

Table 2 Some physical properties of the virions of the 30 families of RNA viruses

Family	Virion <i>M_v</i> ($\times 10^6$)	Structural type	Size ($d \times l$) (nm)	<i>S</i> _{20w}	Sucrose bouyant density (g/cm ³)	CsCl bouyant density (g/cm ³)	Composition	Sensitivity
<i>Leviviridae</i>	3.6–4.2	Icosahedral (T = 3)	26	80–84		1.46	No lipid No carb. RNA 30%	Detergents
<i>Picornaviridae</i>	8.0–9.0	Icosahedral (T = 1)	30	140–165		1.33– 1.45	No lipid No carb. RNA	(low pH) (heat) Stabilized by divalent cations
<i>Sequiviridae</i>	n.d.	Isometric	30	150–190		(high)	No lipid No carb. RNA 40%	Protease
<i>Comoviridae</i>	T = 3.2–3.8 M = 4.6–5.8 B = 6.0–6.2	Three icosahedral particles (T = 1)	28–30 28–30 28–30	49–63 86–128 113–134		128–130 141–148 144–153	No lipid, (carb.) RNA1 in B RNA2 in M None in T	
<i>Potyviridae</i>	n.d.	Flexuous filaments (helical)	11–15 \times 250–900	150–160		1.29–1.30	No lipid No carb. 5% RNA	
<i>Caliciviridae</i>	15	Icosahedral (T = 3)	30–38	170–187		1.33–1.40	No lipid No carb. RNA	Low pH Heat Freeze/thaw (trypsin)
<i>Astroviridae</i>	8	Isometric (5/6 pt. star)	28–30	160		1.36–1.39	No lipid No carb. RNA	
<i>Nodaviridae</i>	8	Icosahedral (T = 3)	30	135–140		1.30–1.34	No lipid No carb. RNA 16%	(1% SDS)
<i>Tetraviridae</i>	16	Icosahedral	40	194–210		1.29–1.30	No lipid No carb. RNA 11%	
<i>Tombusviridae</i>	8.2–8.9	Icosahedral (T = 3)	30	118–140		1.34–1.36	No lipid No carb. 17% RNA	High pH EDTA
<i>Coronaviridae</i>	400	Pleomorphic	120–160	300–500	1.15–1.19	1.23–1.24	Lipid Carb. RNA	Heat Organic solvents Detergents
<i>Arteriviridae</i>	n.d.	Spherical [isometric nucleocapsid]	60	200–230	1.13–1.17	1.17–1.20	Lipid Carb. RNA	n.d.
<i>Flaviviridae</i>	~60	Spherical [isometric core]	40–60	140–200	1.10–1.23		Lipid ~17% Carb. ~9% RNA	Heat Organic solvents Detergents
<i>Togaviridae</i>	52	Spherical [icosahedral core (T = 4)]	70	280	1.18–1.22		Lipid 30% Carb. 5% RNA	Heat Low pH, Organic solvents Detergents
<i>Bromoviridae</i>	(a) 4.6–6.0 (b) 3.5–6.9	(a) Icosahedral (T = 3) (b) bacilliform	(a) 26–35 (b) 18 \times 30–57	63–99		1.35–1.37	No lipid No carb. RNA 14–25%	SDS Rnase
<i>Barnaviridae</i>	7.1	Bacilliform	18–20 \times 48–53	n.d.		1.32 (CsSO ₄)	No lipid No carb. RNA 20%	
<i>Closteroviridae</i>	n.d.	Flexuous filaments (helical)	12 \times 1200– 2200	96–140		1.30–1.34	No lipid No carb. RNA 5–6%	High salt CsCl EDTA RNase

Table 2 Continued

Family	Virion <i>M</i> , ($\times 10^6$)	Structural type	Size (<i>d</i> \times <i>l</i>) (nm)	<i>S</i> _{20w}	Sucrose bouyant density (g/cm ³)	CsCl bouyant density (g/cm ³)	Composition	Sensitivity
<i>Bornaviridae</i>	n.d.	Spherical	90	n.d.	1.22	1.22	Lipid Carb. RNA	Heat Organic solvents Detergents
<i>Rhabdoviridae</i>	300-1000	Bacilliform or Bullet-shaped (helical nucleocapsid)	45-100 \times 100-430	550- 1045+	1.17-1.19	1.19-1.20	Lipids 15-15% Carb. 3% RNA 1-2%	Heat Organic solvents
<i>Paramyxoviridae</i>	500+	Pleomorphic (helical nucleocapsid)	150+	1000+	1.18-1.20		Lipids 20-25% Carb. 6% RNA 0.5%	Heat Organic solvents Detergents
<i>Filoviridae</i>	420	U-, 6-, or S-shaped, and circular filaments (helical nucleocapsid)	80 \times 800- 14 000	1400+	1.14 [pot. tartrate]		Lipid Carb. RNA 1%	Organic Solvents Irradiation
<i>Arenaviridae</i>	n.d.	Pleomorphic	50-300 (mean = 120)	325-500	1.17-1.18	1.19-1.20	Lipid 20% Carb. 8% RNA 2%	Heat Organic solvents Low pH
<i>Bunyaviridae</i>	300-400	Spherical or pleomorphic	80-120	350-500	1.16-1.18	1.20-1.21	Lipid 20-30% Carb. 2-7% RNA 1-2%	Heat Organic solvents Detergents
<i>Orthomyxoviridae</i>	250	Spherical or pleomorphic	80-120	700-800	1.19		Lipid 18-37% Carb. 5% RNA	Heat Organic solvents Detergents
<i>Cystoviridae</i>	99	Spherical with icosahedral core	86	405	1.24	1.27	Lipid 20% No carb. RNA 10%	Organic Solvents Detergents
<i>Reoviridae</i>	120	Icosahedral; complex shell + inner core	60-80	630		1.36-1.39	No lipid Carb. (?) RNA 15-20%	(low pH)
<i>Birnaviridae</i>	55	Icosahedral; single shell	60	435		1.33	No lipid Carb. (?) RNA 9-10%	
<i>Totiviridae</i>	12.3	Isometric	30-40	160-190		1.33-1.43	No lipid No carb. RNA	
<i>Partitiviridae</i>	6-9	Isometric	30-40	101-145		1.34-1.39	No lipid No carb. RNA	
<i>Hypoviridae</i>	n.d.	Vesicle with dsRNA + polymerase	50-80	200		1.27-1.30	Lipid Carb. No virus structural protein	Heat Organic solvents Low/high pH

+, More than.

(...), Variable, some species only.

carb., carbohydrate; NC, nucleocapsid; n.d., no data.

Data compiled from Murphy *et al.* (2)