

TABLE 1. 3D reconstructions of spherical viruses<sup>a</sup>

| Virus family, subfamily (genus), species | Host | NA | Lattice symmetry | Size (Å)  | Reference(s)  |
|--|------|----|------------------|-----------|---------------|
| <i>Adenoviridae</i>                      |      |    |                  |           |               |
| Ad2                                      | V    | dD | T = 25           | 884–1,114 | 70, 296, 298  |
| Ad5                                      | V    | dD | T = 25           | 884–1,114 | 328           |
| Ad5 (without fiber)                      | V    | dD | T = 25           | 884–914   | 328           |
| Ad12                                     | V    | dD | T = 25           | 884–1,114 | 70            |
| Ad2-Fab DAV-1 complex                    | V    | dD | T = 25           | 884–1,114 | 297           |
| Ad2- $\alpha$ , $\beta$ 5 complex        | V    | dD | T = 25           | 884–1,238 | 70            |
| Ad12- $\alpha$ , $\beta$ 5 complex       | V    | dD | T = 25           | 884–1,204 | 70            |
| Ad3 penton dodecahedron                  | V    | —  | T = 1            | 400       | 267           |
| Ad3 penton dodecahedron (without fiber)  | V    | —  | T = 1            | 280       | 267           |
| <i>Bimaviridae</i>                       |      |    |                  |           |               |
| <i>(Avibirnavirus)</i>                   |      |    |                  |           |               |
| IBDV                                     | V    | dR | T = 13d          | 700       | 40            |
| <i>Bromoviridae</i>                      |      |    |                  |           |               |
| <i>(Alphavirus)</i>                      |      |    |                  |           |               |
| Alfalfa mosaic virus capsid              | Pl   | —  | T = 1            | 210       | 191           |
| <i>(Bromovirus)</i>                      |      |    |                  |           |               |
| CCMV                                     | Pl   | sR | T = 3            | 284       | 234, 290, 358 |
| CCMV capsid                              | Pl   | —  | T = 3            | 284       | 123           |
| CCMV RNA1 virion                         | Pl   | sR | T = 3            | 284       | 123           |
| CCMV RNA2 virion                         | Pl   | sR | T = 3            | 284       | 123           |
| CCMV (swollen-mixed)                     | Pl   | sR | T = 3            | 310       | 290, 292      |
| CCMV expressed                           | Pl   | sR | T = 3            | 284       | 358           |

Continued on following page

TABLE 1—Continued

| Virus family, subfamily (genus), species                      | Host | NA | Lattice symmetry | Size (Å) | Reference(s)           |
|---|------|----|------------------|----------|------------------------|
| <i>(Cucumovirus)</i><br>Cucumber mosaic virus                 | Pl   | sR | T = 3            | 280      | 343                    |
| <i>Caliciviridae</i>  |      |    |                  |          |                        |
| Calicivirus   | V    | sR | T = 3            | 405      | 244                    |
| Norwalk virus   | V    | —  | T = 3            | 380      | 246                    |
| Rabbit hemorrhagic disease VLP-MAb-E3 complex                 | V    | —  | T = 3            | >580     | 305                    |
| <i>Comoviridae</i>  |      |    |                  |          |                        |
| <i>(Comovirus)</i>  |      |    |                  |          |                        |
| CPMV mixed  | Pl   | sR | P = 3            | 250–312  | 240, 336               |
| CPMV-T (top component)  | Pl   | —  | P = 3            | 250–312  | 10, 62                 |
| CPMV-M (middle component)                                     | Pl   | sR | P = 3            | 250–312  | 10                     |
| CPMV-B <sub>u</sub> (bottom component-upper)                  | Pl   | sR | P = 3            | 250–312  | 10                     |
| CPMV-M–Fab 5B2 complex  | Pl   | sR | P = 3            | 250–410  | 240, 336               |
| CPMV-M–Fab 10B7 complex                                       | Pl   | sR | P = 3            | 250–410  | 240                    |
| CPMV-M–IgG 10B7 complex                                       | Pl   | sR | P = 3            | 250–>410 | 240                    |
| CPSMV (severe strain)   | Pl   | sR | P = 3            | 250–312  | 234                    |
| <i>(Nepovirus)</i><br>Tobacco ringspot virus, expressed       | Pl   | —  | P = 3            | 300      | 279                    |
| <i>Cystoviridae</i>   |      |    |                  |          |                        |
| φ6 nucleocapsid   | B    | dD | T = 13           | 580      | 48                     |
| φ6 core   | B    | dD | T = 1            | 500–580  | 48                     |
| φ6 procapsid  | B    | dD | T = 1            | 460      | 48                     |
| φ6 P1   | B    | —  | T = 1            | 460      | 48                     |
| φ6 P1P4   | B    | —  | T = 1            | 460      | 48                     |
| <i>Hepadnaviridae</i>   |      |    |                  |          |                        |
| <i>(Orthohepadnavirus)</i>                                    |      |    |                  |          |                        |
| HepBc (human liver) (nHBc)                                    | V    | ?  | T = 4            | 340      | 184                    |
| HBc full length (fHBc)  | V    | sR | T = 3 & 4        | 300, 340 | 184                    |
| HBc expressed (HBcAg)   | V    | sR | T = 3 & 4        | 320, 360 | 93                     |
| HBcAg empty capsid  | V    | —  | T = 3 & 4        | 320, 360 | 93                     |
| HBcAg empty capsid-Fab 312 complex                            | V    | —  | T = 4            | 455      | 78                     |
| HBc expressed, truncated (149-aa) empty capsid (HBcAgΔ)       | V    | —  | T = 3 & 4        | 320, 360 | 41, 42, 80, 93, 184    |
| HBcAgΔ + decapeptide  | V    | —  | T = 3 & 4        | 320, 360 | 41                     |
| HBc expressed, truncated (147-aa) empty capsid (HBc Cp147)    | V    | —  | T = 3 & 4        | 318, 350 | 365                    |
| HBc Cp147 empty capsids                                       | V    | —  | T = 4            | 350      | 364                    |
| HBc Cp183 capsids   | V    | sR | T = 4            | 350      | 364                    |
| HBc Cp*150 labeled with dodecagold                            | V    | —  | T = 4            | 350      | 364                    |
| Hbc Cpe (N-terminal extension)                                | V    | —  | T = 3 & 4        | 290, 330 | 79                     |
| <i>(Avihepadnavirus)</i><br>Duck hepatitis B expressed capsid | V    | sR | T = 3 & 4        | 300, 340 | 184                    |
| <i>Herpesviridae</i>  |      |    |                  |          |                        |
| <i>Alphaherpesvirinae (Simplexvirus)</i>                      |      |    |                  |          |                        |
| HSV-1   | V    | dD | —                | ~2,000   | 359                    |
| HSV-1 A capsid  | V    | —  | T = 16           | 1,250    | 35, 269, 363           |
| HSV-1 B capsid (HSV-1 B)                                      | V    | —  | T = 16           | 1,250    | 83, 224, 313, 361, 362 |
| HSV-1 B + 2.0 M GuHCl (G2.0 capsid)                           | V    | —  | T = 16           | 1,250    | 38, 224, 291           |
| G2.5 capsid   | V    | —  | T = 16           | 1,250    | 224                    |
| G2.0 capsid + VP26  | V    | —  | T = 16           | 1,250    | 38                     |
| G2.0 capsid-MAb 6F10 complex                                  | V    | —  | T = 16           | ~1,380   | 291                    |
| HSV-1 B-MAb 8F5 complex                                       | V    | —  | T = 16           | ~1,400   | 313                    |
| HSV-1 B-MAb 6F10 complex                                      | V    | —  | T = 16           | ~1,300   | 311                    |
| HSV-1 C capsid  | V    | dD | T = 16           | 1,250    | 35, 83, 269            |
| HSV-1 expressed capsid  | V    | —  | T = 16           | 1,250    | 312                    |
| HSV-1 expressed (VP26 <sup>-</sup> ) capsid                   | V    | —  | T = 16           | 1,250    | 312, 348, 362          |
| HSV-1 expressed (VP26 <sup>-</sup> ) capsid + VP26            | V    | —  | T = 16           | 1,250    | 348                    |
| HSV-1 procapsid-MAb 6F10 complex                              | V    | —  | T = 16           | 1,320    | 311                    |
| <i>Alphaherpesvirinae (Varicellovirus)</i>                    |      |    |                  |          |                        |
| Equineherpesvirus type 1 light capsid                         | V    | —  | T = 16           | 1,250    | 17, 18                 |
| Equineherpesvirus type 1 intermediate capsid                  | V    | —  | T = 16           | 1,250    | 17, 18                 |
| <i>Betaherpesvirinae (Cytomegalovirus)</i>                    |      |    |                  |          |                        |
| Human herpesvirus 5 B capsid                                  | V    | —  | T = 16           | ~1,300   | 49                     |
| Unassigned virus in the family<br>Channel catfish herpesvirus | V    | —  | T = 16           | 1,167    | 37                     |
| <i>Microviridae</i>   |      |    |                  |          |                        |
| <i>(Microvirus)</i>   |      |    |                  |          |                        |
| φX174 114S virion   | B    | sD | T = 1            | 260–335  | 26, 166, 231           |
| φX174 108S procapsid  | B    | —  | T = 1            | 363      | 166                    |
| φX174 132S provirion  | B    | sD | T = 1            | 363      | 166                    |

Continued on following page

TABLE 1—Continued

| Virus family, subfamily (genus), species               | Host | NA | Lattice symmetry | Size (Å) | Reference(s)      |
|--|------|----|------------------|----------|-------------------|
| ( <i>Spiromicrovirus</i> )<br>Spiroplasma phage 4      | B    | sD | T = 1            | 270–360  | 68, 69            |
| <i>Myoviridae</i>                                      |      |    |                  |          |                   |
| Enterobacteria phage P2                                | B    | dD | T = 7            | 600      | 101               |
| Enterobacteria phage P4                                | B    | dD | T = 4            | 450      | 101               |
| Enterobacteria phage P4 Sid                            | B    | dD | T = 4            | 450      | 213               |
| Enterobacteria phage P4 Psu                            | B    | dD | T = 4            | 450      | 99                |
| <i>Nodaviridae</i>                                     |      |    |                  |          |                   |
| FHV  | I    | sR | T = 3            | 330      | 11, 66            |
| <i>Papovaviridae</i>                                   |      |    |                  |          |                   |
| ( <i>Polyomavirus</i> )                                |      |    |                  |          |                   |
| Polyomavirus   | V    | dD | T = 7d           | 495      | 26, 30            |
| SV40   | V    | dD | T = 7d           | 495      | 14, 15            |
| ( <i>Papillomavirus</i> )                              |      |    |                  |          |                   |
| HPV-1  | V    | dD | T = 7d           | 600      | 19, 29            |
| HPV-1 expressed L1 capsid                              | V    | —  | T = 7d           | 600      | 146               |
| HPV-1 expressed L1-L2 capsid                           | V    | —  | T = 7d           | 600      | 146               |
| BPV-1  | V    | dD | T = 7d           | 600      | 19, 26, 314       |
| BPV-1–MAb 9 complex                                    | V    | dD | T = 7d           | 710      | 36                |
| BPV-1–MAb 5B6 complex                                  | V    | dD | T = 7d           | 650      | 36                |
| Cottontail rabbit papillomavirus type 1                | V    | dD | T = 7d           | 630      | 29                |
| <i>Parvoviridae</i>                                    |      |    |                  |          |                   |
| <i>Parvovirinae (Parvovirus)</i>                       |      |    |                  |          |                   |
| Aleutian mink disease virus                            | V    | sD | T = 1            | 285      | 214, 232          |
| Canine parvovirus-Fab complex                          | V    | sD | T = 1            | 255–425  | 344               |
| <i>Parvovirinae (Erythrovirus)</i>                     |      |    |                  |          |                   |
| Human parvovirus B19 VLP (B19)                         | V    | —  | T = 1            | 260      | 67                |
| B19 VLP-globoside complex                              | V    | —  | T = 1            | 260      | 67                |
| <i>Densovirinae (Densovirus)</i>                       |      |    |                  |          |                   |
| <i>Galleria mellonella</i> densovirus                  | I    | sD | T = 1            | 260      | 277               |
| <i>Phycodnaviridae</i>                                 |      |    |                  |          |                   |
| <i>Paramecium bursaria</i> <i>Chlorella</i> virus 1    | A    | dD | T = 169          | 1,900    | 351               |
| <i>Picomaviridae</i>                                   |      |    |                  |          |                   |
| ( <i>Rhinovirus</i> )                                  |      |    |                  |          |                   |
| HRV2   | V    | sR | P = 3            | 300      | 156               |
| HRV14  | V    | sR | P = 3            | 300      | 27, 284, 292      |
| HRV16  | V    | sR | P = 3            | 300      | 9, 27             |
| HRV2-MAb 8F5 complex                                   | V    | sR | P = 3            | >440     | 156               |
| HRV2-Fab 3B10 complex                                  | V    | sR | P = 3            | >440     | 161               |
| HRV14-Fab 1-1A complex                                 | V    | sR | P = 3            | 440      | 58                |
| HRV14-Fab 12-1A complex                                | V    | sR | P = 3            | 440      | 58                |
| HRV14-Fab 17-1A complex                                | V    | sR | P = 3            | 440      | 205, 235, 289     |
| HRV14-IgG 17-1A complex                                | V    | sR | P = 3            | >440     | 288               |
| HRV14-D1D2ICAM-1 complex                               | V    | sR | P = 3            | 410      | 259               |
| HRV16-D1D2ICAM-1 complex                               | V    | sR | P = 3            | 410      | 25, 233, 235, 261 |
| ( <i>Aphthovirus</i> )                                 |      |    |                  |          |                   |
| FMDV-C–Fab SD6 complex                                 | V    | sR | P = 3            | 450      | 162               |
| <i>Podoviridae</i>                                     |      |    |                  |          |                   |
| T7-like phages   |      |    |                  |          |                   |
| <i>Bacillus</i> phage $\phi$ 29 ( $\phi$ 29) isometric | B    | —  | T = 3            | 455      | 300               |
| $\phi$ 29 fiberless isometric                          | B    | —  | T = 3            | 425      | 300               |
| Enterobacteria phage P22 head                          | B    | dD | T = 7            | 630      | 245               |
| P22 procapsid  | B    | —  | T = 7            | 612      | 245, 308          |
| P22 procapsid (minus scaffold)                         | B    | —  | T = 4            | 480      | 309               |
| P22 procapsid (minus scaffold)                         | B    | —  | T = 7            | 612      | 309               |
| P22 procapsid mutant 8tsL177I                          | B    | —  | T = 7            | 612      | 308               |
| <i>Reoviridae</i>                                      |      |    |                  |          |                   |
| ( <i>Aquareovirus</i> )                                |      |    |                  |          |                   |
| Aquareovirus   | V    | dR | T = 13/          | 800      | 272               |
| Aquareovirus empty capsid                              | V    | —  | T = 13/          | 800      | 272               |
| ( <i>Cypovirus</i> )                                   |      |    |                  |          |                   |
| BmCPV-1  | I    | dR | T = 1            | 600–800  | 356               |
| BmCPV-1 capsid   | I    | —  | T = 1            | 600–800  | 356               |
| ( <i>Orbivirus</i> )                                   |      |    |                  |          |                   |
| BTV-10   | V    | dR | T = 13/          | 900      | 158, 332          |
| BTV-10 expressed, VLP                                  | V    | —  | T = 13/          | 860      | 159, 332          |
| BTV-10 core  | V    | dR | T = 13/          | 690      | 145, 241, 332     |
| BTV-10 expressed, core-like particle                   | V    | —  | T = 13/          | 690      | 157, 332          |
| BRDV   | V    | dR | T = 13/          | 790      | 268               |

Continued on following page

TABLE 1—Continued

| Virus family, subfamily (genus), species | Host | NA | Lattice symmetry | Size (Å)  | Reference(s)       |
|--|------|----|------------------|-----------|--------------------|
| <i>(Orthoreovirus)</i>                   |      |    |                  |           |                    |
| T1L reovirus virion                      | V    | dR | T = 13/          | 850       | 108, 292           |
| T1L reovirus ISVP                        | V    | dR | T = 13/          | 800       | 108, 292           |
| T1L reovirus core                        | V    | dR | T = 1            | 600–800   | 108, 292           |
| T1L reovirus empty virion                | V    | —  | T = 13/          | 850       | 107                |
| T1L reovirus empty ISVP                  | V    | —  | T = 13/          | 800       | 107                |
| T1L reovirus empty core                  | V    | —  | T = 1            | 600–800   | 107                |
| Type 2 (Jones) reovirus virion           | V    | dR | T = 13/          | 850       | 217                |
| T3D reovirus virion                      | V    | dR | T = 13/          | 850       | 217                |
| T3D reovirus core                        | V    | dR | T = 1            | 600–800   | 209                |
| T3D reovirus empty core                  | V    | —  | T = 1            | 600–800   | 217                |
| T3D-Δλ2                                  | V    | dR | T = 1            | 600–800   | 209                |
| Recoated core                            | V    | dR | T = 1            | 850       | 57                 |
| Recoated ISVP                            | V    | dR | T = 1            | 850       | 171                |
| <i>(Phytoreovirus)</i>                   |      |    |                  |           |                    |
| Rice dwarf virus                         | Pl   | dR | T = 13/          | 700       | 207                |
| <i>(Rotavirus)</i>                       |      |    |                  |           |                    |
| Rhesus rotavirus                         | V    | dR | T = 13/          | 750–>950  | 353                |
| Simian rotavirus (SA11-4F) TLP           | V    | dR | T = 13/          | 765–>950  | 248, 249, 271, 352 |
| Simian rotavirus (SA11-R004) TLP         | V    | dR | T = 13/          | 765       | 271                |
| SA11/VP4 <sup>-</sup>                    | V    | dR | T = 13/          | 750       | 352                |
| SA11/VP4-Fab complex                     | V    | dR | T = 13/          | 765–1,000 | 242                |
| SA11-4F DLP                              | V    | dR | T = 13/          | 700       | 193, 195, 247, 249 |
| SA11-4F DLP transcribing mRNA            | V    | dR | T = 13/          | 700       | 193                |
| SA11-4F 2-VLP                            | V    | —  | T = 1            | 525       | 247                |
| SA11-4F 2/6-VLP                          | V    | —  | T = 13/          | 700       | 195, 247           |
| SA11-4F Δ2/6-VLP                         | V    | —  | T = 13/          | 700       | 195                |
| SA11-4F 1/2/3/6-VLP                      | V    | —  | T = 13/          | 700       | 247                |
| <i>Siphoviridae</i>                      |      |    |                  |           |                    |
| <i>(λ-like phages)</i>                   |      |    |                  |           |                    |
| Coliphage λ                              | B    | dD | T = 7            | 630       | 100                |
| Coliphage λ prohead                      | B    | dD | T = 7            | 540       | 100                |
| Coliphage λ gpD <sup>-</sup>             | B    | dD | T = 7            | 630       | 100                |
| Lambdoid phage HK97 prohead I            | B    | —  | T = 7            | 470       | 81                 |
| Lambdoid phage HK97 prohead II           | B    | —  | T = 7            | 470       | 81                 |
| Lambdoid phage HK97 head I               | B    | dD | T = 7            | 550       | 81                 |
| Lambdoid phage HK97 head II              | B    | dD | T = 7            | 550       | 81                 |
| <i>Tectiviridae</i>                      |      |    |                  |           |                    |
| PRD1                                     | B    | dD | T = 25           | 740       | 50                 |
| PRD1 sus1                                | B    | —  | T = 25           | 740       | 50                 |
| PRD1 P3 shell                            | B    | —  | T = 25           | 740       | 50                 |
| <i>Tetraviridae</i>                      |      |    |                  |           |                    |
| Nudaurelia capensis β virus              | I    | sR | T = 4            | 397       | 229, 230           |
| Nudaurelia capensis ω virus              | I    | sR | T = 4            | 410       | 177                |
| <i>Togaviridae</i>                       |      |    |                  |           |                    |
| <i>(Alphavirus)</i>                      |      |    |                  |           |                    |
| Aura virus                               | V    | sR | T = 4            | 708       | 357                |
| RRV                                      | V    | sR | T = 4            | 700       | 64, 286            |
| RRV-Fab complex                          | V    | sR | T = 4            | 810       | 286                |
| SNV                                      | V    | sR | T = 4            | 700       | 130, 237, 238, 286 |
| SNV TRSB-N (noninfectious mutant)        | V    | sR | T = 4            | 700       | 238                |
| SNV TRSB-NE2G216 (infectious mutant)     | V    | sR | T = 4            | 700       | 238                |
| SNV core                                 | V    | sR | T = 4            | 400       | 131                |
| SNV-Fab complex                          | V    | sR | T = 4            | 810       | 286                |
| SFV                                      | V    | sR | T = 4            | 700       | 132, 186, 327      |
| SFVmSQL mutant                           | V    | sR | T = 4            | 700       | 118, 186           |
| SFV detergent E1 depleted                | V    | sR | T = 4            | 680       | 325                |
| SFV low pH (50-ms form)                  | V    | sR | T = 4            | 700       | 132                |
| <i>Tombusviridae</i>                     |      |    |                  |           |                    |
| Tomato bushy stunt virus                 | Pl   | sR | T = 3            |           | 326                |
| <i>Toitiviridae</i>                      |      |    |                  |           |                    |
| <i>(Totivirus)</i>                       |      |    |                  |           |                    |
| L-A ( <i>Saccharomyces cerevisiae</i> )  | F    | dR | T = 1            | 430       | 55, 63             |
| L-A empty capsid                         | F    | —  | T = 1            | 430       | 55, 63             |
| P4 ( <i>Ustilago maydis</i> )            | F    | dR | T = 1            | 430       | 63                 |

Continued on following page

TABLE 1—Continued

| Virus family, subfamily (genus), species | Host | NA | Lattice symmetry | Size (Å) | Reference(s) |
|--|------|----|------------------|----------|--------------|
| No family or subfamily name              |      |    |                  |          |              |
| <i>(Caulimovirus)</i>                    |      |    |                  |          |              |
| CaMV cabbage                             | Pl   | dD | T = 7            | 538      | 65           |
| CaMV turnip (CM1841)                     | Pl   | dD | T = 7            | 538      | 65           |
| <i>(Tymovirus)</i>                       |      |    |                  |          |              |
| TYMV                                     | Pl   | sR | T = 3            | 300      | 39           |
| TYMV empty capsid                        | Pl   | —  | T = 3            | 300      | 39           |
| Other particles                          |      |    |                  |          |              |
| Yeast retrotransposon Ty1 VLP            | F    | sR | T = 3 & 4        | 166, 191 | 236          |

<sup>a</sup> Abbreviations: NA, nucleic acid genome; V, vertebrate; Pl, plant; B, bacteria; I, invertebrate; A, algae; F, fungi; dD, dsDNA; —, none; dR, dsRNA; sR, ssRNA; ?, unknown; sD, ssDNA; T, triangulation number; P, pseudotriangulation number.