**Virus Particle Structures**

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**Color Plate Legends**

These color plates depict the relative sizes and comparative virion structures of multiple types of viruses. The renderings are based on data from published atomic coordinates as determined by X-ray crystallography. The international online repository for 3D coordinates is the Protein Databank (www.rcsb.org/pdb/), maintained by the Research Collaboratory for Structural Bioinformatics (RCSB). The VIPER web site (mmtsb.scripps.edu/viper), maintains a parallel collection of PDB coordinates for icosahedral viruses and additionally offers a version of each data file permuted into the same relative 3D orientation (Reddy, V., Natarajan, P., Okerberg, B., Li, K., Damodaran, K., Morton, R., Brooks, C. and Johnson, J. (2001). J. Virol., 75, 11943-11947). VIPER also contains an excellent repository of instructional materials pertaining to icosahedral symmetry and viral structures. All images presented here, except for the filamentous viruses, used the standard VIPER orientation along the icosahedral 2-fold axis.

With the exception of Plate 3 as described below, these images were generated from their atomic coordinates using a novel radial depth-cue colorization technique and the program Rasmol (Sayle, R.A., Milner-White, E.J. (1995). RASMOL: biomolecular graphics for all. Trends Biochem. Sci., 20, 374-376). First, the Temperature Factor column for every atom in a PDB coordinate file was edited to record a measure of the radial distance from the virion center. The files were rendered using the Rasmol spacefill menu, with specular and shadow options according to the Van de Waals radius of each atom. Color was assigned on a sliding scale by individual radial distances. The composite assembly and processing used Adobe Photoshop software with attention to relative scale, visual contrast and a uniform color pallet. All graphics are copyright Dr. Jean-Yves Sgro, Institute for Molecular Virology, University of Wisconsin-Madison (E:mail: <jsgro@wisc.edu>) and are available on the VirusWorld web site (virology.wisc.edu/virusworld).

**Plate 1: Picornaviruses**

**Bovine enterovirus 1**: Picornaviridae; Enterovirus; Bovine enterovirus; strain VG-5-27.

**Foot-and-mouth disease virus**: Picornaviridae; Aphthovirus; Foot-and-mouth disease virus; strain disease virus.

**Human coxsackievirus B3**: Picornaviridae; Enterovirus; Human enterovirus B; strain Nancy.

**Human echovirus 1**: Picornaviridae; Enterovirus; Human enterovirus B; strain Farouk.

**Human poliovirus 1**: Picornaviridae; Enterovirus; Poliovirus; strain Mahoney Type I. Miller, S.T., Hogle, J.M. and Filman, D.J. (2003). Crystal structure of Mahoney strain of poliovirus at 2.2A Resolution. (PDB-ID: 1HXS)


**Plate 2: Comparative Structures**


**Enterobacteria phage fd**: Inoviridae; Inovirus; Enterobacteria phage fd;

**Enterobacteria phage MS2**: Leviridae; Levivirus; Enterobacteria phage MS2, strain (NA).

**Enterobacteria phage QBeta**: Leviridae; Allovirus; Enterobacteria phage Q-beta; strain (NA).

**Enterobacteria phage PhiX174**: Microviridae; Microvirus; Enterobacteria phage phi-X174, strain (NA).

**Enterobacteria phage PhiX174+scaffold**: Microviridae; Microvirus; Enterobacteria phage phi-X174; with scaffold.

**Galleria mellonella densovirus**: Parvoviridae; Densovirus; Galleria mellonella densovirus; strain (NA).

**Hepatitis B virus**: Hepadnaviridae; Orthohepadnavirus; Hepatitis B virus; strain ayw.

**Human papillomavirus 16**: Papillomaviridae; Papillomavirus; Human papillomavirus 16, strain (recombinant L1 protein).
Modis, Y., Trus, B.L. and Harrison, S.C. (2002). Atomic model of the papillomavirus capsid. EMBO J., 21, 4754-4762. (PDB-ID: 1L0T)

**Mammalian orthoreovirus 3 - Core**: Reoviridae; Orthoreovirus; Mammalian orthoreovirus type 3 (LMD1, LMD2, sigma2 core proteins), strain Dearing.

**Nodamura virus**: Nodaviridae; Alphanodavirus; Nodamura virus, strain (NA).

**Norwalk virus**: Caliciviridae; Norovirus; Norwalk virus; strain (recombinant capsid).

**Nudaurelia capensis omega virus**: Tetraviridae; Omegatetravirus; Nudaurelia capensis omega virus; strain (NA).

**Rice dwarf virus**: Reoviridae; Phytoreovirus; Rice dwarf virus; strain Akita.

**Simian virus 40**: Polyomaviridae; polyomavirus; simian virus 40; strain (NA).

**Southern bean mosaic virus**: Sobemovirus; Southern bean mosaic virus; strain (NA).


Plate 3: Largest and smallest viral structures. Nucleic acid revealed within Pariacoto virus.

Both images are rendered to the same relative size scale.


