

C

C value. The amount of DNA in the haploid genome of a eukaryotic cell. Typical values are: bacteria 0.005 pg/cell; yeast 0.009 pg/cell; higher plants 10-50 pg/cell; vertebrates 1-10 pg/cell.

C3 spiroplasmavirus group. Proposed genus of phages isolated from *Spiroplasma*, which have short tails and resemble members of the *Podoviridae*. Proposed type member is phage SVC3. Maniloff, J. *et al.* (1982) *Intervirology* **18**, 177.

C-type virus particles. Particles of a morphologically distinct group of RNA viruses often seen in association with cells in leukaemic tissues. They have a diameter of 90-110 nm. with a central core and a lipoprotein envelope covered with knob-like projections 8 nm. in diameter. The core appears to have CUBIC SYMMETRY and consists of an outer layer of ring-like subunits 6 nm. in diameter forming a hexagonal pattern and an inner membrane 3 nm. thick. The majority of RETROVIRUSES have C-type particles. *See* A-, B-, D-TYPE VIRUS PARTICLES.

Cabassou virus. Family *Togaviridae*, genus *Alphavirus*.

cacao necrosis virus. A *Nepovirus*. Kenton, R.H. (1977) CMI/AAB Descriptions of Plant Viruses No. 173. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

cacao swollen shoot virus. Type member of the *Cacao Swollen Shoot Virus* group. Important virus of cacao in West Africa. Brunt, A.A. (1970) CMI/AAB Descriptions of Plant Viruses No. 10. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 235. CRC Press: Boca Raton, Florida.

Cacao swollen shoot virus 'group'. (Named

after type member, CACAO SWOLLEN SHOOT VIRUS). Unofficial group of plant viruses with BACILLIFORM particles 80-180 nm. long and 23-30 nm. in diameter; the particle dimensions vary between viruses. The particles are found in the cytoplasm. These viruses have narrow host ranges. Vectors



of members of this group include aphids (SEMI-PERSISTENT TRANSMISSION), leafhoppers and mealybugs.

Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 237. CRC Press: Boca Raton, Florida.

Cacao virus. Family *Bunyaviridae*, genus *Phlebovirus*. Isolated from *Lutzomyia* sp. in Panama.

cacao yellow mosaic virus. A *Tymovirus*. Brunt, A.A. (1970) CMI/AAB Descriptions of Plant Viruses No. 11. 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.

Cache Valley virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated in several states in the USA and Jamaica. Mosquito-borne. Antibodies found in many species including man but not known to cause disease.

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

cactus virus X. A *Potexvirus*. Bercks, R. (1971) CMI/AAB Descriptions of Plant Viruses No. 58.

34 caesium chloride density gradient centrifugation

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

caesium chloride density gradient centrifugation. Method for separating molecules or viruses according to their density. Sedimentation ceases when the molecules reach the position in the gradient which is the same as their own buoyant density. See ISOPYCNIC GRADIENT.

Caimito virus. Family *Bunyaviridae*, genus *Phlebovirus*. Isolated from the fan fly *Lutzomyia ylephylator* in Panama.

calf diarrhoea virus. See CALF ROTAVIRUS.

calf rotavirus. Synonym: CALF DIARRHOEA VIRUS. Family *Reoviridae*, genus *Rotavirus*. Causes acute enteritis and diarrhoea. Can be grown in calf cell cultures. Related serologically to other rotaviruses.

Caliciviridae. (Latin 'calix' = cup, goblet.) A family of RNA viruses, roughly spherical in shape with a diameter of 35 nm., sedimenting at *c.*180S and banding in CsCl at 1.37 g/cc. They have no envelope or core but possess a unique



100nm

morphology. Negatively stained preparations show dark cup-shaped depressions. Each capsid contains 180 copies of one protein, mw. 65-70 x 10³ and one molecule of infectious (+)-sense ssRNA mw. *c.*2.8 x 10⁶ with a VPg at the 5' end and a 3' polyadenylic acid sequence. Replication is complex; genome size ssRNA, two smaller ssRNAs (mw. 0.7 and 1.1 x 10⁶) and a partially dsRNA are found in infected cells. The capsid protein is the major virus-induced protein. Virions mature in cytoplasm. Caliciviruses have been found in pigs, cats, sea lions and human infants. Transmission is probably mechanical. Matthews, R.E.F. (1982) *Intervirolgy* 17, 133.

Calicivirus. Latin 'calix' = cup or goblet.) Only genus of the family *Caliciviridae*. Contains vesicular exanthema of swine virus, San Miguel sea lion virus and feline calicivirus, all of which occur as multiple serotypes. It is likely that Norwalk virus also belongs to this genus.

California encephalitis viruses. Family *Bunyaviridae*, genus *Bunyavirus*. A group of

viruses isolated from mosquitoes in California, Utah, New Mexico and Texas. Associated with a few cases of encephalitis in man.

California rabbit fibroma virus. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Leprapoxvirus*. Causes fibromas in its natural host, *Sylvilagus* sp. In European rabbits it causes death without the typical signs of myxomatosis.

Callinectes 'baculovirus'. Unclassified virus resembling a NON-OCCLUDED BACULOVIRUS, observed in the crab, *Callinectes sapidus*. Johnson, P.T. (1978) *Mar. Fish. Rev.* 40, 13.

Callinectes 'Reovirus'. Unclassified reovirus-like agent observed in the crab, *Callinectes sapidus*. Johnson, P.T. (1977) *J. Invertebr. Pathol.* 29, 201.

Callinectes W2 virus. See W2 VIRUS.

Callistephus chinensis chlorosis 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.

calovo virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from mosquitoes in Czechoslovakia, Yugoslavia and Austria. Causes fever in man.

camel pox virus. Synonym: PHOTO-SHOOTUR VIRUS. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Orthopoxvirus*. Causes pustules around the lips and nose. Usually mild but in severe cases can cause abortion. Epidemics occur at regular intervals in the Middle East, North Africa, Pakistan and southern USSR. Can cause lesions in man. Grows in chorioallantoic membrane.

Campoletis sonorensis polydnavirus. Type species of subgroup A POLYDNAVIRUS (*POLYDNAVIRIDAE*) isolated from the ichneumonid parasitoid *C. sonorensis*. Virus particles consist of uniform-length fusiform (cigar-shaped) nucleocapsids (330 x 85 nm.) surrounded by two concentric unit membranes, the inner derived by *de novo* synthesis within nuclei and the outer from the plasma membrane of infected parasitoid calyx epithelial cells. Particles have a buoyant density in CsCl of 1.20 g/cc. and contain about 25 poly-

peptides (mw. 15-80 x 10³). The supercoiled circular dsDNA genome is multipartite, containing at least 25 components, not in equimolar amounts, (mw. 4-13.6 x 10⁶; total mw. 135-170 x 10⁶). Some DNA sequences are common to more than one molecule; one repeated 540bp section has been found in all segments of the genome. Whether the entire genome is encapsidated in one or several particles is not known. The virus replicates in the nuclei of calyx epithelial cells in female parasitoids (the calyx is a specialised region of the oviduct) and is secreted within the calyx lumen as part of the 'calyx fluid'. Viral DNA has also been detected in male parasitoid wasps, covalently linked to cellular DNA. Virus replication appears to cause no deleterious effects on the parasitoid, but the virus may directly or indirectly protect the parasitoid egg from encapsulation in the host of the parasitoid, *Heliothis virescens*. While virus replication does not appear to occur in the lepidopteran host of the parasitoid, the fact that virus-specific mRNA transcripts are expressed in parasitised *H. virescens* larvae within two hours of oviposition suggests that the virus plays some active role in this protection. Theilmann, D.A. and Summers, M.D. (1987) *J. Virol.* **61**, 2589.

canary avipoxvirus. Family *Poxviridae*, genus *Avipoxvirus*. Similar to fowlpox virus.

Canavalia maritima 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.

Candiru bunyavirus. Family *Bunyaviridae*, genus *Bunyavirus*, member of Phlebotomus fever group. Isolated from a man with fever in Brazil. Does not multiply in mosquitoes.

canid herpesvirus 1. Synonym: CANINE HERPESVIRUS, CANINE TRACHEO-BRONCHITIS VIRUS. Family *Herpesviridae*, possible member of subfamily *Alphaherpesvirinae*. Causes rhinitis and pneumonia in new-born puppies. Kennel cough in older animals. Grows in dog kidney cell cultures with cpe.

canine adeno-associated parvovirus. Family *Parvoviridae*, genus *Adeno-associated virus* (AAV) or *Dependovirus*.

canine adenovirus. See RUBARTH'S DISEASE VIRUS.

canine coronavirus. Synonym: GASTRO-ENTERITIS VIRUS OF DOGS. Family *Coronaviridae*, genus *Coronavirus*. Causes vomiting and diarrhoea. Related antigenically to porcine transmissible gastro-enteritis virus, which itself will infect dogs.

canine dermal papilloma virus. Synonym: CANINE PAPILLOMA VIRUS. Family *Papovaviridae*, genus *Papillomavirus*. Causes skin papillomas.

canine distemper virus. Family *Paramyxoviridae*, genus *Morbillivirus*. Infects dogs, foxes, wolves, raccoons and mink. Causes fever, nasal and ocular discharge, vomiting and diarrhoea in dogs. There is also CNS involvement, causing fits. The virus is closely related antigenically to measles and rinderpest. It can be grown in dog, ferret and monkey cell cultures and in eggs.

canine hepatitis virus. Synonym: KENNEL COUGH VIRUS, RUBARTH'S DISEASE VIRUS. Family *Adenoviridae*, genus *Mastadenovirus*. Causes fever, diarrhoea and vomiting and frequently death in dogs. In foxes, there is also acute encephalitis. Experimentally coyotes, wolves and raccoons can also be infected. The virus can be grown in dog, ferret, raccoon and pig cells.

canine herpesvirus. See CANID HERPESVIRUS.

canine papilloma virus. See CANINE DERMAL PAPILLOMA VIRUS.

canine parvovirus 1. Synonym: MINUTE VIRUS OF CANINES. Family *Parvoviridae*, genus *Parvovirus*. The virus was isolated from faeces but it is probably not pathogenic although antibodies are found in most dogs. Will grow in a canine cell line from the Walter Reed Institute.

canine parvovirus 2. Family *Parvoviridae*, genus *Parvovirus*. This virus emerged as a new infectious agent in 1978 when it caused a worldwide panzootic. It has since become enzootic in dogs throughout the world. The principal signs of disease are enteritis and myocarditis frequently followed by death.

canine tracheo-bronchitis virus. See CANID HERPESVIRUS.

canna yellow mottle virus. A member of the *Cacao Swollen Shoot Virus* group.

Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 235. CRC Press: Boca Raton, Florida.

cap. A sequence of methylated bases at the 5' terminus of a eukaryotic mRNA molecule joined in the opposite orientation, i.e. 5' to 5' instead of 5' to 3'. The sequence is m⁷G^{5'}ppp^{5'}G(or A)p...; in animal but not plant mRNAs the second G or A is often methylated. The cap interacts with various proteins involved with the initiation of translation.

Cape Wrath virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from a female tick at Cape Wrath.

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

caper vein yellowing virus. A plant *Rhabdovirus*. Franco, A.D. and Gallitelli, D. (1985) *Phytop. Medit.* 24, 234.

Capillovirus group. (Latin 'capillus' = a hair). (Type member APPLE STEM GROOVING VIRUS). Genus of plant viruses comprising some of the viruses which were originally classified in the *CLOSTEROVIRUS*, subgroup 2. The particles are flexuous and filamentous, about 650 x 12 nm., and sediment at about 100S. They are composed



of a helix of a single polypeptide species (mw. $c.27 \times 10^3$), which gives an obvious cross-banding, and a single species of linear ssRNA (mw. 2.7×10^6). The host ranges of members of this group are narrow. The viruses can be transmitted mechanically and are naturally transmitted through seed.

Capim virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from opossums and mosquitoes in S. America.

capping. Addition of the methylated base to the primary transcript in the nucleus while it is being SPLICED and POLYADENYLATED. *See* CAP.

caprine herpesvirus 1. *See* BOVID HERPESVIRUS 5.

caprinized strain of virus. Virus adapted to growth in goats.

Capripoxvirus. (Latin 'caper, capri' = goat.) A genus in the family *Poxviridae*, subfamily *Chordopoxvirinae*, consisting of viruses infecting ungulates. It contains GOATPOX, SHEEPOX and LUMPY SKIN DISEASE VIRUSES. Causes papules, vesicles and pustules before forming scabs, usually on the udder, teats, scrotum and thighs. Widespread occurrence. Virus can be grown in lamb and goat kidney cells and in CAM, causing pocks.

capsid. Protein shell which surrounds the virus nucleic acid. The capsid has ICOSAHERAL, HELICAL or complex symmetry and may be enveloped (enclosed in a membrane) or non-enveloped. The capsid and nucleic acid form the NUCLEOCAPSID.

capsid polypeptide. Protein forming part of the capsid structure of a virus particle.

capsomere. Unit from which the virus capsid is built. The capsomeric unit is visible in the electron microscope and consists of groups of identical protein molecules. In capsids with icosahedral symmetry, the capsomeres at the twelve apices are termed PENTAMERS (because they have five neighbouring capsomeres). The other capsomeres, which have six neighbours, are called HEXAMERS.

capsule. The proteinaceous OCCLUSION BODY produced during GRANULOSIS VIRUS infections (subgroup B, *BACULOVIRUS*), in which the virion is surrounded by a crystalline protein matrix (granulin).

Caraparu virus. Family *Bunyaviridae*, genus *Bunyavirus*. Transmitted by mosquitoes. Causes fever in man.

carbon dioxide-sensitivity virus. *See* SIGMA-VIRUS.

carboxymethylcellulose. A cellulose derivative which is used for the separation of proteins by ion exchange chromatography.

Carcinus viruses. Unclassified viruses isolated from the crabs, *Carcinus maenas* and *C. mediterraneus*, include REOVIRUS- and RHABDOVIRUS-like particles as well as particles resembling NON-OCCLUDED BACULOVIRUSES.

Bergoin, M. *et al.* (1982) In *Invertebrate Pathol-*

ogy and Microbial Control. p. 523. Proc. IIIrd Internat. Colloq. Invertebr. Pathol.

Cardiovirus. (Greek 'kardia' = heart.) A genus in the family *Picornaviridae*. Consists of ENCEPHALOMYOCARDITIS VIRUS, MENGO VIRUS and MURINE ENCEPHALOMYELITIS VIRUS. Characterised by instability at pH6 in the presence of halide ions and of a long polycytidylic acid tract near the 5' end of its RNA genome.

Carey Island virus. Family *Flaviviridae* genus *Flavivirus*. Isolated from bats in Malaysia.

Carlavirus group. (Sigla from CARNATION LATENT, the type virus). Genus of plant viruses with slightly flexuous rod-shaped particles, 600-700 nm. long and c.13 nm. wide which sediment at c.160S and band in CsCl at c.1.3 g/cc. The coat



protein subunits (mw. 32×10^3) are arranged in the particles in helical symmetry with pitch c.3.4 nm. Each particle contains one molecule of linear, (+)-sense ssRNA (mw. 2.7×10^6). Replication thought to be in the cytoplasm. Host ranges of individual viruses are rather narrow. Particles are found in most cell types. The viruses can be mechanically transmitted. Most members are transmitted by aphids in a NON-PERSISTENT TRANSMISSION manner.

Matthews, R.E.F. (1982) *Intervirology* **12**, 149.
Koenig, R. (1982) CMI/AAB Descriptions of Plant Viruses No. 259.

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

Carmovirus group. (Sigla of CARNATION MOTTLE VIRUS, the type member). Genus of plant viruses with small isometric particles, 30 nm. in diameter, which sediment at about 120S and band in CsCl at 1.35 g/cc. The capsid structure is thought to be icosahedral (T=3), the structural subunit being a coat protein (mw. 38×10^3). Each particle contains a single species of (+)-sense, linear ssRNA (mw. 1.4×10^6 ; 4003 nucleotides) which encodes five products. In order from the 5' end these are: one of mw. 27×10^3 , two potential READTHROUGH products of mw. 86 and 98×10^3 , a putative product (mw. 7×10^3) and the coat protein; the latter two products are translated from

SUBGENOMIC mRNAs of 1.7 and 1.5kb respectively. Replication is in the cytoplasm and is via REPLICATIVE INTERMEDIATES. The host ranges of members of this group are wide among angiosperms. They are readily transmitted mechanically, natural transmission being associated with the soil.

Morris, T.J. and Carrington, J.C. (1988) *In The Plant Viruses*. Vol. 3, p. 73. ed. R. Koenig. Plenum Press: New York.

carnation bacilliform virus. A possible plant *Rhabdovirus*.

Matthews, R.E.F. (1982) *Intervirology* **12**, 113.

carnation cryptic virus. A member of the *Cryptovirus* s group, subgroup A.

Lisa, V. *et al.* (1986) CMI/AAB Descriptions of Plant Viruses No. 315.

carnation etched ring virus. A *Caulimovirus*.
Lawson, R.H. *et al.* (1977) CMI/AAB Descriptions of Plant Viruses No. 182.

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

carnation Italian ringspot 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.

carnation latent virus. Type member of the *Carlavirus* group.

Wetter, C. (1971) CMI/AAB Descriptions of Plant Viruses No. 61.

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

carnation mottle virus. Type member of the *Carmovirus* group.

Hollings, M. and Stone, O.M. (1970) CMI/AAB Descriptions of Plant Viruses No. 7.

Morris, T.J. and Carrington, J.C. (1988) *In The Plant Viruses*. Vol 3, p. 73. ed. R. Koenig. Plenum Press: New York.

carnation mottle virus group. Synonym: CARMOVIRUS GROUP.

38 carnation necrotic fleck virus

carnation necrotic fleck virus. A member of the *Closterovirus* subgroup 1.

Inouye, T. (1974) CMI/AAB Descriptions of Plant Viruses No. 136.

Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 219. CRC Press: Boca Raton, Florida.

carnation ringspot virus. Type member of the *Dianthovirus* group.

Tremaine, J.H. and Dodds, J.A. (1985) AAB Descriptions of Plant Viruses No. 308.

carnation vein mottle virus. A *Potyvirus*.

Hollings, M. and Stone, O.M. (1971) CMI/AAB Descriptions of Plant Viruses No. 78.

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

carnation yellow fleck virus. A member of the *Closterovirus* subgroup 1.

Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 219. CRC Press: Boca Raton, Florida.

carnation yellow stripe virus. A *Necrovirus*.

Gallitelli, D. *et al.* (1979) *Phytopath. medit.* **18**, 31.

carnivore pox virus. Family *Poxviridae*, not allocated to genus. A strain of cowpox virus differing in growth characteristics from the reference strains.

carrier culture. A cell culture which is persistently infected with a virus.

carrier state. The condition in which an animal is persistently infected with a virus, often without showing the signs of the disease associated with the virus. The virus can persist even in the presence of the specific neutralising antibody.

carrot latent virus. A plant *Rhabdovirus*, subgroup 2; aphid transmitted.

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

carrot 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.

carrot mottle virus. Unencapsidated RNA, dependent on CARROT REDLEAF VIRUS for aphid transmission.

Murant, A.F. (1974) CMI/AAB Descriptions of Plant Viruses No. 137.

Murant, A.F. *et al.* (1985) *J. gen. Virol.* **66**, 1575 and 2078.

carrot redleaf virus. A *Luteovirus*; considered to be a strain of BEET WESTERN YELLOWS VIRUS. Waterhouse, P.M. and Murant, A.F. (1982) CMI/AAB Descriptions of Plant Viruses No. 249. 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.

carrot temperate virus. A possible member of the *Cryptovirus* group, subgroup A.

Boccardo, G. *et al.* (1987) *Adv. Virus Res.* **32**, 171.

carrot thin leaf virus. A *Potyvirus*.

Howell, W.E. and Mink, G.I. (1980) CMI/AAB Descriptions of Plant Viruses No. 218.

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

carrot yellow leaf virus. A member of the *Closterovirus* subgroup 1.

Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 219. CRC Press: Boca Raton, Florida.

cassava (African) mosaic virus. Synonym: CASSAVA LATENT VIRUS. Type member of the *Geminivirus*, subgroup B. The first geminivirus to be sequenced and shown to have a bipartite genome of 2779 and 2724 nucleotides.

Bock, K.R. and Harrison, B.D. (1985) AAB Descriptions of Plant Viruses No. 297.

Harrison, B.D. (1985) *Ann. Rev. Phytopath.* **23**, 55.

cassava common mosaic virus. A *Potexvirus*. Costa, A.S. and Kitajima, E.W. (1972) CMI/AAB Descriptions of Plant Viruses No. 90.

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

cassava green mottle virus. A *Nepovirus*.

Lennon, A.M. *et al.* (1987) *Ann. Appl. Biol.* **110**, 545.



100nm

cassava latent virus. See CASSAVA (AFRICAN) MOSAIC VIRUS.

cassava vein banding 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.

cassava virus X. A *Potexvirus*.

Harrison, B.D. (1986) *Phytopath.* **76**, 1075.

Cassia mild mosaic virus. A possible *Carla-virus*.

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

Cassia yellow blotch virus. A *Bromovirus*.

Francki, R.I.B. (1985) In *The Plant Viruses*. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

cationic detergent. Detergent having positively-charged surface ions such as molecules containing a quaternary ammonium ion with a group of 12-24 carbon atoms attached to the nitrogen atom in the cation (e.g. cetyl-trimethyl ammonium bromide (CTAB)).

cattle plague virus. See RINDERPEST VIRUS.

Catu virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from man, monkeys, mice and mosquitoes in S. America.

cauliflower mosaic virus. Type member of the *Caulimovirus* group. The DNAs of three isolates have been sequenced (Cabb-S 8024, CM1841 8031 and D/H 8016 nucleotides). First plant virus shown to involve reverse transcription in its replication.

Shepherd, R.J. (1981) *CMI/AAB Descriptions of Plant Viruses* No. 243.

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

Caulimovirus group. (Sigla from CAULIFLOWER MOSAIC, the type virus). Genus of the only plant viruses to contain dsDNA. The particles are found mainly in cytoplasmic proteinaceous INCLUSION

BODIES, characteristic of members of this group, and are isometric, c.50 nm. in diameter, sediment at c.210S and band in CsCl at 1.37 g/cc. They are very stable and have no envelope, surface projections or core. The capsid comprises a single coat protein species (mw. 42×10^3) but degrades to several polypeptides with a major component (mw. 37×10^3) which is PHOSPHORYLATED and possibly GLYCOSYLATED. Each capsid contains a single molecule of relaxed circular dsDNA (mw. = 5×10^6 ; 8kbp) which has single-strand discontinuities at specific sites, one in the transcribed strand and one, two or three in the non-transcribed strand. The DNA of the type member codes for six proteins. Two major RNA species are transcribed in the nucleus from a mini-chromosome form of the virion DNA. One (1.9kb) is the mRNA for the major protein of the cytoplasmic inclusion bodies; the other (8.2kb) is full-length with a terminal redundancy of 180 nucleotides. Replication is by REVERSE TRANSCRIPTION and resembles in many respects that of RETROVIRIDAE; this stage occurs in the cytoplasmic inclusion bodies. The 8.2kb RNA is the template, is primed by a specific tRNA and is reverse-transcribed most probably by a virus-coded enzyme; second-strand priming is at purine-rich regions. The discontinuities in the virion DNA reflect the priming sites. The virus DNA does not specifically integrate into the host genome.

The host range for individual members is narrow. Particles of caulimoviruses are found in most cell types. Many members are transmissible mechanically. Most are transmitted by aphids in a SEMIPERSISTENT TRANSMISSION manner: aphid transmission requires a virus-coded transmission factor.

Matthews, R.E.F. (1982) *Intervirolgy*, **17**, 64.

Hull, R. (1984) *CMI/AAB Descriptions of Plant Viruses* No. 295.

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

caviid herpesviruses. See GUINEA-PIG CYTOMEGALOVIRUS.

cDNA. Abbreviation for complementary DNA.

cebid herpesvirus. Species in the family Herpesviridae, isolated from marmosets and monkeys.

40 celery latent virus

celery latent virus. Unclassified, rod-shaped particles, 860 nm. in length. Luisoni, E. (1966) *Atti Accad. Sci. Torino* **100**, 541.

celery mosaic virus. A *Potyvirus*. Shepherd, R.J. and Grogan, R.G. (1971) CMI/AAB Descriptions of Plant Viruses No. 50. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.

celery yellow 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.

celery yellow spot 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.

cell culture A culture of cells in a liquid or soft gel medium *in vitro*. See ORGAN CULTURE, TISSUE CULTURE.

cell cycle. The cell cycle consists of metaphase (M phase) and interphase (S phase); DNA synthesis occurs during interphase. Between M and S phases is G_1 phase and between S and M is G_2 phase. Somatic cells are in G_0 phase. Most viruses can multiply in cells independently of cell division but there are exceptions, e.g. PARVOVIRUSES and BACULOVIRUSES require rapidly dividing cells.

cell fusion. The formation by fusion of cell membranes of multinucleate giant cells (syncytia). Virus-induced fusion from outside the cell can be caused by exposure to high multiplicity of large enveloped RNA viruses (e.g. SENDAI VIRUS) or some DNA viruses, even when they have been inactivated. Fusion from within the cell depends on the synthesis of virus macromolecules (but not virus particles themselves).

cell line. A culture of cells which can be subcultured indefinitely. It is derived from a primary culture at the time of first subculture. The term implies that such cultures comprise many lineages of cells present in the primary culture.

cell-mediated immunity. Immunity mediated by a variety of cells unrelated to the production of antibody.

cellular immunity. Immunity ascribed to various cellular functions other than those which produce antibody.

CELO virus. Acronym from CHICKEN EMBRYO LETHAL ORPHAN VIRUS. Family *Adenoviridae*, genus *Aviadenovirus*. Associated with several diseases in chickens, turkeys and pheasants. Replicates in chicken cell cultures. Oncogenic in newborn hamsters. Produces cpe in chicken cell cultures.

central dogma. The concept that genetic information is perpetuated as DNA and is transferred to protein via RNA. Thus it cannot be retrieved from the amino acid sequence of a protein. The discovery of reverse transcriptase by H. Temin and the synthesis of DNA from an RNA template is contrary to this concept of a unidirectional flow of information of DNA to RNA to protein. Crick, F.H.C. (1970) *Nature* **227**, 561.

centrifuge. A machine for separating particles by centrifugal force. Usually referred to as low-speed centrifuges (capable of up to 20,000 rev/min.) and high-speed ultracentrifuges (capable of more than 50,000 rev/min.). See ANALYTICAL ULTRACENTRIFUGE.

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

Ceratitis picornavirus V. Unclassified small RNA virus from the Mediterranean fruit-fly, *C. capitata*. Virions are isometric, 24 nm. in diameter, with a buoyant density of 1.35 g/cc. in CsCl. They contain three structural polypeptides (mw. 27, 34 and 39 x 10³) and an RNA genome. A possible INSECT PICORNAVIRUS. Plus, N. and Cavalloro, R. (1983) *In Fruit Flies of Economic Importance*. p. 106. ed. R. Cavalloro. A.A. Balkema: Rotterdam.

Ceratitis reovirus I. Unclassified RNA virus (possible member of REOVIRIDAE) isolated from the Mediterranean fruit-fly, *C. capitata*. Virions are non-enveloped, isometric, 60 nm. in diameter with a double protein shell. Particles have a buoyant density in CsCl of 1.38 g/cc., contain RNA transcriptase activity and a genome of ten segments of dsRNA. The virus has many similarities

to *Drosophila* F virus, but is serologically distinct and does not replicate in *Drosophila*. Although particle morphology resembles virions of the REOVIRUS genus, RNA segment and polypeptide mw. are distinct.

Plus, N. and Cavalloro, R. (1983) *In Fruit Flies of Economic Importance*. p. 106. ed. R. Cavalloro. A.A. Balkema: Rotterdam.

Cercopithecoid herpesvirus 1. Synonym: HERPES B VIRUS, HERPES SIMIAE VIRUS. Family *Herpesviridae*, subfamily *Alphaherpesvirinae*, genus *suid herpesvirus 1 group*. A natural infection of Asiatic monkey; many Rhesus monkeys have antibodies. Infects man, causing vesicular lesions of the tongue and lips, acute encephalitis and, almost always, death. Young mice, chicks and guinea pigs can be infected experimentally.

Cercopithecoid herpesvirus 2. Synonym: AFRICAN MONKEY CYTOMEGALOVIRUS, SA6 VIRUS. Family *Herpesviridae*, subfamily *Betaherpesvirinae*. Isolated from vervet monkey kidney and salivary gland cultures. Produces giant cells and eosinophilic inclusion bodies.

Cercopithecoid herpesvirus 3. Synonym: SA8 VIRUS. Family *Herpesviridae*, subfamily *Alphaherpesvirinae*. Virus was isolated from vervet monkey kidneys and from a baboon. When injected into baby baboons i.c. it causes pneumonia. Serologically related to CERCOPITHECID HERPESVIRUS 1.

cereal chlorotic mottle virus. A plant *Rhabdovirus* subgroup 2; leafhopper transmitted.

Greber, R.S. (1982) *CMI/AAB Descriptions of Plant Viruses* No. 251.

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

cereal striate virus. See BARLEY YELLOW STRIATE MOSAIC VIRUS.

cereal tillering disease virus. A *Fijivirus*. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 1. p. 47. CRC Press: Boca Raton, Florida.

CFT. Abbreviation for COMPLEMENT FIXATION TEST.

CFU. Abbreviation for COLONY FORMING UNITS.

Chaco virus. Family *Rhabdoviridae*; genus not established. Isolated from lizards in S. America. May be arthropod transmitted. Kills new-born mice and replicates in Vero cells.

Chagres virus. Family *Bunyaviridae*; genus *Phlebovirus*. Isolated from a man with fever in Panama and from mosquitoes. Causes cpe in primary Rhesus monkey, human amnion and mouse embryo cell cultures. Kills new-born mice when inoculated i.c.

chamois contagious ecthyma parapoxvirus. See CONTAGIOUS ECTHYMA VIRUS.

chamois papilloma virus. See CONTAGIOUS ECTHYMA VIRUS.

Chandipura virus. Family *Rhabdoviridae*, genus *Vesiculovirus*. Isolated from man with influenza-like illness in India and from sandflies and a hedgehog in Nigeria. Possible distant relationship with vesicular stomatitis virus. Grows well in BHK cells and kills young mice when inoculated i.c.

Changuinola virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from *Phlebotomus* sp. and small rodents in Panama and from a man with fever.

Chaoborus 'baculovirus'. Unclassified virus, morphologically similar to a NON-OCCLUDED BACULOVIRUS, observed in the phantom midge *Chaoborus crystallinus* in Sweden. Particles observed in section contained a nucleocapsid (38-43 x 210-226 nm.) surrounded by a unit membrane. Infection was restricted to the mid gut epithelium. Similar particles have been observed in *C. astictopus*.

Larsson, R. (1984) *J. Invertebr. Pathol.* **44**, 178.

Chara corallina virus. A possible member of the TOBAMOVIRUS GROUP. A virus of a green alga, *Chara corallina*. It has rigid rod-shaped particles, 530 nm. long, 18 nm. wide, which sediment at 230S. The coat protein subunits (mw. 17.5 x 10³) are arranged in the particles in helical symmetry with pitch of 2.75 nm. Each particle contains one species of ssRNA (mw. 3.6 x 10⁶). The virus is transmissible to *C. corallina* by injection, leading to chlorosis and death in ten days.

Skotnicki, A. *et al.* (1976) *Virology* **75**, 457.

Charleville virus. Unclassified arthropod-borne

42 chelating agent

virus. Isolated from sandflies and a lizard in Charleville, Queensland, Australia.

chelating agent. (From Greek 'chelos' = crab's claw). Compounds which bind divalent cations, so inhibiting their activity. Can be used to inhibit biological interactions which require divalent cations, e.g. deoxyribonuclease, attachment of some viruses (e.g. foot-and-mouth disease virus) to cells. See ETHYLENEDIAMINETETRA-ACETIC ACID, ETHYLENGLYCOLBIS(AMINOETHYLETHER)TETRA-ACETIC ACID.

Chelonid herpesvirus 1. Synonym: GREEN SEA-TURTLE HERPESVIRUS, GREY PATCH DISEASE OF TURTLES VIRUS. Family *Herpesviridae*, subfamily *Chordopoxvirinae*, not allocated to genus. Isolated from green sea-turtles kept in captivity in West Indies. Intranuclear inclusions and herpesvirus-like particles present in the lesions. Disease can be transmitted by a cell-free extract.

chemotherapeutic index. An index for assessing the potential of an antiviral compound. It is the ratio between the lowest effective antiviral concentration and the highest non-toxic concentration of that compound.

chemotherapy. The use of compounds which will inhibit the growth of infectious agents without unduly affecting host-cell metabolism e.g. ACYCLOVIR for herpesvirus infections, AZT for AIDS.

Chenuda virus. Family *Retroviridae*, subfamily *Oncovirinae*, genus *type C oncovirus* group, subgenus avian type C oncovirus.

cherry leaf roll virus. A *Nepovirus*. Jones, A.T. (1985) AAB Descriptions of Plant Viruses No. 306. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

cherry rasp leaf virus. A possible *Nepovirus*. Stace-Smith, R. and Hansen, A.J. (1976) CMI/AAB Descriptions of Plant Viruses No. 159. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

cherry rugose mosaic virus. A strain of *Prunus Necrotic Ringspot Virus*.

Francki, R.I.B. (1985) In The Plant Viruses. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

chick embryo fibroblast (CEF) cells. A primary cell culture system prepared from chick embryos. Used for culture of many viruses e.g. RABIES VIRUS.

chickenpox virus. See VARICELLA ZOSTER VIRUS.

chickpea stunt virus. Synonym: BEAN LEAF ROLL VIRUS (PEA LEAF ROLL VIRUS).

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

chicory virus X. A *Potexvirus*. Gallitelli, D. and Franco, A.D. (1982) Phytopath. Z. **105**, 120.

chicory yellow mottle virus. A *Nepovirus*. Quacquarelli, A. *et al.* (1974) CMI/AAB Descriptions of Plant Viruses No. 132. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

Chikungunya virus. Family *Togaviridae*, genus *Alphavirus*. Causes severe joint and back pains in man, followed several days later by a rash. Transmitted by *Aedes africanus* and *A. aegyptii*. Antibodies present in birds, monkeys and many mammals. Occurs in many parts of Africa and Asia. Kills suckling mice when inoculated i.c. and replicates in chick embryo fibroblasts, Rhesus kidney and HeLa cells.

Chilibre virus. Family *Bunyaviridae*, genus *Phlebovirus*. Isolated from insects in Panama.

Chilo iridescent virus. Type species of the small iridescent insect virus group (*Iridovirus*; *Iridoviridae*), isolated from *Chilo suppressalis* (Lepidoptera). Originally referred to as insect iridescent virus type 6. Virions have the characteristic morphological properties of the IRIDOVIRUS group (c.120 nm. in diameter) sediment at 3300S and contain about 26 polypeptides (mw. 10-230 x 10³). The genome is a linear dsDNA (mw. 158 x 10⁶; 209 kbp) which is circularly permuted and terminally redundant. The virus has a wide experimental host range within insects (including

some Lepidoptera, Coleoptera, Hymenoptera, Diptera and Orthoptera) and has been experimentally transmitted to some Crustacea. Schnitzler, P. *et al.* (1987) *Virology* **160**, 66.

Chinese hamster ovary (CHO) cells. A primary cell culture system prepared from the ovaries of Chinese hamsters. Used for the culture of many viruses, e.g. the herpesviruses.

Chinese yam necrotic mosaic virus. A *Carla-virus*, occurs in Japan. Doi, Y. *Personal communication*.

Chinook salmon virus. See SACRAMENTO RIVER CHINOOK SALMON VIRUS.

Chironomus entomopoxvirus. Type species of probable sub-genus C, insect poxviruses (ENTOMOPOXVIRINAE) from *C. luridus* (Diptera). Virions are brick-shaped, 330 x 230 x 110 nm., containing two LATERAL BODIES and a biconcave core. The genome is a single linear molecule of dsDNA, approximately 200 x 10⁶. Virions are occluded within proteinaceous occlusion bodies (2-8 µm) during infection. No spindle-shaped inclusion bodies are produced. Viruses with similar properties have been isolated from *C. attenuatus*, *Camptochironomus*, *Goeldichironomus* and *Aedes* spp. (Diptera). Arif, B.M. (1984). *Adv. Virus Res.* **29**, 195.

chloramphenicol. An antibiotic (mw. 323.1) isolated from *Streptomyces venezuelae*. It acts as an analogue of phenylalanine and blocks the amino acid accepting site on phenylalanine tRNA.

chloramphenicol acetyl transferase (CAT) gene. The CAT gene product catalyses the acetylation of chloramphenicol, disrupting its antibiotic activity. The most commonly used type was obtained from the bacterial transposon, Tn9. The CAT gene is frequently used as a marker in genetic cloning experiments.

Chloriridovirus. (Greek 'chloros' = green.) Genus of the large iridescent virus group (IRIDOVIRIDAE). Virions are isometric, approximately 180 nm. in diameter, reportedly containing about nine polypeptides (mw. 15-98 x 10³) and a linear dsDNA genome (mw. 240-288 x 10⁶). The type species is the regular (R) strain of MOSQUITO IRIDESCENT VIRUS (Iridescent virus type 3) from *Aedes taeniorhynchus*. Other insect iridescent

virus isolates included in the Chloriridovirus genus have been isolated from *Aedes* spp. (iridescent virus types 4, 5, 11, 12, 14 and 15), *Simulium* sp. (type 7), *Culicoides* sp. (type 8) and *Corethrella* sp. (type 13) (Diptera). A number of possible members have been observed in other Diptera (see IRIDESCENT VIRUSES). A virus with similar morphological properties has also been found in *Daphnia* sp. (Crustacea). A list of iridescent virus infections of insects is given in Appendix E.

Hall, D.W. (1985) *In Viral Insecticides for Biological Control*. p.163. ed. K. Maramorosch and K.E. Sherman. Academic Press: New York.

Chloris striate mosaic virus. A *Geminivirus*, subgroup A.

Francki, R.I.B. and Hatta, T. (1980) CMI/AAB Descriptions of Plant Viruses No. 221. Harrison, B.D. (1985) *Ann. Rev. Phytopath.* **23**, 55.

chlorotic. Yellow symptoms induced by viruses in plant leaves. Usually due to effects on the structure of the chloroplasts, resulting in reduced levels of chlorophyll.

Chondrilla juncea stunting 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.

Chordopoxvirinae. A subfamily in the family *Poxviridae*. It contains all the viruses infecting vertebrates and is subdivided into six genera: Avipox, Capripox, Leporipox, Orthopox, Parapox and Suipox viruses. The names are derived from Latin 'avis' = bird; Latin 'caper, capris' = goat; Latin 'lepus, lepori' = hare; Greek 'orthos' = straight; Greek 'para' = by the side of; Latin 'sus' = swine.

Choristoneura entomopoxvirus. Insect poxviruses isolated from the budworms *Choristoneura biennis*, *C. conflictana* and *C. diversana* (Lepidoptera), with characteristics of viruses of the Entomopoxvirus sub-genus B (type species *Amsacta entomopoxvirus*). Arif, B.M. (1984) *Adv. Virus Res.* **29**, 195.

Choristoneura fumiferana nuclear polyhedrosis virus. Baculovirus (MNPV) isolated in Canada from the eastern spruce budworm, *C. fumiferana*; also infectious for other budworms including *C. occidentalis*. A number

44 chromatid

of closely-related genotypic variants have been isolated. Like *Autographa californica* NPV, the viral genome contains several regions of repeated sequences and the overall organisation of the two viral genomes shows similarities (colinearity) and extensive homology. The virus replicates *in vitro* in cell lines derived from the homologous host.

Arif, B.M. *et al.* (1985) *Virus Res.* **2**, 85.

chromatid. See CHROMOSOME.

chromatin. See CHROMOSOME.

chromatography. A method of separating and analysing chemical substances by preferential retention, either as a gas or liquid, on to a solid medium e.g. activated charcoal, silica gel, agarose beads with different pore sizes.

chromosome. A self-replicating nucleic acid molecule containing a number of genes. In bacteria the entire genome is contained within one ds circular DNA molecule. In eukaryotes chromosomes are linear dsDNA molecules and most organisms have a number of chromosomes which are characteristic of a particular species. When they are not undergoing mitosis or meiosis they normally interact with HISTONES to form chromatin. During the prophase stage of meiosis the chromatin forms thread-like structures termed chromatids.

chronic bee-paralysis virus. See BEE CHRONIC PARALYSIS VIRUS.

chronic bee-paralysis virus associate. See BEE CHRONIC PARALYSIS VIRUS ASSOCIATE.

chronic infection. An infection which lingers, often without symptoms, e.g. lymphocytic choriomeningitis in mice.

Chrysanthemum chlorotic mottle viroid. A VIROID.

Horst, R.K. (1987) *In The Viroids.* p. 291. ed. T.O. Diener. Plenum Press: New York.

Chrysanthemum frutescens rhabdovirus. A probable plant *Rhabdovirus*.

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

Chrysanthemum mild mottle virus. A

Cucumovirus; occurs in Japan.

Doi, Y. *Personal communication.*

Chrysanthemum stunt viroid. A VIROID, 354 nucleotides, depending on isolate.

Lawson, R.H. (1987) *In The Viroids.* p. 247. ed. T.O. Diener. Plenum Press: New York.

Chrysanthemum vein chlorosis virus. A possible plant *Rhabdovirus*.

Matthews, R.E.F. (1982) *Intervirology* **17**, 113.

Chrysanthemum virus B. A *Carlavirus*. Hollings, M. and Stone, O.M. (1972) CMI/AAB Descriptions of Plant Viruses No. 110.

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

chymotrypsin. A protease which hydrolyses the peptide bond on the C-terminal side of valine, isoleucine, phenylalanine, tyrosine, methionine and some alanine residues. See TLCK.

Ambler, R.P. and Meadway, R.J. (1968) *Biochem. J.* **108**, 893.

circulative transmission. Synonym: PERSISTENT TRANSMISSION.

cis-trans test. A genetic COMPLEMENTATION TEST first used in the genetic mapping of phage T4. It is used to establish whether two mutations are in the same gene where the wild-type allele is dominant. If the mutations are in different genes there will be *trans*-complementation.

Benzer, S. (1955) *Proc. Natl. Acad. Sci. USA* **41**, 344.

cistron. The basic unit of genetic function. It usually refers to a gene or the coding region for a protein. The term derived from the *CIS-TRANS TEST*. Benzer, S. (1959) *Proc. Natl. Acad. Sci. USA* **45**, 1607.

citrus crinkly leaf virus. An *Ilarvirus*.

Francki, R.I.B. (1985) *In The Plant Viruses.* Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

citrus exocortis viroid. A VIROID, 371 nucleotides.

Semancik, J.S. (1980) CMI/AAB Descriptions of Plant Viruses No. 226.

Broadbent, P. and Garnsey, S.M. (1987) *In The*

Viroids. p. 235. ed. T.O. Diener. Plenum Press: New York.

citrus leaf rugose virus. An *Ilarvirus*.
Garnsey, S.M. and Gonsalves, D. (1976) CMI/AAB Descriptions of Plant Viruses No. 164.
Francki, R.I.B. (1985) In *The Plant Viruses*. Vol. 2. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

citrus leprosis virus. A possible plant *Rhabdovirus*; unenveloped particles.
Matthews, R.E.F. (1982) *Intervirology* **17**, 114.

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

citrus tatter leaf virus. A possible *Closterovirus*.
Francki, R.I.B. *et al.* (1985) In *Atlas of Plant Viruses*. Vol. 2. p. 219. CRC Press: Boca Raton, Florida.

citrus tristeza virus. A member of the *Closterovirus* subgroup 1.
Price, W.C. (1970) CMI/AAB Descriptions of Plant Viruses No. 33.
Francki, R.I.B. *et al.* (1985) In *Atlas of Plant Viruses*. Vol. 2. p. 219. CRC Press: Boca Raton, Florida.

citrus variegation virus. An *Ilarvirus*.
Francki, R.I.B. (1985) In *The Plant Viruses*. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

clavelee virus. See SHEEP CAPRIPOX VIRUS.

cleavage. The cutting of nucleic acid or protein usually enzymatically, at specific sites. See RESTRICTION ENDONUCLEASE, PROTEASE.

Cleland's reagent. See DITHIOTHREITOL.

Clitoria mosaic virus. A *Potexvirus*.
Srivastava, B.N. *et al.* (1978) *Ind. Phytopath.* **31**, 248.

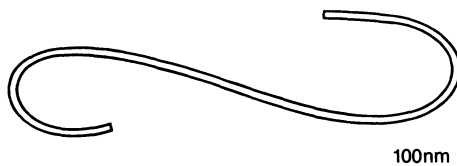
Clitoria yellow vein virus. A *Tymovirus*.
Bock, K.R. and Guthrie, E.J. (1977) CMI/AAB Descriptions of Plant Viruses No. 171.
Francki, R.I.B. *et al.* (1985) In *Atlas of Plant Viruses*. Vol. 1. p. 117. CRC Press: Boca Raton, Florida.

Hirth, L. and Girard, L. (1988) In *The Plant Viruses*. Vol. 3. p. 163. ed. R. Koenig. Plenum Press: New York.

Clo Mor virus. Family *Bunyaviridae*, genus *Nairovirus*.

clone. This term is used in a number of senses. As a noun it may mean a) a population of recombinant DNA molecules all carrying the same inserted sequence; b) a colony of micro-organisms containing a specific DNA fragment inserted into a vector; c) a population of cells or organisms of identical genotype. As a verb it means a) the use of *in vitro* recombination techniques to insert a particular DNA sequence into a vector; b) the selection of a unique virus isolate from individual PLAQUES, POCKS or LESIONS or by limiting dilution.

Closterovirus group. (Greek 'kloster' = thread). Genus of plant viruses with very flexuous rod-shaped particles 600-2,000 nm. long, 12 nm. wide, which sediment at 96-130S and band in CsCl at 1.30-1.34 g/cc. The coat protein subunits



(mw. $23\text{-}27 \times 10^3$) are arranged in a helix with pitch of 3.4-3.7 nm. Each particle contains one molecule of linear, (+)-sense ssRNA (mw. $2.2\text{-}4.7 \times 10^6$). Replication is probably cytoplasmic. Individual viruses have a moderately wide host range. Virus particles are found mainly in the phloem cells and often form large crystalline arrays. These viruses are transmissible mechanically with difficulty. Some members are transmitted by aphids in a SEMIPERSISTENT TRANSMISSION manner. It has been suggested that closteroviruses be divided into two subgroups. Subgroup 1 (A) (type member BEET YELLOWS VIRUS) are typical closteroviruses with coat protein of mw. $23\text{-}25 \times 10^3$ and are mostly aphid-transmitted. Subgroup 2 (B) (type member APPLE CHLOROTIC LEAFSPOT VIRUS) viruses have a coat protein, mw. 27×10^3 and no known vectors; some members of this subgroup are now placed in the CAPILLOVIRUS group. The cytopathology of the two subgroups differs.

Matthews, R.E.F. (1982) *Intervirology*, **17**, 147.
Bar-Joseph, M. and Murrant, A.F. (1982) CMI/

46 cloudy wing particle

AAB Descriptions of Plant Viruses No. 260. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2, p. 219. CRC Press.: Boca Raton, Florida.

cloudy wing particle. An unclassified small RNA virus from adult honey bees. Infection is characterised by a marked loss of transparency of the wings. Virions are spherical, 17 nm. in diameter and sediment at 49S. The particles have a buoyant density in CsCl of 1.38 g/cc. and contain a single polypeptide (mw. 19×10^3). The genome is ssRNA (mw. 0.45×10^6). The small size of the virus suggests that it could be a satellite virus but current evidence indicates that it replicates independently. Bailey, L. *et al.* (1980). *J. gen. Virol.* **46**, 149.

clover (Croatian) 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.

clover enation 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.

clover mild mosaic virus. An unclassified plant virus with isometric particles 27-28 nm. in diameter which sediment at 121S. The virus is transmitted by aphids in the SEMIPERSISTENT TRANSMISSION manner.

clover yellow mosaic virus. A *Potexvirus*. Bos, L. (1973) CMI/AAB Descriptions of Plant Viruses No. 111. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2, p. 159. CRC Press: Boca Raton, Florida.

clover yellow vein virus. A *Potyvirus*. Hollings, M. and Stone, O.M. (1974) CMI/AAB Descriptions of Plant Viruses No. 131. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2, p. 183. CRC Press: Boca Raton, Florida.

clover yellows virus. A member of the *Closterovirus* subgroup 1. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2, p. 219. CRC Press: Boca Raton, Florida.

CMI/AAB. Abbreviation for Commonwealth

Mycological Institute/Association for Applied Biologists who publish Plant Virus Descriptions.

CMP. Abbreviation for cytidine 5'-monophosphate.

CO₂-sensitivity virus. See SIGMAVIRUS.

Co Ar 1071 virus. Family *Bunyaviridae*, genus *Bunyavirus*.

Co Ar 3624 virus. Family *Bunyaviridae*, genus *Bunyavirus*.

coat (protein). The protective layer(s) which surround(s) the viral nucleic acid. In simple viruses, e.g. PICORNAVIRUSES, it is the capsid but in other viruses, e.g. ORTHOMYXOVIRUSES, it may consist of several layers of protein and lipids.

cocksfoot mild mosaic virus. Synonym: BROME STEMLEAF MOTTLE VIRUS. A possible *Sobemovirus*. Huth, W. and Paul, H.L. (1972) CMI/AAB Descriptions of Plant Viruses No. 107. Hull, R. (1988) *In The Plant Viruses*. Vol. 3, p. 113. ed. R. Koenig. Plenum Press: New York.

cocksfoot mottle virus. A possible *Sobemovirus*. Catherall, P.L. (1970) CMI/AAB Descriptions of Plant Viruses No. 23. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 1, p. 153. CRC Press: Boca Raton, Florida. Hull, R. (1988) *In The Plant Viruses*. Vol. 3, p. 113. ed. R. Koenig. Plenum Press: New York.

cocksfoot streak virus. A *Potyvirus*. Catherall, P.L. (1971) CMI/AAB Descriptions of Plant Viruses No. 59. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2, p. 183. CRC Press: Boca Raton, Florida.

coconut cadang-cadang viroid. A VIROID with at least four molecular forms (246, 287, 492 and 574 nucleotides) which differ in size but not sequence complexity. Lethal to coconut palms. Found in the Philippines. Randles, J.W. and Imperial, J.S. (1984) CMI/AAB Descriptions of Plant Viruses No. 287. Randles, J.W. (1987) *In The Viroids*. p. 265. ed. T.O Diener. Plenum Press: New York.

coding capacity. The amount of protein that a

given DNA or RNA sequence can in theory encode. As a rough estimate a dsDNA of mw. 1×10^6 can code for a protein of mw. 60-70 $\times 10^3$.

coding sequence. That portion of a nucleic acid that directly specifies the amino acid sequence of a protein product. Non-coding sequences include control regions such as PROMOTERS, and POLY-ADENYLATION SIGNALS.

codling moth granulosis virus. See *CYDIA POMONELLA GRANULOSIS VIRUS*.

codon. The set of three bases in a nucleic acid (listed under GENETIC CODE) which specifies an amino acid. Mitochondrial DNA uses some unusual codons. See ANTICODON, START CODON, STOP CODON.

cofactor. Additional (non-protein) components required by an enzyme for action.

coffee ringspot virus. A plant *Rhabdovirus*, subgroup 2; transmitted by mites. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

cohesive ends. Synonym: 'STICKY ENDS'.

coital exanthema virus. Synonym: EQUID HERPESVIRUS 3. Family *Herpesviridae*, probable member of subfamily *Alphaherpesvirinae*. Causes genital infection.

Col An 57389 virus. Family *Bunyaviridae*, genus *Bunyavirus*.

cold-adapted mutants. Mutants which can replicate at temperatures below the optimum for the wild type, e.g. INFLUENZA VIRUS can be adapted to replicate in eggs at 25°C. This mutant has reduced replication efficiency at 37°C and hence may be suitable as a live vaccine.

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

colicin. A protein toxin produced by coliform bacteria, e.g. *E. coli*, which is toxic to other bacteria. Production of, and immunity to, a colicin is usually encoded by genes on a plasmid

termed a Col factor. These plasmids form the basis of a number of popular cloning vectors, e.g. pBR322.

coliphage. PHAGE isolated from *E. coli*.

coliphage lambda. See LAMBDA (λ) PHAGE.

coliphage T2. See T2 PHAGE.

coliphage T4. See T4 PHAGE.

coliphage T7. See T7 PHAGE.

collar. A morphological component in some TAILED PHAGES (e.g. T4 phage) attached to the connector (neck) that links the phage head to the tail. See T4 PHAGE.

Colocasia bacilliform virus. A member of the *Cacao Swollen Shoot Virus* group. Francki, R.I.B. *et al.* (1985) Atlas of Plant Viruses. Vol. 2. p. 235. CRC Press: Boca Raton, Florida.

Colocasia bobone disease virus. A probable plant *Rhabdovirus*, subgroup 2; leafhopper transmitted. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

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

colony. A cluster of cells derived from a single cell by division on a solid medium, e.g. agar.

colony forming units (CFU). The number of colonies formed per unit of volume or weight of a cell suspension

Colorado tick fever virus. Family *Reoviridae*, provisionally genus *Orbivirus*; unlike members of the *Orbivirus* genus, particles contain 12 segments of dsRNA. Causes fever, leucopenia, headache, limb pains and vomiting. Transmitted by bite of infected ticks. Virus also isolated from rodents, in which disease is inapparent. Occurs in parts of the USA. Hamsters can be infected i.p. Virus replicates in eggs and some tissue culture cells.

Columbia SK virus. A strain of ENCEPHALOMYOCARDITIS VIRUS.

Columnea latent viroid. A VIROID.
Diener, T.O. (1987) *In* The Viroids. p. 297. ed. T.O. Diener. Plenum Press: New York.

Commelina 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.

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

common cold virus. *See* HUMAN RHINOVIRUS.

Commonwealth Mycological Institute/Association of Applied Biologists Descriptions of Plant Viruses. A set of pamphlets, edited by B.D. Harrison and A.F. Murant, giving detailed descriptions of plant viruses and virus groups.

communicable disease. A disease which is easily transmitted horizontally between organisms, e.g. INFLUENZA.

Comovirus group. (Sigla from COWPEA MOSAIC, the type virus). Genus of MULTICOMPONENT plant viruses with small isometric particles, 28 nm. in diameter, which sediment at 118S (bottom (B) component), 98S (middle (M) component) and 58S (top (T) component which lacks nucleic acid); CsCl banding densities (g/cc.) are 1.44-1.46 (B), 1.41 (M) and 1.29 (T). The capsids have



icosahedral symmetry (T=1), the structural subunit comprising one molecule each of polypeptides of mw. c.22 and 42 x 10³. The genome is linear, (+)-sense ssRNA, B component containing RNA-1 (mw. 2.4 x 10⁶; 5,889 nucleotides) and M component containing RNA-2 (mw. 1.4 x 10⁶; 3,481 nucleotides); the 5' terminus has a VPg (mw. 5 x 10³), the 3' terminus is polyadenylated. Replication is in the cytoplasm via distinct ds REPLICATIVE INTERMEDIATES; the polymerase is, at least in part, virus coded. Virus mRNAs are translated to give POLYPROTEINS (RNA-1, mw. 207 x 10³; RNA-2, mw. 116 x 10³) which are cleaved to give functional proteins, those from RNA-1 being involved primarily with replication and those from RNA-2 being primarily structural.

The host ranges of individual members are narrow. Particles are found in most cell types, infection being characterised by large cytoplasmic membranous inclusions. Comoviruses are readily transmissible mechanically. Some members are seed transmitted, others are transmitted by beetles.

Matthews, R.E.F. (1982) *Intervirolgy* **17**, 161.
Bruening, G. (1978) CMI/AAB Descriptions of Plant Viruses No. 199.

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

complement fixation test (CFT). A serological test often used for comparing different or related antigens, e.g. viruses. Complement is a multi-component enzyme system present in an inactive state in serum. It becomes activated when a specific site of the Fc portion of certain antibody molecules becomes exposed as a result of antibody binding and is then able to bind to the C1q component. When an antibody is directed against a virus particle the complement will also be irreversibly bound to the virus-antibody complex; this removes complement from the antiserum. The amount of complement remaining is estimated by the reaction with antibody directed against membrane antigens of erythrocytes; the reaction leads to lysis of the erythrocytes and released haemoglobin can be estimated spectrophotometrically. From the amount of complement in the original serum the amount fixed by the virus-antibody complex can be estimated.

complementary base sequence. A nucleic acid sequence which is able to form a perfectly hydrogen-bonded duplex with the one to which it is complementary. Thus an mRNA molecule is complementary to the parts of the DNA strand from which it was transcribed, e.g. for the DNA base sequence ..CGATG.., ..GCTAC.. is the complementary sequence in the DNA strand and ..GCUAC.. in the complementary RNA strand.

complementary DNA (cDNA). An ssDNA molecule that is complementary in base sequence to the single strand from which it was transcribed. Often refers to DNA transcribed from RNA using REVERSE TRANSCRIPTASE. If this cDNA is made double-stranded and cloned it is described as a cDNA clone.

complementary RNA (cRNA). An ssRNA molecule that is complementary in base sequence

to the single strand from which it was transcribed. Most ssRNA viruses (except RETROVIRUSES) use complementary RNA as intermediates in replication.

complementary strand. An ss nucleic acid molecule complementary in base sequence to the single strand from which it was transcribed.

complementation. The process by which one genome provides functions which another genome lacks. There are two types of complementation between viruses; a) intergenic, in which mutants defective in different genes assist one another and b) intragenic, in which mutants defective in the same gene produce a functional gene product.

complementation group. A group of viruses with mutations in the same codon and which cannot complement each other.

complementation test. A test to determine whether two mutants of a virus are defective in the same cistron. If there is no increase in virus yield from a mixed infection of the two mutants compared with the yield after infection with the individual mutants the two viruses are said to be in the same COMPLEMENTATION GROUP.

Con A. Abbreviation for CONCAVAVALIN A.

concanavalin A. A lectin from the plant *Canavalia ensiformis*. It has affinity for terminal α -D-glucosyl residues and is used for purifying glycoproteins. It has been used in the purification of interferon.

concatemer. A long DNA molecule made up from repeated monomers of a single type joined to give a linear multimer with the monomers all in the same orientation. Phage λ replicates by a rolling circle mechanism to give concatemeric DNA which is cleaved at specific (COS) sites during packaging.

conditional lethal mutant. A mutant which will not replicate under conditions in which the wild type replicates, but will under other permissive conditions, e.g. different temperature.

congenital infection. Infection occurring before birth. There are two types of condition in congenital virus infections; a) affecting particular organs

depending upon the stage of foetal development during infection e.g. RUBELLA VIRUS or b) infection of every cell of the embryo and persistence of infection throughout adult life e.g. LYMPHOCYTIC CHORIOMENINGITIS VIRUS in mice.

conjugate. Used as a noun refers to the linking of two macromolecules or a molecule to a macromolecule, e.g. an enzyme to an antibody for use in ELISA.

conjugation. The transfer of a plasmid from one cell to another. The plasmid usually encodes most of the required functions.

conservative replication. A model of nucleic acid replication in which the parent double strand is preserved and both strands of the progeny molecule are newly synthesised. In REOVIRIDAE the progeny dsRNA strands are produced by a fully conservative mechanism. See SEMICONSERVATIVE REPLICATION.

contact infection. A disease transmitted by close mechanical contact between organisms e.g. common cold, herpes, AIDS.

contact inhibition. The inhibition of growth and/or movement when cells come into contact. Natural situation in many non-infected tissue culture systems. Infection with e.g. picornaviruses in mammalian cell line overcomes it.

contagion. A disease syndrome caused by an organism capable of transmission between individual hosts.

contagious ecthyma virus. Synonyms: CHAMOIS CONTAGIOUS ECTHYMA VIRUS, CHAMOIS PAPILLOMA VIRUS. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Parapoxvirus*. Causes lesions in sheep around mouth and lips, and sometimes on udder, thighs, anus and eyes. Occurs in many parts of world. Antigenically distinct from goat pox virus.

contagious pustular dermatitis of horses virus. See HORSE POX VIRUS.

continuous cell line. Cells with uniform morphology and capable of indefinite propagation *in vitro*. This condition may be induced by transformation of a primary cell culture, frequently of tumour tissue. Most do not show CONTACT INHIBITION.

50 continuous flow centrifugation

continuous flow centrifugation. Centrifugation in a rotor which has a fluid seal which allows the continuous flow of a sample into and out of the rotor while it is rotating at high speed. Used for large-scale purification of viruses.

contour length. The length of a nucleic acid molecule as measured by electron microscopy. As the actual length measured depends on the strandedness of the nucleic acid (ss or ds) and on the method of preparation, internal size markers should be used. See KLEINSCHMIDT PROCEDURE.

conversion. A term usually applied to interactions between a temperate PHAGE and a prokaryote host where new properties, which have no obvious relation to the replication cycle of the phage, are conferred on the host by the genome of the PROPHAGE. These can include changes in colony morphology or pigmentation, modification of the antigenic properties of the host (e.g. *Salmonella* strains lysogenic for phage ϵ 15) and effects on toxin production (e.g. *Corynebacterium diphtheriae* lysogenic for phage β).

core. The central part of a virion enclosed by a capsid and comprising protein and the viral nucleic acid genome.

Coronaviridae. (Latin 'corona' = crown.) A family of RNA viruses comprising a single genus (CORONAVIRUS) with pleomorphic particles, 75-160 nm. in diameter. The particles have a lipid



100nm

envelope with club-shaped surface projections 12-24 nm. in length. The ribonucleoprotein is seen as a helical structure 11-13 nm. diameter or as strands 9 nm. in diameter. There are four to six proteins: the surface projections are glycosylated. The RNA comprises one molecule of (+)-sense ssRNA, mw. $5-6 \times 10^6$ with a poly A tail at the 3' end. During replication ssRNA species are produced. These comprise the virion RNA and shorter forms in which the sequence of each RNA is contained within every larger RNA species (nested set). Several virus-specific non-structural proteins are found in infected cells. The host range includes man, mouse, pig, dog, cow and rats. Transmission is probably mechanical. Matthews, R.E.F. (1982) Intervirology 17, 102.

Coronavirus. The single genus of the family *Coronaviridae*. Contains AVIAN INFECTIOUS BRONCHITIS, HUMAN CORONA, MURINE HEPATITIS, PORCINE HAEMAGGLUTININATING ENCEPHALITIS and TRANSMISSIBLE PORCINE GASTRO-ENTERITIS VIRUSES.

Corriparta virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from culicines and birds in Northern Australia.

Corticoviridae. (Latin 'cortex, corticis' = bark, crust). A family of viruses of prokaryotes including large (60 nm. in diameter) isometric DNA-containing PHAGES with an outer protein capsid and an internal lipoprotein layer. Few virus iso-



100nm

lates have been found with these properties. The type species is PM2 PHAGE (isolated from a bacterium of the genus, *Alteromonas*). Phage 06N 58P (from *Vibrio*) is a possible member of this virus group. Contains a single genus, *CORTICOVIRUS*.

Corticovirus. See CORTICOVIRIDAE.

cos site. The sticky ends of certain phage DNA molecules. It usually refers to λ which has 12 base sticky ends formed during packaging of CONCATAMERIC λ DNA. The λ -'ter' gene product cuts the ds cos sequence asymmetrically to give the sticky ends.

cosmid. A plasmid vector which contains the COS SITE of phage λ and one or more selectable markers; the cos site enables *in vitro* packaging to take place in phage. Cosmids are capable of being used for cloning large (up to 35kbp) DNA fragments at high efficiency.

Cotesia marginiventris virus. Unclassified long, filamentous virus associated with the reproductive tract of the braconid parasitoid *Cotesia* (= *Apanteles*) *marginiventris*. Virions are 50-98 nm. in width and about 865 nm. long, straight or slightly flexuous. The virus is morphologically distinct from polydnviruses and, unlike polydnviruses, it replicates in the tissues of the lepidopteran hosts of the parasitoid. It is also morphologically distinct from the other parasitoid virus (see *Cotesia melanoscela* virus) known to infect host larvae.

Styer, E.L., *et al.* (1987) J. Invertebr. Pathol. 50, 302.

- Cotesia melanoscela viruses.** Viruses isolated from the braconid wasp, *C. melanoscela*, a parasitoid of the gypsy moth. They include a typical POLYDNA VIRUS and an unclassified virus (designated CmV2). The CmV2 virion consists of a large quasicylindrical nucleocapsid surrounded by two unit membranes. The genome is probably a single dsDNA molecule of approximately 125kbp rather than the polydisperse genome characteristic of polydnaviruses. Virus replication occurs in the ovarian calyx and in some other tissues of both male and female parasitoids. CmV2 also replicates in tissues of the caterpillar hosts of the parasitoid and in lepidopteran cell cultures.
Stoltz, D.B. *et al.* (1988) *Virology* **162**, 311.
- Cotia virus.** Family *Poxviridae*, not assigned to genus. Isolated from man, sentinel mice and mosquitoes in S. America. Replicates in human embryo lung cells and in cell lines.
- cotton anthocyanosis 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.
- cotton leaf crumple virus.** A probable *Geminivirus*, subgroup B.
Harrison, B.D. (1985) *Ann. Rev. Phytopath.* **23**, 55.
- councilman bodies.** Collections of necrotic hyaline cells in the liver of individuals infected with YELLOW FEVER VIRUS. They stain in a characteristic manner with eosin.
- counts per minute (cpm).** A measure of the radioactivity of a sample. It is the basic output from a radioactivity counter and does not allow for quenching of counts by components in the sample. *See* DISINTEGRATIONS PER MINUTE.
- covalently closed circular DNA (cccDNA).** A form of dsDNA in which both strands are circular i.e. do not have free ends. Also known as form I DNA. *See* SUPERCOILED DNA.
- cow parsnip mosaic virus.** A probable 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.
- Cowbone Ridge virus.** Family *Flaviviridae*, genus *Flavivirus*. Isolated from a cotton rat in Florida.
- cowpea aphid-borne mosaic virus.** Synonym: ADZUKI BEAN MOSAIC VIRUS. A *Potyvirus*.
Bock, K.R. and Conti, M. (1974) *CMI/AAB Descriptions of Plant Viruses* No. 134.
Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 183. CRC Press: Boca Raton, Florida.
- cowpea chlorotic mottle virus.** A *Bromovirus*.
Bancroft, J.B. (1971) *CMI/AAB Descriptions of Plant Viruses* No. 49.
Francki, R.I.B. (1985) *In The Plant Viruses*. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.
- cowpea green vein-banding virus.** A *Potyvirus*.
Lin, M.T. *et al.* (1979) *Fitopat. Bras.* **4**, 120.
- cowpea mild mottle virus.** A *Carlavirus*.
Brunt, A.A. and Kenton, R.H. (1974) *CMI/AAB Descriptions of Plant Viruses* No. 140.
Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 173. CRC Press: Boca Raton, Florida.
- cowpea mosaic virus.** Type member of the *Comovirus* group.
van Kammen, A. and de Jager, C.P. (1978) *CMI/AAB Descriptions of Plant Viruses* No. 197.
Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 1. CRC Press: Boca Raton, Florida.
- cowpea mottle virus.** A possible member of the *Carmovirus* group.
Bozarth, R.F. and Shoyinka, S.A. (1979) *CMI/AAB Descriptions of Plant Viruses* No. 212.
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.
- cowpea ringspot virus.** A possible *Cucumovirus*.
Francki, R.I.B. (1985) *In The Plant Viruses*. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.
- cowpea severe mosaic virus.** A *Comovirus*.

52 cowpox virus

de Jager, C.P. (1979) CMI/AAB Descriptions of Plant Viruses No. 209.

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

cowpox virus. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Orthopoxvirus*. Causes papules and then vesicles, followed by crusting on teats and udders of cows. Infects hands of milk attendants. Forms basis of Jenner's original smallpox vaccine. Many species including guinea pigs, mice, monkeys and rabbits can be infected. Can be grown in chorioallantoic membrane and in many cell lines.

Coxsackie viruses. Family *Picornaviridae*, genus *Enterovirus*. Cause herpangina, aseptic meningitis, pleurodynia, myalgia, orchitis and myocarditis. Divided into groups A and B on basis of disease signs in suckling mice. Those in group A cause flaccid paralysis whereas those in group B cause a spastic paralysis. Both groups grow in tissue culture cells. Coxsackie B5 virus is closely related antigenically to swine vesicular disease virus. The group first assumed importance because it was mistakenly considered to be poliovirus.

Cp 169 cells. Insect cell line derived from the codling moth, *Cydia pomonella*, that is non-permissive for the replication of *Autographa californica* nuclear polyhedrosis virus.

cpe. Abbreviation for CYTOPATHIC EFFECT.

cpm. Abbreviation for COUNTS PER MINUTE.

CPV. Common abbreviation for cytoplasmic polyhedrosis virus, but also used on occasion for BEE CHRONIC PARALYSIS VIRUS.

Crawley virus. Family *Reoviridae*, genus *Reovirus*. Isolated from birds.

cricket paralysis virus: CrPV. A member of the *PICORNAVIRIDAE* not yet assigned to a specific genus; first isolated from the Australian field cricket (*Teleogryllus oceanicus*; Orthoptera). Virions resemble vertebrate *PICORNAVIRUSES* in many properties being isometric, 27 nm. in diameter, sedimenting at 167S and having a buoyant density in CsCl of 1.34 g/cc. However, only three major structural polypeptides have been observed (mw. 35, 34, 30 x 10³) and the

presumed viral replicase is larger than replicases from vertebrate picornaviruses. The (+)-sense ssRNA genome has a mw. of 2.5-2.8 x 10⁶. CrPV is serologically related to *DROSOPHILA C VIRUS* but no sequence homology with this virus has been detected. IgM antibodies to CrPV have been found in several mammalian species and the virus appears to cross-react serologically with *ENCEPHALOMYOCARDITIS VIRUS*. However, direct evidence obtained so far indicates that CrPV only infects invertebrates. Identical or closely-related viruses have been isolated from Lepidoptera, Orthoptera and Hymenoptera.

Moore, N.F. (1985) *J. gen. Virol.* **66**, 647.

Crimean-Congo haemorrhagic fever virus. Family *Bunyaviridae*, genus *Nairovirus*. Isolated from febrile patients in Belgian Congo. Occurs widely in Africa, Crimea, causing high mortality. Symptoms include purpuric rash and severe haemorrhaging in lungs, gastro-intestinal tract and kidneys, accompanied by shock and renal insufficiency.

crimson clover latent virus. A *Nepovirus*. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2. p. 23. CRC Press: Boca Raton, Florida.

Crinum 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.

cRNA. Abbreviation for COMPLEMENTARY RNA

cross-hybridisation. Hybridisation between complementary nucleic acids from different sources. Percentage cross-hybridisation can provide a measure of the relatedness of two nucleic acids.

cross-protection. The protection conferred on a host by infection with one strain of a virus which prevents infection by a closely-related strain. Usually applied to plant or animal viruses (*see SUPERINFECTION EXCLUSION*). Mild strains of a virus have been used to protect against infection with severe strains e.g. *TOMATO MOSAIC VIRUS*. The phenomenon is also used to assess relatedness of virus strains.

cross-reactivation. Synonym: *MARKER RESCUE*.

crossed immunoelectrophoresis. A variation of

ROCKET IMMUNOELECTROPHORESIS in which a mixture of antigens is first separated by electrophoresis in an agarose gel and then electrophoresed at right angles into a gel containing antibodies. It is used to resolve complex antibody-antigen systems and to quantify the antigens present by analysing the area enclosed within the precipitin arcs formed during electrophoresis in the second dimension.

Vestergaard, B.F. *et al.* (1977) *J. Virol.* **24**, 82.

cryptogram. A cipher used to record certain basic properties of a virus. It consists of four pairs of symbols; 1st. pair: type of nucleic acid and strandedness; 2nd. pair: mw. of nucleic acid ($\times 10^6$) and percent nucleic acid in infective particle; 3rd pair: outline of particle and shape of nucleocapsid; 4th. pair: kind of host infected and kind of vector, e.g. INFLUENZA VIRUS A R/1:2/1:S/E:V/O; TOBACCO MOSAIC VIRUS R/1:2/5:E/E:S/O where R = RNA, 1 = ss; 2 = mw. 2×10^6 , 1 and 5 are the % nucleic acid; S = spherical, E = elongate; V = vertebrate, S = seed plant, O = no known vector. Gibbs, A.J. *et al.* (1966) *Nature* **209**, 450.

cryptotope. *See* EPITOPE.

Jerne, N.K. (1960) *Ann. Rev. Microbiol.* **14**, 341.

Cryptovirus group. ('cryptic' = lack of symptoms). Genus of plant viruses with isometric particles, 30 or 38 nm. in diameter, which sediment at *c.*120S. The structural subunit is a coat



100nm

protein mw. $53-63 \times 10^3$. The particles contain dsRNA, usually two or three species with mw. ranging from $1.6-0.6 \times 10^6$. There are two subgroups, A (type member WHITE CLOVER CRYPTIC VIRUS 1) which has smooth particles 30 nm. in diameter and B (type member WHITE CLOVER CRYPTIC VIRUS 2) which has particles 38 nm. in diameter with prominent subunits. Cryptic viruses cause no apparent symptoms in plants. They are not transmitted mechanically or by grafting but are transmitted very efficiently through seed. Cryptic viruses are also known as temperate viruses.

Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2, p. 244. CRC Press.: Boca Raton, Florida.

Boccardo, G. *et al.* (1987) *Adv. Virus Res.* **31**, 171.

crystalline array virus. Unclassified small

RNA virus isolated from the grasshopper *Melanoplus bivittatus* (Orthoptera). Virions are isometric, 13 nm. in diameter (from thin section studies) and sediment at 42S. Particles contain 18-22% RNA and occur in dense arrays in the cytoplasm of infected cells. Although the small size of the virus suggests that it could be a satellite virus, it does not occur in association with a larger helper virus.

Jutila, J.W. *et al.* (1970) *J. Invertebr. Pathol.* **15**, 225.

cubic phages. Viruses, isolated from prokaryotes, whose capsids have cubic (icosahedral) symmetry. These include members of the *MICROVIRIDAE* (e.g. ϕ X174), *CORTICOVIRIDAE* (e.g. PM2), *TECTIVIRIDAE* (e.g. PRD1), *LEVIVIRIDAE* (e.g. MS2), *CYSTOVIRIDAE* (e.g. ϕ 6) and the unclassified phage SiI (*see* PHAGE).

Ackermann, H.W (1978) *In Handbook of Microbiology*. Vol II, p. 639 ed. A.I. Laskin and H.A. Lechevalier. CRC Press: Boca Raton, Florida.

cubic symmetry. One of the major groups of regular (Platonic) polyhedra. There are three types of cubic symmetry: a) tetrahedral symmetry which has four 3-fold axes and three 2-fold axes, b) octahedral symmetry which has three 4-fold axes, four 3-fold axes and six 2-fold axes and c) ICOSAHEDRAL SYMMETRY which has twelve 5-fold axes, ten 3-fold axes and fifteen 2-fold axes. Many isometric viruses have icosahedral symmetry.

cucumber fruit streak virus. Synonym: CUCUMBER LEAF SPOT VIRUS.

cucumber green mottle mosaic virus. A *Tobamovirus*.

Hollings, M. *et al.* (1975) *CMI/AAB Descriptions of Plant Viruses* No. 154.

Okada, Y. (1986) *In The Plant Viruses*. Vol. 2. p. 267. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

cucumber leaf spot virus. A possible member of the *Tombusvirus* group.

Weber, I. (1986) *AAB Descriptions of Plant Viruses* No. 319.

Morris, T.J. and Carrington, J.C. (1988) *In The Plant Viruses*. Vol. 3. p. 73. ed. R. Koenig. Plenum Press: New York.

cucumber mosaic virus (CMV). Type member of the *Cucumovirus* group. The virus has a very

wide host range with more than 470 species from 67 families being reported as natural hosts. The symptoms are most commonly mosaics but in some hosts deformation of leaves or necrosis can occur. CMV is of moderate economic importance but in some crops can cause severe damage. Its occurrence is widespread and it is found in both temperate and tropical countries. The virus is very variable and numerous 'strains' have been described. The designation of strain is confused because of the effects that a virus-dependent satellite RNA (CARNA-5) can have on symptoms. Strains Q, S, Y, D, W, Imperial and Price's No. 6 are widely recognised. CARNA-5 is a linear ssRNA of 335-336 nucleotides.

Francki, R.I.B. *et al.* (1979) CMI/AAB Descriptions of Plant Viruses No. 213.

Francki, R.I.B. (1985) *In* The Plant Viruses. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

cucumber necrosis virus. A possible member of the *Tombusvirus* group.

Dias, H.F. and McKeen, C.D. (1972) CMI/AAB Descriptions of Plant Viruses No. 82.

Rochon, D'A. and Tremaine, J.H. (1988) *J. gen. Virol.* **69**, 395.

Morris, T.J. and Carrington, J.C. (1988) *In* The Plant Viruses. Vol. 3, p. 73. ed. R. Koenig. Plenum Press: New York.

cucumber pale fruit viroid. A VIROID.

Diener, T.O. (1987) *In* The Viroids. p. 261. ed. T.O. Diener. Plenum Press: New York.

cucumber soil-borne virus. A possible member of the *Tombusvirus* group.

Francki, R.I.B. *et al.* (1985) *In* Atlas of Plant Viruses. Vol. 2. p. 235. CRC Press: Boca Raton, Florida.

cucumber yellows virus. A possible *Closterovirus*.

Francki, R.I.B. *et al.* (1985) *In* Atlas of Plant Viruses. Vol. 2. p. 219. CRC Press: Boca Raton, Florida.

Cucumovirus group. (Sigla from CUCUMBER MOSAIC, the type virus). Genus of MULTICOMPONENT plant viruses with small isometric particles, 29 nm. in diameter, which sediment at 99S and band in CsCl at 1.37 g/cc when fixed. Virus

particles are stabilised primarily by protein-RNA interactions; they are sensitive to ribonuclease. Capsid structure is icosahedral (T=3), the structural subunit being a single protein species (mw. 24×10^3). Genomic linear (+)-sense ssRNA comprises three species, RNA-1 (mw. 1.27×10^6 ; 3,389 nucleotides), RNA-2 (mw. 1.13×10^6 ; 3,035 nucleotides) and RNA 3 (mw. 0.82×10^6 ; 2,216 nucleotides). RNAs-1 and -2 are separately encapsidated; RNA-3 is encapsidated with the coat protein mRNA, RNA-4 (mw. 0.35×10^6 ; 1,049 nucleotides). The 5' termini of the RNAs have a CAP; the 3' termini have a tRNA-like structure which accepts tyrosine. Replication is in the cytoplasm and, for the genomic RNAs, is via distinct ds REPLICATIVE INTERMEDIATES; RNA-4 is derived from RNA-3. RNAs-1, -2 and -4 are MONOCISTRONIC messengers for proteins of mw. 105, 120 and 24 (coat protein) $\times 10^3$ respectively; RNA-3 is bicistronic encoding a protein of mw. 34×10^3 at the 5' end and having the coat protein cistron at the 3' end.

The host range varies from wide for the type member to narrow for the other members. Particles are found in most cell types. Cucumoviruses are readily mechanically transmitted. They are seed transmitted in several hosts and are transmitted by aphids in the NON-PERSISTENT TRANSMISSION manner.

Matthews, R.E.F. (1982) *Intervirolgy* **17**, 171.
Francki, R.I.B. *et al.* (1985) *In* Atlas of Plant Viruses. Vol. 2. p. 53. CRC Press.: Boca Raton, Florida.

Francki, R.I.B. (1985) *In* The Plant Viruses. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

culture collection. A repository of cultures of characterised viruses, bacteria, cells and other organisms. Used for reference and comparison with new isolates. The AMERICAN TYPE CULTURE COLLECTION is one of the main repositories for viruses.

culture medium. Solution, usually containing various inorganic salts, sugars, amino acids, antibiotics and (for animal viruses) sera, used for culturing cells.

curing. Loss of a LYSOGENIC phage from a bacterial culture thus converting the culture to a non-lysogenic state.

cyanogen bromide. A chemical which reacts with methionine, converting it to homoserine



100nm

lactone, thus splitting the peptide chain on the C-terminal side of that amino acid. It is used to obtain peptides with C-terminal methionine residues from proteins.

Steeres, E. *et al.* (1965) *J. Biol. Chem.* **240**, 2478.

Cyanomyovirus. (From 'cyano', Greek 'kyanos' = blue and 'myo', Greek 'myos' = muscle). Proposed genus of the *MYOVIRIDAE* including phages with long contractile tails isolated from blue-green algae (cyanobacteria). The proposed type species is cyanophage AS-1 isolated from unicellular cyanobacteria (*Anacystis* and *Synechococcus*). Virions of AS-1 are of the A1 morphotype (*see PHAGE*), with a 90 nm. diameter isometric head and an extended tail of 244 x 23 nm. contracting to 93 nm. The base plate is 40 nm. wide and bears short tail pins. Particles sediment at 754S and have a buoyant density in CsCl of 1.49 g/cc. Thirty structural proteins have been detected. The genome is linear dsDNA (mw. 57 x 10⁶). The virus replicates in the nucleoplasm of the host. Other members of the genus are cyanophages N1, A-1(L) and A-2.

Safferman, R.S. *et al.* (1983) *Intervirology* **19**, 61.

cyanophages. Viruses isolated from blue-green algae (cyanobacteria), morphologically similar to many bacteriophages. All isolates to date resemble TAILED PHAGES and have been provisionally grouped into three proposed genera: CYANOMYOVIRUS (*MYOVIRIDAE*), CYANOSTYLOVIRUS (*Styloviridae*, now superseded by *SIPHOVIRIDAE*) and CYANOPODOVIRUS (*PODOVIRIDAE*).

Safferman, R.S. *et al.* (1983) *Intervirology* **19**, 61.

Cyanopodovirus. ('cyano', Greek 'kyanos' = blue and 'podo', Greek 'podos' = foot). Proposed genus of the *PODOVIRIDAE* including phages with short tails isolated from blue-green algae (cyanobacteria). The proposed type species is cyanophage LPP-1 isolated from filamentous cyanobacteria (*Lyngbya*, *Plectonema* and *Phormidium*). Virions of LPP-1 are of the C1 morphotype (*see PHAGE*), with a 59 nm. diameter isometric head and a tail 15-20 nm. long, 15 nm. wide. Particles sediment at 548S and have a buoyant density in CsCl of 1.48 g/cc. Ten structural proteins have been observed (major head proteins mw. 39 and 13 x 10³; major tail protein mw. 80 x 10³). The genome is linear dsDNA (mw. 27 x 10⁶). The virus replicates in the peripheral region of the host cell, displacing the photosynthetic lamellae. Other members of the genus are cyanophages LPP-2, SM-1, A-4(L) and AC-1.

Safferman, R.S. *et al.* (1983) *Intervirology* **19**, 61.

cyanostylovirus. ('cyano', Greek 'kyanos' = blue and 'stylo', Greek 'stylos' = pillar). Proposed genus of the *STYLOVIRIDAE* (now superseded by *SIPHOVIRIDAE*), including phages with long, noncontractile tails isolated from blue-green algae (cyanobacteria). The proposed type species is cyanophage S-1 isolated from unicellular cyanobacteria (*Synechococcus*). Virions of S-1 are of the B1 morphotype (*see PHAGE*), with a 50 nm. diameter head and a rigid noncontractile tail 140 nm. long. Particles sediment at 353S and have a buoyant density in CsCl of 1.50 g/cc. Thirteen structural proteins have been observed (major proteins mw. 39, 11 and 10 x 10³). The genome is linear dsDNA (mw. 23-26 x 10⁶). Other members of the genus are cyanophages S-2L and SM-2.

Safferman, R.S. *et al.* (1983) *Intervirology* **19**, 61.

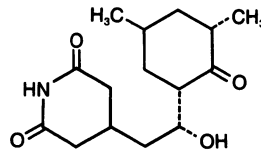
cybrid. The product of the fusion of a cell with a cytoplasm (a cell from which the nucleus has been deleted). The resulting cell may contain cytoplasmic components, e.g. A-type virus particles, not under the control of the cell genome.

cycas necrotic stunt virus. A *Nepovirus*, occurs in Japan.

Kusunoki, M. *et al.* (1986) *Ann. Phytopath. Soc. Japan* **52**, 302.

cyclic AMP. A compound derived from ATP by the action of the enzyme adenylyl cyclase. It is an important regulatory molecule in higher eukaryotes, being a mediator of hormone action while in prokaryotes it is involved in the catabolite repression of gene expression.

cycloheximide. 3-[2-(3,5-dimethyl-2-oxocyclohexyl)-2-hydroxyethyl]glutarimide. An antibiotic isolated from certain strains of *Streptomyces griseus*. It is a reversible inhibitor of protein synthesis in eukaryotic cells but not in prokaryotic systems.



Cydia pomonella granulosis virus. Baculovirus (Subgroup B) isolated in Mexico from the codling

56 *Cylindocapsa geminella* 'virus'

moth, *C. pomonella*. The virus is highly infectious for neonate larvae with an LD_{50} of *c.* one virus particle and an LT_{50} of approximately four days at 25°C. The virus is infectious for a small number of closely-related insect species within the family Tortricidae. It has received considerable attention as a selective biological control agent of codling moth and several trial commercial products have been developed (e.g. SAN 404 and DECYDE). A product is currently marketed on a small scale in Switzerland. Isolates of the virus from the UK and USSR are genetically very closely related, though not identical, to the original Mexican isolate. Codling moth GV is one of the few GVs where a productive infection has been recorded *in vitro* in cell cultures of the homologous host.

Crook, N.E. *et al.* (1985) *J. gen. Virol.* **66**, 2423.

***Cylindocapsa geminella* 'virus'**. Virus-like particles found in a green alga. The particles are isometric, 200-230 nm. in diameter with a complex multilayered capsid comprising at least ten protein species (mw. 10-160 x 10³) surrounding dsDNA (mw. 175-190 x 10⁶). Infectivity has not been shown.

Stanker, L.H. *et al.* (1981) *Virology* **114**, 357.

Cymbidium mosaic virus. A *Potexvirus*. Francki, R.I.B. (1970) CMI/AAB Descriptions of Plant Viruses No. 27.

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

Cymbidium ringspot virus. A *Tombusvirus*. Hollings, M. and Stone, O.M. (1977) CMI/AAB Descriptions of Plant Viruses No. 178.

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.

Cynara virus. 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.

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

cynosorus mottle virus. An unclassified plant virus with isometric particles.

Hull, R. (1988) *The Plant Viruses*. Vol. 3. p. 113. ed. R. Koenig. Plenum Press: New York.

Cypovirus. Unofficial name for CYTOPLASMIC POLYHEDROSIS VIRUS GROUP.

Cystoviridae. ('cysto', Greek 'kystis' = bladder, sack). A family of phages in which virions are enveloped and contain a segmented dsRNA genome. $\phi 6$ PHAGE is the only member.



100nm

Cystovirus. See $\phi 6$ PHAGE.

cytidine. The nucleoside of cytosine and ribose. See NUCLEIC ACID.

cytidine 5'-triphosphate. The triphosphate of the nucleoside cytidine. See NUCLEIC ACID.

cytochrome c. A basic protein with mw. ranging from 12.1-12.6 x 10³ depending upon source. Used in the electron microscopy of nucleic acids as it binds to them and renders them detectable in the electron microscope. See KLEINSCHMIDT PROCEDURE.

cytotoxic. Causes cell death.

cytomegalovirus. See BETAHERPESVIRINAE. A subfamily in the *Herpesviridae*. Isolated principally from the salivary glands and kidneys of many species, including man, mouse and guinea pig.

cytopathic effect (cpe). Changes in the microscopic appearance of cultured cells often seen following virus infection. Can consist of changes in cell morphology, e.g. rounding up, cell fusion or the production of intracellular structures, e.g. INCLUSION BODIES.

cytoplasm. The protoplasm of an animal or plant cell external to the nucleus and other organelles.

cytoplasmic polyhedrosis virus group. Genus of the *REOVIRIDAE* containing viruses isolated only from arthropods. The viruses differ from other genera within the *Reoviridae* by having virions only 50-65 nm. in diameter, with a single shell

which carries twelve spikes (c.20 nm. long) located at the icosahedral vertices. During replication many virions are occluded singly or, more usually, in large numbers within proteinaceous occlusion bodies (polyhedra). Unlike most other reoviruses, the RNA transcriptase and associated RNA-capping enzymes in the virion do not require prior treatment with proteolytic enzymes for their activation. Virions generally contain five polypeptides (mw. 31-151 x 10³) and the OCCLUSION BODY matrix protein (POLYHEDRIN) varies in mw. from 25-37 x 10³ depending on the virus isolate. Twelve virus 'types' have been defined (from 68 isolates examined) by their distinctive ELECTROPHEROTYPE, antigenic properties and RNA homology studies. The type species is *BOMBYX MORI* CYTOPLASMIC POLYHEDROSIS VIRUS (type 1). Other CPV 'types' are: type 2 (from *Inachis io*); type 3 (from *Spodoptera exempta*); type 4 (from *Actias selene*); type 5 (from *Trichoplusia ni*); type 6 (from *Biston betularia*);

type 7 (from *Noctua (=Triphaena) pronuba*); type 8 (from *Abraxas grossulariata*); type 9 (from *Agrotis segetum*); type 10 (from *Aporophyla lutulenta*); type 11 (from *Spodoptera exigua*); type 12 (from *Spodoptera exempta*). CPV isolates have been recorded in more than 200 arthropod species, predominantly from Lepidoptera, but also Diptera, Hymenoptera and the crustacean *Simocephalus expinosus*. Virus replication is confined to the cytoplasm of cells of the gut epithelium. A list of insect hosts in which CPVs have been recorded is given in Appendix B. Payne, C.C. and Mertens, P.P.C. (1983) *In The Reoviridae*, p. 425, ed. W.K. Joklik. Plenum Press: New York.

cytosine. A constituent pyrimidine base of DNA and RNA. *See* NUCLEIC ACID.

cytoskeleton. The protein fibres which make up the structural framework of a cell.