroshima/39-852/2003/JP	Norwalk virus (Hu/NLV/OC98008/1998/JP)
Norovirus Hu/Hiroshima/43-886/2004/JP	Norwalk virus (Hu/NLV/OC99288/1999/JP)
Norovirus Hu/Hiroshima/48-936/2004/JP	Norwalk virus Hu/NV/Chiba/001049/2000/JP
Norovirus Hu/Hiroshima/48-938/2004/JP	Norwalk virus Hu/NV/Chiba/0 l0 105/200 1/JP
Norovirus Hu/Hiroshima/60- 10 15/2005/JP	Norwalk virus Hu/NV/Chiba/021071/2002/JP
Norovirus Hu/Hiroshima/62- 1046/2006/JP	Norwalk virus Hu/NV/Chiba/030100/2003/JP
Norovirus Hu/Hiroshima/66-1 110/2006/JP	Norwalk virus Hu/NV/Chiba/030556/2003/JP
Norovirus Hu/Hokkaido/ 10-1 3/2004/JP	Noi-walk virus Hu/NV/Chiba/030910/2003/JP
Norovirus Hu/Hokkaido/109/2002/JP	Noi-walk virus Hu/NV/Chiba/03 1038/2003/JP
Norovirus Hu/Hokkaido/110/2002/JP	Norwalk virus Hu/NV/Chiba/040092/2004/JP
Norovirus Hu/Hokkaido/1 11A/2002/JP	Norwalk virus Hu/NV/Chiba/040 l 10/2004/JP
Norovirus Hu/Hokkaido/ 112/2002/JP	Norwalk virus Hu/NV/Chiba/040277/2004/JP
Norovirus Hu/Hokkaido/133/2003/JP	Norwalk virus Hu/NV/Chiba/040502/2004/JP
Norovirus Hu/Hokkaido/134/2003/JP	Noi-walk virus Hu/NV/Chiba/991 002/1 999/JP
Norovirus Hu/Hokkaido/ 139/2003/JP	Noi-walk virus Hu/NV/Karaclii/1001/1990
Norovirus Hu/Hokkaido/141/2003/JP	Norwalk virus NLV/Carousel/1998/UK

Norovirus Hu/Hokkaido/ 146A/2003/JP	Norwalk virus NLV/Driffield/1999/UK
Norovirus Hu/Hokkaido/157/2003/JP	Norwalk virus NLV/Luton/1999/UK
Norovirus Hu/Hokkaido/ 160/2003/JP	Norwalk virus NLV/Ramridge/1998/UK
Norovirus Hu/Hokkaido/ 182/2004/JP	Norwalk virus NLV/Windlesham/1998/UK
Norovirus Hu/Hokkaido/190/2004/JP	Norwalk virus NV/hokkaido/C-39/04/JP
Norovirus Hu/Hokkaido/203A/2004/JP	Norwalk virus NV/hokkaido/C-40/04/JP
Norovirus Hu/Hokkaido/21 1/2004/JP	Norwalk-like virus Hu/NLV/GI/464/US
Norovirus Hu/Hokkaido/228/2004/JP	Norwalk-like virus Hu/NLV/GI/487/US
Norovirus Hu/Hokkaido/28/1999/JP	Norwalk-like virus Hu/NLV/GI/488/US
Norovirus Hu/Hokkaido/34B/2000/JP	Norwalk-like virus Hu/NLV/GI/560/US
Norovirus Hu/Hokkaido/5-05/2003/JP	Norwalk-like virus Hu/NLV/GI/579/US
Norovirus Hu/Hokkaido/60/2001/JP	Norwalk-like virus Hu/NLV/GI/61 1/US
Norovirus Hu/Hokkaido/7-07/2004/JP	Norwalk-like virus Hu/NLV/GI/61 5/US
Norovirus Hu/Hokkaido/74/200 1/JP	Norwalk-like virus Hu/NLV/GI/629/US
Norovirus Hu/Hokkaido/77/2001/JP	Norwalk-like vims Hu/NLV/GI/653/US
Norovirus Hu/Hokkaido/82/2001/JP	Norwalk-like virus Hu/NLV/GI/661/US
Norovirus Hu/Hokkaido/83/2001/JP	Norwalk-like virus Hu/NLV/GI/665/US
Norovirus Hu/Hokkaido/86B/2001/JP	Norwalk-like virus Hu/NLV/GI/684/US
Norovirus Hu/Hokkaido/87/2001/JP	Norwalk-like virus Hu/NLV/GI/736/US
Norovii-us Hu/Hokkaido/88/2001/JP	Norwalk-like virus Hu/NLV/GI/772/US
Norovirus Hu/Hokkaido/90/200 1/JP	Norwalk-like vims Hu/NLV/GII/506/US
Norovirus Hu/Hokkaido/91/2001/JP	Norwalk-like virus Hu/NLV/GII/514/US
Norovirus Hu/Hokkaido/92/2002/JP	Norwalk-like virus Hu/NLV/GII/535/US
Norovirus Hu/Hokkaido/94/2002/JP	Norwalk-like virus Hu/NLV/GII/542/US
Norovirus Hu/Hokkaido/96B/2002/JP	Norwalk-like virus Hu/NLV/GII/549/US
Norovirus Hu/Hospital_AA_PAAZ_pat_l/l 5-07-2002/NL	Norwalk-like virus Hu/NLV/GII/562/US
	Norwalk-like virus Hu/NLV/GII/564/US
Norovirus Hu/Hospital_AA_PAAZ_personel_l/18-07-2002/NL	Norwalk-like virus Hu/NLV/GII/565/US
	Norwalk-like virus Hu/NLV/GII/567/US
Norovirus Hu/Hospital_AB_Al_pat_l 04-02-2003/NL	Norwalk-like virus Hu/NLV/GII/577/US
	Norwalk-like virus Hu/NLV/GII/580/US
Norovirus Hu/Hospital_AB_A 1_pat_205-03-2003/NL	Norwalk-like virus Hu/NLV/GII/586/US
	Norwalk-like virus Hu/NLV/GII/596/US
Norovirus Hu/Hospital_AB_A3_pat_ 1/10-02-2003/NL	Norwalk-like virus Hu/NLV/GII/604/US
	Norwalk-like vims Hu/NLV/GII/607/US
Norovirus Hu/Hospital_AB_A3_personel_l/10-02-2003/NL	Norwalk-like vims Hu/NLV/GII/634/US
	Norwalk-like vims Hu/NLV/GII/642/US
	Norwalk-like vims Hu/NLV/GII/643/US
	Norwalk-like vims Hu/NLV/GII/649/US
Norovirus Hu/Hospital_AB_A7_pat_l /06-0 1-2003/NL	Norwalk-like vims Hu/NLV/GII/654/US
	Norwalk-like vims Hu/NLV/GII/663/US
Norovirus Hu/Hospital_AB_A8_pat_l/2 1-0 1-2003/NL	Norwalk-like vims Hu/NLV/GII/668/US
	Norwalk-like vims Hu/NLV/GII/677/US
Norovirus Hu/Hospital_AB_A9_pat_l/18-12. -2002/NL	Norwalk-like vims Hu/NLV/GII/682/US
	Norwalk-like vims Hu/NLV/GII/683/US
Norovirus Hu/Hospital_AB_B 1_pat_l /22-0 1-2003/NL	Norwalk-like vims Hu/NLV/GII/691/US
	Norwalk-like vims Hu/NLV/GII/692/US
Norovirus Hu/Hospital_AB_B l_pat_2/28-02-2003/NL	Norwalk-like vims Hu/NLV/GII/707/US
	Norwalk-like vims Hu/NLV/GII/708/US
	Norwalk-like vims Hu/NLV/GII/710/US
Norovirus Hu/Hospital_AB_B l_personel_l/27-01 -2003/NL	Norwalk-like vims Hu/NLV/GII/712/US
	Norwalk-like vims Hu/NLV/GII/715/US
Norovirus Hu/Hospital_AB_PAAZ_pat07 -02-2003/NL2.	Norwalk-like vims Hu/NLV/GII/723/US
	Norwalk-like vims Hu/NLV/GII/733/US
Norovirus Hu/Hospital_AB_PAAZ_pat_3/1 1-	Norwalk-like vims Hu/NLV/GII/734/US

02-2003/NL	Norwalk-like virus Hu/NLV/GII/737/US
Norovirus Hu/IlOa/JPN	Norwalk-like virus Hu/NLV/GII/740/US
Norovirus Hu/IlOb/JPN	Norwalk-like virus Hu/NLV/GII/741/US
Norovirus Hu/I3a/JPN	Norwalk-like virus Hu/NLV/GII/759/US
Norovirus Hu/I3b/JPN	Norwalk-like virus Hu/NLV/GII/762/US
Norovirus Hu/I4/JPN	Norwalk-like virus Hu/NLV/GIV/765/US
Norovirus Hu/IR-112/2006/Iran	Norwalk-like virus Hu/NV/03012-2/GII/2003/JP
Norovirus Hu/IR-1 15/2006/Iran	Norwalk-like virus Hu/NV/OC02065/2002/JP
Norovirus Hu/IR-1 17/2006/Iran	Norwalk-like virus Hu/NV/OC02172-l/GII/2002/Japan
Norovirus Hu/IR-1 86/2006/Iran	Norwalk-like virus Hu/NV/OC02172-2/GII/2002/Japan
Norovirus Hu/IR-1 97/2006/Iran	Norwalk-like virus Hii/NV/OC02172-3/GII/2002/Japan
Norovirus Hu/IR-198/2006/Iran	Norwalk-like virus Hu/NV/OC02172-4/GII/2002/Japan
Norovirus Hu/IR-202/2006/Iran	Norwalk-like virus Hu/NV/OC02189/2002/Japan
Norovirus Hu/IR-240/2006/Iran	Norwalk-like virus Hu/NV/OC02198-2/2002/JP
Norovirus Hu/IR-41/2006/Iran	Norwalk-like virus Hu/NV/OC03006/2002/JP
Norovirus Hu/Jl/JPN	Norwalk-like virus Hu/NV/OC03008/2003/JP
Norovirus Hu/Jilin/48344/2006/CHN	Norwalk-like virus Hu/NV/OC03009/GI/2003/JP
Norovirus Hu/Jilin/48352/2006/CHN	Norwalk-like virus Hu/NV/OC03009/GII/2003/JP
Norovirus Hu/Jilin/48354/2006/CHN	Norwalk-like virus Hu/NV/OC0301 1/2003/JP
Norovirus Hu/Jilin/48356/2006/CHN	Norwalk-like virus Hu/NV/OC03012-l/GII/2003/JP
Norovirus Hu/Jilin/48358/2006/CHN	Norwalk-like virus Hu/NV/OC03012-3/GII/2003/JP
Norovirus Hu/Jilin/49129/2006/CHN	Norwalk-like virus Hu/NV/OC03012/GI/2003/JP
Norovirus Hu/Jilin/491 33/2006/CHN	Norwalk-like virus Hu/NV/OC03017/2003/JP
Norovirus Hu/Jilin/491 37/2006/CHN	Norwalk-like virus Hu/NV/OC03020/2003/JP
Norovirus Hu/Jilin/49141/2006/CHN	Norwalk-like virus Hu/NV/OC03021-l/2003/JP
Norovirus Hu/Jilin/50143/2006/CHN	Norwalk-like virus Hu/NV/OC03021-2/2003/JP
Norovirus Hu/Jilin/50145/2006/CHN	Norwalk-like virus Hu/NV/OC03022-l/GI/2003/JP
Norovirus Hu/Jilin/50148/2006/CHN	Norwalk-like virus Hii/NV/OC03022-l/GII/2003/JP
Norovirus Hu/Jilin/50151/2006/CHN	Norwalk-like virus Hu/NV/OC03022-2/GI/2003/JP
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Norovirus Hu/K13830/05/IND	Norwalk-like virus Hu/NV/OC03024/2003/JP
Norovirus Hu/K4/JPN	Norwalk-like virus Hu/NV/OC03026/GI/2003/JP
Norovirus Hu/Kagoshima/6-04/2003/JP	Norwalk-like virus Hu/NV/OC03026/GII/2003/JP
Norovirus Hu/Kakunodate/l/2008/JP	Norwalk-like virus Hu/NV/OC03027/2003/JP
Norovirus Hu/Karlsruhel0567/2002/DE	Norwalk-like virus Hu/NV/OC03028/2003/JP
Norovirus Hu/Karlsruhe2527/2004/DE	Norwalk-like virus Hu/NV/OC03034-l/GI/2003/JP
Norovirus Hu/Karlsruhe892/2002/DE	Norwalk-like virus Hu/NV/OC03034-l/GII/2003/JP
Norovirus Hu/Kawabe/l/05/JP	Norwalk-like virus Hu/NV/OC03034-2/GI/2003/JP
Norovirus Hu/Kazuno/l/2007/JP	Norwalk-like virus Hu/NV/OC03034-2/GII/2003/JP
Norovirus Hu/KLl 009/1 998/US	Norwalk-like virus Hu/NV/OC03034-3/GI/2003/JP
Norovirus Hu/KLl 327/1 999/US	Norwalk-like virus Hu/NV/OC03035/2003/JP
Norovirus Hu/KL1353/1998/US	Norwalk-like virus Hu/NV/OC03036/2003/JP
Norovirus Hu/KLl 372/1 999/US	Norwalk-like virus Hu/NV/OC03037/2003/JP
Norovirus Hu/KLl 404/1 998/US	Norwalk-like virus Hu/NV/OC03039-l/GII/2003/JP
Norovirus Hu/KLl 4 18/1 998/US	Norwalk-like virus Hu/NV/OC03039-2/GII/2003/JP
Norovirus Hu/KLl 454/1 999/US	Norwalk-like virus Hu/NV/OC03039/GI/2003/JP
Norovims Hu/KL1461/1998/US	Norwalk-like virus Hu/NV/OC03040/2003/JP
Norovirus Hu/KLl 486/1 998/US	Norwalk-like virus Hu/NV/OC03042/2003/JP
Norovirus Hu/KLl 494/1 998/US	Norwalk-like virus Hu/NV/OC03047/GI/2003/JP
Norovirus Hu/KLl 5 12/1 998/US	Norwalk-like virus Hu/NV/OC03047/GII/2003/JP
Norovirus Hu/KLl 522/1 998/US	Norwalk-like virus Hu/NV/OC03048/2003/JP
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Norovirus Hu/KLl 574/1 999/US	
Norovirus Hu/KLl 620/1 998/US	
Norovirus Hu/KLl 682/1 998/US	

Norovirus Hu/KLl 733/1 999/US	Norwalk-like virus Hu/NV/OC03050/2003/JP
Norovirus Hu/KLl 798/1 998/US	Norwalk-like virus Hu/NV/OC03053/2003/JP
Norovirus Hu/KLl 823/1 999/US	Norwalk-like virus Hu/NV/OC03054/2003/JP
Norovirus Hu/KLl 852/1 999/US	Norwalk-like virus Hu/NV/OC03055/2003/JP
Norovirus Hu/KLl 872/1 999/US	Norwalk-like virus NLV/Appalachicola
Norovirus Hu/KLl 884/1 999/US	Bay/31 8/ 1995/US
Norovirus Hu/KL1912/1999/US	Norwalk-like virus NLV/Baltimore/274/1993/US
Norovirus Hu/KL 1943/1 999/US	Noi-walk-like virus NLV/Baltimore/277/1993/US
Norovirus Hu/KL 1974/1 999/US	Norwalk-like virus NLV/Brattleboro/321/1995/US
Norovirus Hu/KL201 8/1 999/US	Norwalk-like virus NLV/Burwash
Norovirus Hu/KL2022/1 999/US	Landing/331 /1995/US
Norovirus Hu/KL2030/1 999/US	Noi-walk-like virus NLV/Florida/269/1993/US
Norovirus Hu/KL2033/1999/US	Norwalk-like virus NLV/Fort
Norovirus Hu/KL2059/1 999/US	Lauderdale/560/1 998/US
Norovirus Hu/KL2089/1 999/US	Norwalk-like virus NLV/Gwynedd/273/1 994/US
Norovirus Hu/KL2092/1 999/US	Norwalk-like virus NLV/Honolulu/2 19/1 992/US
Norovirus Hu/KL2 146/1 999/US	Norwalk-like virus NLV/Honolulu/3 14/1 994/US
Norovirus Hu/KL2 162/1 999/US	Norwalk-like virus NLV/Lionville/247/1993/US
Norovirus Hu/KL7 14/1 999/US	Norwalk-like virus NLV/Little Rock/3 16/1 994/US
Norovirus Hu/KL724/1 998/US	Norwalk-like virus NLV/Miami
Norovirus Hu/KL755/1 998/US	Beach/326/1 995/US
Norovirus Hu/KL759/1997/US	Norwalk-like virus NLV/Miami/292/1 994/US
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Norovirus Hu/KL8 17/1 998/US	Norwalk-like virus
Norovirus Hu/KL824/1 998/US	NLV/Montgomery/3 12/1 994/US
Norovirus Hu/KL828/1998/US	Norwalk-like virus NLV/New
Norovirus Hu/KL874/1999/US	Orleans/266/ 1993/US
Norovirus Hu/KL942/1 998/US	Norwalk-like virus NLV/New
Norovirus Hu/Kolkata/L8775/2006/IND	Orleans/279/1 994/US
Norovirus Hu/Kolkata/V1041	Norwalk-like virus NLV/New
Norovirus Hu/Kolkata/V1370	Orleans/306/1 994/US
Norovirus Hu/Kolkata/V5 18	Norwalk-like virus NLV/Port
Norovirus Hu/Komaki/l/2006/JP	Canaveral/301/1994/US
Norovirus Hu/Kuala	Noi-walk-like virus NLV/Richmond/2 83/1 994/US
Lumpur/NB2824/1998/MYS	Norwalk-like virus NLV/Saint Cloud/624/1 998/US
Norovirus Hu/Kuala	Norwalk-like virus NLV/Towson/3 13/1 994/US
Lumpur/NB2834/1998/MYS	Norwalk-like virus NLV/UK3-17/12700/1992/GB
Norovirus Hu/Kuala	Norwalk-like virus NLV/Westover/302/1 994/US
Lumpur/NB2 85*11*1998/MYS	Noi-walk-like virus NLV/White River/290/1 994/US
Norovirus Hu/Kuala	Norwalk-like virus Sw/NLV/VA34/1998/NL
Lumpur/NB2 875/ 1998/MYS	Saratoga calicivirus 7
Norovirus Hu/Kuala	Norwalk-like virus sp.
Lumpur/NB2895/1998/MYS	Noi-walk-like virus
Norovirus Hu/Kuala	Small round structured vims
Lumpur/NB2922/1998/MYS	Human calicivims SRSV-Ba/98/CH
Norovirus Hu/Kuala	Human calicivims SRSV-Gst/98/CH
Lumpur/NB2969/1998/MYS	Human calicivims SRSV/MI1/94/JP
Norovirus Hu/Kuala	Human calicivims SRSV/SA1/89/JP
Lumpur/NB2978/1998/MYS	Human calicivims SRSV/SA2/91/JP
Norovirus Hu/Kuala	Human calicivims SRSVl-LaN/98/CH
Lumpur/NB4464/ 1999/MYS	Human calicivims SRSV2-LaN/98/CH
Norovirus Hu/Kuala	unclassified Norovirus
Lumpur/NB4467/ 1999/MYS	Bovine enteric calicivims
Norovirus Hu/Kuala	Human norovims - Alphatron
Lumpur/NB4469/ 1999/MYS	Human norovims Saitama

Norovirus Hu/Kuala Lumpur/NB4492/ l999/MYS	Minireovirus
Norovirus Hu/Kuala Lumpur/NB4495/1 999/MYS	Murine norovirus
Norovirus Hu/Kuala Lumpur/NB4529/1 999/MYS	Murine norovirus 1
Norovirus Hu/Kuala Lumpur/NB4532/ 1999/MYS	Murine norovirus 2
Norovirus Hu/Kuala Lumpur/NB4540/1 999/MYS	Murine norovirus 3
Norovirus Hu/Kuala Lumpur/NB4543/ 1999/MYS	Murine norovirus 4
Norovirus Hu/Kuala Lumpur/NB455 0/ 1999/MYS	Murine norovirus 5
Norovirus Hu/Kuala Lumpur/NB4552/1 999/MYS	Murine norovirus 6
Norovirus Hu/Kuala Lumpur/NB4577/ l999/MYS	Murine norovirus 7
Norovirus Hu/Kuala Lumpur/NR26/1994/MYS	Norovirus Hu/Monastir/249/2003/TUN
Norovirus Hu/Kuala Lumpur/NR94/1994/MYS	Norovirus Hu/Monastir/273/2003/TUN
Norovirus Hu/Kuenzelsau 16836/2001 /DE	Norovirus Hu/Monastir/294/2003/TUN
Norovirus Hu/Kunming/1 46/2004/China	Norovirus Hu/Monastir/310/2003/TUN
Norovirus Hu/Kurume/95 1228/1 995/JP/4 19	Norovirus Hu/Monastir/375/2003/TUN
Norovirus Hu/L154/2000/France	Norovirus Hu/Monastir/389/2003/TUN
Norovirus Hu/Lla/JPN	Norovirus Hu/Monastir/8655/2007/TUN
Norovirus Hu/Llb/JPN	Norovirus Hu/Mougon692/2004/France
Norovirus Hu/L2a/JPN	Norovirus Hu/Mum/M004/2006/India
Norovirus Hu/L2b/JPN	Norovirus Hu/Mum/M633/2006/India
Norovirus Hu/L2c/JPN	Norovirus Hu/Mum/M685/2006/India
Norovirus Hu/L3/JPN	Norovirus Hu/Mum/M689/2006/India
Norovirus Hu/L4/JPN	Norovirus Hu/Mum/M777/2006/India
Norovirus Hu/Leipzig/CEl/2009/DEU	Norovirus Hu/Mum/M780/2006/India
Norovirus Hu/Leipzig/CE2/2009/DEU	Norovirus Hu/Mum/M802/2006/India
Norovirus Hu/Leipzig/Pl-5/2009/DEU	Norovirus Hu/Mum/M844/2006/India
Norovirus Hu/Lelystad_Hospital/ 16-01-2003/NL	Norovirus Hu/Mum/M853/2006/India
Norovirus Hu/Lely stad_Nursing-home/2 1-07-2002/NL	Norovirus Hu/Mum/M860/2006/India
Norovirus Hu/Lelystad_Nursing-home/22-07-2002/NL	Norovirus Hu/mussels/Mo04-05/2004b/UK
Norovirus Hu/Leonbergl098/2003/DE	Norovirus Hu/mussels/Mo04-07/2004/IE
Norovirus Hu/Leonbergl661/2003/DE	Norovirus Hu/mussels/Mo04-08/2004/UK
Norovirus Hu/Loerrachl 1869/02/DE	Norovirus Hu/mussels/Mo04- 10/2004b/UK
Norovirus Hu/Loerrach5230/2001/DE	Norovirus Hu/mussels/Mo04- 14/2004c/IE
Norovirus Hu/Loerrach840/2002/DE	Norovirus Hu/mussels/Mo04- 15/2004/IE
Norovirus Hu/Ludwigsburg02 11/2002/DE	Norovirus Hu/mussels/Mo04-2 l/2004b/UK
Norovirus Hu/Ludwigsburgl 3253/2002/DE	Norovirus Hu/mussels/Mo04-2 l/2004c/UK
Norovirus Hu/Ludwigsburgl 472/2004/DE	Norovirus Hu/mussels/Mo04-22/2004/IE
Norovirus Hu/Ludwigsburg75 63/2002/DE	Norovirus Hu/mussels/Mo04-22/2004b/IE
Norovirus Hu/Ludwigsburg78 1/2003/DE	Norovirus Hu/mussels/Mo04-23/2004/UK
Norovirus Hu/LuoChengl7/Sep2006/CHN	Norovirus Hu/mussels/Mo04-25/2004c/IE
Norovirus Hu/Maastricht/03-01 -2003/NL	Norovirus Hu/mussels/Mo04-32/2004b/IE
Norovirus Hu/Maizuru/000324/2000/JP/2468	Norovirus Hu/mussels/Mo 19NL2000a/Netherlands
Norovirus Hu/Maiziu-u/000602/2000/JP/2840	Norovirus Hu/mussels/Mosl 1GB2003/United Kingdom
Norovirus Hu/Maizuru/01 0426/2001/JP/3385	Norovirus Hu/mussels/Mosl 8I2004b/UK
	Norovirus Hu/mussels/Mos2GB2003/United Kingdom
	Norovirus Hu/mussels/Mos9I2003a/Ireland
	Norovirus Hu/mussels/Mos9I2003b/Ireland
	Norovirus Hu/mussels/Mos9I2003c/Ireland
	Norovirus Hu/Nl/JPN
	Norovirus Hu/N2/JPN
	Norovirus Hu/N3/JPN
	Norovirus Hu/Nag/N230/2006/India
	Norovirus Hu/Nag/N248/2006/India
	Norovirus Hu/Nag/N259/2006/India

Norovirus Hu/Maizuru/0 10524/200 l/JP/3229	Norovirus Hu/Nag/N273/2007/India
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Norovirus Hu/Maizuru/71 79/2005/JP	Norovirus Hu/Nag/N41 6/2007/India
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Norovirus Hu/Manitoba/4205/2003/CAN	Norovirus Hu/Nagano/l -01/2002/JP
Norovirus Hu/Mannheiml 265/2003/DE	Norovirus Hu/Nagano/2-01/2002/JP
Norovirus Hu/Mannheiml 3 1/2009/DE	Norovirus Hu/Nagano/3-0 1/2002/JP
Norovirus Hu/Mannheiml 706/2003/DE	Norovirus Hu/Nagano/37-3/Feb2008/JPN
Norovirus Hu/Mannheim2491/2004/DE	Norovirus Hu/Nagano/4-04/2003/JP
Norovirus Hu/Mannheim5 1912/2002/DE	Norovirus Hu/Nagano/7-1 9/Apr2008/JPN
Norovirus Hu/Mannheim6 1209/200 1/DE	
Norovirus Hu/Mihama/l/2006/JP	
Norovirus Hu/Minase/l/05/JP	
Norovirus Hu/MK04/2004/JP	
Norovirus Hu/Monastir 113/2003/TUN	
Norovirus Hu/Monastir 127/2003/TUN	
Norovirus Hu/Monastir 3968/2004/TUN	
Norovirus Hu/Monastir 493/2003/TUN	
Norovirus Hu/Monastir 529/2003/TUN	
Norovirus Hu/Monastir 7 15/2003/TUN	
Norovirus Hu/Monastir 8655/2007/TUN	
Norovirus Hu/Monastir/03/2003/TUN	
Norovirus Hu/Monastir/1 27/2003/TUN	
Norovirus Hu/Monastir/1 3562/2004/TUN	
Norovirus Hu/Monastir/1 7285/2004/TUN	
Norovirus Hu/Monastir/ 1729 1/2006/TUN	
Norovirus Hu/Monastir/1 7736/2005/TUN	
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Norovirus Hu/Monastir/430/2003/TUN	
Norovirus Hu/Monastir/4456/2005/TUN	
Norovirus Hu/Monastir/474/2003/TUN	
Norovirus Hu/Monastir/5 19/2003/TUN	
Norovirus Hu/Monastir/578/2003/TUN	
Norovirus Hu/Monastir/862/2003/TUN	
Murine norovirus GV	
Oyster norovirus	Oyster norovirus HK-W498-02
Oyster norovirus HK-W423-02	Oyster norovirus HK-W5 07-02
Oyster norovirus HK-W426-02	Oyster norovirus HK-W539-02
Oyster norovirus HK-W464-02	Swine norovirus
Oyster norovirus HK-W469-02	

CLAIMS

What is claimed is:

1. A chimeric norovirus viral protein 1 (VPl) comprising the S-domain of the VPl from a first norovirus strain and at least a portion of the P-domain of the VP1 from a second norovirus strain.

2. The chimeric norovirus VPl of claim 1, further comprising a linker peptide that operably links the S-domain and the P-domain.

3. The chimeric norovirus VPl of claim 2, wherein the linker peptide is a linker peptide of the VPl from the first norovirus strain, from the second norovirus strain, or from a third norovirus strain.

4. The chimeric norovirus VP1 of claim 1, which has the formula:

A—S—L—P—B

wherein

A and B are independently absent or any desired amino acid sequence;
S is the S-domain of VPl from a first norovirus strain;
L is absent or a linker peptide;
P is a norovirus VP1 P-domain; wherein at least a portion of the P-domain is from a second norovirus strain.

5. The chimeric VPl of claim 4, wherein L is the linker peptide of VPl from the first norovirus strain, from the second norovirus strain or from a third norovirus strain.

6. The chimeric VPl of claim 4 or claim 5, wherein P is the entire P-domain from a second norovirus strain.

7. The chimeric VPl of claim 4 or claim 5, wherein P comprises a P1-subdomain, or portion thereof, from the first norovirus strain and a P2-subdomain from a second norovirus strain.

8. The chimeric VP1 protein of any one of claims 1 to 7, wherein the first norovirus strain is selected from the group consisting of the norovirus strains listed in Table 1.

9. The chimeric VP1 protein of any one of claims 1 to 8, wherein the first norovirus strain is the Snow Mountain strain.

10. The chimeric VP1 protein of any one of claims 1 to 9, wherein the second norovirus strain is selected from the group consisting of the norovirus strains listed in Table 1.

11. The chimeric VP1 protein of claim 9, wherein the second norovirus strain is a strain selected from the group consisting of genogroup GII, a norovirus strain from genogroup GI and a norovirus strain from genogroup GIV.

12. The chimeric VP1 protein of claim 9, wherein the second norovirus strain is selected from the group consisting of a norovirus strain from genogroup GII, and a norovirus strain from genogroup GI.

13. The chimeric VP1 protein of claim 12, wherein the second norovirus strain is Norwalk virus, GII.4.2006a, or New Orleans.

14. A norovirus virus like particle (VLP) comprising a chimeric VP1 protein of any one of claims 1-13.

15. A monovalent norovirus virus like particle (VLP) comprising a chimeric VP1 protein of any one of claims 1-13.

16. A multivalent norovirus virus like particle (VLP) comprising a chimeric VP1 protein is of any one of claims 1-13.

17. The multivalent VLP according to claim 16, wherein the VLP comprises two or more different chimeric VP1 proteins.

18. An immunogenic composition comprising a chimeric VP1 protein of any one of claims 1-13.

19. An immunogenic composition comprising a VLP of any one of claims 14-17.

20. An immunogenic composition comprising a monovalent VLP of claim 15.

21. An immunogenic composition comprising a multivalent VLP of claim 16 or claim 17.

22. An immunogenic composition, comprising two or more different monovalent VLPs of claim 15.

23. A recombinant nucleic acid encoding a chimeric VP1 protein of any one of claims 1-13.

24. The recombinant nucleic acid of claim 23, wherein the recombinant nucleic acid comprises a vector.

25. The recombinant nucleic acid of claim 23, wherein the recombinant nucleic acid is self-replicating.

26. An immunogenic composition comprising a recombinant nucleic acid of any one of claims 23-25.

27. A recombinant host cell comprising a recombinant nucleic acid of any one of claims 23-25.

28. The recombinant host cell of claim 27, wherein the host cell is selected from the group consisting of insect cells, mammalian cells, avian cells, bacteria, yeast cells, Tetrahymena cells and combinations thereof.

29. A method of producing a chimeric norovirus VP1 protein and/or VLP, comprising culturing a recombinant host cell of claim 28 under conditions whereby the recombinant nucleic acid is expressed and chimericVP1protein is produced.

30. The method of claim 29, wherein the recombinant host cell is maintained under conditions suitable for formation of VLPs.

31. The method of claim 29 or claim 30, further comprising isolating the chimeric norovirus VPl protein and/or VLPs from the culture media and/or the recombinant host cells.

32. The method of claim 31, wherein VLPs are isolated.

33. The method of claim 32, wherein the VLPs are isolated using a sucrose cushion or sucrose gradient.

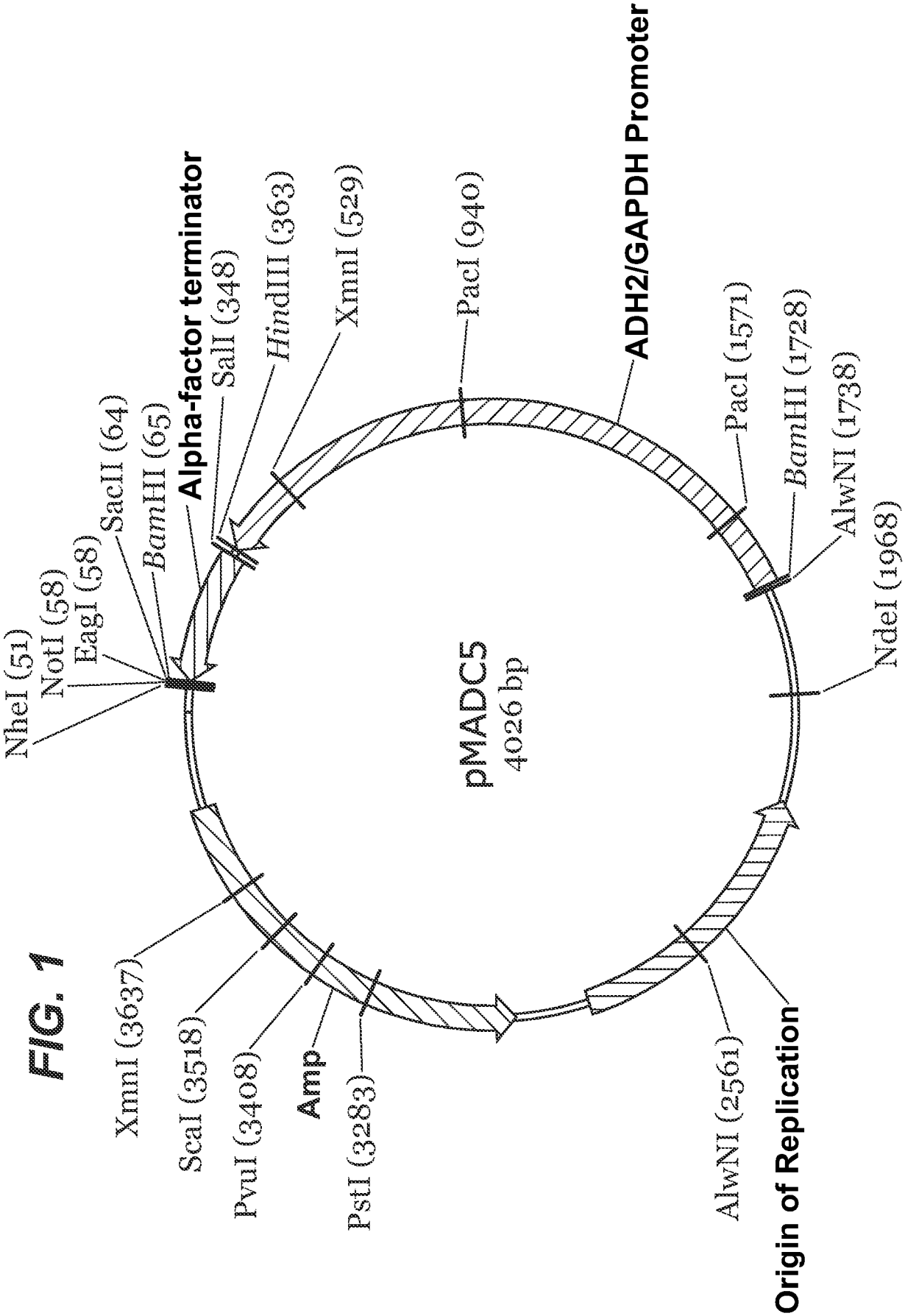
pMADC5
4026 bp
ADH2/GAPDH Promoter
Alpha-factor terminator
Amp
Origin of Replication
NheI (51)
NotI (58)
EagI (58)
SacII (64)
BamHI (65)
SalI (348)
HindIII (363)
XmnI (529)
PacI (940)
PacI (1571)
BamHI (1728)
AlwNI (1738)
NdeI (1968)
AlwNI (2561)
PstI (3283)
PvuI (3408)
ScaI (3518)
XmnI (3637)

FIG. 1

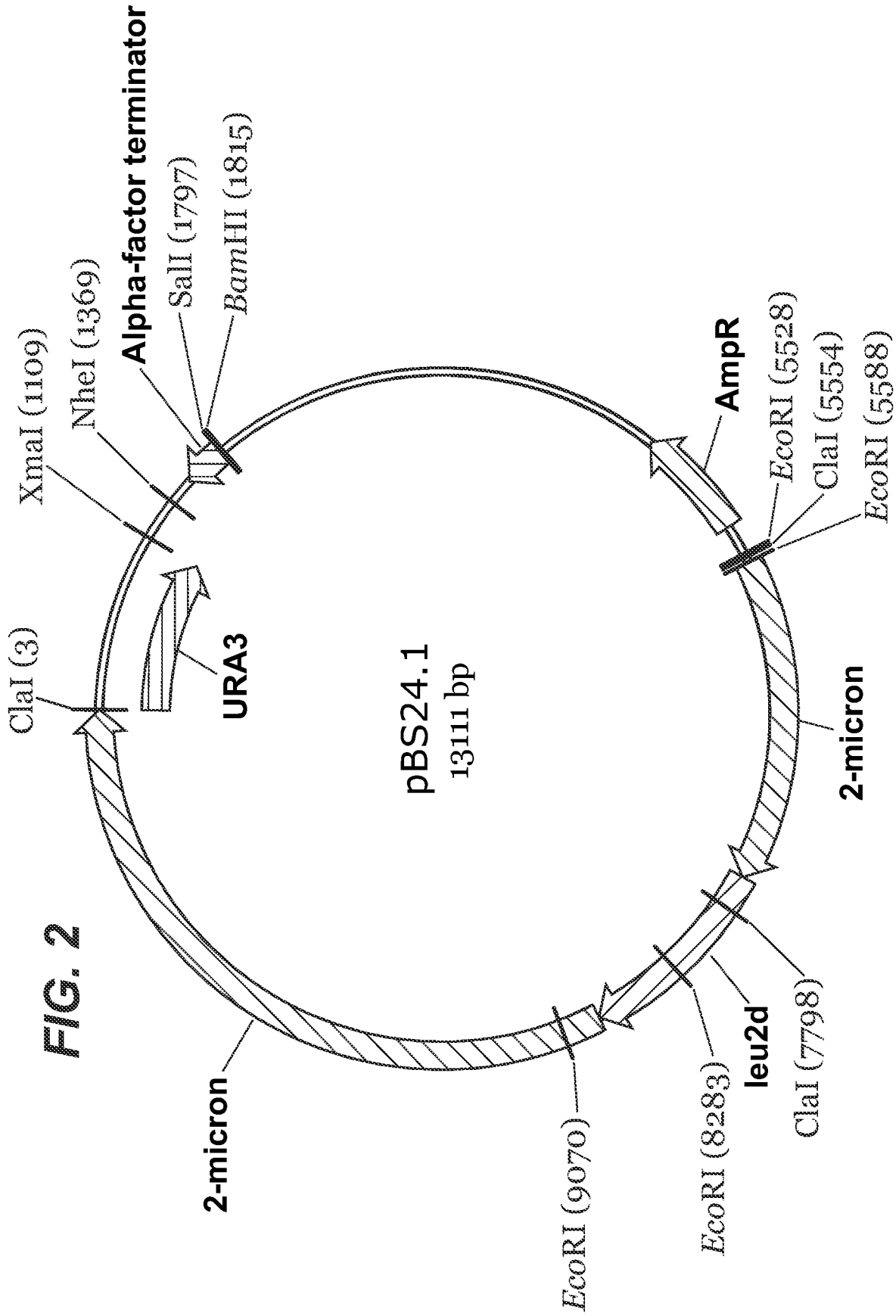
pBS24.1
13111 bp
Alpha-factor terminator
SalI (1797)
BamHI (1815)
NheI (1369)
XmaI (1109)
ClaI (3)
URA3
2-micron
EcoRI (9070)
EcoRI (8283)
leu2d
ClaI (7798)
2-micron
AmpR
EcoRI (5528)
ClaI (5554)
EcoRI (5588)

FIG. 2

```
norw   MMMASKDATSSVDGASGAGQLVPEVNASDPLAMDPVAGSSTAVATAGQVNPIDPWIINNF 60
snow   MKMASNDAAPSTDGAAG---LVPESNN-EVMALEPVAGAALAAPVTGQTNIIDPWIRANF 56
g2.4   MKMASSDANPSDGSTAN---LVPEVNN-EVMALEPVVGAAIAAPVAGQQNVIDPWIRNNF 56
       * ***.** .* ..::.   **** *  : :*::**.*:: *...:** * *****  **

norw   VQAPQGEFTISPNNTPGDVLFDLSLGPHLNPFLLHLSQMYNGWVGNMRVRIMLAGNAFTA 120
snow   VQAPNGEFTVSPRNAPGEVLLNLELGPELNPYLAHLARMYNGYAGGMEVQVMLAGNAFTA 116
g2.4   VQAPGGEFTVSPRNAPGEILWSAPLGPDLNPYLSHLARMYNGYAGGFEVQVILAGNAFTA 116
       **** ****:**.*:**::* .  ***.***:* **::****:.*.:.*:::********

norw   GKIIVSCIPPGFGSHNLTIAQATLFPHVIADVRTLDPIEVPLEDVRNVLFHNNDRNQQTM 180
snow   GKLVFAAVPPHFPVENLSPQQITMFPHVIIDVRTLEPVLLPLPDVRNNFFHYNQKDDPKM 176
g2.4   GKIVFAAVPPNFPTEGLSPSQVTMFPHIIVDVRQLEPVLIPLPDVRNNFYHYNQSNDPTI 176
       **::.:.:** *  ..*:  * *:***:* *** *:*: :** **** ::* *: :: .:

norw   RLVCMLYTPLRTGGGTGDSFVVAGRVMTCPSPDFNFLFLVPPTVEQKTRPFTLPNLPLSS 240
snow   RIVAMLYTPLRSNGSGDDVFTVSCRVLTRPSPDFDFTYLVPPTVESKTKPFTLPILTLGE 236
g2.4   KLIAMLYTPLRANNAGEDVFTVSCRVLTRPSPDFDFIFLVPPTVESRTKPFSVPILTVEE 236
       :::.*******:...  * *.*: **:* *****:* :*******.:*:**::* *.: .

norw   LSNSRAPLPISSMGISPDNVQSVQFQNGRCTLDGRLVGTTPVSLSHVAKIRGTSNGTV-- 298
snow   LSNSRFPVSIDQMYTSPNEVISVQCQNGRCTLDGELQGTTQLQVSGICAFKGEVTAHLQD 296
g2.4   MTNSRFPIPLEKLFTGPSSTIVVQPQNGRCTTDGVLLGTTQLSPVNICTFRGDVTHIAGT 296
       ::*** *:.:..:  .*...  ** ****** ** * *** :.   :. ::*  .

norw   -------INLTELDGTPFHPFEG-PAPIGFPDLGG-CDWHINMTQFGHSS--------QTQ 342
snow   NDHLYNITITNLNGSPFDPSEDIPAPLGVPDFQGRVFGVITQRDKQNAAGQSQPANRGHD 356
g2.4   QEYTMNLASQNWNN--YDPTEEIPAPLGTPDFVGKIQGVLTQTTRRDGS------TRGHK 348
             :   : :.  :.* *  ***:* **: *     :.     ..:          .

norw   YDVDTTPDTFVPHLGSIQANGIGSGNY-VGVLSWISPPSHP---SGSQVD---LWKIPNY 395
snow   AVVPTYTAQYTPKLGQVQIGTWQTDDLKVNQPVKFTPVGLN---DTEHFN---QWVVPRY 410
g2.4   ATVSTGSVNFTPKLGRIQFSTDTSNDFETGQSTRFTPVGVVQDGSTTHQNEPQQWVLPDY 408
         * * .  :.*:** :* .   :.:  ..    ::* .     .  : :    * :* *

norw   GSSITEATHLAPSVYPPGFGEVLVFFMSKMPGPGAY---NLPCLLPQEYISHLASEQAPT 452
snow   AGALNLNTNLAPSVAPVFPGERLLFFRSYLPLKGGYGNPAIDCLLPQEWVQHFYQEAAPS 470
g2.4   SGRDSHNVHLAPAVAPSFPGEQLLFFRSTMPGCSGYPNMNLDCLLPQEWVQHFYQEAAPA 468
       ..  .  .:***:* *   ** *:** * :*  ..*    : ******::.*: .* **:

norw   VGEAALLHYVDPDTGRNLGEFKAYPDGFLTCVPNGASSGPQQLPINGVFVFVSWVSRFYQ 512
snow   MSEVALVRYINPDTGRALFEAKLHRAGFMTVSSN--TSAPVVVPANGYFRFDSWVNQFYS 528
g2.4   QSDVALLRFVNPDTGRVLFECKLHKSGYVTVAHT--GQHDLVIPPNGYFRSDSWVNQFYT 526
        .:.**:::::***** * * * :  *::*   .   .    :* ** *   ***.:**

norw   LKPVGTASSARGRLGLRR 530
snow   LAPMGTGNGRRRIQ---- 542
g2.4   LAPMGNGTGRRRAL---- 540
       * *:*.... *
```

FIG. 3

Snow Mountain virus ORF2 cDNA encoding VP1 protein
Nucleotide residues 1..1629 corresponding to
GENE BANK ACCESSION No. AY134748 (REGION: 5085..6713)

```
   1 atgaagatgg cgtcgaatga cgccgctcca tctactgatg gtgcagccgg cctcgtgcca
  61 gaaagtaata atgaggtcat ggctcttgag cccgtggctg gtgctgcctt ggcagccccg
 121 gtcaccggtc aaacaaatat tatagaccct tggattagag caaatttttgt ccaggccccct
 181 aatggtgaat ttacagtttc tccccgtaat gcccctggtg aagtgctatt aaatctagaa
 241 ttgggtccag aattaaatcc ttatctggca catttagcaa gaatgtacaa cgggtatgcc
 301 ggtgggatgg aggtgcaggt catgctagct gggaacgcgt tcacagctgg caaattggtc
 361 ttcgctgctg taccacctca tttcccggtt gaaaacctta gtccacagca aattaccatg
 421 ttccctcatg tgattataga tgttaggact ttggaacctg ttttattgcc actccccgat
 481 gttagaaata atttcttcca ttataatcaa aaagatgatc ctaagatgag aattgtggct
 541 atgctttata ctcccctcag gtccaatggt tctggtgatg atgtgttcac agtctcttgc
 601 agggtgttga ctagaccctc ccctgatttt gattttacat acctggtacc accaacagtg
 661 gaatccaaaa caaaaccatt cacccttcca attcttacac ttggggagct ttccaattct
 721 agatttccag tgtccataga tcagatgtac actagcccca atgaagtcat atctgtgcag
 781 tgccagaatg gaaggtgcac actggatggg gagctccaag gaacaacaca gctccaagtt
 841 agtggcattt gtgcattcaa aggagaagtg accgctcact tgcaggacaa tgatcaccta
 901 tacaacatca ccatcacaaa cttgaatggg tcccctttg atcctctga ggacatcccc
 961 gccccctgg gtgtgcccga ctttcaggga agagtctttg gtgtcatcac tcaaagagac
1021 aaacagaatg ccgctgggca aagccagccg gcaaacaggg gacacgatgc tgtggtcccc
1081 acttacacag cccagtatac cccaaaattg ggtcaggttc aaattggcac atggcagacc
1141 gacgatctta aagtcaacca accagtcaaa ttcaccccag tcggtctcaa tgacacagaa
1201 catttcaatc agtgggtggt ccctaggtac gctggtgctt taaatctaaa cacaaatctt
1261 gccccctctg ttgctccagt gtttccaggg gagcgtctgc tcttctttag atcatacctc
1321 cccttaagg gtggttatgg aaacccagct attgattgcc tgctaccaca agagtgggtg
1381 cagcattttt atcaggaagc agcccctca atgagtgagg tagcccttgt cagatacatc
1441 aatccggaca ctggccgggc gctgtttgag gccaaactcc acagagctgg tttcatgaca
1501 gtctcgagta acaccagtgc tccggtggtt gtgcctgcca acggatactt cagatttgac
1561 tcttgggtga accaatttta ttctcttgcc cccatgggaa ctggaaatgg gcgtagaagg
1621 attcagtga
```

FIG. 4A

Snow Mountain virus, major capsid protein; VP1
Amino acid residues 1..542
PROTEIN ACCESSION No. AAN08112

```
   1 MKMASNDAAP STDGAAGLVP ESNNEVMALE PVAGAALAAP VTGQTNIIDP WIRA
NFVQAP
  61 NGEFTVSPRN APGEVLLNLE LGPELNPYLA HLARMYNGYA GGMEVQVMLA GNAFTAGKLV
 121 FAAVPPHFPV ENLSPQQITM FPHVIIDVRT LEPVLLPLPD VRNNFFHYNQ KDDPKMRIVA
 181 MLYTPLRSNG SGDDVFTVSC RVLTRPSPDF DFTYLVPPTV ESKTKPFTLP ILTLGELSNS
 241 RFPVSIDQMY TSPNEVISVQ CQNGRCTLDG ELQGTTQLQV SGICAFKGEV TAHLQDNDHL
 301 YNITITNLNG SPFDPSEDIP APLGVPDFQG RVFGVITQRD KQNAAGQSQP ANRGHDAVVP
 361 TYTAQYTPKL GQVQIGTWQT DDLKVNQPVK FTPVGLNDTE HFNQWVVPRY AGALNLNTNL
 421 APSVAPVFPG ERLLFFRSYL PLKGGYGNPA IDCLLPQEWV QHFYQEAAPS MSEVALVRYI
 481 NPDTGRALFE AKLHRAGFMT VSSNTSAPVV VPANGYFRFD SWVNQFYSLA PMGTGNGRRR
 541 IQ
```

FIG. 4B

Chimera

SMV.S.NV.OPTI.P

AAGCTTACAAAACAAAATGAAGATGGCGTCGAATGACGCCGCTCCATCTACTGATGGTGC
AGCTGGTCTCGTGCCAGAAAGTAATAATGAGGTCATGGCTCTTGAGCCCGTGGCTGGTGC
TGCCTTGGCAGCCCCGGTCACCGGTCAAACAAATATTATAGACCCTTGGATTAGAGCAAA
TTTTGTCCAGGCCCCTAATGGTGAATTTACAGTTTCTCCCCGTAATGCCCCTGGTGAAGT
GCTATTAAATCTAGAATTGGGTCCAGAATTAAATCCTTATCTGGCACATTTAGCAAGAAT
GTACAACGGGTATGCCGGTGGGATGGAGGTGCAGGTCATGTTAGCTGGGAACGCGTTCAC
AGCTGGCAAATTGGTCTTCGCTGCTGTACCACCTCATTTCCCGGTTGAAAACCTTAGTCC
ACAGCAAATTACCATGTTCCCTCATGTGATTATAGATGTTAGGACTTTGGAACCTGTTTT
ATTGCCACTCCCCGATGTTAGAAATAATTTCTTCCATTATAATCAAAAAGATGATCCTAA
GATGAGAATTGTGGCTATGCATTATACTCCCCTCAGGTCCAATGGTTCTGGTGATGATGT
GTTCACAGTCTCTTGCAGGGTGTTGACTAGACCCTCCCCTGATTTTGATTTTACATACCT
GGTACCACCAACAGTGGAATCCAAAACAAAACCATTTACTTTGCCAAATTTACCTTTGTC
ATCTTTATCTAATTCTAGAGCACCCTTGCCAATTTCTTCTATGGGTATTTCTCCTGATAA
TGTTCAATCTGTTCAATTTCAAAACGGTAGATGTACTTTAGATGGTAGATTGGTTGGTAC
TACTCCCGTTTCTTTATCTCATGTTGCTAAAATTAGAGGTACTTCTAACGGTACTGTTAT
TAACTTGACTGAATTAGATGGTACTCCATTTCATCCTTTTGAAGGTCCCGCTCCAATTGG
TTTTCCTGATTTGGGTGGTTGTGATTGGCATATTAACATGACTCAATTCGGTCATTCTTC
TCAAACTCAATACGATGTTGATACTACACCCGATACTTTTGTTCCACATTTAGGTTCTAT
TCAAGCTAATGGTATTGGTTCTGGTAATTATGTTGGTGTTTTGTCTTGGATTTCTCCTCC
CTCTCATCCATCTGGTTCTCAAGTTGATTTATGGAAAATTCCTAATTACGGTTCTTCTAT
TACTGAAGCTACTCATTTGGCTCCCTCTGTTTATCCACCTGGTTTCGGTGAAGTTTTAGT
TTTTTTCATGTCTAAAATGCCAGGTCCCGGTGCTTACAATTTGCCATGTTTATTGCCTCA
AGAATACATTTCTCATTTAGCTTCAGAACAAGCTCCCACTGTTGGTGAAGCTGCTTTGTT
ACATTATGTTGATCCAGATACTGGTAGAAATTTGGGTGAATTTAAAGCTTATCCTGATGG
TTTTTTAACTTGTGTTCCCAATGGTGCTTCTTCTGGTCCACAACAATTGCCTATTAATGG
TGTTTTTGTTTTCGTTTCTTGGGTTTCTAGATTTTACCAATTAAAACCCGTTGGTACTGC
TTCTTCTGCTAGAGGTAGATTGGGTTTGAGAAGATAATGAGTCGAC

FIG. 5

Chimera
SMV.S.GII.4.2006a.P

AAGCTTACAAAACAAAATGAAGATGGCGTCGAATGACGCCGCTCCATCTACTGATGGTGC
AGCTGGTCTCGTGCCAGAAAGTAATAATGAGGTCATGGCTCTTGAGCCCGTGGCTGGTGC
TGCCTTGGCAGCCCCGGTCACCGGTCAAACAAATATTATAGACCCTTGGATTAGAGCAAA
TTTTGTCCAGGCCCCTAATGGTGAATTTACAGTTTCTCCCCGTAATGCCCCTGGTGAAGT
GCTATTAAATCTAGAATTGGGTCCAGAATTAAATCCTTATCTGGCACATTTAGCAAGAAT
GTACAACGGGTATGCCGGTGGGATGGAGGTGCAGGTCATGTTAGCTGGGAACGCGTTCAC
AGCTGGCAAATTGGTCTTCGCTGCTGTACCACCTCATTTCCCGGTTGAAAACCTTAGTCC
ACAGCAAATTACCATGTTCCCTCATGTGATTATAGATGTTAGGACTTTGGAACCTGTTTT
ATTGCCACTCCCCGATGTTAGAAATAATTTCTTCCATTATAATCAAAAAGATGATCCTAA
GATGAGAATTGTGGCTATGCATTATACTCCCCTCAGGTCCAATGGTTCTGGTGATGATGT
GTTCACAGTCTCTTGCAGGGTGTTGACTAGACCCTCCCCTGATTTTGATTTTACATACCT
GGTACCACCAACAGTGGAATCCAAAACAAAACCCTTTTCTGTTCCAATTTTAACTGTTGA
AGAAATGACTAATTCTAGATTCCCTATTCCCTTGGAAAAATTGTTTACTGGTCCATCTTC
TACTATTGTTGTTCAACCTCAAAATGGTAGATGTACTACTGATGGTGTTTTGTTAGGTAC
TACTCAATTGTCTCCCGTTAACATTTGTACTTTCAGAGGTGATGTTACTCATATTGCTGG
TACTCAAGAATATACTATGAACTTAGCTTCTCAAAATTGGAACAATTACGATCCAACTGA
AGAAATTCCTGCTCCCTTAGGTACACCAGATTTTGTTGGTAAAATTCAAGGTGTTTTGAC
TCAAACTACTAGAAGAGATGGTTCTACAAGAGGTCATAAAGCTACTGTTTCTACTGGTTC
TGTTAATTTCACTCCTAAGTTGGGTAGAATTCAATTTTCTACTGATACTTCTAACGATTT
TGAAACTGGTCAATCTACTAGATTTACTCCCGTTGGTGTTGTTCAAGATGGTTCAACTAC
TCATCAAAATGAACCACAACAATGGGTTTTACCTGATTATTCTGGTAGAGATTCTCATAA
TGTTCATTTGGCTCCCGCTGTTGCTCCATCTTTTCCAGGTGAACAATTATTGTTTTTCAG
ATCTACTATGCCCGGTTGTTCTGGTTATCCAAATATGAACTTAGATTGTTTGTTACCTCA
AGAATGGGTTCAACATTTTTATCAAGAAGCTGCTCCCGCTCAATCTGATGTTGCTTTGTT
AAGATTTGTTAATCCAGATACTGGTAGAGTTTTGTTCGAATGTAAATTACATAAATCTGG
TTATGTTACTGTTGCTCATACTGGTCAACATGATTTGGTTATTCCTCCCAATGGTTACTT
TAGATCTGATTCTTGGGTTAATCAATTTTACACTTTAGCTCCAATGGGTAATGGTACTGG
TAGAAGAAGAGCTTTGTAATGAGTCGAC

FIG. 6

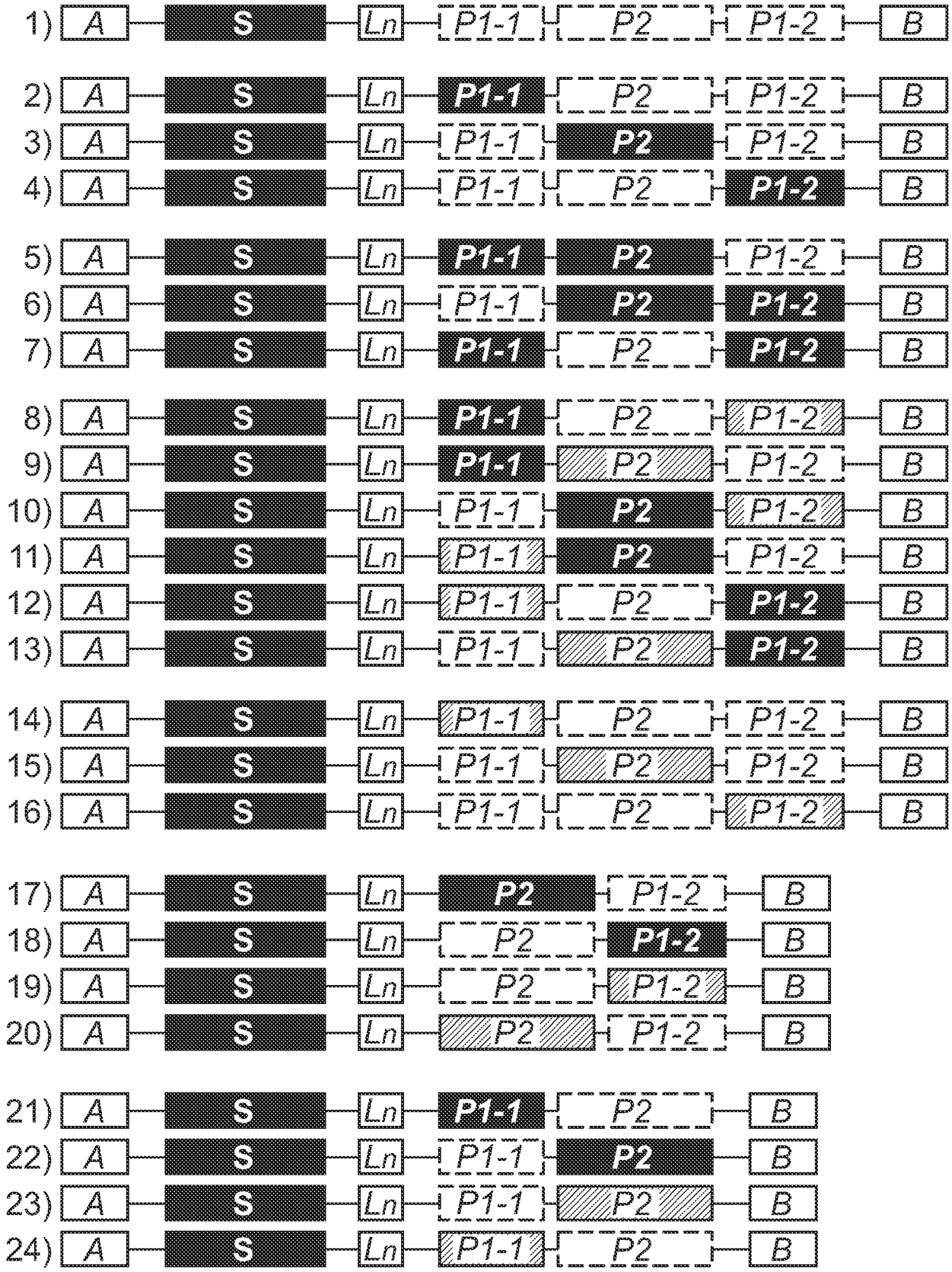
1) A S Ln P1-1 P2 P1-2 B
2) A S Ln P1-1 P2 P1-2 B
3) A S Ln P1-1 P2 P1-2 B
4) A S Ln P1-1 P2 P1-2 B
5) A S Ln P1-1 P2 P1-2 B
6) A S Ln P1-1 P2 P1-2 B
7) A S Ln P1-1 P2 P1-2 B
8) A S Ln P1-1 P2 P1-2 B
9) A S Ln P1-1 P2 P1-2 B
10) A S Ln P1-1 P2 P1-2 B
11) A S Ln P1-1 P2 P1-2 B
12) A S Ln P1-1 P2 P1-2 B
13) A S Ln P1-1 P2 P1-2 B
14) A S Ln P1-1 P2 P1-2 B
15) A S Ln P1-1 P2 P1-2 B
16) A S Ln P1-1 P2 P1-2 B
17) A S Ln P2 P1-2 B
18) A S Ln P2 P1-2 B
19) A S Ln P2 P1-2 B
20) A S Ln P2 P1-2 B
21) A S Ln P1-1 P2 B
22) A S Ln P1-1 P2 B
23) A S Ln P1-1 P2 B
24) A S Ln P1-1 P2 B
From a First Norovirus Strain
From a Second Norovirus Strain
From a Third Norovirus Strain

FIG. 7

#8 MMMASKDAPTNMDGTSGAGQLVPEANTAEPISMDPVAGAATAVATAGQINMIDPWIMSNTVQAPQGEFTVSPNNTPGDVLFDLQLGPQLNPFLAHLAQMYNGWVGNMRVKVLLAGNAFTA 120
SeV .....TSSV..A.....V.ASD.LA.....SS.....V.P.....IN.....I.....G.....S...H.....L..S.....RIM..... 120
258 .....QSA..A.....V...D.LP.E.....PT.....V.....VN.....P.....I.....I.....H.....S..S.....RI.....S. 120
645 .....E.....AA.A.....V.....Y.....I.....I.....H.....S..A.....K..... 120
CV .....TPSA..AT.....V...D..PI.....SS..L.....V.L.....TN.....I.....L..H.....S..S.....R.R.V..... 120
WUG1 .....SP..A.....Q.....S.....V.....FN.....I.....I.....H.....S.....R.RIL..... 120
HV .K...-----NDAAPSNDGAAGLVPEVNN.TMALE.....SI.APLT..N.V.....RM.....N.....R.S..EI.LN.E...E.....SR....YA.GVE.Q.L..... 116
485 .K...-----NDAAPSNDGAAGLVPEVNN.MMALE.....SI.APLT..N.V.....RM.....N.....R.S..EI.LN.E...E.....SR....YA.GVE.Q.L..... 116
Ina .K...-----NDAAPSTDGAAGLVPESNN.VMALE.....L.APVT..T.I.....RA.....N.....R.A..E..LS.E...E...Y....AR....YA.G.E.Q.M..... 116
809 .K...-----NDAAPSNDGAAGLVPEINN.AMAL.....I.APLT..Q.I.....MN.....G.....R.S..E..LN.E...EI..Y....AR....YA.GFE.Q.V..... 116
Sh5 .K...-----NDAAPSNDGAAGLVPEINN.AMAL.....I.APLT..Q.I.....MN.....G.....R.S..E..LN.E...EI..Y....AR....YA.GFE.Q.V..... 116
18-3 .K...-----NDAAPSNDGAAGLVPEINN.AMALE.....I.APLT..Q.I.....MN.....G.....R.S..E..LN.E...EI..Y....AR....YA.GFE.Q.V..... 116
336 .K...-----NDAAPSNDGAAGLVPEINN.AMAL.....I.APLT..Q.I.....MN.....G.....R.S..E..LN.E...EI..Y....AR....YA.GFE.Q.V..... 116
1152 .K...-----NDAAPSNDGAAGLVPEINN.AMAL.....I.APLT..Q.I.....MN.....G.....R.S..E..LN.E...EI..Y....AR....YA.GFE.Q.V..... 116
104 .K...-----NDANPSD.STANLVPEVNN.VMALE..V...I.APV...Q.V.....RN.....G.....R.A..EI.WSAP...D...Y.S..AR....YA.GFE.Q.I..... 116
754 .K...-----NDATPSNDGAAGLVPESNN.AMALE..V..SI.APVT..T.I.....RT.....N.....R.S..EI.VNLE...E...Y....AR....YA.G.E.Q.M..... 116
7k .K...-----NDAAPSNDGAANLVPEAND.VMALE..V..SI.APVV..Q.I.....RE.....R.S..EM.LN.E...E...Y.S..SR....YA.G.Q.Q.V..... 116
445 .K...-----NDAAPSNDGAANLVPEANN.VMALE..V..SI.APVV..Q.I.....RE.....R.S..EM.LN.E...E...Y.S..SR....YA.G.Q.Q.V..... 116
10-25 .K...-----NDAAPS.DGAAGLVPEINN.VMPLE.....SL.TPVV..Q.I.....RN.....A.....R.S..EI.LDLE...D...Y.A..AR....HA.G.E.QIV..... 116
U25 .K...-----NDAAPSNDGAAGLVPEINH.VMAIE.....SL.APVV..L.I.....RN.....A.....R.A..EF.LD.E...E...Y....AR....HA.G.E.QIV..... 116
026 .K...-----NDAAPSNDGAAGLVPESNN.VMALE.....SL.APVT..T.I.....RM.....N.....R.S..E...LN.E...E...Y....SR....YA.G.E.QIM..... 116
CHV .K...-----NDAAPSNDGAAGLVPEANN.TMALE.....SI.APLT..N.I.....RL.....N.....R.S..E..LN.E...E...Y....SR....YA.GVE.Q.L..... 116
47 .K...-----NDAAPSNDGAASLVPEGIN.TMPLE.....SI.APV...T.I.....RT.....N.....R.S.EI.LN.E...D...Y....SR....YA.GVE.Q.L..... 116
Hiro .K...-----SDAAPSNDGAAGLVPEANN.TMALE.....SI.APLT..N.I.....RL.....N.....R.S..E..LN.E...E...Y....SR....YA.GVE.Q.L..... 116
Alph23 .K...-----NDAAPSTDGAGNLVPESQQ.VLPLA.....L.APVV..T.I.....KE.....K.S..EI.VN.E...K...Y.D..SR...SYA.GID.M.V..... 116

FIG. 8A

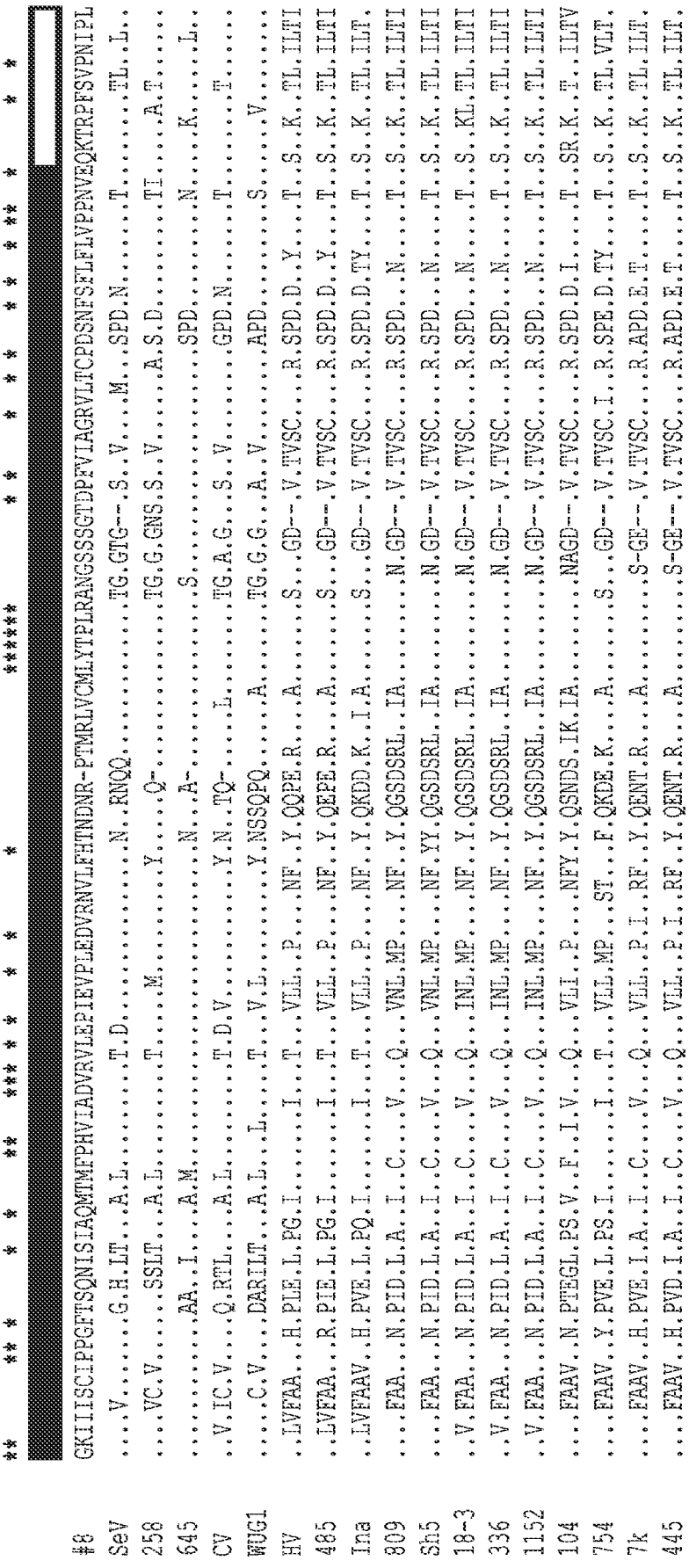
#8 GKIIISCIPPGFTSQNISIAQMTMFPHVIADVRNVLEHTNDNR-PTMRLVCML.YTPLRANGSSSGTDPFVIAGRVLTCPDSNFSFLFLVPPNVEQKTRPFSVPNIPL 239
SeV ....V.....G.H.LT...A.L.....T.D.....N..RNQQ.....TG.GTG--.S..V....M...SPD.N.....T.....TL..L.. 238
258 ...VC.V.....SSLT...A.L.....T.....M.....Y.....Q-.....TG.G.GNS.S..V.....A.S.D.....TI.....A.T..... 239
645 .....AA..I....A.M.....N..A-.....S.....SPD.....N.....K.....L.. 239
CV .V.IC.V.....Q.RTL....A.L.....T.D.V.....Y.N..TQ-.....L.....TG.A.G...S..V.....GPD.N.....T.....T..... 239
WUG1 .....C.V.....DARILT...A.L...L.....T...V.L.....Y.NSSQPQ.....A.....TG.G.G...A..V.....APD.....S.....V..... 240
HV ..LVTAA...H.PLE.L.PG.I.....I...T...VLL..P....NF..Y.QQPE.R....A.....S...GD--.V.TVSC....R.SPD.D..Y....T..S..K..TL.ILTI 234
485 ..LVTAA...R.PIE.L.PG.I.....I...T...VLL..P....NF..Y.QEPE.R....A.....S...GD--.V.TVSC....R.SPD.D..Y....T..S..K..TL.ILTI 234
Ina ..LVTAAV..H.PVE.L.PQ.I.....I...T...VLL..P....NF..Y.QKDD.K..I.A.....S...GD--.V.TVSC....R.SPD.D.TY....T..S..K..TL.ILT. 234
809 ....FAA...N.PID.L.A...I..C....V...Q...VNL.MP....NF..Y.QGSDSRL..IA.....N.GD--.V.TVSC....R.SPD...N.....T..S..K..TL.ILTI 234
Sh5 ....FAA...N.PID.L.A...I..C....V...Q...VNL.MP....NF.YY.QGSDSRL..IA.....N.GD--.V.TVSC....R.SPD...N.....T..S..K..TL.ILTI 234
18-3 .V.FAA...N.PID.L.A...I..C....V...Q...INL.MP....NF..Y.QGSDSRL..IA.....N.GD--.V.TVSC....R.SPD...N.....T..S..KL.TL.ILTI 234
336 ..V.FAA...N.PID.L.A...I..C....V...Q...INL.MP....NF..Y.QGSDSRL..IA.....N.GD--.V.TVSC....R.SPD...N.....T..S..K..TL.ILTI 234
1152 ..V.FAA...N.PID.L.A...I..C....V...Q...INL.MP....NF..Y.QGSDSRL..IA.....N.GD--.V.TVSC....R.SPD...N.....T..S..K..TL.ILTI 234
104 ....FAAV..N.PTEGL.PS.V..F..I.V....Q...VLI..P....NFY.Y.QSNDS.IK.IA.....NAGD--.V.TVSC....R.SPD.D.I.....T..SR.K..T..ILTV 234
754 ....FAAV..Y.PVE.L.PS.I.....I...T...VLL.MP...ST...F.QKDE.K....A.....S...GD--.V.TVSC.I..R.SPE.D.TY....T..S..K..TL.VLT. 234
7k ....FAAV..H.PVE.I.A...I..C....V...Q...VLL..P.I..RF..Y.QENT.R....A.....S-GE--.V.TVSC....R.APD.E.T.....T..S..K..TL.ILT. 233
445 ....FAAV..H.PVD.I.A...I..C....V...Q...VLL..P.I..RF..Y.QENT.R....A.....S-GE--.V.TVSC....R.APD.E.T.....T..S..K..TL.ILT. 233
10-25 ....FAA.....PYE.L.PS.I..C....I...Q...FLL.MP.IW.NF..Y.QGND.KL...A.....N.GD--.V.TVSC....K.SPD.E.T.....T..S..KQ.AL.ILKI 234
U25 ...LFAV.....PYE.L.P...L..C...VV...Q...ILL.MP.I..TF..Y.QSNG.KL...A.....NAGE--.V.TVSC....R.SPD.E.N.....S..S..KA.TL.ILKI 234
026 ..L.FAAV..H.PIE.L.PP.I.....I...T...VLL.MP.I..SF..FTQRDE.K....A.....S...GD--.V.TVSC....R.TPD.D.TY....T..S.SK..TL.ILT. 234
CHV ..LVTAAV..H.PLE.I.PG.I.....I...T...VLL..P....NF..Y.QQNE.R....A.....S...GD--.V.TVSC....R.SPD.D..Y....TL.S..K..TL.ILTI 234
47 ...LPAA...N.LVDM..P..I..L..L.V...T...IMT..P.....FY.F.NQPQ.R....A.....S...GD--.V.TVSC....R.TPD.E.IY....S..S..K..TL.ILTI 234
Hiro ..LVTAAV..H.PLE...PG.I.....I...T...VLL..P....NF..Y.QQNE.R....A.....S...GD--.V.TVSC....R.SPD.D..Y....T..S..K..TL.ILTI 234
Alph23 ..VL.AA...N.PVEGV.AS.A.Q....VI...T.D.VRL..P...STF..YTNDIE.K....IW.....T...GD--.S.TVS..I..R.SQD.E.A..I..T..T..T.....GFSV 234

FIG. 8B

```
        ***  *                       * ****   **    ***            *
#8      NTLSNSRVPSLIKSMTISRDQNQIIQFQNGRVTLDGQLQGTTPTSVSQLCKIRGTTYHATGGNGINLTELNGEPYHAFESPAPIGFPDLGGCDWHLTATPTQAFNDGAKVVRLSVTQGAA 359
SeV     SS.....A.LP.SG.G..P.NV.SV......C....R.V....V.L.HVA.....SNGTVINLTELDGTPFHPFEGPAPIGF.DLGGCDWHINMTQFGHSS.TQY.VDTTPDTF.PHLGS 358
258     Q......F.SL.QG.IL.P.AS.VV......CLIDG..L....ATSG..FRV..KINQGARTLNLTEVDGKPFMAFDSPA.VGFPDFGKCDWHMRISK..NNTSSGDPMRSVSVQ.NVQG 359
645     ...............MV.R.HG.MV...................A........SVF..N....Y.....D.S.................E....ME.S..TQ..T.DVIKQIN.K.ES. 359
CV      KY.....I.NP.EG.SL.P..T.NV......C.I...PL....V.......F..RITSGQRVLNLTELDGSPFMAF.APA..GFPDLGSCDWHIEMSKI.NSSTQNNPI.TNSVKPNSQQ 359
WUG1    KD.....V.VP.QG.FM.P.V..SV......CQI.........V.L........K.SSNARVLNLSEVDGTPFIPLESPA.VGFPDLGGCDWHVNF.FQAQNQDPSQSVTFATNDAS--- 357
HV      GE.....F.VP.DELYT.PNEGV.V.P....S....E.L...QLVP.NI.AL..RINAQVPDDHHQW--NLQVTNTNGTPFD.TEDVPAPLGTPDFL.NIYGVTSQRNPNNTCRAHD.VL 352
485     GE.....F.AP.DELYT.PNEGLVV.P....S....E.L...QLVP.NI.SL..RINAHLPD.QHRW--NMQVTNANGTPFD.TEDVPAPLGTPDFL.NIYGVTSQRNPDNTCRAHD.IL 352
Ina     GE.....F.VS.DQ.YT.PNEVISV.C....C....E.....QLQ..GI.AFK.EVTAHLHD.DHLY--NVTITNLNGPPFD.SEDIPAPLGVPDFQGRVFGVISQRD.QNAAGHSEP.N 352
809     SEM....F.VP.E.LHT.PTE.IVV.C.........E.M...QLLP..I.AF..VLTRS.SRASDQADTATPRLFNYYWHVQLDNLNGTPYDPAEDIPG.LGTPDFRG..FGVASQRNLD 354
Sh5     SEM....F.VP.E.LHT.PTE.IVV.C.........E.M...QLLP..I.AF..VLTRS.SRASDQADTATPRLFNYYWHVQLDNLNGTPYDPAEDIPG.LGTPDFRG..FGVASQRNPD 354
18-3    SEM....F.VP.D.LHT.PTE.IVV.C.........E.M...QLLP..I.AF...LTRP.SRASDQADTPTPRLFNHRWHIQLDNLNGTPYDPAEDIPA.LGTPDFRG..FGVASQRNPD 354
336     SEM....F.VP.D.LHT.PTESVVV.C.........E.M...QLLP..I.AF...LTRP.NRASDQADTATPRLFNHQWHIQLDNLNGTPYDPAEDIPA.LGTPDFRG..FGVASQRDPD 354
1152    SEM....F.VP.D.LHT.PTE.IVV.C.........E.M...QLLP..I.TF...LTRS.SRASDQADTATPRLFNYYWHIQLDNLNGTPYDPAEDIPA.LGTPDFRG..FGVASQRNPD 354
104     EEM....F.IPLEKLYTGPSSAFVV.P....C.T..V.L...QL.AVNI.TF..DVTHIA.SHDYTMNLASQNWSNYDPTEEIPAPLGTPDFVGKIQGML..TTREDGSTRAHKA.VSTG 354
754     GE.....F.LSIDE.VT.PNESIVV.P.........E.L...QLQACNI.SI..KVTGQVPSEQHMW--NLEITNLNGTQFD.TDDVPAPLGVPDFAGEVFGVLSQRNRGESNPANRAHD 352
7k      GE.....F.AA.DMLYTDPNESIVV.P....C....T.....QLVPT.I.AF...LISQTARAADSTDSPQRARN.PLHVQVKNLDGTQYDPTDDIP.VLGAIDFK.TVFGVA.QRDVSG 353
445     GE.....F.AA.DMLYADPNESIVV.P....C....T.....QLVPT.I.AF...LISQTARATDSTDSPQRARD.PLHVQVKNLDGTQYDPTDDIP.VLGAIDFK.TVFGVA.QRDVSG 353
10-25   SEMT...F.VPVDV.YTA.NE..VV.P.........E.L....LLAVNI.KFK.EVIAKN.DVRSYRMDMEITNTDGTPIDPTEDTPGPIGSPDFQGILFGV.SQRNKNEQNPATRAHE. 354
U25     SEMT...F.IPVDQ.YT..NE.IVV.P.........E.....TLQPVSI.GF...LQTRLADQPNYT-YQVHLENLDGSPVD.TDEVPAPLGTPDFQ.QLFGVISQRSSDNATRAHEARV 353
026     GE.T...F.LP.DVLYTNPNESA.V.C....C....E.....QLLPTGI.AF..KVTQQVQDEHRGTHWNMTVTNLNGTPFD.TEDVPAPLGTPDFSGQIYGVISQRNTNTVPGEGNLP. 354
CHV     GE.T...F.VP.DELYT.PNESLVV.P....CA...E.....QLLPTAI.SF..RINQKVS.ENHVW--NMQVTNINGTPFD.TGDVPAPLGTPDFSGKLFGVLSQRDHDNACRSHDAVI 352
47      SE.T...F.IP.EQLYTAPNETNVV.C....C....E.....QLLS.AV.FLQ.R.VADN.D.WDQN--.LQLTYPNGASYD.TDEVPAPLGTQDFSGMLYGVLTQDNVN.STGEAKN.K 352
Hiro    GE.T...F.VP.DELYT.PNESLVV.P....CA...E.....QLLPTAI.SF..RINQKVS.ENHVW--NMQVTNINGTPFD.TEDVPAPLGTPDFSGKLFGVLSQRDHDNACRSHDAVI 352
Alph23  QEM....W.AA.SA.VVRGNEP.VV......AH...M.L....V.PNYIASY..ISTGNSRSASSEAD.RAVGSFDVWVRLQEPDGQPYDIFGKQPAPIG.PD.KAVIVGFAARPLTSGS 354
```

FIG. 8C

#8 FAPHLGTIHYTTTDTDYSPNTSIICTLDWLSQTTGQNN-VDPWQIFTYGSTLTEAAQLAPPIFPPGFGETLVFTLSDFPISNGKNGLSVPCTLPQEFVTHFVNEQAPIRGEAALLHYVDP 447
SeV IQANGIGSGNYIGVLSWVSPP.HPSGSQVDLWKIPNYGSSITEATHLAP.VYPPGFGEVLVF.MSKIPGPGAYS.PCLLPQEYISH.AS---------- ....TV..... 333
258 .V....S.QFDEVTNHPTGDVIGTIEWISQPS.PPGTDINLWEIPDYGS.LSQA.NLAP.VFP.GFGEALVY.VSAFPGPN.RSAPND...L....YI....S....TM.D..... 469
645 .A.....QADGLSDVSVNTNM.AKLGWVSPVSD.HRGD....V..R.....Y.....AI..M.....AH.T.....I.....T..... 333
CV .V...SS.TLDENVSSG-GDYIGTIQWTSPPSDS.GA.TNFWKIPDYGS.LAEASQLAPAVYP.GFNEVTVY.MA.IPGPWQSGSPNL...L....YI....IS.....Q..... 470
WUG1 ----FVPYLGSISPHNGGDFHAGDIIGSLGWISAPSD.TQLNVWTIPKYGSSLQMSLTLHLLCS.RLW.VILY.Y.T..G.GQPSQ.Q...L.....I...C.....A..... 465
HV ATWSPKFTP----------KLGSVI.GTWEESDLDL.QPTRFTPVGLFN.DHFDQWAL.SYSGRLTLNMNLAPSVSPLFPGEQLLFTRSHIPLKGGTSDGAIDCLLPQEWIQHFYQESA 460
485 ATWSPKFTP----------KLGSVV.GTWEDRDFDI.QPTRFTPVGLYD.DHFNQWAL.NYSGALTLNMNLAPSVAPLFPGEQLLFTRSHIPLKGGTSNGAIDCLLPQEWVQHFYQESA 461
Ina RGHDAVVPT----Y.AQYTPKLGQVQIGTWQTDDL.V.QPVKFTPVGLND.EHFNQWVV.RYAGALNLN.NLAPSVAPVFPGERLLFTKSYIPLKGGYGNPAIDCLLPQEWVQHFYQEAA 468
809 STTRAHEAKVD..AGRFT.KLGSLEISTDSDDFDQNQPTKFTPVGIGVDNEAEFQQWSL.DYSGQFTHNMNLAPAVAPNFPGEQLLFTRSQLPSSGGRSNGVLDCLVPQEWVQHFYQESA 474
Sh5 STTRAHEAKVD..AGRFT.KLGSLEISTES.DFDQNQPTRFTPVGIGVDNEADFQQWSL.DYSGQFTHNMNLAPAVAPNFPGEQLLFTRSQLPSSGGRSNGVLDCLVPQEWVQHFYQESA 474
18-3 STTRAHEAKVD..SGRFT.KLGSLEITTESDDFDTNQSTKFTPVGIGVDNEAEFQQWSL.NYSGQFTHNMNLAPAVAPNFPGEQLLFTRSQLPSSGGRSNGVLDCLVPQEWVQHFYQESA 474
336 GTTRAHEAKVD..SGRFT.KLGSLEITTESDDFNQNKPTRFTPVGIGVDNEADFQQWIL.DYSGQFTHNMNLAPAVAPNFPGEQLLFTRSQLPSSGGRSNGILDCLVPQEWVQHFYQESA 474
1152 STTRAHEAKVD..SGRFI.KLGSLEISTESDDFDQNQPTRFTPVGIGVDNEAGFQQWSL.DYSGQFTHNMNLAPAVAPNFPGEQLLFTRSQLPSSGGRSNGILDCLVPQEWVQHFYQESA 474
104 SVHFTPKLGSVQYT..TNNDFQTCQNTKFTPVGVI.DGNNHQNEPQQWVLPNYSGRTGHNVHLA.AVAPT.PGEQLL.FR.TMPGCSGY.NMNLDCLIPQEWVQHFCQEAAP.QSDVALL 474
754 AVVATYSDK----Y.PKLG--LVQIGTWNTNDVEN.PTKFT.IGLNEVANGHRFEQWTL.RYSGALTLNMNLAPAVAPLFPGERLLFTRSYVPLKGGFGNPAIDCSVPQEWVQHFYQESA 467
7k QQEQGHYATRAHEAHIDTTDPKYAPK.GTILIKS.SDDFNTNQP.RFTPVGMGDNNWRQWELPDYSGRL..NMNLAPAVSPSFPGERILFFRSIVPSAGGYGSGYIDCLIPQEWVQHFYQ 456
445 PQEQGHYATRAHEAHIDTTDPKYAPK.GTILIKSES.DFTTNQP.RFTPVGMGDNNWRQWELPDYSGRL..NMNLAPAVSPSFPGERILFFRSIVPSAGGYGSGYIDCLIPQEWGQHFYQ 456
10-25 IINTG.DHLCPQISSSEIYL..PNILRCTNP.PLP.SGLRGTIL.RSDNGHCHDMVGTS.TTPTWPQQWRRCSRG.NCCS.GHRYPVP.VMNRVTWI.LSHKSGFSTSTRKLPQ.NLRW. 474
U25 NTNDPTFAP----------QIAQVRFKSPSNDFFDNEPIKFTPVGISVD.QNSYNQW.L.RYGGHLTNN.HLAPSVSPMTPGEQILFTRSFMPGASGH.DGAIDCLLPQEWV.HFYQEAA 462
026 NRA.EAV.ATYSPKFTPKLGNIQFS.WETQDVSS..PTKFT.VGLASVDANSHFDQWTL.SYSGALTLNMNLAPSVAPVTPGECLLFTRSFIPIKGGYGNPAIDCLMPQEWVQH.YQESA 473
CHV ATNSAKFTP----------KLGAIQIGTWEEDDVHI.QPTKFTPVGLFENEGFNQWTL.NYSGALTLNMGLAPPVAPTTPGEQILFTKSHIFILKGG.ADP.IDCLIPQEWGQH.YQESA 460
47 GIYIST.SG----KFTPKIGSIGLHSITEHVHPNQ.SRFTPVGVAVDENTPFQQWVLPHYAGSLALNTNLAPAVAPT..GEQLLFTRSRVPCVQGLQGQDAFIDCLLPQEWVNHFYQEAA 467
Hiro ATNSAKFTP----------KLGAIQIGTWEEDDVHI.QPTKFTPVGLFEDGGFNQWTL.NYSGALTLNMGLAPPVAPTTPGEQILFTRSHIPLKGG.ADP.IDCLLPQEWIQH.YQESA 460
Alph23 Y.NEAYVNTTASDYAPATG.MRFTVRNGGTGHISANKYWEPKSFGVEGEGHTNIQY.EYELPDYS.QVASNHNLAPPVAPRMPGES.LLFQSSMPVWDDGHGESTPKKIHCLLPQEFIGH 473

FIG. 8D

#8 DTHRNLGEFKLYPEGFMTCVPNTSGGPQTLPINGVFVFVSWVSRFYQLKPVGTAGARRLGLRRS---------- 543
SeV ..G.T.....A..D..L.....GASS...Q.....SS..GRLGL.R---------- 530
258 ..N.....G.YL.....GV.A...Q..L.....ST..SRLGV.RI---------- 546
645 .....S..T.....P.C---------- 540
CV ..N.....G.YL.....S.ST...Q..LD.....P..GRLGV.R---------- 544
WUG1 ..G.....D.FM.....SVSS.....S.....L..I---------- 539
HV PSPTDVALIRYTNPDTGRVLFEAKLHRQGFITVANSGSRPIV.PPNGYFRFDSWVNQFYS.APMGTGNGRRVQ---------- 535
485 PSSTDVALIRYTNPDTGRVLFEAKLHRQGFITVANSGSRPIV.PPNGYFRFDSWVNQFYS.APMGTGNGRRVQ---------- 535
Ina PSMSEVALVRYINPDTGRALFEAKLHRAGFVTVSSNTSAPVV.PANGYFRFDSWVNQFYS.APMGAGNGRRVQ---------- 542
809 PAQTQVALVRYVNPDTGKVLFEAKLHKLGFMT.ANNGDSPIT.PPNGYFRFESWVNPFYT.APMGTGNGRRIQ---------- 548
Sh5 PAQTQVALVRYVNPDTGRVLFGAKLHKLGFMT.AKNGDSPIT.PPNGYFRFESWVNPFYT.APMGTGNGRRIQ---------- 548
18-3 PAQTQVALVKYVNPDTGRVLFEAKLHKLGFMT.AKNGDSPIT.PPNGYFRFESWVNPFYT.APMGTGNGRRIQ---------- 548
336 PAQTQVALVRYVNPDTGRVLFEAKLHKMGFMT.AKNGDSPIT.PPNGYFRFESWVNPFYT.APMGTGKGRRIQ---------- 548
1152 PAQTQVALVRYVNPDTGRVLFEAKLHKLGFMT.SKNGDSPIT.PPNGYFRFESWVNPEYT.APMGTGNGRRIQ---------- 548
104 RFVNPDTGRV.FECKLHKSGYV.VAHTGPHDLVIPPNGYFRFD.WVN.FYTLAPM.NGAGRRRAL---------- 539
754 PSLGDVALVRYVNPDTGRVLFEAKLHKGGF.TVSSTSTGPVV.PANGYF.FDSWVNQFYS.APMGTGNGRRVQGIRRS---- 545
7k EAAPSQSAVA.VRYVNPDTGR.IFEAKLHREGFLT.ANCGNNPIVVPPNGYFRFEAWGNQFYTLAPMGSGQGRRRAQ---------- 550
445 EAAPSQSAVA.VRYVNPDTGR.IFEAKLHREGFLT.ANSGNNPIVVPPNGYFRFEAWVNQFYTLAPMGSGQGRRRA---------- 550
10-25 LIRFTNPDTGRVLFEARLHKQGFITVAHTGDNPIVMPPNGYFRFEAWVNQFYSL.PVGTGKG.R..VQ---------- 541
U25 TAQTDVALIRFVNPDTGRVLFEGKLHKQGFIT.SNSGDHPIVMPANGYFRFEAWVNQFYS.APVGTGSGRRRIQ---------- 537
026 PSLSDVALVRYVNPETGRTLFEAKLHRNGF.TVARNSAGPVVAPTNGYFRFDSWVNQFYT.APMGNGSGRRRMQ---------- 548
CHV PSQSDVALIRFTNPDTGRVLFEAKLHRSGYITVANTGSRPIVVPANGYFRFDTWVNQFYS.APMGTGNGRRRVQ---------- 535
47 PSQADVALIRYVNPDTGRTLFEAKLHRSGFITVSHTGAYPLVVPPNGHFRFDSWVNQFYS.APMGTGNGRRRIQ---------- 542
Hiro PSQSDVALIRFTNPDTGRVLFEAKLHRSGYITVANTGSRPIVVPANGYFRFDSWVNQFYS.APMGTGNGRRRVQ---------- 535
Alph23 FFDKQAPSLGDAALLRYVNQETNRVLFECK.YRD.YITVAASSGLLDFPLDGFTRFDSWVSSFYILSPVGSGQGRRGRVRFQ 556

FIG. 8E

Partitions	Evolutionary class Total	ID	Sequence clusters in class	Antigenic norovirus strains in class	Class-specific residues and insertions that occur in the different evolutionary classes corresponding to the first few partitions
P01	1		S1–S56	DSV, SOV, NV, MXV, HV, SMV, LSV	
P02, P03, P04	2	GI	S1–S10	DSV, SOV, NV	44A, 70I, 104V, 106N, 163E, 201V, 203A, 204G, **226Q, 329H, 375W, 377S, 397S, 414F, 434P, 460H, 463D, 471G, 485P *,486N*, 500V, 514K, 519A, 527G***
		GII	S12–S56	MXV, HV, SMV, LSV	44P, 70V, 104A, 106G, 163P, 201T, 203S, 204C, **226S, 329G, 375P, 377G, 397G, 414P, 434D, 460R, 463N, 471F, 500Y, 514A, 519G**
P05	3	GIa	S1–S10	DSV, SOV, NV	GI + [83L, 181R, **227K, 306G, 492P**]
		GIIa	S12–S42	MXV, HV, SMV	GII + [83L, 181R, **227K, 306G, 492P**]
		GIIb	S43–S56	LSV	GII + [83A, 181K, **227R, 306W, 492D**]
P06	7	GIb	S1–S3	DSV	GIa + [46A, **229K, 232S, 236L, 241L**]
		GIc	S4–S6	SOV	GIb: [199S, **229R, 232T, 236I, 310M**]
		GId	S7–S9	NV	GIb: [84S, 197G*, **229R, 232T, 241L**,]
		GIIc	S12–S23	MXV	GIIa + [46T, 195G*, 199V, **229K, 232T**]
		GIId	S25–S37	HV, SMV	GIIa: [65N, 241L, **509Q**]
		GIIe	S39–S42	HV, SMV	GIIa: [46V, **250V, 509Q**]
		GIIf	S43–S56	LSV	GIIa: [46A, **250L, 275V, 306W, 310D**]
P07	8	GIb	S1–S3	DSV	P06 + 43A, 65Q, 82D, 125I, 133A, 142A, 149I, 156E, 160V, 203C, 223N, **239N, 240T, 246V, 253M, 259H, 288C, 301L, 347*, 356L, 389P, 401E, 422M, 446V, 452T, 504V**
		GIe	S4–S5	DSV	P06+ 43L, 65Q, 82D, 125I, 133Q, 142A, 149I, 156D, 160V, 203C, 223T, **239K, 240Y, 246I, 253M, 259Q, 288C, 301L, 347P, 356L, 389F, 401E, 422M, 446I, 452I, 504A**
		GId	S7–S9	NV	P06+ 43V, 65Q, 82D, 125V, 133G, 142A, 149I, 156D, 160V, 203C, 223T, **239S, 240S, 246A, 253M, 259N, 288A, 301L, 347T, 356L, 389L, 401E, 422M, 446A, 452T, 504V**
		GIIc	S12–S23	MXV	P06+ 43A, 65G, 82N, 125F, 133P, 142I, 149I, 156E, 160L, 203R, 223T, **239S, 240E, 246F, 253L, 259E, 288C, 301L, 347T, 356L, 389Q, 401H, 422R, 446Y, 452A, 504E**
		GIIg	S25–S32	HV	P06+ 43A, 65N, 82N, 125F, 133P, 142I, 149I, 156E, 160L, 203R, 223T, **239G, 240E, 246F, 253L, 259E, 288C, 301V, 347T, 356L, 389Q, 401L, 422R, 446Y, 452S, 504D**
		GIIh	S33–S37	SMV	P06+ 43A, 65N, 82N, 125F, 133P, 142I, 149I, 156E, 160L, 203R, 223T, **239G, 240E, 246F, 253M, 259E, 288C, 301I, 347T, 356L, 389Q, 401L, 422R, 446Y, 452S, 504D**
		GIIi	S39–S41	SMV	P06+ 43A, 65A, 82D, 125F, 133P, 142L, 149V, 156E, 160L, 203R, 223S, **239S, 240E, 246F, 253M, 259E, 288C, 301L, 347T, 356I, 389Q, 401N, 422R, 446Y, 452A, 504E**
		GIIf	S43–S56	LV	P06+ 43A, 65G, 82S, 125F, 133P, 142V, 149I, 156E, 160I, 203R, 223T, **239E, 240E, 246F, 253L, 259S, 288C, 301L, 347T, 356L, 389Q, 401R, 422R, 446Y, 452A, 504D**

Residue numbers correspond to that of NV. The hinge region residues and the P domain residues are boldfaced in contrast to the S domain class-specific residues. *, insertions; P0n+, including all class specific residues of the previous class denoted by the number *n*.

FIG. 9

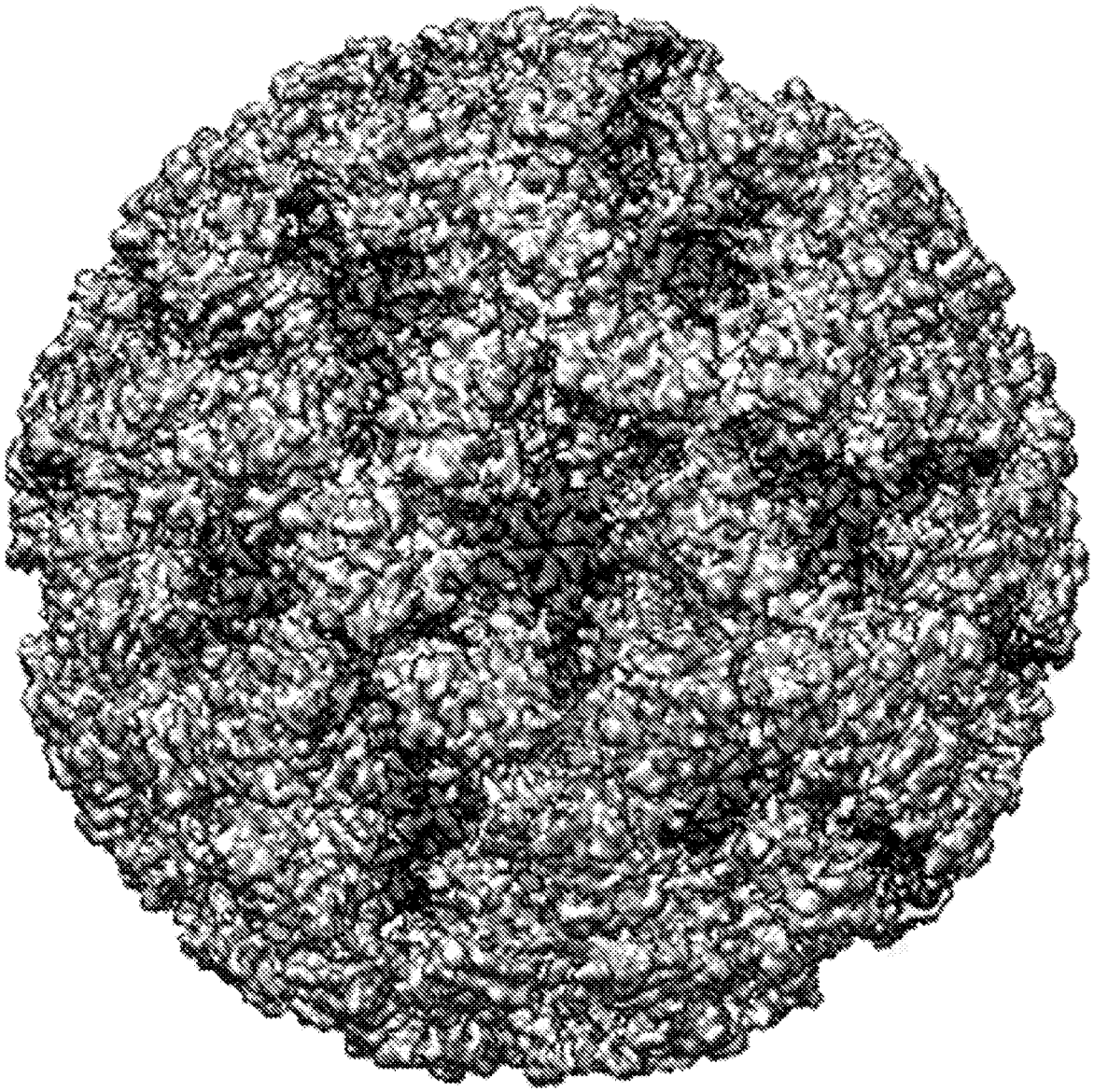

FIG. 10A

FIG. 10B

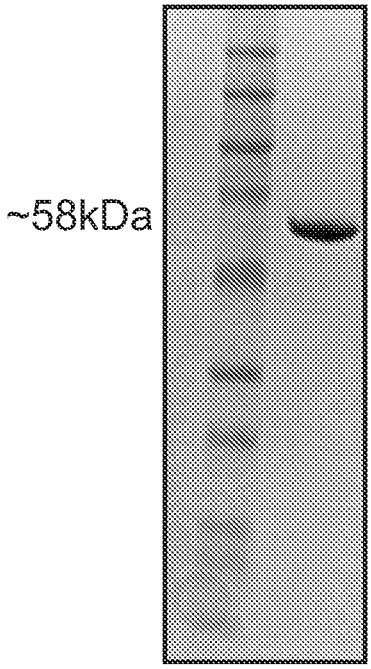

FIG. 11A

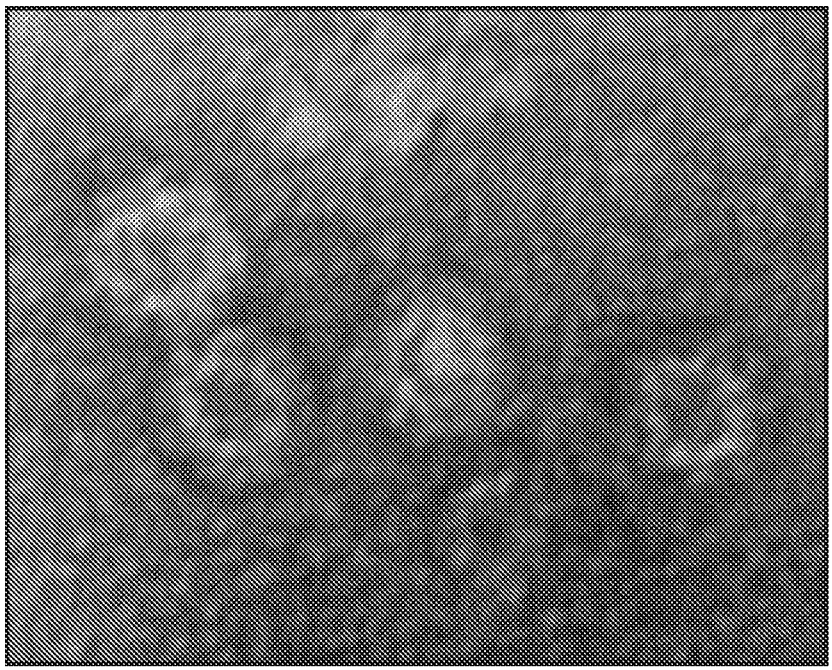

FIG. 11B

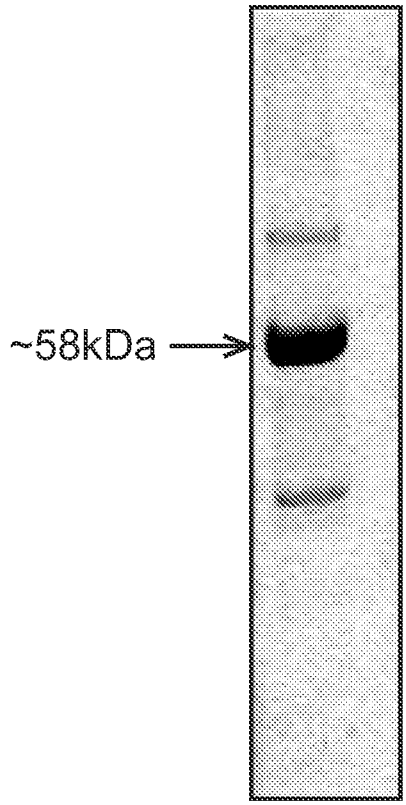

FIG. 12A

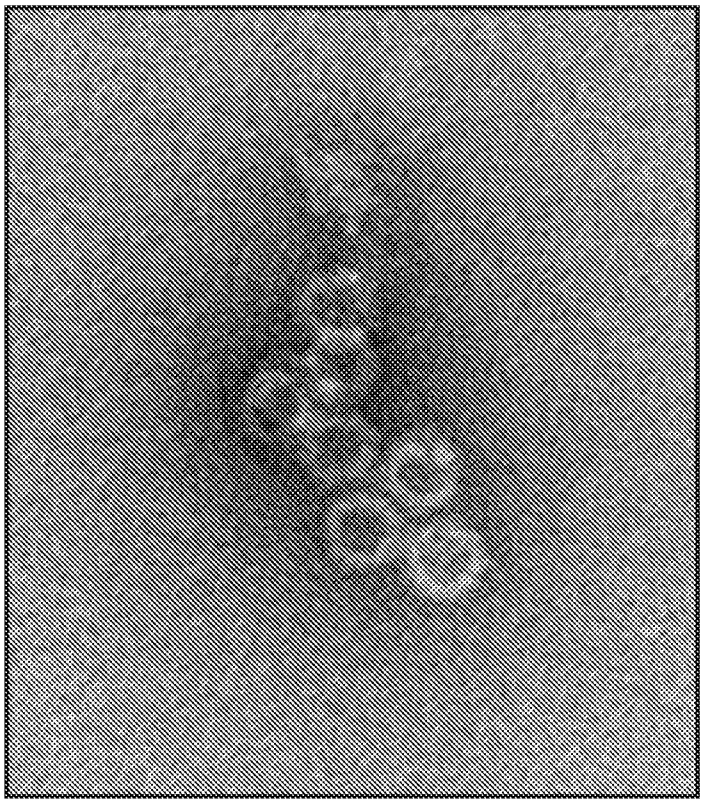

FIG. 12B

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/042979

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12N7/Q4
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	Pierre Pothier: "AERES report on the research unit Agents pathogenes et inflammation From the University of Franche-Comte; PROJECT Team 3", , 1 November 2010 (2010-11-01) , XP55009042 , France Retrieved from the Internet: URL:http://www.aeres-evaluation.fr/aeres/advancedsearch?SearchText=pathogenes&language_doc=l&academy=&wave=&reportType [] =217&reportType [] =252&reportType [] =226&reportType [] =404&reportType [] =392&reportType [] =362&SearchButton=Afficher+les+r%C3%A9sultats&Search0rder=pertinance [retrieved on 2011-10-10] page 5, paragraph 1 item 3.5 ; page 6 -/--	1-33

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 October 2011	24/10/2011

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/042979

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2009/039229 A2 (LIGOCYTE PHARMACEUTICALS INC [US] ; RICHARDSON CHARLES [US] ; VEDVICK TH) 26 March 2009 (2009-03-26) cited in the application page 6, line 5 - page 8, line 29	1-33
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