P

13p2 virus. Synonym: AMERICAN OYSTER REO-LIKE VIRUS.

P1 phage. Temperate tailed phage (*MYOVIRIDAE*) which does not integrate into the host chromosome. Instead the PROPHAGE resembles a plasmid and replicates autonomously at a low number of copies per cell.
Ritchie, D.A. (1983) **In** Topley and Wilson's Principles of Bacteriology, Virology and Immunity. Vol. 1. p. 177. ed. G. Wilson, A. Miles and M.T. Parker. Edward Arnold: London.

ø6 phage. Type species of CYSTOVIRUS genus (*CYSTOVIRIDAE*) isolated from *Pseudomonas phaseolicola* HB10Y. Virions are unique among phage isolates as they are composed of an isometric capsid (50 nm. in diameter) surrounded by a lipid-containing envelope and contain dsRNA. The intact particles are amorphous in shape, 60-70 nm. in diameter, sediment at 446S and have a buoyant density in CsCl of 1.27 g/cc. They contain at least ten polypeptides (mw. 6-82 x 10^3) and a genome composed of three segments of dsRNA (mw. 2.3, 3.1 and 5 x 10^6). The virion contains a transcriptase which produces complete ssRNA transcripts of the genome segments. Virus particles adsorb to pili of the host and infection results in lysis. The virus is the only described isolate within the *Cystoviridae*.
Mindich, L. (1978) **In** Comprehensive Virology. Vol. 12. p. 271. ed. H. Fraenkel-Conrat and R.R. Wagner. Plenum Press: New York.

øX phage group. Vernacular name for *MICROVIRUS* genus.

øX174 phage. MICROVIRUS type species infecting Enterobacteria. Particles are isometric, 27-30 nm. in diameter, with spikes at the vertices. They have a mw. of about 6.2 x 10^6, sediment at 114-120S and a buoyant density in CsCl of 1.4 g/cc. Virions contain 60 copies of a 46.4 x 10^3 mw. protein, 30-50 copies of a 4.2 x 10^3 mw. protein, as well as two protein species associated with the spikes (60 copies 19.1 x 10^3 mw. and 12 copies 35.8 x 10^3 mw.(H protein)). The genome is circular (+)-sense ssDNA (5386 nucleotides) and has been sequenced and genetically and physically mapped. It contains genetic information for at least ten different proteins. Five of these genes share their nucleotide sequence with another gene (overlapping genes), three of which read the base sequence in a different reading frame. The H protein facilitates adsorption to the host cell wall and is also required for DNA entry and the initiation of DNA replication. Production of replicative form (RF) DNA is primed by RNA and occurs during the first minute of infection. Only the minus strand of the RF is transcribed into mRNA. The RF is also used as the template for synthesis of further RF molecules by a semi-conservative process probably involving a rolling circle-like process without concatemeric DNA formation. Twenty minutes post infection, the RF gives rise to progeny ssDNA by a similar mechanism but because the (+)-sense (viral) strand is simultaneously encapsidated it cannot act as template for minus strand and RF formation. About 60 progeny RF molecules are produced per cell and about 500 progeny viral ssDNA strands. The replication cycle is complete within 25-30 minutes and the host cell is lysed.
Denhardt, D.T. (1977) **In** Comprehensive Virology. Vol. 7. p. 1. ed. H. Fraenkel-Conrat and R.R. Wagner. Plenum Press: New York.
Ritchie, D.A. (1983) **In** Topley and Wilson's Principles of Bacteriology, Virology and Immunity. Vol. 1. p. 177. ed. G. Wilson, A. Miles and M.T. Parker. Edward Arnold: London.
Weisbeek, P. (1984) **In** Genetic Maps 1984. Vol. 3. p. 22. ed. S.J. O'Brien. Cold Spring Harbor Laboratory: New York.

Pacora virus. Unclassified arthropod-borne virus. Isolated from mosquitoes in Panama.

Pacui virus. Family *Bunyaviridae*, genus

Phlebovirus. Isolated from rodents in Brazil and Trinidad.

Pahayokee virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from mosquitoes in Florida.

Palestina virus. Family *Bunyaviridae*, genus *Bunyavirus*.

palm mosaic virus. A possible *Potyvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

Palyam virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from mosquitoes in India. Australia and Nigeria.

pangola stunt virus. A *Phytoreovirus*.
Milne, R.G. (1977) CMI/AAB Descriptions of Plant Viruses No. 175.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 47. CRC Press: Boca Raton, Florida.

Panicum mosaic virus. A possible *Sobemovirus*.
Niblett, C.L. *et al.* (1977) CMI/AAB Descriptions of Plant Viruses No. 177.
Hull, R. (1988) **In** The Plant Viruses Vol. 3. p. 113. ed. R. Koenig. Plenum Press: New York.

Panonychus 'baculovirus'. Unclassified viruses, morphologically similar to NON-OCCLUDED BACULOVIRUSES have been observed in the mid gut epithelium of the European fruit tree red spider mite (*Panonychus ulmi*) and the citrus red mite (*Panonychus citri*). *P. citri* virus particles are enveloped (81 x 206 nm.) and contain a rod-shaped nucleocapsid (58 x 194 nm.). The virus occurs naturally in *P. citri* in California and Arizona where it significantly reduces mite populations.
Reed, D.K. (1981) **In** Microbial Control of Pests and Plant Diseases 1970-1980. p. 427. ed. H.D. Burges. Academic Press: London.

panzootic. Affecting many animals of different species over a wide area.

papaya mosaic virus. A *Potexvirus*.
Purcifull, D.E. and Hiebert, E. (1971) CMI/AAB Descriptions of Plant Viruses No. 56.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

papaya ringspot virus. A *Potyvirus*.
Purcifull, D.E. *et al.* (1984) CMI/AAB Descriptions of Plant Viruses No. 292.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

Papillomavirus. (Latin 'papilla' = nipple, pustule and Greek suffix '-oma'.) A genus in the family *Papovaviridae*. Consists of members isolated from man (nine types), cow (five types), deer, dog, goat, horse, rat and sheep.

Papovaviridae. (Sigla from PApilloma, POlyoma and VAcuolating agent (Latin 'papilla' = nipple, pustule; Greek suffix '-oma', used to form noun, denoting tumours and from Greek 'poly' = many.) A family of DNA viruses with non-enveloped icosahedral particles, 45-55 nm. in diameter which sediment at 240-300S and band in CsCl at 1.32 g/cc. There are 72 capsomeres in

skew arrangement in the capsid, which consists of 5-7 proteins with mw. 10-75 x 10^3 and also contains host cell histones. Each capsid contains one molecule of ds circular DNA, mw. 3-5 x 10^6. Replication is in the nucleus. Expression is divided into early and late events and host cell histones are incorporated into virions during maturation in nucleus. Viruses of each genus share a common antigen but each virus has a distinct surface antigen. Viral DNA of polyomaviruses which integrates in cellular chromosomes of transformed cells. There are two genera, *PAPILLOMAVIRUS* and *POLYOMAVIRUS*.

Papillomaviruses cause papillomas in several species including man, cattle, dogs, rabbits, horses, monkeys, sheep, goats and birds and are generally species-specific. Polyomaviruses usually cause silent infection in their natural hosts but most are oncogenic when injected into new-born animals.
Matthews, R.E.F. (1982) Intervirology **17**, 62.

papular stomatitis of cattle virus. *See* BOVINE PUSTULAR STOMATITIS VIRUS.

parainfluenza virus. Family *Paramyxoviridae*, genus *Paramyxovirus*. There are several different parainfluenza viruses (types 1-5) of human, sim-

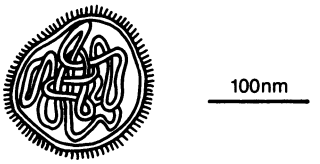
ian, bovine, canine, ovine and avian origin, causing febrile respiratory illness. Most can be grown in a variety of cell cultures.

parainfluenza virus type 1 murine. *See* SENDAI VIRUS.

Paramaribo virus. A strain of Venezuelan equine encephalomyelitis virus.

Paramushir virus. Unclassified arthropod-borne virus. Isolated from ticks in Eastern USSR. infesting guillemots and cormorants. Causes illness in suckling mice when injected i.c. Replicates in chick embryo fibroblasts and BHK cells.

Paramyxoviridae. (Greek 'para' = by the side of and 'myxa' = mucus.) A family of RNA viruses with three genera, *PARAMYXOVIRUS, MORBILLIVIRUS* (measles, rinderpest, canine distemper) and *PNEUMOVIRUS* (respiratory syncytial virus). The particles are pleomorphic, roughly spherical and are 150 nm. or greater in diameter. They have a lipid envelope with surface projections, 8 nm. long, and a nucleoprotein with well defined helical symmetry, 12-17 nm. in diameter and up to 1μm in length. The virus particle contains 5-7



proteins, mw. 35-200 x 10^3 and a variety of enzymes. The RNA is generally (–)-sense ssRNA, mw. 5-7 x 10^6 but some particles contain (+)-sense RNA. The virus enters the host cell by fusion of the viral envelope with the cell surface membrane. The RNA is transcribed to mRNAs on the nucleoprotein as the functional template. Replication of the RNA also occurs on nucleoprotein template. The host range of the family as a whole is wide but individual viruses may have narrow host ranges. Transmission is horizontal, mainly airborne.
Matthews, R.E.F. (1982) Intervirology **17**, 104.

Paramyxovirus. (Greek 'para' = by the side of and 'myxa' = mucus.) A genus in the family *Paramyxoviridae* containing members which infect man, birds, mice, cattle, sheep, monkeys and dogs.

Parana virus. Family *Arenaviridae*, genus *Arenavirus*. Isolated from rodents in Paraguay.

Parapoxvirus. (Greek 'para' = by the side of.) A genus in the subfamily *Chordopoxvirinae*. Consists of viruses of ungulates: bovine pustular stomatitis, chamois contagious ecthyma, milker's node and orf viruses.

paravaccinia virus. Synonym: MILKER'S NODE VIRUS.

Paroo River orbivirus. Family *Reovirus*, genus *Orbivirus*.

parrot paramyxovirus. Family *Paramyxoviridae*, genus *Paramyxovirus*.

Parry Creek rhabdovirus. Family *Rhabdoviridae*, unassigned to genus.

parsley latent virus. A probable plant *Rhabdovirus*, subgroup 1; aphid transmitted.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

parsley virus 5. A possible *Potexvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

parsnip mosaic virus. A *Potyvirus*.
Murant, A.F. (1972) CMI/AAB Descriptions of Plant Viruses No. 91.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

parsnip virus 3. A possible *Potexvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

parsnip yellow fleck virus. The parsnip strain is the type member of the *Parsnip Yellow Fleck Virus* group.
Murant, A.F. (1974) CMI/AAB Descriptions of Plant Viruses No. 129.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 235. CRC Press: Boca Raton, Florida.
Murant, A.F. (1988) **In** The Plant Viruses. Vol. 3. p. 273. ed. R. Koenig. Plenum Press: New York

parsnip yellow fleck virus group. (Named after type member). Genus of plant viruses with isometric particles about 30 nm. in diameter which sediment as two components, 152S (bottom (B) component containing 42% RNA) and 60S (top (T) component which lacks nucleic acid); CsCl banding densities are 1.52 g/cc for B and 1.30 g/cc for T component. The capsids are made up of

three major polypeptide species (mw. 31, 26 and 22.5 x 10^3). B component particles each contain one molecule of linear (+)-sense ssRNA of mw. 3.5 x 10^6. Replication is thought to occur in large cytoplasmic inclusion bodies adjacent to the nucleus. The host ranges are narrow. Viruses in this group are mechanically transmissible. In nature they are transmitted by aphids in the SEMI-PERSISTENT TRANSMISSION manner only in association with a helper virus.

Murant, A.F. (1988) **In** The Plant Viruses. Vol. 3. p. 273. ed. R. Koenig. Plenum Press: New York.

partial specific volume. The volume displaced when 1g solute (or 1kg in SI units) is added to an infinite volume of solvent. The symbol is v* which is formally given as:-

$$\bar{v} = \left(\frac{\delta V}{\delta g}\right) T_p$$

where V is volume of solution, g is mass of solute added at constant temperature and pressure. Measured in a pycnometer at constant pressure and temperature or can be estimated approximately if the % RNA of the virus is known. This estimate uses a $\bar{v}$ for RNA of 0.55 cm^3g^{-1} and for protein approximately 0.74 cm^3g^{-1} ; if the amino acid composition is known, the protein value can be derived more accurately from the weighted sum of $\bar{v}$ of individual amino acids *(see* AMINO ACID). $\bar{v}$ is also used in the calculation of molecular weight using the SVEDBERG EQUATION.

partition coefficient. The constant ratio of the concentration of a solute in the upper phase to its concentration in the lower phase when the solute is in equilibrium distribution between two liquid phases.

Partitiviridae. (from Latin 'partitus' = divided). Family of fungal viruses with divided dsRNA genomes containing two genera, the *PARTITIVIRUS* GROUP and the *PENICILLIUM CHRYSOGENUM* VIRUS GROUP.

Partitivirus group. (Type member *Gaeumannomyces graminis* virus 019/6-A). Genus of PARTITIVIRIDAE with bipartite dsRNA genome. Formed by the amalgamation of the *Gaeumannomyces graminis* virus groups I and II and the *Penicillium stoloniferum* virus group. The particles are isometric, 30-35 nm. in diameter, sediment at 101-145S and band in CsCl at 1.35-1.36 g/cc. The CAPSIDS are composed of a single coat protein species (mw. 42-73 x 10^3). The genome comprises two species of dsRNA (mw. 0.9-1.6 x 10^6 for each segment) encapsidated in separate particles. One RNA species encodes the coat protein, the other a polypeptide which is probably the virus polymerase.

Buck, K.W. (1986) **In** Fungal Virology. p. 1. ed. K.W. Buck. CRC Press: Boca Raton, Florida.

parts per million (p.p.m). Concentration of a solute in a solvent. It is equivalent to μg solute per g solvent.

Parvoviridae. (Latin 'parvus' = small.) A family of unenveloped DNA viruses comprising three genera, *PARVOVIRUS, DEPENDOVIRUS* and *DENSOVIRUS*. They have isometric particles 18-26 nm. in diameter, possessing icosahedral symmetry (and probably 32 capsomeres), sedimenting at 110-122S and banding at 1.39-1.42 g/cc in CsCl. The

particles have a core with a diameter of 14-17 nm. The capsid consists of three proteins and surrounds a single molecule of ssDNA, mw. 1.5-2.0 x 10^6. In some members the single strands are complementary and after extraction these form dsDNA. Replication is in the nucleus. One or more cellular functions are necessary for replication. Members of *Parvovirus* and *Dependovirus* genera have a wide host range but the host range of the insect virus genus (*Densovirus*) is restricted to *Lepidoptera* and probably *Diptera* and *Orthoptera*.

Matthews, R.E.F. (1982) Intervirology **17**, 72.

Parvovirus. (Latin 'parvus' = small.) A genus in the family *Parvoviridae*. Contains viruses infecting many different species. The most important

are those infecting cats (FELINE PANLEUCOPENIA VIRUS), mink (MINK ENTERITIS VIRUS) and dogs (CANINE PARVOVIRUS). Many molecular studies made on latent rat virus and minute virus of mice virus.

Paspalum striate mosaic virus. A possible *Geminivirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 33. CRC Press: Boca Raton, Florida.

passage. The infection of a host with a virus or a mixture of viruses and the subsequent recovery of the virus from that host (usually after one infection cycle). It is a procedure by which for example, a specific virus can be separated from a mixture of viruses or (through a series of infection cycles) a virus can be adapted to grow well in a host in which it originally grew poorly.

passiflora latent virus. A *Carlavirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.

passiflora yellow mosaic virus. A possible *Tymovirus*.
Hirth, L. and Girard, L. (1988) **In** The Plant Viruses. Vol. 3. p. 163. ed. R. Koenig. Plenum Press: New York.

passionfruit ringspot virus. A possible *Potyvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

passionfruit woodiness virus. A *Potyvirus*.
Taylor, R.H. and Greber, R.S. (1973) CMI/AAB Descriptions of Plant Viruses No. 122.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

passive haemagglutination. A serological test which can be used to detect a virus-specific ANTIBODY by coating red blood cells with viral antigen. If viral antibody is present in test samples, the red blood cells will agglutinate. *See* REVERSE PASSIVE HAEMAGGLUTINATION.
Herbert, W.J. (1967) **In** Handbook of Experimental Immunology. p. 720. ed. D.M. Weir. Blackwell Scientific Publications: Oxford.

Pata virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from mosquitoes in Central African Republic.

Patas virus. *See* CERCOPITHECID HERPESVIRUS 5.

patchouli (Pogostemon patchouli) mottle virus. A possible plant *Rhabdovirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

pathogen. An organism or virus which causes a disease.

pathogenesis related (PR) proteins Proteins which accumulate intracellularly in plant tissues in reaction to the hypersensitive response to viral or fungal infection or to certain chemical treatments.
Bol, J.F. *et al.* (1987) **In** Plant Resistance to Viruses. p. 72. Ciba Foundation Symposium No. 133. Wiley: Chichester.

pathogenicity. The ability of a pathogen to cause disease.

pathology. The study of diseases. For history *see* Dictionary of the History of Science (1981) ed. W.F. Bynum *et al.* Macmillan Press Ltd.: London.

Pathum Thani virus. Family *Bunyaviridae*, genus *Nairovirus*. Isolated from a tick in Thailand.

Patois virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from cotton rats and mosquitoes in Panama and Mexico.

PB viruses. Viruses isolated from the fungus *Penicillium brevicompactum* and other *Penicillium* spp.; reported also to grow in bacteria (e.g. *E. coli*). They include phage-like viruses, morphologically similar to members of the *MYOVIRIDAE*, *SIPHOVIRIDAE*, *PODOVIRIDAE* and *MICROVIRIDAE*.
Tikchonenko, T.I. (1978) **In** Comprehensive Virology. Vol. 12. p. 235. ed. H. Fraenkel-Conrat and R.R. Wagner. Plenum Press: New York.

PBCV-1 A virus from the green *Chlorella*-like alga *Paramecium bursaria*. It has isometric particles 150-190 nm. in diameter with the capsid comprising many protein species (mw. 10-135 x 10^3) containing dsDNA of about 330kbp. Particles

contain a lipid component essential for infectivity.
van Etten, J.L. *et al.* (1985) Virology **140**, 135.

PBS. Abbreviation for PHOSPHATE-BUFFERED SALINE.

pea early browning virus. A *Tobravirus.*
Harrison, B.D. (1973) CMI/AAB Descriptions of Plant Viruses No. 120.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 147. CRC Press: Boca Raton, Florida.

pea enation mosaic virus. Type member of the *Pea Enation Mosaic Virus* group.
Peters, D. (1982) CMI/AAB Descriptions of Plant Viruses No. 257.

Pea enation mosaic virus group. (Named after the type virus). Monotypic genus comprising a MULTICOMPONENT plant virus with isometric particles, 28 nm. in diameter, which sediment as two components, bottom (B) 112S and middle (M) 99S but form one band in CsCl (after fixation) at 1.42 g/cc. The capsid of B component has 180

subunits of coat protein mw. 22 x 10^3, that of M component 150 subunits. The components differ in stability, the particles of B being relatively stable, those of M being disrupted in neutral chloride salts. The genome comprises two species of linear, (+)-sense ssRNA, B component containing RNA-1 (mw. 1.7 x 10^6) and M component RNA-2 (mw. 1.3 x 10^6). RNA-1 contains the information for coat protein. The virus is transmitted by aphids in the PERSISTENT TRANSMISSION manner. It is readily mechanically transmitted but this often leads to loss of aphid transmissibility.
Matthews, R.E.F. (1982) Intervirology **17**, 166.
Peters, D. (1982) CMI/AAB Descriptions of Plant Viruses No. 257.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2, p. 39. CRC Press: Boca Raton, Florida.

pea leaf roll virus. *See* BEAN LEAF ROLL VIRUS.

pea mild mosaic virus. A *Comovirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 1. CRC Press: Boca Raton, Florida.

pea mosaic virus. A *Potyvirus*, closely related to *Bean Yellow Mosaic* and *Bean Common Mosaic Viruses.*
Taylor, R.H. and Smith, P.R. (1968) Aust. J. Biol. Sci. **21**, 429.

pea necrosis virus. *See* CLOVER YELLOW VEIN VIRUS.

pea seed-borne mosaic virus. A *Potyvirus.*
Hampton, R.O. and Mink, G.I. (1975) CMI/AAB Descriptions of Plant Viruses No. 146.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

pea streak virus. A *Carlavirus.* Synonym: ALFALFA LATENT VIRUS.
Bos, L. (1973) CMI/AAB Descriptions of Plant Viruses No. 112.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.

peach enation virus. An unclassified plant virus with isometric particles; occurs in Japan.
Doi, Y. *Personal communication.*

peach rosette mosaic virus. A *Nepovirus.*
Dias, H.F. (1975) CMI/AAB Descriptions of Plant Viruses No. 150.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

peach yellow leaf virus. A *Closterovirus*, occurs in Japan.
Doi, Y. *Personal communication.*

peach yellow mosaic virus. An unclassified plant virus with isometric particles; occurs in Japan.
Doi, Y. *Personal communication.*

peanut chlorotic streak virus. A possible *Caulimovirus.*
Iizuka, N. and Reddy, D.V.R. (1986) Tech. Bull. Trop. Ag. Res. Center, Japan, **21**, 164.

peanut clump virus. A *Furovirus.*
Thouvenal, J-C. and Fauquet, C. (1981) CMI/AAB Descriptions of Plant Viruses No. 235.
Brunt, A.A. and Shikata, E. (1986) **In** The Plant Viruses. Vol. 2. p. 305. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum

Press: New York.

peanut green mosaic virus. A *Potyvirus.*
Sreenivasulu, P. *et al.* (1981) Ann. Appl. Biol. **98**, 255.

peanut mottle virus. A *Potyvirus.*
Bock, K.R. and Kuhn, C.W. (1975) CMI/AAB Descriptions of Plant Viruses No. 141.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

peanut stripe virus. A *Potyvirus.*
Denski, J.W. and Lovell, G.R. (1985) Plant Disease **69**, 734.

peanut stunt virus. A *Cucumovirus.*
Mink, G.I. (1972) CMI/AAB Descriptions of Plant Viruses No. 92.
Francki, R.I.B. (1985) **In** The Plant Viruses. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

peanut yellow mottle virus. A *Tymovirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 117. CRC Press: Boca Raton, Florida.
Hirth, L. and Girard, L. (1988) **In** The Plant Viruses. Vol. 3. p. 163. ed. R. Koenig. Plenum Press: New York.

pear ringspot virus. An *Ilarvirus*, occurs in Japan.
Doi, Y. *Personal communication.*

peaton virus. Family *Bunyaviridae*, genus *Bunyavirus.*

Pecicilis mosaic virus. A *Potyvirus*, occurs in Japan.
Doi, Y. *Personal communication.*

PEG. Abbreviation for POLYETHYLENE GLYCOL.

pelargonium flower-break virus. A member of the *Carmovirus* group.
Hollings, M. and Stone, O.M. (1974) CMI/AAB Descriptions of Plant Viruses No. 130.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 235. CRC Press: Boca Raton, Florida.
Morris, T.J. and Carrington, J.C. (1988) **In** The Plant Viruses. Vol. 3. p. 73. ed. R. Koenig. Plenum Press: New York.

pelargonium leafcurl virus. A *Tombusvirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 181. CRC Press: Boca Raton, Florida.
Martelli, G.P. *et al.* (1988) **In** The Plant Viruses. Vol. 3. p. 13. ed. R. Koenig. Plenum Press: New York.

pelargonium line pattern virus. A member of the *Carmovirus* group.
Morris, T.J. and Carrington, J.C. (1988) **In** The Plant Viruses. Vol. 3. p. 73. ed. R. Koenig. Plenum Press: New York.

pelargonium vein clearing virus. A plant *Rhabdovirus*, subgroup 2.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

pelargonium zonate spot virus. An unclassified plant virus with isometric particles, 25-30 nm. in diameter, which sediment as three components (118, 90 and 80S) and band in CsCl at 1.35 g/cc. The capsids are composed of a single coat protein species (mw. 23 x 10^3) and contain two RNA species (mw. 1.25 and 0.95 x 10^6).
Gallitelli, D. *et al.* (1983) CMI/AAB Descriptions of Plant Viruses No. 272.

pellet. The material concentrated at the bottom of a centrifuge tube after centrifugation. *See* SUPERNATANT.

Penaeus 'baculovirus'. An occluded baculovirus (NUCLEAR POLYHEDROSIS VIRUS) isolated from the pink shrimp, *Penaeus duorarum* in the Gulf of Mexico. Virions consist of a single nucleocapsid (270 x 50 nm.) surrounded by an envelope. Particles are occluded within pyramidal-shaped occlusion bodies 0.5-20 μm in size. The polyhedrin has a mw. of 53 x 10^3 and cross-reacts immunologically with NPV polyhedrin from Lepidoptera, despite being almost twice the mw. Another occluded NPV which produces amorphous occlusion bodies has been detected in *P. monodon.* A putative NON-OCCLUDED BACULOVIRUS (310 x 72 nm.) was isolated from nuclei of infected mid gut tissue of *Penaeus japonicus* in Japan. The virus is a serious pathogen in intensive shrimp farming.
Couch, J.A. (1974) J. Invertebr. Pathol. **24**, 311.
Rohrmann, G.F. (1986) **In** The Biology of Baculoviruses. Vol. I. p. 203. ed. R.R. Granados and B.A. Federici. CRC Press: Boca Raton,

Florida.
Sano, T. *et al.* (1981). Abstr. 5th Internat. Congr. Virol. p. 297.

penetration. The second step in the initiation of infection in which the virus particle penetrates the cell surface. For viruses of animals it is an energy-dependent step and involves either translocation of the entire virus particle across the plasma membrane (e.g. POLIOVIRUS), PINOCYTOSIS or fusion of the virion envelope with the plasma membrane (e.g. ORTHO- and PARA-MYXOVIRUSES). Plant viruses probably enter through sites of mechanical damage. Some phages actively inject their nucleic acid through the host cell wall.

Penicillium brevicompactum virus. (PbV). A member of the *Penicillium chrysogenum virus group.*

Penicillium chrysogenum virus (PcV). Type member of the *Penicillium chrysogenum virus group.*

Penicillium chrysogenum virus group. (Named after the type member). A possible genus of the *PARTITIVIRIDAE*. Particles are isometric, 35-40 nm. in diameter and sediment at 145-150S. The capsid is composed of a single coat protein species (mw. 125 x 10^3). Three dsRNA species with mw. in the range 1.9-2.4 x 10^6 are encapsidated separately. The number of RNA segments required for replication is not known.
Buck, K.W. (1986) **In** Fungal Virology. p. 1. ed. K.W. Buck. CRC Press: Boca Raton, Florida

Penicillium cyaneo-fulvum virus (Pc-fV). A member of the *Penicillium chrysogenum virus group.*

Penicillium stoloniferum virus F (PsV-F). Possible member of the *Partitivirus group.*

Penicillium stoloniferum virus S (PsV-S). Member of the *Partitivirus group.*

pentamer. A group of five protein subunits which in the virus capsid form the vertices of an ICOSAHEDRON. *See* HEXAMER.

penton. Complex structures in the coat of ADENOVIRUSES comprising a PENTAMER base, a fibre and a knob.

Pepino latent virus. A *Carlavirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.

Pepino mosaic virus. A *Potexvirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

peplomer. Large, well-separated, petal- or knob-shaped glycoprotein SPIKES found, e.g. on the surface of CORONAVIRUS particles. They serve as antireceptors which bind the virion to the cell-surface receptors.

pepper mild mosaic virus. A *Potyvirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

pepper mild mottle virus. A *Tobamovirus.*
Brunt, A.A. (1986) **In** The Plant Viruses. Vol. 2. p. 283. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

pepper mottle virus. A *Potyvirus.*
Nelson, M.R. and Zitter, T.A. (1982) CMI/AAB Descriptions of Plant Viruses No. 253.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

pepper ringspot virus. A *Tobravirus*, originally known as the CAM (Campina) strain of TOBACCO RATTLE VIRUS.
Harrison, B.D. and Robinson, D.J. (1986) **In** The Plant Viruses. Vol. 2. p. 339. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

pepper severe mosaic virus. A *Potyvirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

pepper veinal mottle virus. A *Potyvirus.*
Brunt, A.A. and Kenton, R.H. (1972) CMI/AAB Descriptions of Plant Viruses No. 104.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

peptide. A compound of two or more amino acids joined by peptide bonds.

peptide bond. A chemical link formed by the reaction between the carboxylic acid group of one amino acid and the amino group of another thus uniting the carbon atom of one with the nitrogen atom of the other. *See* AMINO ACID for figure.

per os. (Latin = by, through the mouth). Usually refers to the method of transmission of a virus.

Perilla mottle virus. A *Potyvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

perinuclear. Situated in the region between the two membranes of the nucleus or close to the outer membrane. Certain RHABDOVIRUSES which are thought to bud through one nuclear membrane accumulate in the perinuclear space; members of the REOVIRIDAE replicate in the cytoplasm near the outer nuclear membrane.

periodic acid-Schiff's (PAS) reagent. A sensitive stain for glycoproteins. Frequently used for the detection of glycoproteins after SDS-gel electrophoresis.
Gordon, A.H. (1975) Electrophoresis of Proteins in Polyacrylamide and Starch Gels. North Holland/American Elsevier: Amsterdam.

permissive cells. Cells in which infection results in the production of infectious progeny virus.

Peromyscus virus. Family *Paramyxoviridae*, genus *Paramyxovirus*. Isolated from white-footed mice in Virginia, USA Kills suckling mice and hamsters injected i.c. and i.p. Grows in embryonated eggs and many different cell cultures.

peroxidase. An enzyme that catalyses reactions in which hydrogen peroxide is an electron acceptor. Used as a reporter molecule in diagnostic techniques such as ELISA.

persistence. The capacity of a virus to persist in a host for an extended time without inducing lysis.

persistent infection. An infection in which the virus does not induce lysis but reaches a form of equilibrium with the host. It is often associated with integration of the viral genome into the host genome. Three types of persistence have been distinguished: 1) the virus persists within the cell but at no time is shed to the outside. This is rare as it is an evolutionary dead-end for the virus; it has been shown for VISNAVIRUS in sheep and SSPE (MEASLES VIRUS) in humans; 2) the virus is shed to the outside sporadically, e.g. as a result of reactivation of HUMAN PAPOVAVIRUS in the kidney; 3) the virus is continually shed to the outside but with no lysis, e.g. LYMPHOCYTIC CHORIOMENINGITIS. *See* LATENT INFECTIONS.
Virus Persistence (1982) ed. B.W.J. Mahy *et al.* Cambridge University Press.

persistent transmission. The relationship between a virus or plant pathogenic mycoplasm and its arthropod (or nematode) vector which is characterised by the need for long acquisition feeds, frequently a latent period before the vector is able to transmit and then the vector being able to transmit for long periods (days to weeks). The virus has to pass through the vector's gut wall to the haemocoel and then accumulates in the salivary glands where it may or may not multiply. Also termed circulative transmission. *See* NON-PERSISTENT TRANSMISSION, SEMIPERSISTENT TRANSMISSION.

Peru tomato virus. Synonym: TOMATO (PERU) VIRUS.

peste des petits ruminants. Synonyms: KATA VIRUS, PSEUDORINDERPEST VIRUS. Family *Paramyxoviridae*, genus *Morbillivirus*. Causes a disease in sheep and goats in West Africa similar to rinderpest in cattle. However, cattle are not affected by this virus. There is pyrexia with nasal and ocular discharge, necrotic stomatitis, severe enteritis and pneumonia. There is high mortality. Replicates in a variety of cell cultures. Closely related structurally and antigenically to canine distemper, measles and rinderpest viruses. In fact, rinderpest vaccine will protect against the disease and the virus grows well enough in cattle to protect them against rinderpest.

Pestivirus. (Latin 'pestis' = plague.) A genus in the family *Togaviridae*. Contains several important disease agents including those causing mucosal disease of cattle, swine fever (hog cholera) and Border disease of sheep.

pestivirus diarrhoea virus. Synonym: BOVINE DIARRHOEA VIRUS, MUCOSAL DISEASE VIRUS.

Petri dish. A shallow glass or plastic dish with a loosely fitting overlapping cover used for

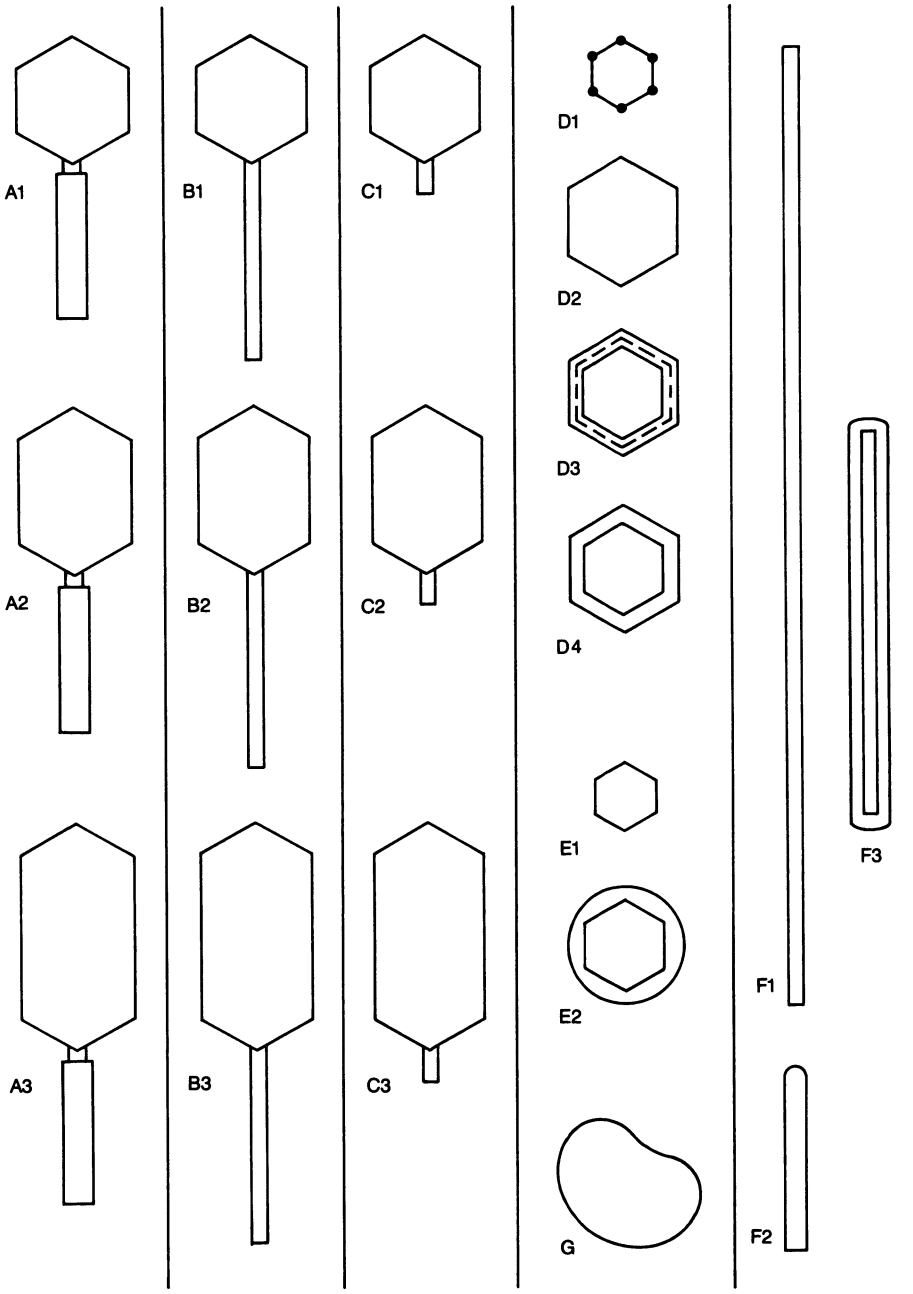
bacterial plate cultures and plant and animal tissue cultures. Named after Richard J. Petri (assistant to Dr. R. Koch) who invented the dish in 1887.

petunia asteroid mosaic virus. A *Tombusvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 181. CRC Press: Boca Raton, Florida.
Martelli, G.P. *et al.* (1988) **In** The Plant Viruses. Vol. 3. p. 13. ed. R. Koenig. Plenum Press: New York.

petunia vein clearing virus. A possible *Caulimovirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 17. CRC Press: Boca Raton, Florida.

phage. A general term used for viruses isolated from prokaryotes including bacteria, blue-green algae (cyanobacteria) and mollicutes (mycoplasma and spiroplasma). The viruses from these different host groups are termed bacteriophages, cyanophages and mycoplasmaphages respectively. The phages include a highly heterogeneous range of viruses which fall into four main morphological groups: tailed, cubic, rod-shaped (filamentous) and pleomorphic (*see* figure). These groups are further subdivided according to morphological and biochemical properties of the viruses as follows:

TAILED PHAGES:		
Morphotypes A1 to A3:	Tails long and contractile.	*Myoviridae* (type species T2 PHAGE)
Morphotypes B1 to B3:	Tails long and non-contractile.	*Siphoviridae* (type species λ PHAGE)
Morphotypes C1 to C3:	Tails short.	*Podoviridae* (type species T7 PHAGE)
CUBIC PHAGES: (Phages with cubic symmetry)		
Morphotype D1:	Small unenveloped phages containing ssDNA	*Microviridae* (type species ϕX174 PHAGE)
Morphotype D2:	Large unenveloped phages containing dsDNA.	Unclassified (e.g. SIL PHAGE)
Morphotype D3:	Large phages containing dsDNA and an internal lipid layer	*Corticoviridae* (type species PM2 PHAGE)
Morphotype D4:	Large phages containing dsDNA; double capsid structure and internal lipid.	*Tectiviridae* (type species PRD1 PHAGE)
Morphotype E1:	Small naked phages containing ssRNA.	*Leviviridae* type species MS2 PHAGE)
Morphotype E2:	Large isometric phages with segmented dsRNA genome and lipid envelope.	*Cystoviridae* (type ϕ6 PHAGE)
ROD-SHAPED OR FILAMENTOUS PHAGES (*Inoviridae*)		
Morphotype F1:	Long flexible rods containing ssDNA.	INOVIRUS (type species fd PHAGE)
Morphotype F2:	Short straight rods containing ssDNA.	PLECTROVIRUS (type species MVL51 PHAGE)
Morphotype F3:	Enveloped rigid rods of variable length containing dsDNA.	Unclassified (e.g.TTV1 PHAGE)
PLEOMORPHIC PHAGES (*Plasmaviridae*)		
Morphotype G:	Rounded phages with flexible envelope.	PLASMAVIRUS (type species L2 PHAGE)


Particles not to scale
A1
B1
C1
D1
D2
D3
D4
A2
B2
C2
E1
E2
F1
F3
A3
B3
C3
G
F2

A given phage type infects a limited range of susceptible hosts and the host range usually follows the established taxonomic divisions among prokaryotes. While some phages attack only one or a few closely-related host strains, others may infect an entire species, or several related species and occasionally genera (e.g. among the enterobacteria). Where a phage adsorbs to a pilus rather than the cell wall, the susceptibility of the cell is governed by the availability of pili. Some pili are determined by plasmid-coded functions (e.g. F-plasmid codes for F pilus). Where these plasmids have a broad host-range, the phage host range is equally broad.

Unfortunately, there has been a marked tendency to give each new phage isolate a name regardless of the properties of the virus. At present there is no widespread agreement on nomenclature and this has led to a proliferation of names including many identical names for different phages. Descriptions of phage families, genera and type species are given in alphabetic order in Appendix F which includes approximately 2000 phage isolates from bacteria, cyanobacteria and mycoplasma that have been studied in detail, and/or listed in recent attempts to classify the viruses.
Ackermann, H.W. *et al.* (1978) Adv. Virus Res. **23**, 2.
Reanney, D.C. and Ackermann, H.W. (1982) Adv. Virus Res. **27**, 206.
Ackermann, H.W. and Du Bow, M.S. (1987) Viruses of Prokaryotes. CRC Press: Boca Raton, Florida.

phage typing. Subdivision of bacteria into 'phage types' according to their susceptibility to host-range specific phages. Phage typing is a useful epidemiological tool for tracing the origin of infection in epidemics by further subdividing the biotypes or serotypes of the bacterial hosts, e.g. in outbreaks of food poisoning by Staphylococci, *Salmonella* etc.
Kasatiya, S.S. and Nicolle, P. (1978) In Handbook of Microbiology. Vol. 2. p. 699. ed. Laskin, A.I. and Lechevalier, M.E. CRC Press: Boca Raton, Florida.

phagocyte. An amoeboid cell that engulfs foreign material. Also known as macrophage. They are part of the defence system of vertebrates against infection.

phagocytosis. A mechanism by which certain animal cells such as protozoans and phagocytes engulf and carry particles into the cytoplasm. One of the mechanisms by which viruses can enter cells.

Phalaenopsis chlorotic spot virus. A possible plant *Rhabdovirus;* nonenveloped particles.
Francki, R.I.B. et al. (1985) In Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

phase-contrast microscope. A compound microscope that has an annular diaphragm in the front focal plane of the substage condenser and a phase plate at the rear focal plane of the objective to make visible, differences in phase or optical path in transparent or reflecting media.

phenotype. The outward, observable characteristics of an organism determined by its genotype but modified by the environment. For history see Dictionary of the History of Science (1981) ed. W.F. Bynum et al. Macmillan Press Ltd.: London.

phenotypic mixing. Synonym: genomic masking. A process by which an individual progeny from a mixed viral infection contains structural proteins derived from both viruses or has the genome of one virus encapsidated in the structural proteins of the other; this latter situation is termed genomic masking or transcapsidation.
Boettiger, D. (1979) Prog. med. Virol. 25, 37.
Zavada, J. (1976) Arch. Virol. 50, 1.

Phialophora sp. with lobed hyphobia (Phialophora radicola var. radicola) virus 2-2-A. (PrV-2-2-A). A probable member of the *Partitivirus group.*

phlebotomus fever virus. Synonym: sandfly FEVER VIRUS, HUNDSKRANKHEIT VIRUS. Family *Bunyaviridae*, genus *Phlebovirus*. Causes fever in man with pain in the eyes, head, back and limbs. There is also gastrointestinal involvement and leucopenia. Isolated in several parts of the world including Italy, Egypt, Iran and Pakistan. The sandfly is the vector. Grows in human, mouse and hamster kidney cell cultures. Occurs as at least two distinct antigenic types.

Phlebovirus. (Phlebotomine vectors: from Greek 'phlebos' = vein.) A genus in the family *Bunyaviridae* containing many viruses, of which the best known are RIFT VALLEY FEVER VIRUS and SANDFLY FEVER VIRUS.

phleum mottle virus. Synonym: COCKSFOOT MILD MOSAIC VIRUS.
Hull, R. (1988) **In** The Plant Viruses. Vol. 3. p. 113. ed. R. Koenig. Plenum Press: New York.

Phnom-Penh bat virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from bats in Kampuchia.

phosphatase. An enzyme that catalyses the hydrolysis and synthesis of phosphoric acid esters and the transfer of phosphate groups from phosphoric acid to other compounds. Used in various gene cloning techniques to remove the 5′-terminal phosphate from a nucleic acid.

phosphate-buffered saline. A solution used in cell culture and serology. It consists of 8.00g NaCl, 0.20g KCl, 0.20g KH_2PO_4 0.15g Na_2HPO_4 per litre (pH 7.2).

phosphodiester bond. Link formed between the nucleotides of polynucleotide chains by covalent bonding of the phosphoric acid with the 3′-hydroxyl group of one ribose or deoxyribose molecule and the 5′-hydroxyl group of the next ribose or deoxyribose ring. *See* NUCLEIC ACID.

phospholipase. An enzyme that catalyses the hydrolysis of a phospholipid, e.g. lecithinase that acts on lecithin. Used in the study of viral membranes.

phosphoprotein. A protein that has had one or more amino acids phosphorylated by a PROTEIN KINASE. The amino acids most commonly phosphorylated are serine, threonine and tyrosine. Examples of phosphoproteins are the *GAG* GENE PRODUCT in many RETROVIRUSES and the coat protein of CAULIFLOWER MOSAIC VIRUS.

phosphorylation. The esterification of a compound with phosphoric acid.

phosphotungstic acid. A NEGATIVE STAIN used for electron microscopy. It consists of dodecatungstophosphoric acid dissolved in water to give a 1-2% solution and adjusted to about pH 7 with NaOH.

photo-Shootur virus. *See* CAMEL POX VIURUS.

photon correlation spectroscopy. A technique which allows the study of movements of macromolecules, organelles and cells from their scattering of laser light. Can be used in the estimation of DIFFUSION COEFFICIENTS of virus particles.
Steer, M.W. *et al.* (1985) **In** Advances in Botanical Research, Vol. 11, p. 1. ed. J.A. Callow and H.W. Woolhouse. Academic Press: London.

photoreactivation. The enzymic repair of DNA damaged by UV-light. The cellular enzymes involved are activated by exposure to long wavelength light.

Phthorimaea operculella granulosis virus. BACULOVIRUS (Subgroup B) isolated from the potato tuber moth, *P. operculella*, and evaluated in field trials in Australia as a selective biological control agent for the homologous host. Laboratory tests have demonstrated that larvae can develop resistance to the virus under high selection pressure.
Briese, D.T. and Mende, H.A. (1983) Bull. ent. Res. **73**, 1.

phycovirus. Synonym: CYANOPHAGE.

Physalis mild chlorosis virus. A possible *Luteovirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 137. CRC Press: Boca Raton, Florida.

Physalis mosaic virus. A *Tymovirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 117. CRC Press: Boca Raton, Florida.
Hirth, L. and Girard, L. (1988) **In** The Plant Viruses. Vol. 3. p. 163. ed. R. Koenig. Plenum Press: New York.

Physalis vein blotch virus. A possible *Luteovirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 137. CRC Press: Boca Raton, Florida.

Phytocryptic virus 'group'. Synonym: CRYPTOVIRUS 'GROUP'.

Phytoreovirus group. (Greek 'phytos' = plant and reovirus). (Type member WOUND TUMOUR VIRUS). One of the two genera of plant viruses in the family *REOVIRIDAE*; also known as plant reovirus subgroup 1. The particles are isometric, with an outer shell 70 nm. in diameter and an inner core 59 nm. in diameter; they sediment at 510S. The outer shell is made up of four polypeptide

species mw. 130, 96, 36 and 35 x 10^3 and the inner core of three polypeptides mw. 160, 118 and 58 x 10^3. Particles contain 12 species of dsRNA with mw. ranging from 3.0 to 0.3 x 10^6. Host range in plants varies between members from wide to narrow. Virus particles are found in most cell types; there are characteristic cytoplasmic inclusion bodies (VIROPLASMS). Phytoreoviruses also multiply in their insect vectors, cicadellid leafhoppers, which transmit them in the PERSISTENT TRANSMISSION manner. They are not transmitted mechanically.
Matthews, R.E.F. (1982) Intervirology **17**, 85.

PIB. Abbreviation sometimes used for 'polyhedral inclusion bodies' referring to the polyhedra of nuclear and cytoplasmic polyhedrosis viruses.

Pichinde virus. Family *Arenaviridae*, genus *Arenavirus*. Isolated from rodents, mosquitoes and mites in Colombia.

Picornaviridae. (Acronym from Old Spanish 'pico' = micro micro, RNA.) A family of four genera of viruses with small isometric particles 22-30 nm. in diameter which sediment between 140-165S and band in CsCl at 1.33-1.45 g/cc (depending on genus). The four genera, *APHTHOVIRUS*, *CARDIOVIRUS*, *ENTEROVIRUS* and *RHINOVIRUS* are distinguished by the stability of virions below pH7, their CsCl banding density, possession of a polycytidylic acid tract, base composition of RNA and clinical manifestations in susceptible hosts. They have no envelope or core, nor any surface projections. The capsids are T=1, the structural subunit comprising one molecule of each of the four major capsid polypeptides; these are derived by cleavage of the structural protein precursor (mw. 80-100 x 10^3). Each capsid contains one molecule of infectious (+)-sense ssRNA, mw. *c.*2.5 x 10^6, *c.*7,500 nucleotides and has a 5′ VPg (mw. *c.*2,400) and 3′ polyadenylic acid sequence. The cardio- and aphtho-viruses have a polycytidylic acid tract near the 5′ end. Most picornaviruses can be grown in cell culture.

Replication is in the cytoplasm and is via two distinct partially double-stranded replicative intermediates, one using (+)-RNA and the other (–)-RNA RNA as template; the polymerase is virus-coded. Virus mRNA is translated to give a large (mw. *c.*210,000) precursor polyprotein which is cleaved to give the functional proteins. The natural host range of most picornaviruses is host-species specific except for Coxsackie B5 virus, EMC virus and aphthoviruses.
Matthews, R.E.F. (1982) Intervirology **17**, 129.

Pieris spp. granulosis virus. A large number of closely-related genotypic variants of this BACULOVIRUS (GV) have been isolated from larvae of the cabbage white butterflies *Pieris* (= *Artogeia*) *rapae* and *P. brassicae*. The virus has been extensively tested as a selective control agent for these pests; large quantities of the virus are used for this purpose in the People's Republic of China for *P. rapae* control. Some protein sequence homology (53%) has been detected between the granulin component of *P. brassicae* GV and the polyhedrin of the prototype baculovirus, *Autographa californica* nuclear polyhedrosis virus.
Crook, N.E. (1986) J. gen. Virol. **67**, 781.

pig cytomegalovirus. Family *Herpesviridae*, subfamily *Betaherpesvirinae*, genus *Murine Cytomegalovirus* group. Causes rhinitis and sneezing in young piglets, often leading to death. Can be grown in pig cell cultures.

pig poxvirus. *See* SWINE POXVIRUS.

pigeon pea (Cajanus cajan) proliferation virus. A possible plant *Rhabdovirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

pike fry disease rhabdovirus. *See* RED DISEASE OF PIKE VIRUS.

pilus. Filamentous non-motile appendage found on many gram-negative bacilli. Somatic pili (several hundred per cell) function in bacterial adherence, while conjugation between bacteria depends on the one or two sex pili on male cells. Sex pili are coded for by conjugative plasmids (*see* F PLASMID, I PLASMID, R PLASMID). Certain bacteriophages adsorb to specific sex pili and their host range is therefore restricted to bacteria containing the appropriate plasmid.
Hardy, K. (1986) Bacterial Plasmids. 2nd. ed.

Thomas Nelson: Walton-upon-Thames.

pine sawfly nuclear polyhedrosis virus. *See* *NEODIPRION SERTIFER* NUCLEAR POLYHEDROSIS VIRUS.

pineapple chlorotic leaf streak virus. A possible plant *Rhabdovirus*, subgroup 2.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

Pinellia mosaic virus. A *Potyvirus*, occurs in Japan.
Doi, Y. *Personal communication.*

pink eye virus. *See* EQUINE ARTERITIS VIRUS.

pinocytosis. A form of active transport of water and dissolved or suspended molecules across a cell membrane involving the internalisation of a fluid-filled vacuole. A common mode of entry for many animal viruses into cells. *See* VIROPEXIS.

pinwheel inclusions. CYTOPLASMIC INCLUSION BODIES comprising sheets of virus-coded protein which form characteristic structures in cells of plants infected with POTYVIRUSES.
Christie, R.G. and Edwardson, J.R. (1977) Light and Electron Microscopy of Plant Virus Inclusions. Florida Ag. Expt. Sta. Monograph, No. 9.

PIPES. Piperazine-N,N′-bis-2-ethanesulphonic acid (mw. 302.36). A biological buffer, $pK_a = 6.8$, used in the pH range 6.2 - 8.2.
Good, N. *et al.* (1966) Biochemistry **5**, 467.

Piry virus. Family *Rhabdoviridae*, genus *Vesiculovirus*. Isolated from an opposum in Brazil. Laboratory infection of man is common, resulting in fever with myalgia, anthralgia and soreness of abdomen. Very similar structurally to vesicular stomatitis virus but the antigenic relationship is tenuous.

Pisaura viruses. Unclassified viruses observed in the nuclei of hepatopancreatic cells of the spider *P. mirabilis* including particles resembling a NON-OCCLUDED BACULOVIRUS (nucleocapsids 300 x 30 nm., enveloped), an adeno-like virus (80 nm. in diameter, DNA mw. 12×10^6) and a small isometric virus (40-45 nm. in diameter).
Bergoin, M. *et al.* (1982) **In** Invertebrate Pathology and Microbial Control. p. 523. Proc. IIIrd Internat. Colloq. Invertebr. Pathol.

Pisum rhabdovirus. A plant *Rhabdovirus*, subgroup 1.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

pittosporum vein yellowing virus. A plant *Rhabdovirus*, subgroup 2.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

Pixuna virus. Family *Togaviridae*, genus *Alphavirus*. Isolated from rodents and mosquitoes in Brazil. Related antigenically to Venezuelan equine encephalomyelitis virus.

plant reovirus group. Term sometimes used collectively for the PHYTOREOVIRUS and FIJIVIRUS groups.
Boccardo, G. and Milne, R.G. (1984) CMI/AAB Descriptions of Plant Viruses No. 294.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1, p. 47. CRC Press: Boca Raton, Florida.

plant rhabdovirus group. A group of the *Rhabdoviridae* family consisting of plant viruses with characteristic BACILLIFORM or bullet-shaped particles which have many similarities to rhabdoviruses from vertebrates and insects; many of them replicate in their insect vectors. The basic shape, structure and molecular biology, where known, resemble closely the vertebrate rhabdoviruses. However, there are some members which appear to lack the outer membrane. The group is divided into two subgroups. Members of subgroup 1 (type member LETTUCE NECROTIC YELLOWS VIRUS) mature in association with the endoplasmic reticulum and accumulate in vesicles in the cytoplasm. Members of subgroup 2 (type member POTATO YELLOW DWARF VIRUS) tend to have wider particles than those of subgroup 1; they bud at the inner nuclear membrane and accumulate in the perinuclear space. Most plant rhabdoviruses have a narrow host range. However, as most are not sap-transmissible and for many no vector is known, it is uncertain that all the named plant rhabdoviruses are distinct. The natural vectors are plant-sucking arthropods (aphids, leafhoppers, plant bugs, mites, etc). Virus-vector relationships are very specific and in all cases are of the PERSISTENT TRANSMISSION type. For several members of the group there is direct evidence for virus multiplication in the vector.

Peters, D. (1981) CMI/AAB Descriptions of Plant Viruses No. 244.

Plantago mottle virus. A *Tymovirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 117. CRC Press: Boca Raton, Florida.
Hirth, L. and Girard, L. (1988) **In** The Plant Viruses. Vol. 3. p. 163. ed. R. Koenig. Plenum Press: New York.

Plantago severe mottle virus. A *Potexvirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

Plantago virus 4. A possible *Caulimovirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 17. CRC Press: Boca Raton, Florida.

Plantago virus X. A *Potexvirus.*
Hammond, J. and Hull, R. (1983) CMI/AAB Descriptions of Plant Viruses No. 266.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

plantain 6 virus. A possible member of the *Carmovirus* group.
Hammond, J. (1981) Plant Path. **30**, 237.
Morris, T.J. and Carrington, J.C. (1988) **In** The Plant Viruses. Vol. 3. p. 73. ed. R. Koenig. Plenum Press: New York.

plantain (Plantago lanceolata) mottle virus. A possible plant *Rhabdovirus.*
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

plaque. The area or 'hole' formed in a lawn of cells due to infection with a virus. In infections with bacteriophage VIRULENT PHAGE form clear plaques in bacterial lawns whereas TEMPERATE PHAGE form turbid plaques due to the survival and division of bacteria in which the phage has become LYSOGENIC.

plaque assay. An assay in which the concentration of infective particles in a virus solution is recorded as the number of plaques induced on a lawn of bacteria or cells. It can also be used to distinguish between different strains or distinct viruses by the features of the plaque.

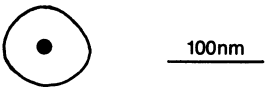
plaque mutants. Mutants which produce PLAQUES differing in size or appearance from those produced by the wild-type virus.

plaque neutralisation test (plaque reduction test). A method for either identifying a virus (or serotype) or for titrating an antiserum by analysing the inhibitory effect of antibodies on the infectivity of the virus using the plaque assay.

plaque picking. The selection of individual plaques which are considered to be formed by a single infection event. Clones of a virus can thus be selected and further studied.

plaque-forming units (pfu). The number of PLAQUES formed per unit of volume or weight of a virus suspension.

Plasmaviridae. (Greek 'plasma' = shaped product). A family of phages containing a single genus (PLASMAVIRUS) of pleomorphic viruses with a circular supercoiled dsDNA genome (PHAGE morphotype G).



Plasmavirus. dsDNA phages with pleomorphic enveloped particles which have a broad size range (52-125 nm. in diameter). The virion is a nucleoprotein condensation bounded by a lipoprotein membrane. The viral genome is a molecule of circular supercoiled dsDNA (mw. 7.8 x 10^6). Virus infection is non-lytic; mature virus is released by budding and the genome is maintained as a PROPHAGE in the host chromosome. The type species is L2 PHAGE isolated from the mycoplasma *Acholeplasma laidlawii.*
Maniloff, J. *et al.* (1982) Intervirology **18**, 177.

plasmid. An extrachromosomal DNA element (usually of a bacterium) which is capable of independent replication. Plasmids vary in size from fewer than one kbp to more than 300kbp and in copy number from one to more than 100 per cell. Most plasmids are covalently closed dsDNA circles but some are linear molecules. The information that plasmids carry includes antibiotic resistance and toxin expression.

plasmid vector. A plasmid which is used for CLONING 'foreign' DNA. The plasmid is often manipulated to contain desirable features such as

resistance to two or more antibiotics, ability to produce multiple copies, single-cutting restriction enzyme sites and strong promoters.

plating efficiency (efficiency of plating). The number of PLAQUES divided by the total number of virions in the inoculum. Used to quantify relative efficiencies with which cells can be infected and support viral replication.
Ellis, E.L. and Delbruck, M. (1939) J. gen. Physiol. **22**, 365.

Playas virus. Family *Bunyaviridae*, genus *Bunyavirus*.

Plectrovirus. Genus of phages (*Inoviridae*) characterised by rod-shaped virions with one rounded end (bullet-shaped) *c.*84 x 14 nm. from *Acholeplasma* or 250 x 13 nm. from *Spiroplasma*. The genome is a molecule of circular ssDNA (mw. 1.5 x 10^6). During infection, phages are extruded through the host membrane and the host survives infection. The type species is MVL51 PHAGE, isolated from *Acholeplasma laidlawii*. Other members and possible members are listed in Appendix F.
Maniloff, J. *et al.* (1982) Intervirology **18**, 177.

pleioblastus mosaic virus. A *Potyvirus*, occurs in Japan.
Doi, Y. *Personal communication.*

pleomorphic phages. Enveloped, dsDNA-containing phages without apparent capsid structure (PLASMAVIRUS).

Plodia interpunctella granulosis virus. BACULOVIRUS (Subgroup B) isolated from the Indian meal moth, *P. interpunctella*. The biochemical properties of the virus resemble those of other baculoviruses (*see* BACULOVIRUS, GRANULOSIS VIRUS, NUCLEAR POLYHEDROSIS VIRUS). The virus has been used with some success in trials as a selective biological control agent for its insect host.
Tweeten, K.A. *et al.* (1981) Microbial. Rev. **45**, 379.

plum line pattern virus *See* AMERICAN PLUM LINE PATTERN VIRUS, DANISH PLUM LINE PATTERN VIRUS.

plum pox virus. A *Potyvirus*.
Kegler, H. and Schade, C. (1971) CMI/AAB Descriptions of Plant Viruses No. 70.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

plus strand. *See* POSITIVE-SENSE STRAND (POSITIVE STRAND).

PM2 phage. Type species of the *CORTICOVIRUS* genus, isolated from *Alteromonas espejiana*. Virus particles are icosahedral, about 60 nm. in diameter, non-enveloped and have brush-like spikes on the vertices. The particles are double-shelled, the internal and external shells separated by a lipid bilayer (predominantly phosphatidyl glycerol). Virions have a mw. of about 50 x 10^6, sediment at 230S and have a buoyant density in CsCl of 1.28 g/cc. Infectivity is sensitive to lipid solvents. There are four structural proteins, the spike protein (mw. 43 x 10^3), the outer shell protein (mw. 26 x 10^3), and two internal proteins (mw. 12.5 and 4.7 x 10^3) which behave as proteolipids. The virus contains polynucleotide pyrophosphorylase. The genome is a single molecule of circular supercoiled DNA (mw. 5.8 x 10^6). Infection causes lysis of the host.
Mindich, L. (1978) **In** Comprehensive Virology. Vol. 12. p. 271. ed. H. Fraenkel-Conrat and R.R. Wagner. Plenum Press: New York.
Ackermann, H.W. and Dubow, M.S. (1987). Viruses of Prokaryotes. CRC Press: Boca Raton, Florida.

PM2 phage group. Vernacular name for *CORTICOVIRUS*.

PMSF (phenyl methanesulphonyl fluoride, α-toluenesulphonyl fluoride). An inhibitor of PROTEASES. Used in studies on viral proteins where proteolysis is to be avoided.

pneumonia of mice virus. Family *Paramyxoviridae*, genus *Pneumovirus*. Causes a latent or mild respiratory infection of laboratory mice. Serial passage of lung tissue in mice activates the virus to cause accumulation of mononuclear cells around the bronchi and blood vessels. Grows in hamster kidney cell cultures and in BHK21 cells.

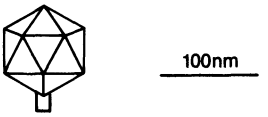
Pneumovirus. (Greek 'pneuma' = breath.) A genus in the family *Paramyxoviridae*. Consists of viruses causing respiratory syncytial disease in man and pneumonia in cattle, turkeys and mice.

Poa semi-latent virus. A *Hordeivirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant

Viruses. Vol. 2. p. 133. CRC Press: Boca Raton, Florida.

pock assay. An assay in which the concentration of infective particles in a virus solution is estimated by the number of lesions (pocks) it induces on the chicken egg allantoic membrane. Used for the assay of e.g. VACCINIA VIRUS.

Podoviridae. (Greek 'pous, podos' = foot). Family of virulent or temperate phages with short (*c.*20 nm. non-contractile tails (phage morphotypes C1-C3; *see* PHAGE) which contain linear dsDNA. The short tail may carry a base plate and tail fibres (dependent on virus strain). A large



number of phage isolates with these properties have been obtained from bacteria, cyanobacteria and mycoplasmas (*see* Appendix F). The family at present contains a single genus (the T7 PHAGE GROUP), although other isolates will probably be assigned to several genera in future. The type species is T7 PHAGE.
Ackermann, H.W. *et al.* (1984) Intervirology **22**, 181.

Poikilovirus. A proposed genus in the family *Herpesviridae*. It consists of SUID HERPESVIRUS 1 (PSEUDORABIES VIRUS), equid herpesvirus 1 and HUMAN HERPESVIRUS 3.

poinsettia mosaic virus. A possible *Tymovirus*.
Koenig. R. *et al.* (1986) AAB Descriptions of Plant Viruses No. 311.
Hirth, L. and Girard, L. (1988) **In** The Plant Viruses. Vol. 3. p..163. ed. R. Koenig. Plenum Press: New York.

pokeweed mosaic virus. A *Potyvirus*.
Shepherd, R.J. (1972) CMI/AAB Descriptions of Plant Viruses No. 97.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

Pol gene. Gene which codes for a POLYMERASE.

PolA mutant. A mutant of a bacterium which affects the DNA repair enzyme, DNA-dependent DNA polymerase II.

polar mutant. A mutant having effects on genes transcribed downstream, e.g. NONSENSE MUTANT, TRANSPOSON insertions.

poliomyelitis virus. Family *Picornaviridae*, genus *Enterovirus*. A common infection of the gastro-intestinal tract which is usually silent. When the central nervous system is infected there is damage to the anterior horn cells and motor paralysis which can be severe. Causes similar disease in chimpanzees and monkeys when injected. Grows in monkey kidney and HeLa cells. Both the Salk (inactivated) and Sabin (attenuated) vaccines have been successful in controlling the disease in developed countries.

poly(A). Polyadenylic acid. Most eukaryotic messenger RNAs have a stretch of up to 300 nucleotides of adenosine at the 3′ end. The mRNAs of many eukaryotic viruses are polyadenylated as are the encapsidated RNAs of some viruses (e.g. PICORNAVIRUSES, COMOVIRUSES).

poly(A) polymerase. An enzyme which adds adenylate residues to the 3′ end of RNA.

polyacrylamide gel electrophoresis (PAGE). Electrophoresis in a gel composed of polyacrylamide which is made by cross-linking acrylamide usually with N,N′-methylene-bis-acrylamide; other cross-linkers can be used, e.g. bis acrylylcystamine which can be broken down by reducing agents thus solubilising the gel. Polymerisation is activated by the addition of a source of free radicals (usually ammonium persulphate or riboflavin) which, in turn, activates the TEMED. The TEMED acts as an electron carrier to activate the acrylamide monomer which then reacts with an unactivated monomer to begin the polymer chain elongation. The elongating polymer chains are randomly crosslinked by bis, resulting in a complex 'web' polymer with a characteristic porosity which depends upon the polymerisation conditions and the monomer concentrations. Polyacrylamide gel electrophoresis is used for the separation of nucleic acid or protein molecules according to their molecular size and thus in estimating relative molecular weights. In the case of proteins an ionic detergent, such as SODIUM DODECYL SULPHATE, is usually added to denature the protein and provide a uniform charge per unit molecular weight. The pore size is varied by changing the concentration of acrylamide and the extent of cross-linking.

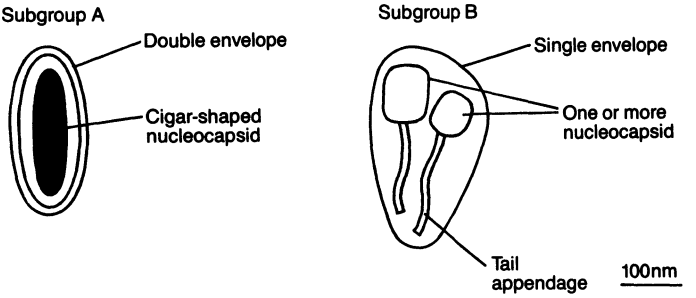
polyadenylation. The addition of adenylate residues usually to the 3 end of RNA molecules.

poly(C). Polycytidylic acid. Some PICORNAVIRUSES have a stretch of about 100 nucleotides of cytosine in the genomic RNA.

polycistronic. A nucleic acid coding for more than one CISTRON.

polyclonal antibody. A preparation containing antibodies against more than one EPITOPE of an antigen. When an antigen is injected into a warm-blooded animal, antibodies are produced by different cell types against the various antigenic sites, the relative amounts being controlled by the antigenicity of the sites. *See* MONOCLONAL ANTIBODY.

Polydnaviridae. (Greek 'poly' = many, DNA virus.) A family containing a single genus, *POLYDNAVIRUS*. The particles contain multiple supercoiled dsDNAs of variable mw. ranging from approximately 2 to 25 x 10^6 with an aggregate genome mw. of about 80-170 x 10^6. Earlier classified as subgroup D of *Baculovirus* genus. Stoltz, D.B. *et al.* (1984) Intervirology **21**, 1.



Polydnavirus. Genus of enveloped DNA-containing viruses with rod-shaped nucleocapsids isolated from parasitic hymenopteran insects (parasitoids) of the families Ichneumonidae and Braconidae. Two subgroups have been proposed based on morphological and other properties. Subgroup A includes viruses with fusiform (cigar-shaped) nucleocapsids of uniform length. Each nucleocapsid is surrounded by two unit-membrane envelopes, though in some members (e.g. a virus from *Glypta* sp.), more than one nucleocapsid may be enclosed within the envelopes. Virions are structurally complex, containing 20-30 polypeptides. The genome is multipartite (polydisperse) circular supercoiled dsDNA made up of a large number of molecules ranging in size from about 1.7 to 6.2 x 10^6. Viruses of this type have been found predominantly in parasitoids of the family Ichneumonidae. The type species is *CAMPOLETIS SONORENSIS* VIRUS. Another well-studied member is *HYPOSOTER EXIGUAE* VIRUS. Subgroup B includes viruses with rod-shaped nucleocapsids, variable in length (30-100 nm.), usually carrying tail appendages. A single envelope surrounds one or more nucleocapsids. Particles contain at least 18 polypeptides and a polydisperse dsDNA genome with as many as 15 different molecules ranging in size from 2-25 x 10^6. Viruses of this type have been found predominantly in parasitoids of the family *Braconidae*. No type species has been defined, though *APANTELES MELANOSCELUS* VIRUS is representative of the group. In both subgroups each virus isolate (as defined by the host wasp species) contains a distinct spectrum of DNA molecules which is constant for one individual wasp species. It is not yet clear how the different-sized DNA molecules are distributed among the virus particles. Cross-reacting antigenic determinants are present on viruses within each subgroup but no serological cross-reactions have been detected between subgroups. All viruses of this unusual group have been associated with parasitoid Hymenoptera. They replicate in the ovaries of female parasitoids and are injected (during oviposition) into the host of the parasitoid. The viruses appear to function by preventing encapsulation of the parasitoid egg and hence in promoting successful parasitism. Association of these viruses with female parasitoid Hymenoptera is probably the rule rather than the exception. As there may be >100,000 species of parasitoid Hymenoptera, this implies the existence of huge numbers of polydnavirus strains. There is no formal nomenclature for each virus although, conventionally, they have been named after the parasitoid host from which they were first isolated.

Stoltz, D.B. *et al.* (1984) Intervirology **21**, 1.
Stoltz, D.B. and Vinson S.B. (1979) Adv. Virus Res. **24**, 125.

polyethylene glycol (PEG). A polymer with the general formula $HOCH_2(CH_2OCH_2)_xCH_2OH$ which is available in molecular weights ranging from 200 to 20,000 (abbreviated PEG 200, PEG 20,000). PEG is a coacervate and will bind water; thus it can be used to concentrate solutions by withdrawing water from them. PEG 4000 and 6000 are commonly used to promote cell or protoplast fusion and to facilitate the uptake of DNA in transformation, especially of yeast. PEG 6000 is also used in precipitating viruses or DNA.

polyheads. Phage heads of normal diameter but exaggerated length due to mutations (e.g. in T-EVEN PHAGE, the lack of glycoprotein 20) or to growing the phage in the presence of certain amino acid analogues, e.g.L-canavavine.
Cummins, D.J. and Bolin, R.W. (1976) Bact. Rev. **40**, 314.
Showe, M.H. and Kellenberger, E. (1975) Symp. Soc. Gen. Microbiol. **25**, 407.

polyhedral protein. *See* POLYHEDRIN.

polyhedrin. The matrix protein which comprises the major component of the occlusion bodies produced during nuclear polyhedrosis (NPV) and cytoplasmic polyhedrosis (CPV) virus infections. Sometimes used as a generic term to include the matrix protein of granulosis (GV) virus occlusion bodies (*see* GRANULIN). NPV polyhedrin is a protein of mw. about 29×10^3 and is alkali soluble. During NPV virus infection, polyhedrin is produced in larger amounts than any other viral protein. Because of the high level of expression, the polyhedrin gene region has been used for the construction and high-level expression of foreign genes (*see* BACULOVIRUS EXPRESSION VECTOR). 5′ flanking sequences for polyhedrin genes contain a highly conserved sequence of 12 nucleotides with the consensus sequence AATAAGTATTTT beginning 20-70 nucleotides upstream from the protein initiation codon, followed by an AT-rich sequence believed to be important in the regulation of high-level expression. Polyhedrin is synthesised late in virus infection when it occludes virus particles within the large para-crystalline occlusion bodies. NPV polyhedrins and GV granulins are highly conserved and contain related sequences reflected in antigenic properties and amino acid sequences. Lepidopteran NPV polyhedrins appear closely-related to one another and demonstrate 85-90% amino acid homology. Granulins are related but include additional cysteine residues and an N-terminal insertion not found in lepidopteran NPV polyhedrin. Polyhedrins from hymenopteran NPVs appear inter-related but have only limited relatedness to lepidopteran polyhedrins. Polyhedrin from a dipteran NPV (*Tipula paludosa* NPV), though similar in size, shows no serological or N-terminal amino acid sequence relatedness. CPV polyhedrins are of similar size to NPV polyhedrins but are unrelated to them as judged by serological comparisons or N-terminal amino acid sequence. Nonetheless, the protein serves the same function in all occluded viruses, forming a protective crystal around virus particles, allowing the virus to remain viable for many years outside the insect host (*see* also SPHEROIDIN).
Rohrmann, G.F. (1986) J. gen. Virol. **67**, 1499.

polyhedron. (plural polyhedra) OCCLUSION BODY produced during infection with NUCLEAR POLYHEDROSIS OR CYTOPLASMIC POLYHEDROSIS VIRUSES, containing numerous virions surrounded by crystalline protein matrix (POLYHEDRIN).

polyhedrosis. Virus disease of invertebrates (generally insects) larvae characterised by breakdown of tissues and the presence of polyhedral OCCLUSION BODIES. *See* NUCLEAR POLYHEDROSIS VIRUS, CYTOPLASMIC POLYHEDROSIS VIRUS.

poly(I):poly(C). A synthetic duplex of polyriboinosinic acid and polycytidylic acid. Induces INTERFERON.

poly L-lysine. *See* POLY L-ORNITHINE.

poly L-ornithine. A polycation used to induce the uptake of virus or nucleic acid by protoplasts or cells. The function is considered to be twofold, to give the inoculum the correct charge for association with the plasma membrane and to damage the plasma membrane in such a way as to allow virus entry. Poly L-lysine is used for this purpose less frequently.
Watts, J.W. *et al.* (1981) Ciba Found. Symp. **80**, 56.

polylysogeny. A condition where bacterial strains are LYSOGENIC for several different phages. *See* LYSOGEN.

polymerase. An enzyme which catalyses the formation of RNA or DNA by the addition of ribonucleotide or deoxyribonucleotide triphosphates. *See* DNA-DEPENDENT DNA POLYMERASE, DNA-DEPENDENT RNA POLYMERASE, RNA-DEPENDENT RNA POLYMERASE, REVERSE TRANSCRIPTASE.

polymerase chain return (PCR). The selective amplification of DNA by repeated cycles of a) heat denaturation of the DNA, b) annealing of two oligonucleotide primers that flank the DNA segment to be amplified and c) the extension of the annealed primers with the heat-insensitive *Tag* DNA polymerase. Can be used to produce probes for virus diagnosis and in the amplification of low copy number sequences.
Saibi, R.K. *et al.* (1988) Science **239,** 487.

polynucleotide kinase. An enzyme (e.g. encoded by PHAGE T4) which phosphorylates the 5′-OH termini of RNA or DNA polynucleotide chains. Used to label nucleic acids at the 5′ terminus.

polynucleotide ligase. Generic term for enzymes which catalyse the linking or repair of either DNA or RNA strands. *See* DNA LIGASE, RNA LIGASE.

polyoma virus. Family *Papovaviridae*, genus *Polyomavirus*. Causes a natural infection of laboratory mice and rats without any signs of disease. However, when injected into new-born mice or hamsters it is highly oncogenic. Grows in mouse embryo cell cultures and transforms hamster cell cultures.

Polyomavirus. (Greek 'poly' = many and suffix '-oma'.) A genus in the family *Papovaviridae*. Members have been isolated from man, mouse, rabbit, hamster and several species of monkey.

polypeptide. A chain of amino acids linked together by peptide bonds obtained by synthesis or by partial hydrolysis of a protein. Can also refer to the primary structure of a protein, e.g. polypeptide chain.

polyploid virus. A virus, the particles of which contain a variable number of genomes. The number of genomes per particle depends on factors such as host cell and cultural conditions but is independent of the number of genomes in the infecting particles. Polyploidy is found in viruses of various groups including MYXOVIRUSES, HERPES VIRUS, VISNAVIRUS and NUCLEAR POLYHEDROSIS VIRUSES.
Simon, E.H. (1972) Prog. med. Virol. **14,** 36.

polyprotein. A large precursor protein subsequently cleaved to give two or more functional proteins, e.g. the primary translation product of PICORNAVIRUS RNA is a polyprotein which is cleaved to give the structural and non-structural proteins.

polyribosome. A structure comprising several ribosomes attached to messenger RNA during the translation of that RNA.

polysome. *See* POLYRIBOSOME.

Pongola virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from mosquitoes in several countries in Africa. Kills new-born mice on injection. Sheep, cattle and donkeys are the natural hosts. Antibodies are found in man but no disease is reported.

Ponteves virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from a tick in Southern France.

Poovoot virus. Family *Reoviridae*, genus *Orbivirus*.

poplar mosaic virus. A *Carlavirus*.
Biddle, P.G. and Tinsley, T.W. (1971) CMI/AAB Descriptions of Plant Viruses No. 75.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.

POPOP. 1,4-bis-2-(5-phenyloxazolyl)benzene. A secondary solute used in SCINTILLATION FLUIDS to shift wavelength to enhance radioisotope detection by liquid scintillation counting.

porcine adenovirus. Family *Adenoviridae*, genus *Mastadenovirus*. Found in digestive tract of pigs but apparently causes no disease. Grows in a wide range of cell cultures.

porcine enterovirus. Synonym: TESCHEN DISEASE VIRUS, TALFAN DISEASE VIRUS, PORCINE POLIOMYELITIS VIRUS. Family *Picornaviridae*, genus *Enterovirus*. Usually present in intestinal tract without causing disease. However, virulent strains can cause diarrhoea or fever, convulsions,

encephalomyelitis and paralysis. There are several antigenic variants. The virus grows in pig kidney cell cultures.

porcine haemagglutinating encephalitis virus. Synonym: VOMITING AND WASTING DISEASE VIRUS. Family *Coronaviridae*, genus *Coronavirus*. Causes encephalomyelitis in pigs with high mortality in young animals and stunted growth in older animals. Virus grows in primary pig kidney cell cultures.

porcine parvovirus. Family *Parvoviridae*, genus *Parvovirus*. A natural infection of pigs. May be the cause of prenatal death without maternal disease. Has been grown in cultures of kidney tissue from normal animals.

porcine transmissible gastroenteritis virus. Family *Coronaviridae*, genus *Coronavirus*. Occurs worldwide, causing a fatal disease of young pigs, following diarrhoea, vomiting and dehydration. Older pigs have diarrhoea but survive. Replicates in pig kidney cell cultures.

porcine type C oncovirus. Family *Retroviridae*, subfamily *Oncovirinae*, genus *Type C Oncovirus* group, sub-genus *Mammalian Type C Oncovirus*. Isolated from a cell line grown from a lymph node of a leukaemic pig.

Portillo virus. Family *Arenaviridae*, genus *Arenavirus*. Isolated from children in Buenos Aires with haemolytic-uraemic disease. Closely related to Junin virus.

positive-sense strand (positive strand). For RNA it is the strand which functions as the messenger (mRNA). For DNA it is the strand with the same sequence as the mRNA.

post-transcriptional cleavage. Cleavage of RNA into functional units, usually MONOCISTRONIC mRNAS. *See* SUBGENOMIC RNA.

post-transcriptional processing. Alterations to the structure of a mRNA after it has been transcribed from either DNA or RNA. These include CAPPING, addition of POLY(A) to the 3′ end, SPLICING and METHYLATION.

post-translational cleavage. Cleavage of a POLYPROTEIN into functional proteins. It can be effected by either virus-coded or host proteases.

potassium phosphotungstate. A NEGATIVE STAIN for electron microscope samples. Usually made up as a 2% solution of phosphotungstic acid with the pH adjusted to 6.8 with potassium hydroxide.
Brenner, S. and Horne, R.W. (1953) Biochim. Biophys. Acta **34**, 103-110.

potato 14R virus. A *Tobamovirus*.
Brunt, A.A. (1986) **In** The Plant Viruses. Vol. 2. p.183. ed. M.H.V. van Regenmortel and H.Fraenkel-Conrat. Plenum Press: New York.

potato aucuba mosaic virus. A possible *Potexvirus*.
Kassanis, B. and Govier, D.A. (1972) CMI/AAB Descriptions of Plant Viruses No. 98.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

potato black ringspot virus. A *Nepovirus*.
Salazar, L.F. and Harrison, B.D. (1979) CMI/AAB Descriptions of Plant Viruses No. 206.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

potato leaf roll virus (PLRV). A *Luteovirus*. Probably originated in South America and now found everywhere potatoes are grown. Causes leafrolling and stunting. It is one of the most important viruses of potatoes.
Harrison, B.D. (1984) CMI/AAB Descriptions of Plant Viruses No. 291.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 137. CRC Press: Boca Raton, Florida.
Casper, R. (1988) **In** The Plant Viruses. Vol. 3. p. 235. ed. R. Koenig. Plenum Press: New York.

potato moptop virus. A *Furovirus*.
Harrison, B.D. (1974) CMI/AAB Descriptions of Plant Viruses No. 138.
Brunt, A.A and Shikata, E. (1986) **In** The Plant Viruses. Vol. 2. p. 305. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

potato spindle tuber viroid. A VIROID, 359 nucleotides.
Diener. T.O. and Raymer, W.B. (1971) CMI/AAB Descriptions of Plant Viruses No. 66.
Diener. T.O. (1987) **In** The Viroids. ed. T.O. Diener. p. 221. Plenum Press: New York.

potato virus A. A *Potyvirus*.
Bartels, R. (1971) CMI/AAB Descriptions of Plant Viruses No. 54.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

potato virus M. A *Carlavirus*.
Wetter, C. (1972) CMI/AAB Descriptions of Plant Viruses No. 87.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.

potato virus S. A *Carlavirus*.
Wetter, C. (1971) CMI/AAB Descriptions of Plant Viruses No. 60.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.

potato virus T. A member of the *Capillovirus* group.
Salazar, L.F. and Harrison, B.D. (1978) CMI/AAB Descriptions of Plant Viruses No. 187.

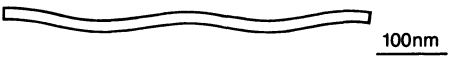
potato virus V. A *Potyvirus*.
Jones, R.A.C. and Fribourg, C.E. (1986) AAB Descriptions of Plant Viruses No. 316.

potato virus X. Type member of the *Potexvirus* group.
Bercks, R. (1970) CMI/AAB Descriptions of Plant Viruses No. 4.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

potato virus Y. Type member of the *Potyvirus* group. One of the most important viruses of potatoes.
de Bokx, J.A. and Huttinga, H. (1981) CMI/AAB Descriptions of Plant Viruses No. 242.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

potato yellow dwarf virus. Type member of subgroup 2 of the plant *Rhabdoviruses*; transmitted by leafhopper.
Black, L.M. (1970) CMI/AAB Descriptions of Plant Viruses No. 35.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

Potexvirus group. (Sigla of potato X from the type member POTATO VIRUS X). Genus of plant viruses with flexuous rod-shaped particles, 470-580 nm. long and 13 nm. wide which sediment at 115-130S and band in CsCl at 1.31 g/cc. The coat



protein subunits (mw. 18-23 x 10^3) are arranged in a helix with a pitch of 3.4 nm. Each particle contains one molecule of linear, (+)-sense ssRNA (mw. 2.1 x 10^6) which has a CAP at the 5′ terminus; in some members SUB-GENOMIC RNAS may be encapsidated. The host range of individual members is narrow. Virus particles are found in most cell types where they aggregate to form cytoplasmic inclusion bodies. Potexviruses are readily transmitted mechanically and by contact. There are no known natural vectors.
Matthews, R.E.F. (1982) Intervirology **17**, 156.
Koenig. R. and Lesemann, D-E. (1978) CMI/AAB Descriptions of Plant Viruses No. 200.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 159. CRC Press: Boca Raton, Florida.

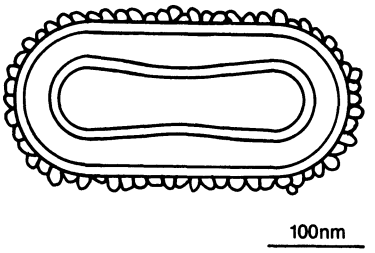
Potyvirus group. (Sigla of potato Y from the type member POTATO VIRUS Y). Genus of plant viruses with flexuous particles, 680-900 nm. long and 11 nm. wide which sediment at 150-160S and band in CsCl at 1.31 g/cc. The coat protein subunits

(mw. 32-36 x 10^3) are arranged in a helix with pitch of 3.4 nm. Each particle contains one molecule of linear (+)-sense ssRNA (mw. 3.0-3.5 x 10^6); the 3′ end of the RNA of some viruses has a poly(A) tract. The host range of individual members is narrow. Potyviruses occur in most cell types where they are characterised by cylindrical or conical proteinaceous inclusions (virus coded, mw. 70 x 10^3) which appear as pinwheels in transverse section. Nuclear inclusions (virus coded, mw. 49 x 10^3) are induced by some members. Potyviruses are easily mechanically transmitted. Most are transmitted by aphids in the NON-PERSISTENT TRANSMISSION manner requiring a virus-coded transmission factor (mw. 53-58 x 10^3). Some possible members are transmitted by whiteflies, mites or fungi.
Matthews, R.E.F. (1982) Intervirology **17**, 152.

Hollings, M. and Brunt, A.A. (1981) CMI/AAB Descriptions of Plant Viruses No. 245.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

Powassan virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from a human case of fatal encephalitis in Ontario, Canada, and from ticks in some parts of the USA. New-born mice can be infected experimentally. Antibodies are present in squirrels and chipmunks in Ontario.

Poxviridae. (Old English 'poc, pocc' = pustule, ulcer.) A family of several subfamilies and genera of viruses with large, brick-shaped or ovoid particles, 300-450 x 170-260 nm. with an external coat containing lipid and tubular or globular protein structures and a core, which contains the genome. There are more than 30 structural proteins and several viral enzymes concerned with nucleic acid synthesis and processing. There is about 3-4% by weight of lipid and carbohydrate. Each particle contains one molecule of dsDNA, mw. 85-240 x 10^6. Replication occurs in the cytoplasm with inclusion bodies. Genetic recombination occurs within genera; non-genetic reactivation occurs both within and between genera. The natural host range is narrow. Transmission is by several routes including airborne, fomites, direct contact and mechanically by arthropods.



Matthews, R.E.F. (1982) Intervirology **17**, 42.

PPO. 2,5-diphenyloxazole. A primary solute (scintillator) used in SCINTILLATION FLUIDS. Its optimum concentration in toluene is 7g/l.

PRD1 phage. TECTIVIRUS type species (*Tectiviridae*) isolated from *Pseudomonas*. VIRIONS are unenveloped icosahedral, 65 nm. in diameter (PHAGE morphotype D4). Particles are characterised by a double capsid structure. The outer capsid is a rigid shell, 3 nm. thick, surrounding a flexible inner coat, 5-6 nm. thick, containing lipid. Particles sediment at about 390S and have a buoyant density in CsCl of 1.28 g/cc. 16-18 proteins have been detected in the virion and the genome is a single piece of linear dsDNA (14.7 kbp) with long inverted terminal repeats and covalently bound at its 5′ ends to a protein. Infectivity is sensitive to organic solvents. Virions adsorb to pili of bacteria harbouring certain wide host-range drug-resistant plasmids and hence the virus host range includes a wide range of gram-negative bacteria. The host cell is lysed by infection.

Granados, D.D.and Ito, J. (1987) J. Virol. **61**, 594.

PRD1 phage group. Vernacular name for *TECTIVIRUS*.

precipitation reaction. The formation of a visible precipitate when adequate quantities of antigen and antibody are allowed to combine. It is the basic reaction which has contributed to the development of immunochemistry as a quantitative science. The precipitate is formed by a lattice of antigen and antibody molecules which grows in size. The precipitate will only form when the concentrations of antigen and antibody are within a certain range of ratios; it can be inhibited by excess of either. *See* AGGLUTINATION, RADIAL IMMUNODIFFUSION, RADIOIMMUNOPRECIPITATION, SINGLE RADIAL DIFFUSION TEST.

precipitin test. *See* IMMUNOPRECIPITATION, PRECIPITATION REACTION.

Preserve. Trials product of the nuclear polyhedrosis virus of the pine sawfly, *Neodiprion sertifer*, produced in 1986 by MicroGeneSys, West Haven, Connecticut, USA.

Pretoria virus. Family *Bunyaviridae*, genus *Nairovirus*. Isolated from a tick in South Africa.

Pribnow box. A nucleotide sequence found in prokaryotic promoters about 10 bp upstream of the start of transcription. It has the consensus sequence:

5′ T A T A A T G 3′
-12 -11 -10 -9 -8 -7 -6
nucleotides to the start of transcription.

See TATA BOX.

primary culture. The establishment of cells in culture from tissue. The organised tissue needs

dissociation into single cells usually by various hydrolytic enzymes (e.g. pronase or trypsin). It does not include cultures started from explants of tumours developed by injecting cultured cells into animals.
Kruse, P.F. and Patterson, M.K. (1973) Tissue Culture, Methods and Applications. Academic Press: New York.

primase. An enzyme which synthesises the RNA primers for DNA synthesis on a DNA template. *See* OKAZAKI FRAGMENTS.

primer. Small fragment of nucleic acid with a free 3′-hydroxyl group necessary for the initiation of DNA and, sometimes, RNA synthesis. *See* PRIMASE.

primula mosaic virus. A possible *Potyvirus*.
Francki, R.I.B. *et al.* (1985) **In** Atlas of Plant Viruses. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

prion. (Sigla from proteinaceous infectious (particle)). Term used for the pathogens which induce some neurological diseases of vertebrates, e.g. scrapie disease of sheep and goats. It was considered at the time the term was introduced that the infectious agent was a protein, a very controversial concept. There is considerable uncertainty as to the causal agent of these diseases.
Diener, T.O. (1987) Cell **49**, 719.

probe. A specific sequence of DNA or RNA used to detect complementary sequences by hybridisation. The probe has reporter groups, e.g. radioactive LABEL, BIOTIN, by which successful hybridisation can be detected. Also used as a verb to describe the act of hybridisation.

probit analysis. A statistical method which involves the transformation of dose-response data represented as percentages or proportions to probits. This has the effect of changing the normal sigmoid curve characteristic of this type of data into a straight line by stretching the linear scale on which the percentages or proportions are measured. Probits are often used in the analysis of biological assays and to make changes in series of percentages or proportions more readily comparable, e.g. a reduction in percent mortality from 99% to 98% indicates a doubling of the number of survivors while a drop from 51% to 50% is less spectacular and likely to be less important. Tables are available which give the probit transformation directly.
Fisher, R.A. and Yates, F. (1963) Statistical Tables for Biological, Agricultural and Medical Research. Oliver and Boyd Ltd.: Edinburgh.
Finney, D.J. (1971) Probit Analysis. 3rd edition. Cambridge University Press.

procapsid. A viral capsid without nucleic acid considered to be a stage in virion formation. Found, for example, in the synthesis of POLIOVIRUS particles.
Jacobson, M. and Baltimore, D. (1968) J. mol. Biol. **33**, 369.

productive infection. Infection of a cell in which complete virus particles are formed.

progressive pneumonia virus. Family *Retroviridae*, subfamily *Lentivirinae*. Causes a chronic pulmonary disease in sheep, with gradual loss of weight. There is a proliferation of lymphocytes in the lungs and thickening of interalveolar septa. Very similar to Maedi virus. Spread by contact.

prokaryote, prokaryotic. Organisms which have a genome of a single circular dsDNA free in the cytoplasm and not in an organelle. e.g. nucleus. Prokaryotes are divided into the true bacteria (eubacteria), the archaebacteria and the blue-green algae (cyanobacteria).

promoter. A region of DNA, usually upstream of a coding sequence which binds RNA polymerase and directs the enzyme to the correct transcriptional start site. As well as the defined sequences, e.g. PRIBNOW BOX, TATA BOX, there are upstream and sometimes downstream sequences which attenuate or modulate transcription.

pronase. A non-specific proteolytic enzyme isolated from the bacterium *Streptomyces griseus*.

prophage. The genome of a phage which is perpetuated in the host cell by integration into the host chromosome or by plasmid formation. *See* TEMPERATE PHAGE.

protease. A generic term for an enzyme which cleaves a polypeptide chain.

protein. (Greek 'protos' = first, as chief constituent of living matter.) A class of high molecular weight polymer compounds composed of a vari-

ety of α-amino acids joined by peptide bonds.

protein A. A protein, found on the surface of the cells of certain *Staphylococcus aureus* strains, which has the ability to bind strongly to the Fc portion of an antibody molecule when that antibody is bound to an antigen. When protein A is labelled, e.g. with ^{125}I or a fluorescent molecule, it can be used to detect antibody-antigen complexes in various immunological tests.

protein kinase. Enzyme which catalyses the PHOSPHORYLATION of proteins usually in the presence of cyclic AMP or cyclic GMP. There are three main groups, protein-serine, protein-threonine and protein-tyrosine kinases which esterify phosphate to different amino acids.

proteolytic cleavage. The cleavage of a protein at specific site(s), e.g. the cleavage of a polyprotein to yield structural proteins.

protomers. Protein subunits which form a CAPSOMERE.

protoplast. A microbial or plant cell from which the cell wall has been removed, usually enzymatically. They are used for transformation and, in the case of plant cells, for studying the synchronous replication of viruses.

provirus. A virus genome integrated into the cell genome or into a plasmid in which it replicates. The viral DNA is thus passively replicated by the host machinery.

prune dwarf virus. An *Ilarvirus*.
Fulton, R.W. (1970) CMI/AAB Descriptions of Plant Viruses No. 19.
Francki, R.I.B. (1985) **In** The Plant Viruses. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

Prunus necrotic ringspot virus. An *Ilarvirus*.
Fulton, R.W. (1970) CMI/AAB Descriptions of Plant Viruses No. 5.
Francki, R.I.B. (1985) In The Plant Viruses. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

Prunus virus S. A *Carlavirus*, occurs in Japan.
Doi, Y. *Personal communication.*

Pseudoplusia includens icosahedral virus. Unclassified RNA virus isolated from *P. includens*; some physicochemical similarities with viruses of the *Tetraviridae* (*Nudaurelia* β virus group). Virions are isometric, 40 nm. in diameter; they sediment at 190S and have a buoyant density in CsCl of 1.33 g/cc. The viral genome is ssRNA (mw. 1.9 x 10^6) and particles contain a single structural polypeptide (mw. 55 x 10^3) somewhat smaller than the protein size recorded for acknowledged members of the *TETRAVIRIDAE*. The virus is not serologically related to two tetraviruses isolated from *Trichoplusia ni* and *Antheraea eucalypti*.
Chao, Y.C. *et al.* (1983) J. gen. Virol. **64**, 1835.

Pseudoplusia includens picornavirus. Unclassified small RNA virus (a possible INSECT PICORNAVIRUS) isolated from the armyworm, *Pseudoplusia includens*. Virions are isometric, 25 nm. in diameter, sediment at 178S and contain three major structural proteins (mw. 30, 31 and 34 x 10^3). The genome is ssRNA (mw. 3.3 x 10^6). Serologically-related to CRICKET PARALYSIS VIRUS.
Chao, Y.C., *et al.* (1986) J. Invertebr. Pathol. **47**, 247.

pseudorabies virus. *See* AUJESZKY'S DISEASE VIRUS.

pseudorecombinant. A virus produced by the *in vitro* mixing of segments of nucleic acid of two (closely related) viruses with fragmented or MULTIPARTITE GENOMES. Used as a method for mapping the genes encoded on the nucleic acid segments of plant viruses, e.g. BROMOVIRUSES. *See* REASSORTMENT.

pseudorinderpest virus. *See* AUJESZKY'S DISEASE VIRUS.

pseudotype. The genome of one virus enclosed in the capsid or outer coat of another resulting from a mixed infection.

PTA. Abbreviation for PHOSPHOTUNGSTIC ACID.

Puchong virus. Unclassified arthropod-borne virus. Isolated from mosquitoes in Malaysia.

Pueblo Viejo virus. Family *Bunyaviridae*, genus *Bunyavirus*.

puffinosis. A disease of possible viral aetiology causing blistering of the feet of the Manx Shearwater (*Puffinus puffinus*). Epizootic among fledglings on Skomer and Skokholm Islands off

the coast of Wales.

pulmonary adenomatosis virus of sheep. Family *Retroviridae*, subfamily *Oncovirinae*. Causes a pulmonary disease of sheep in which there are adenocarcinomas which may metastasise.

pulse-chase. An experimental method in which a radioactively-labelled product is added to cells or a cell extract for a short period (pulse) and followed by a large excess of unlabelled product (chase) to prevent further significant incorporation of radioactivity. The course of metabolism of the labelled product is then studied.

Punta Salinas virus. Family *Bunyaviridae*, genus *Phlebovirus*. Isolated from man in Panama and Colombia. It causes fever with myalgia and enlarged liver and spleen.

purine. A heterocyclic compound containing fused pyrimidine and imidazole rings; adenine and guanine are the purine components of nucleic acids. *See* NUCLEIC ACID.

puromycin. A broad spectrum antibiotic produced by a strain of *Streptomyces*. It has the composition $C_{22}H_{29}O_5N_7$.

pustular dermatitis of camels virus. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Parapoxvirus*. Causes pustular dermatitis in camels.

pyrimidine. A heterocyclic organic compound containing nitrogen atoms at positions 1 and 3. *See* NUCLEIC ACID.