

B

734B B virus. Family *Retroviridae*, subfamily *Oncovirinae*, genus *Type B Oncovirus group*. Present in MCF-7 cells, a line derived from a patient with disseminated mammary adenocarcinoma. Related to mouse mammary tumour virus but no relationship with the Type C oncovirus group.

B-type inclusion body. Inclusion bodies observed in the cytoplasm of vertebrate POXVIRUS infected cells, representing sites of virus synthesis; characteristic of all productive poxvirus infections.

B-type virus particles. A morphologically defined group of enveloped RNA virus particles, seen outside the cells in mouse mammary carcinoma. They have a dense body or core 40-60 nm. in diameter which is contained in an envelope 90-120 nm. in diameter. The particles bud through the cell membrane. The prototype member is MOUSE MAMMARY TUMOUR VIRUS. See A-, C-, D-TYPE VIRUS PARTICLE.

Dalton, A. J. (1972) *J. Natl. Cancer Inst.* **49**, 323.

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

Baboon Type C Oncovirus. Family *Retroviridae*, subfamily *Oncovirinae*, genus *Type C Oncovirus Group*, sub-genus *Type C Oncovirus*. Isolated from a baboon *Papio cynocephalus*. Can be grown in foetal canine cells.

baby hamster kidney cells. Heteroploid fibroblastic cells from kidneys of day-old Syrian or golden hamster; susceptible to many viruses e.g. FOOT-AND-MOUTH DISEASE VIRUS, VESICULAR STOMATITIS VIRUS, RABIES VIRUS.

MacPherson, I. and Stoker, M. (1962) *Virology* **16**, 147.

bacilliform. Description of shape of certain virus

particles which are cylindrical with two rounded ends, e.g. PLANT RHABDOVIRUSES, BACULOVIRUSES.

Bacillus 'baculovirus'. Unclassified virus, morphologically similar to a NON-OCCLUDED BACULOVIRUS, observed in mid-gut epithelial cells of the stick insect, *Bacillus rossius*. Particles in section consist of a rod-shaped nucleocapsid (210 x 50-60 nm.) surrounded by a membrane.

Scali V. *et al.* (1980) *J. Invertebr. Pathol.* **35**, 109.

bacteriocinogen. Genetic determinant in some bacteria (often plasmids) which specifies the production of a BACTERIOCIN. The determinants for particulate bacteriocins are specified by chromosomal genes and behave like a defective PROPHAGE. Particulate bacteriocin production (which is normally suppressed) can be induced by agents such as UV light which normally 'activate' LYSOGENIC phages.

Hardy, K. (1986) *Bacterial Plasmids*. 2nd edit. Thomas Nelson: Walton-upon-Thames.

bacteriocins. Proteins released by some bacteria, which are able to kill other bacterial strains. The producing strain is relatively immune to the effects of its own bacteriocin. 'Particulate bacteriocins', which resemble phage particles or subviral particles (e.g. TAILS) adsorb to and kill sensitive cells without multiplying in them. 'True' bacteriocins are agents without complex morphology (e.g. enzymes) and of low mw. Colicins (bacteriocins produced by *E. coli*) are specified by *Col* plasmids and range from mw. 12-90 x 10³.

Ackermann, H.W. and Brochu, G. (1978) *In Handbook of Microbiology*. Vol II. p. 691. ed. A.I. Laskin and H.A. Lechevalier. CRC Press: Boca Raton, Florida.

Hardy, K. (1986) *Bacterial Plasmids*. 2nd edit. Thomas Nelson: Walton-upon-Thames.

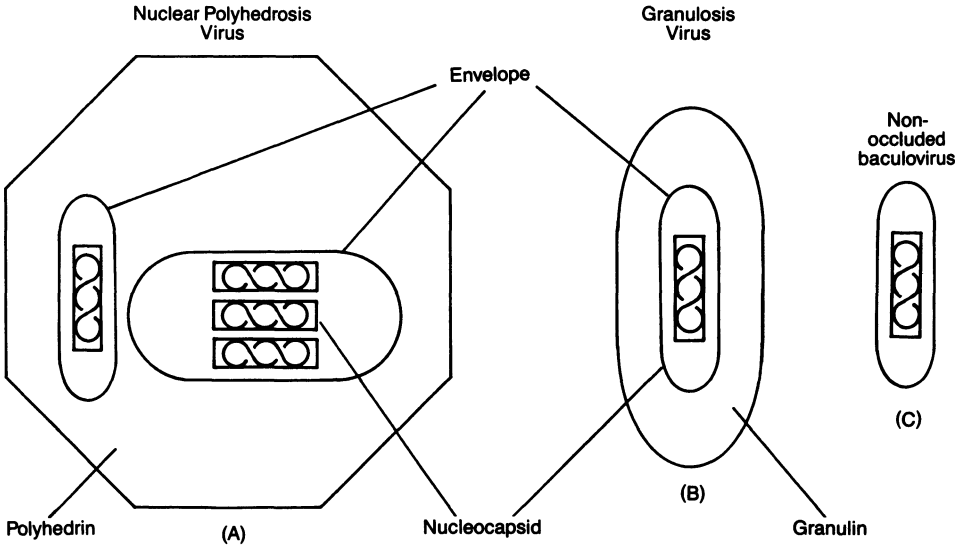
Reaney, D.C. and Ackermann, H.W. (1982) *Adv. Virus Res.* **27**, 205.

18 bacteriophage

bacteriophage. A virus which replicates inside a bacterium. *See* PHAGE.

Baculoviridae. (Latin 'baculum' = 'stick'-viruses; from the rod-shaped morphology of the virion.) A family of viruses containing a single genus (BACULOVIRUS) isolated from Arthropods.

occur in the cytoplasm. Virions of subgroups A and B can be occluded during infection in crystalline protein OCCLUSION BODIES which may be polyhedral in shape and contain many virus particles (subgroup A = NPV) or may be ovoid cylindrical and contain only one or rarely two or more particles (subgroup B = GV); *see* Figure. Size estimates for



Particles not to scale

Virions contain one or more rod-shaped nucleocapsids surrounded by an envelope. The viral genome is a single molecule of circular supercoiled dsDNA.

Baculovirus. The only genus of viruses currently classified within the *Baculoviridae*. Virions consist of one or more rod-shaped nucleocapsids (40-60 nm. x 200-400 nm.) enclosed within a single envelope, which sediment between 1230-1640S and have buoyant densities in CsCl of 1.20-1.32 g/cc. for enveloped particles and 1.47-1.48 g/cc. for nucleocapsids. Virions are structurally complex and may contain at least 25 polypeptides (mw. $10\text{-}160 \times 10^3$) of which about eleven are nucleocapsid components. The DNA genome is a single molecule of circular supercoiled dsDNA (mw. $59 \times 10^6\text{-}154 \times 10^6$). Of the three subgroups within the genus (A = NUCLEAR POLYHEDROSIS VIRUSES (= NPVs); B = GRANULOSIS VIRUSES (= GVs) and C = NON-OCCLUDED BACULOVIRUSES), viruses of subgroups A and C replicate exclusively in the nucleus, while those of subgroup B replicate mainly in the nucleus but replication can

the matrix protein of the occlusion bodies (referred to as 'POLYHEDRIN' for NPVs and 'GRANULIN' for GVs) range from $25\text{-}33 \times 10^3$, depending on virus isolate. Virus infection in susceptible larvae follows ingestion of the virus and solubilization of the occlusion body in the gut. Virus enters the cell by fusion of the envelope with the cell membrane. Nucleocapsids uncoat at pores in the nuclear membrane and/or within the nucleus. Biochemical events in baculovirus replication have been intensively studied with the type species of subgroup A, *Autographa californica* NPV. In this virus at least, two morphological forms of the virus are known to occur; one form acquires the envelope *de novo* within the nucleus of an infected cell before occlusion; the other, which is not occluded, acquires the envelope by budding through the plasma membrane and is responsible for cell-to-cell spread of infection. Baculoviruses or baculovirus-like particles have been isolated from several hundred members of the Insecta (particularly Lepidoptera and Hymenoptera but also Coleoptera, Diptera, Neuroptera and Trichoptera) as well as certain arachnids and

crustaceans. A putative baculovirus with similar general morphology has been observed in a fungus (*Strongwellsea magna*). There is no formal nomenclature for each virus isolate although, conventionally, viruses have been named after the host from which they were first isolated (e.g. *A. californica* NUCLEAR POLYHEDROSIS VIRUS = AcNPV). Occasionally, Latin binomials have been used (e.g. *Baculovirus heliothis* for an NPV from *Heliothis* spp.). Relationships between the many isolates have not been clearly defined. Transmission is generally horizontal, by contamination of the food, but vertical transmission through surface contamination of the egg also occurs. The host range of individual isolates may be restricted to one or a few arthropod species. For this reason and because they often induce a lethal infection in susceptible hosts, certain baculoviruses have found favour as selective insect pest control agents.

A fourth baculovirus subgroup (D) was proposed in earlier classifications, which included non-occluded nuclear viruses with a polydisperse (multipartite) DNA genome isolated from the ovaries of parasitoid Hymenoptera. These have now been classified as a separate family (see POLYDNAVIRIDAE). However, certain unclassified virus isolates from braconid parasitoids do not have a polydisperse genome and most closely resemble non-occluded baculoviruses (e.g. *Mesoleius Baculovirus*).

Granados, R.R. and Federici, B.A. (1986) *The Biology of Baculoviruses*. Vols. I and II. CRC Press: Boca Raton, Florida.

Stoltz D.B. *et al.* (1984) *Intervirology* **21**, 1.

Baculovirus expression vector. A gene expression system which utilises a strong promoter found in baculoviruses to obtain high-level expression of foreign genes. The baculovirus vector uses the highly expressed and regulated polyhedrin promoter modified for the insertion of foreign genes. The baculovirus used is usually *Autographa californica* nuclear polyhedrosis virus (NPV), the type species of the NPV subgroup. One of the major advantages of this invertebrate virus expression vector over bacterial, yeast and mammalian expression systems is the abundant expression of proteins coded by the inserted gene. In addition, recombinant proteins produced in insect cells with baculovirus vectors are biologically active and, for the most part, appear to undergo post-translational processing to produce gene products with similar properties to the authentic proteins.

Lucknow, V.A. and Summers, M.D. (1988) *Biotechnology* **6**, 47.

Baculovirus heliothis. See HELIOTHIS ZEA NUCLEAR POLYHEDROSIS VIRUS.

Bagaza virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from *Culex* mosquitoes in Africa by injection into suckling mice.

Bahia Grande virus. Probable member of the family *Rhabdoviridae*.

Bahig virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from birds in Egypt and Italy. Antibodies found in various species in Cyprus and Israel.

Bakalasa virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from bats of *Tadarida* sp. in Uganda.

Bakau virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from mosquitoes in Malaya and Pakistan.

Baku virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from the tick *Ornithodoros capensis*. Antibodies found in the bird *Larus argentatus* on islands in the Caspian Sea.

bal 31. An EXONUCLEASE which digests dsDNA at both the 5' and 3' ends. Isolated from *Alteromonas espeiana* (formerly *Brevibacterium albidum*). Used for forming processive deletions of DNA.

balanced salt solutions. Solutions which have the composition which maintains a balance of the requirements of the cells for which they are providing nutrients. They also control the osmolarity of the nutrient solution.

Balano posthitis virus of sheep. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Parapoxvirus*. Causes ulcerative dermatitis, balanitis and ulcerative vulvitis. Found in Australia, S. Africa, Britain and USA.

bamblé disease virus. See BORNHOLM DISEASE VIRUS.

bamboo 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.

20 banana bunchy top virus

banana bunchy top virus. A possible member of the *Luteovirus* group.

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.

Bandia virus. Family *Bunyaviridae*, genus *Nairovirus*. Isolated from mice and *Ornithodoros* ticks in Bardia Forest, Senegal.

Bangor virus. Family *Paramyxoviridae*, genus *Paramyxovirus*. Isolated from a finch in Northern Ireland.

McFerran J.B. *et al.* (1974) *Arch. Virusforsch.* **46**, 281.

Bangoran virus. An unclassified arthropod-borne virus. Isolated from *Culex perfuscus* mosquitoes and the Kurrichane thrush *Turdus iboyanus* in Africa.

Bangui virus. An unclassified arthropod-borne virus. Isolated from a man with fever in Africa.

Banzi virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from a boy with fever in S. Africa. Also found in other African countries. Mosquito-borne. Natural hosts are probably cattle and sheep.

barley B-1 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.

barley stripe mosaic virus. Type member of the *Hordeivirus* group.

Atabekov, J.G. and Novikov, V.K. (1971) CMI/AAB Descriptions of Plant Viruses No. 68.

Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 133. CRC Press: Boca Raton, Florida.

barley yellow dwarf virus. Type member of the *Luteovirus* group. Has several strains based on aphid vector specificity. Isolates RPV and RMV are considered to be strains of BEET WESTERN YELLOWS VIRUS. An important virus of temperate cereal crops.

Rochow, W.F. (1970) CMI/AAB Descriptions of Plant Viruses No. 32.

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.

barley yellow mosaic virus. Type member of the *Barley Yellow Mosaic Virus* group.

Inouye, T. and Saito, Y. (1975) CMI/AAB Descriptions of Plant Viruses No. 143.

Barley yellow mosaic virus 'group'. (type member of group, BARLEY YELLOW MOSAIC VIRUS). Unofficial group of plant viruses with flexuous



rod-shaped particles, 550-700 nm. long and 13 nm. in diameter which sediment as two components and band in CsCl at 1.29 g/cc. The host range is narrow. Virus particles are found in most cell types. They are transmissible mechanically. In nature they are transmitted by fungi (Plasmodiophorales).

barley yellow striate mosaic virus. Synonym: CEREAL STRIATE VIRUS. A plant *Rhabdovirus*, subgroup 1; planthopper transmitted.

Milne, R.G. and Conti, M. (1986) CMI/AAB Description of Plant Viruses No. 312.

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

Barmah Forest virus. Family *Bunyaviridae*, genus *Bunyavirus*.

Barur virus. Family *Rhabdoviridae*, unassigned genus. Isolated from *Rattus rattur* and *Haemaphysalis intermedia* ticks in India and Canada.

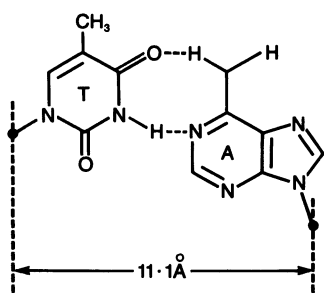
base. The purine (adenine or guanine) or pyrimidine (uridine, thymidine, or cytidine) compounds forming the structure of RNA and DNA. *See* NUCLEIC ACID.

base analogue. A compound resembling one of the natural bases occurring in RNA or DNA which is incorporated into newly synthesised nucleic acid by substituting for the 'normal' base. This can result in mutation or inhibition of growth. An example is 5-fluorouracil which substitutes for uracil.

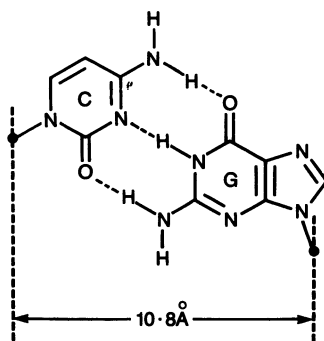
base composition. Proportion of the four bases

within a particular RNA or DNA molecule. This is a highly specific proportion for individual viruses.

base pair. A pair of nucleotides held together by hydrogen bonding. These are found in ds nucleic acids. DNA contains the base pairs A-T and G-C and RNA the base pairs A-U and G-C. See NUCLEIC ACID.



T = A



C ≡ G

base plate. The structure in some TAILED PHAGE particles at the distal end of the tail, to which any tail pins and tails fibres are attached (see T4 PHAGE and TAIL).

base sequence. The order in which the four purine and pyrimidine molecules A, G, C, U, (T) occur along the polynucleotide chain of nucleic acids.

Batai virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated in India, Malaya, Thailand, Czechoslovakia and the Ukraine. Mosquito-borne.

Batken virus. An unclassified arthropod-borne virus. Isolated from the sheep tick *Hyalomma p. plumbeum* in the USSR.

Batu Cave virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from bats in Malaysia.

Bauline virus. Family *Reoviridae*, genus *Orbivirus*. Isolated from the tick *Ixodes uriae* in Newfoundland. Antibodies are present in puffins and petrels.

BBV. Abbreviation for BLACK BEETLE VIRUS.

BCIRL-HZ-AM3 cells. Insect cell line from *Heliothis zea* susceptible to infection by the NUCLEAR POLYHEDROSIS VIRUS of *H. zea* (HzSNPV).

Bdellovibriophage. PHAGE isolated from *Bdellovibrio* spp. (a group of intracellular parasitic bacteria which can only divide and grow within a bacterial cell).

bean common mosaic virus. A *Potyvirus*. Important as a seed-transmitted virus of Phaseolus beans.

Bos, L. (1971) CMI/AAB Descriptions of Plant Viruses No. 73.

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

bean distortion dwarf virus. A possible *Geminivirus*, subgroup B.

Xi, Z. *et al.* (1982) Acta Microbiol. Sinica 22, 293.

bean golden mosaic virus. A *Geminivirus*, subgroup B. The genome comprises ssDNA species of 2646 and 2587 nucleotides.

Goodman, R.M. and Bird, J. (1978) CMI/AAB Descriptions of Plant Viruses No. 192.

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

bean leaf roll virus. A *Luteovirus*.

Ashby, J.W. (1984) CMI/AAB Descriptions of Plant Viruses No. 286.

Casper, R. (1988) In The Plant Viruses. Vol. 3. p. 235. ed. R. Koenig. Plenum Press: New York.

bean mild mosaic virus. A possible member of the *Carmovirus* group.

Waterworth, H. (1981) CMI/AAB Descriptions of Plant Viruses No. 231.

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

22 bean pod mottle virus

bean pod mottle virus. A *Comovirus*.

Semancik, J.S. (1972) CMI/AAB Descriptions of Plant Viruses No. 108.

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

bean rugose mosaic virus. A *Comovirus*. Gamez, R. (1982) CMI/AAB Descriptions of Plant Viruses No. 246.

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

bean yellow mosaic virus. A *Potyvirus*. Closely related to BEAN COMMON MOSAIC and PEA MOSAIC VIRUSES.

Bos, L. (1970) CMI/AAB Descriptions of Plant Viruses No. 40.

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

bean yellow vein banding virus. Uncapsidated RNA, depending on BEAN LEAF ROLL VIRUS for aphid transmission.

Cockbain, A.J. *et al.* (1986) Ann. Appl. Biol. **108**, 59.

bearded iris mosaic virus. A *Potyvirus*.

Barnett, O.W. and Brunt, A.A. (1975) CMI/AAB Descriptions of Plant Viruses No. 147.

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

Bebaru virus. Family *Togaviridae*, genus *Alpha-virus*. Isolated from mosquitoes in Malaya.

bedbug reovirus. An unclassified reovirus-like agent isolated from the bedbug, *Cimex lectularius*. Particles are isometric and double-shelled, c.56 nm. in diameter. The dsRNA genome contains at least eleven and possibly twelve RNA segments.

Eley, S. M. *et al.* (1987) J. gen. Virol. **68**, 195.

bee acute paralysis virus. Synonym: ACUTE BEE-PARALYSIS VIRUS. Unclassified small RNA virus which infects adult honey bees rendering them flightless and killing them in 5-6 days. Virions are isometric, 30 nm. in diameter, unenveloped, sediment at 160S and have a buoyant density in CsCl of 1.34-1.38 g/cc. Particles contain two structural polypeptides (23.5×10^3 and 31.5×10^3) and an

ssRNA genome. Isolated from UK, France and Australia.

Bailey, L. and Woods R.D. (1977) J. gen. Virol. **37**, 175.

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

bee chronic paralysis virus. Unclassified small RNA virus isolated from paralysed adult honey bees. Virions have an unusual ellipsoidal morphology (similar to *DROSOPHILA RS VIRUS*) c.22 nm. wide, with average lengths of four particle sizes of 30, 40, 55 and 65 nm. which sediment at 82, 100, 110 and 126S, respectively. All particles have a buoyant density in CsCl of 1.34 g/cc, contain a single structural polypeptide (23.5×10^3) and an ssRNA genome. Purified virions contain five ssRNA components, two larger RNA species (mw. 1.35×10^6 and 0.9×10^6) and three smaller RNAs (mw. each 0.35×10^6). The small RNAs are probably identical with the three RNA components of the SATELLITE VIRUS, BEE CHRONIC PARALYSIS VIRUS ASSOCIATE and have sequences in common with the 0.9×10^6 RNA species. The virus has a worldwide distribution.

Bailey, L. (1976) Adv. Virus Res. **20**, 271.

Overton, H.A. *et al.* (1982) J. gen. Virol. **63**, 171.

bee chronic paralysis virus associate. Unclassified small RNA virus from honey bees whose replication is absolutely dependent on BEE CHRONIC PARALYSIS VIRUS as a helper virus. The two viruses are serologically unrelated. Virions are isometric, 17 nm. in diameter and sediment at 41S. The particles have a buoyant density of 1.38 g/cc. in CsCl, a single structural polypeptide (15×10^3) and contain three RNA molecules (each 0.35×10^6) which have some common oligonucleotides but are distinguishable from one another. These RNAs are also packaged within virions of the helper virus, bee chronic paralysis virus, accounting for the appearance of the associate virus in bees injected with purified bee chronic paralysis virus.

Ball, B.V. *et al.* (1985) J. gen. Virol. **66**, 1423.

Overton, H.A. *et al.* (1982) J. gen. Virol. **63**, 171.

bee filamentous virus. An unclassified DNA virus of the honey bee. Ovoid virus particles measure 450 x 150 nm. and comprise a folded NUCLEOCAPSID (3000 x 40 nm.) within a membrane. Buoyant density in CsCl is 1.28 g/cc. Particles are structurally complex with about 12 proteins (mw. $13-70 \times 10^3$) and a genome of linear dsDNA (approximately 12×10^6). Isolated from

bees from Europe, N. America, Asia and Australasia.

Clark, T.B. (1978) *J. Invertebr. Pathol.* **32**, 332.
Bailey, L. *et al.* (1981) *Virology* **114**, 1.

bee iridescent virus. Synonym: APIS IRIDESCENT VIRUS. Member (type 24) of small iridescent insect virus group (IRIDOVIRUS; IRIDOVIRIDAE), isolated from *Apis cerana* from Kashmir.
Bailey, L. *et al.* (1976) *J. gen. Virol.* **31**, 459.

bee slow paralysis virus. Unclassified small RNA virus causing paralysis in honey bees. Virions are isometric, 30 nm. in diameter, sediment at 178S and have a buoyant density in CsCl of 1.37 g/cc. Particles contain three structural proteins (mw. 27×10^3 , 29×10^3 , 46×10^3) and an RNA genome. Considered as a possible INSECT PICORNAVIRUS.
Bailey, L. (1976) *Adv. Virus Res.* **20**, 271.

bee virus X. Unclassified small RNA virus of the honey bee. Virions are isometric, 35 nm. in diameter, sediment at 187S and have a buoyant density in CsCl of 1.36 g/cc. Particles contain one structural polypeptide (mw. 54.5×10^3) and an RNA genome. Physical properties may be similar to those of NUDAURELIA B VIRUS GROUP.
Bailey, L. (1976) *Adv. Virus Res.* **20**, 271.

bee virus Y. Serotype of BEE VIRUS X occurring commonly in Great Britain.
Bailey, L. (1980) *J. gen. Virol.* **51**, 405.

beet cryptic virus 1. Synonym: BEET TEMPERATE VIRUS. A member of the *Cryptovirus* group, subgroup A.
Boccardo, G. *et al.* (1987) *Adv. Virus Res.* **32**, 171.

beet cryptic virus 2. A member of the *Cryptovirus* group, subgroup B.
Boccardo, G. *et al.* (1987) *Adv. Virus Res.* **32**, 171.

beet curly top virus. A *Geminivirus*, subgroup C. Has a wide host range. Single DNA species of 2993 nucleotides.
Thomas, P.E. and Mink, G.I. (1979) CMI/AAB Descriptions of Plant Viruses No. 210.
Harrison, B.D. (1985) *Ann. Rev. Phytopath.* **23**, 55.
Stanley, J. *et al.* (1986) *EMBO Jour.* **8**, 1761.

beet leaf curl virus. A probable plant *Rhabdo-*

virus, subgroup 2; transmitted by lace-bugs.
Proeseler, G. (1983) CMI/AAB Descriptions of Plant Viruses No. 268.

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

beet mild yellowing virus. A *Luteovirus*; considered to be a strain of BEET WESTERN YELLOWS VIRUS. One of the two viruses, the other being BEET YELLOWS VIRUS, which causes virus yellows of sugarbeet.

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.

beet mosaic virus. A *Potyvirus*.

Russell, G.E. (1971) CMI/AAB Descriptions of Plant Viruses No. 53.

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

beet necrotic yellow vein virus. A possible member of the *Furovirus* group. Causes 'rhizomania' disease in sugarbeet, so named because of the proliferation of rootlets.

Tamada, T. (1975) CMI/AAB Descriptions of Plant Viruses No. 144.

Brunt, A.A. and Shikata, E. (1986) *In The Plant Viruses*. Vol. 2. p. 385. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

beet pseudo yellows virus. A possible *Closterovirus*, transmitted by whitefly.

Duffus, J.E. *et al.* (1986) *Phytopath.* **76**, 97.

beet ringspot virus. Serotype of TOMATO BLACK RING VIRUS.

beet soil-borne virus. A possible member of the *Furovirus* group.

Brunt, A.A. and Shikata, E. (1986) *In The Plant Viruses*. Vol. 2. p. 385. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

beet temperate virus. See BEET CRYPTIC VIRUS 1.

beet western yellows virus. A *Luteovirus*. Has a wide host range and is important in beet, lettuce and other crops.

24 beet yellow net virus

Duffus, J.E. (1972) CMI/AAB Descriptions of Plant Viruses No. 89.

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.

beet yellow net virus. A possible member of the *Luteoviruses*.

Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 1. p. 137. CRC Press: Boca Raton, Florida.

beet yellow stunt virus. A member of the *Closterovirus* subgroup 1.

Duffus, J.E. (1979) CMI/AAB Descriptions of Plant Viruses No. 207.

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

beet yellows virus. Type member of the *Closterovirus* group, subgroup 1. One of two viruses, the other being BEET MILD YELLOWS VIRUS which causes sugarbeet yellows disease.

Russell, G.E. (1970) CMI/AAB Descriptions of Plant Viruses No. 13.

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

belladonna mottle virus. A *Tymovirus*.

Paul, H.L. (1971) CMI/AAB Descriptions of Plant Viruses No. 52.

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.

Belmont virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from *Culex annulirostris* in Queensland, Australia. Antibodies found in cattle, wallaby and kangaroo.

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

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

Bergoldiavirus. Former nomenclature for GRANULOSIS VIRUS (after G.H. Bergold).

Berkeley bee picornavirus. Unclassified small RNA virus (a possible INSECT PICORNAVIRUS) isolated in mixed infections with ARKANSAS BEE VIRUS from honey bees in California, USA. Virions are isometric, sediment at 165S and contain three structural proteins (mw. 32.5×10^3 , 35×10^3 and 37×10^3) and an ssRNA genome (mw. 2.8×10^6). Virus is unrelated to ARKANSAS BEE VIRUS.

Lommel, S.A. *et al.* (1985) Intervirology 23, 199.

Bermudagrass etched-line virus. A member of the *Marafivirus* group.

Gamez, R. and Leon, P. (1988) In The Plant Viruses. Vol. 3. p. 212. ed. R.Koenig. Plenum Press: New York.

Berry-Dedrick virus. See RABBIT FIBROMA VIRUS.

Bertioga virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from sentinel mice in Brazil.

BES. N,N-bis(2-hydroxyethyl)-2-aminoethanesulphonic acid (mw. 213.25). A biological buffer, pK_a 7.15 with a pH range 6.2-8.2.

Good, N. *et al.* (1966) Biochem. 5, 469.

Betaherpesvirinae. Synonym: CYTOMEGALOVIRUS. A subfamily in the family *Herpesviridae*. There are two genera, *Human* and *Murid Cytomegalovirus Group*. Viruses cause latent infection in the salivary glands. Inclusion bodies are found in the nuclei and cytoplasm late in infection.

Bhanja virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from ticks in many countries and from cattle, sheep, hedgehog and squirrel. May cause fever in man.

BHK cells Abbreviation for BABY HAMSTER KIDNEY CELLS.

Bidens 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.

Bidens mottle virus. A *Potyvirus*. Purcifull, D.E. *et al.* (1976) CMI/AAB Descriptions of Plant Viruses No. 161.

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

Bijou Bridge virus. Family *Togaviridae*, genus

Alphavirus.

Bimbovirus. Unclassified arthropod-borne virus. Isolated from a Golden Bishop bird *Buplectes afer* in Africa.

Bimiti virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from *Culex spissipes* in Trinidad, Brazil, French Guiana and Surinam.

binding site. 1. Region of a protein at which binding occurs with a compound (e.g. an enzyme and its substrate) whose structure is changed by the activity of the protein. 2. The site on a cell to which virus particles adsorb before entry.

bioassay. Determination of the amount of a virus by measuring its biological activity (e.g. infectivity for its host).

biological containment. Method for reducing or even eliminating the risk of viruses or other micro-organisms escaping from the laboratory. In the specialised sense of recombinant DNA molecules, this is a strategy which involves the use of vectors which have been genetically disabled so that they can only survive in the conditions used by the experimenter and which are unavailable outside the laboratory. Containment conditions are determined by national regulatory bodies.

biological control. Pest control using agents of biological origin including parasites, predators and pathogens. Some viruses have been used as biological control agents e.g. myxoma virus for rabbit control and baculoviruses for insect pest control.

biorational pesticides. Pest control agents of biological origin including viruses as well as bacteria, protozoa, fungi and biochemical products of natural origin or identical to a natural product.

biotin. A small water-soluble macromolecule (vitamin H) which is used as a non-radioactive reporter group for LABELLING nucleic acid PROBES. It has a very high affinity for avidin (STREPT-AVIDIN) ($k_{ds} = 10^{-15}$) which, when coupled with an indicator molecule (enzyme, fluorescent dye), is used to detect biotin.

Biotrol. Nuclear polyhedrosis virus preparations produced on a semi-commercial scale by Nutri-

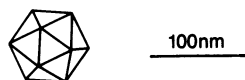
lite Products Inc., USA; now discontinued. Biotrol VPO was developed for the biological control of *Prodenia* sp.; Biotrol VSE for *Spodoptera* sp.; Biotrol VHZ for *Heliothis* sp. and Biotrol VIN for *Trichoplusia ni*.

biphasic milk fever virus. See TICK-BORNE ENCEPHALITIS VIRUS.

birao virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from *Anopheles pharoensis* and *Anopheles squamosus* in Africa.

Birdiavirus. Former nomenclature for NUCLEAR POLYHEDROSIS VIRUSES isolated from Hymenoptera (Insecta) which only infect cells in the gut epithelium of susceptible hosts (after F.T. Bird).

Birnaviridae. A family of viruses roughly



spherical in shape with a diameter of c.60 nm., sedimenting at 650S and banding in CsCl at 1.32 g/cc; there is no envelope. The capsid is composed of four major polypeptides and contains a genome comprising two segments of dsRNA, mw. 2.5 and 2.2×10^6 . The family contains viruses infecting fish (infectious pancreatic necrosis viruses) and chickens (infectious bursal disease virus), both important commercially. Dobos, P. J. *Virology* (1979) 32, 593.

Birnavirus. A genus in the family *Birnaviridae*.

Biston betularia Cytoplasmic Polyhedrosis Virus. Cytoplasmic polyhedrosis virus (CPV) isolated in the United Kingdom from field-collected larvae of the peppered moth, *Biston betularia* (Geometridae, Lepidoptera). The virus is the type member of 'type 6' CPV and is unrelated to *Bombyx mori* (type 1) CPV on the basis of RNA electropherotype. Viruses of similar electropherotype have been observed in other Lepidoptera (see APPENDIX B). Payne, C.C. and Mertens, P.P.C. (1983) *In The Reoviridae*. p. 425. ed. W.K. Joklik. Plenum Press: New York.

BK polyoma virus. Family *Papovaviridae*, genus *Polyomavirus*. Isolated from a patient on immunosuppressive drugs after transplantation.

26 black beetle virus (BBV)

Antibodies in man suggest it is a common infection. Grows in Vero cells and primary human foetal kidney cells. Transforms rat and hamster cells in culture and is oncogenic in new-born hamsters.

black beetle virus (BBV). Family *Nodaviridae*, genus *Nodavirus*, isolated from *Heteronychus arator* (Coleoptera) in New Zealand and more intensively studied than other Nodaviruses. Virions are icosahedral, 30 nm. in diameter, sediment at 137S and have a buoyant density in CsCl of 1.33 g/cc. They contain 180 protein subunits arranged in T=3 quasimmetry. The particles contain one major polypeptide (mw. 39×10^3) and two minor proteins (mw. 44×10^3 and another of $c.4.5 \times 10^3$ derived by proteolytic cleavage from the 44×10^3 precursor). The genome is composed of two + strand ssRNA molecules (RNA1, 3106 bases and RNA2, 1399 bases) in the same particle, both of which are required for infection. The RNAs are not polyadenylated. The larger RNA codes for a polymerase (mw. 104×10^3), the smaller for the capsid protein precursor (mw. 44×10^3). The virus multiplies in the cytoplasm of infected cells. The precursor coat protein (407 aa residues) is cleaved at residue 363 within the provirion form of the particle, leading to a more stable virion structure. Unlike NODAMURA virus, BBV does not replicate in vertebrate cells or suckling mice, but replicates to high titre in *Drosophila melanogaster* line 1 cells. Extensive homology has been detected between the coat protein genes of BBV and Flock House Virus.

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

black locust true mosaic virus. A strain of PEANUT STUNT VIRUS.

Richter, J. *et al.* (1979) *Acta Virol.* **23**, 489.

black queen cell virus. Unclassified small RNA virus isolated from prepupae and pupae of queen honey bees in Britain. Virions are isometric, 30 nm. in diameter and sediment at 151S. They have a buoyant density in CsCl of 1.345 g/cc., contain a single structural polypeptide (mw. 30×10^3) and an RNA genome.

Bailey, L. and Woods, R.D. (1977) *J. gen. Virol.* **37**, 175.

black raspberry latent virus. An *Ikarvirus*. Lister, R.M. and Converse, R.H. (1972) CMI/AAB Descriptions of Plant Viruses No. 106.

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

blackeye cowpea mosaic virus. A *Potyvirus*. Purcifull, D. and Gonsalves, D. (1985) CMI/AAB Descriptions of Plant Viruses No. 305.

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

blackgram mottle virus. A possible member of the *Carmovirus* group.

Scott, H.A. and Hoy, J.W. (1981) CMI/AAB Descriptions of Plant Viruses No. 237.

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

blind passage. Inoculation of material (from an animal or cell culture) which shows no evidence of infection into a fresh animal or cell culture, usually with the aim of growing and identifying an infectious agent.

blotting. A technique to transfer DNA, RNA or protein to an immobilising matrix such as nitrocellulose or nylon filters or DIAZOBENZYLOXY-METHYL PAPER. *See* NORTHERN BLOTTING, SOUTHERN BLOTTING, WESTERN BLOTTING.

blueberry leaf mottle virus. A *Nepovirus*. Ramsdell, D.C. and Stace-Smith, R. (1983) CMI/AAB Descriptions of Plant Viruses No. 267.

blueberry shoestring virus. A possible *Sobemovirus*. Ramsdell, D.C. (1979) CMI/AAB Descriptions of Plant Viruses No. 204.

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.

bluecomb disease virus. Family *Coronaviridae*, genus *Coronavirus*.

bluetongue virus. Family *Reoviridae*, genus *Orbivirus*. Causes a serious disease of sheep with mortality up to 30%. Fever, oedema of the head and neck, cyanosis, erosions round the mouth and lameness are observed. Cattle and goats develop a milder disease. Pigs have foot lesions and wild ruminants are often affected. Usually found in

Africa, Cyprus, Palestine, Turkey, Spain, Portugal, Pakistan, India, Japan and parts of the USA. Transmission is by biting *Culicoides*. Replication occurs in the insects. Virus can be grown in yolk sac of eggs and causes cpe in a variety of cells. Gorman, B.M. (1979) *J. gen. Virol.* **44**, 1. Bluetongue and Related Viruses (1985) *In Progress in Clinical and Biological Research*. Vol. 178. ed. T.L. Barber and M.M. Jochim. Alan R. Liss: New York.

blunt end. (Synonym: FLUSH END.) DNA fragments generated by certain RESTRICTION ENDONUCLEASES, e.g. *Hae* III, and which are perfectly base-paired along their entire length, i.e. they do not carry single-stranded regions after cleavage with the enzyme.

Bm-5 cells. Insect cell line from the silkworm, *Bombyx mori*, susceptible to infection by *B. mori* nuclear polyhedrosis virus.

BML-TC7A medium. Insect cell culture medium developed for the production of a cell line derived from *Spodoptera frugiperda* which supports the growth of *S. frugiperda* and *Autographa californica* nuclear polyhedrosis viruses. The medium also supports growth of insect cell lines from *Cydia pomonella*, *Heliothis zea* and *Trichoplusia ni*.

BML-TC10 medium. Insect cell culture medium developed for growth of a cell line derived from *Spodoptera frugiperda* (IPLB-SF-21) and for the production of its homologous nuclear polyhedrosis virus.

Bobayavirus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from an African thrush *Turdus libonyanus* in Central Africa.

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

Bocas virus. Family *Coronaviridae*, genus *Coronavirus*. Possibly the same as MOUSE HEPATITIS VIRUS.

boletus 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.

Bolivian haemorrhagic fever virus. See MACHUPO VIRUS.

Bombyx mori cytoplasmic polyhedrosis virus. Type species of the CYTOPHASMIC POLYHEDROSIS VIRUS group (REOVIRIDAE), isolated from the silkworm, *B. mori* in Japan. VIRIONS are icosahedral (c.60 nm. in diameter), with 20 nm. spikes at each of the twelve vertices. Particles sediment at 400-440S and have a buoyant density in CsCl of 1.44 g/cc. The virion contains at least five polypeptides (mw. c.146 x 10³, 138 x 10³, 125 x 10³, 70 x 10³ and 31 x 10³) and a segmented dsRNA genome (ten segments; total mw. c.15 x 10⁶). During infection, virions are occluded within large occlusion bodies (polyhedra) the matrix protein of which ('polyhedrin') has a mw. of 27 x 10³ and is coded for by the smallest genome segment. The + strands of the genome RNA segments carry a m⁷G CAP. Virions contain transcriptase, nucleotide phosphohydrolase, guanylyl transferase and transmethylnases necessary for the synthesis of complete viral mRNA copies of the genome + strands. The virus infects larvae after ingestion of polyhedra. Replication is confined to cells of the gut epithelium. The virus is associated with a complex of other diseases which together cause extensive losses in the silk industry. At least nine CPV isolates have been reported in the silkworm and classified according to the shape and/or intracellular location of occlusion bodies.

Payne, C.C. and Mertens, P.P.C. (1983) *In The Reoviridae*. p. 425. ed. W.K. Joklik. Plenum Press: New York.

Bombyx mori nuclear polyhedrosis virus. Member of subgroup A (NUCLEAR POLYHEDROSIS VIRUS) of the BACULOVIRUS genus isolated from the silkworm, *B. mori*. It is representative of the SNPV subtype where the enveloped virions contain predominantly single nucleocapsids.

boolarra virus. A NODAVIRUS isolated from *Oncopera intricoides* (Lepidoptera) in Australia. Reinganum, C. *et al.* (1985) *Intervirology* **24**, 10.

boraceiavirus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from *Anopheles cruzii* and *Photomyia pilicande* in Brazil.

border disease virus. Family *Togaviridae*, genus *Pestivirus*. First described on the borders of Wales and England. Causes a congenital condition of new-born lambs, characterised by a hairy birth coat and a tremor. There is defective myelination of the CNS and virus can be isolated from this. Injection of virus into pregnant ewes causes

28 borna disease virus

abortion and border disease in the fetuses which survive. Disease has now been found in Germany, Australia and New Zealand. The virus replicates in primary calf and foetal lamb kidney cells. The virus is related antigenically to swine fever and mucosal disease viruses.

Barlow, R.M. *et al.* (1979). *Vet. Rec.* **104**, 334.

borna disease virus. Unclassified arthropod-borne virus. Found in Germany, Poland, Rumania, Russia, Syria and Egypt. Isolated from ticks and from the brains of herons and other wild birds. Causes lassitude followed by chronic spasms and paralysis in horses, sheep, cattle and deer. Rabbits infected experimentally show similar signs. No infection of man has been reported. Virus replicates in the chorioallantoic membrane and in cultures of lamb testis and monkey kidney cells.

Bornholm disease virus. Synonym: BAMBLE DISEASE VIRUS. Family *Picornaviridae*, genus *Enterovirus*. This can be any one of several Coxsackie or Echo virus strains. These viruses cause chest, abdomen and muscle pain.

Borrel bodies. Minute granules (Bollinger bodies) found in FOWLPOX VIRUS infected cells. Named after Professor Borrel (Institut Pasteur).

Borrelinavirus. Former nomenclature for NUCLEAR POLYHEDROSIS VIRUSES from Lepidoptera (Insecta), after Professor Borrel (Institut Pasteur).

Botambi virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from *Culex guiarti* in Africa.

Boteke virus. Unclassified arthropod-borne virus. Isolated from *Mansonia maculipennis* in Africa.

Bothid herpesvirus 1. Synonym: TURBOT HERPESVIRUS. Member of family *Herpesviridae*. Isolated from turbot in a fish farm.

Bouboui virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from mosquitoes and the baboon *Papio papio* in Africa.

bovid (alpha) herpesvirus 2. Synonyms: ALLERTON VIRUS, BOVINE MAMMILLITIS VIRUS. Family *Herpesviridae*, subfamily *Alphaherpesvirinae*, genus *Human Herpesvirus 1 Group*). Causes lumpy skin disease in cattle. Probably transmitted

by insects. Infection of day-old rats, mice and hamsters may lead to stunted growth, rashes and death. Grows in calf kidney cell cultures, producing syncytia.

bovid herpesvirus 1. Synonyms: INFECTIOUS BOVINE RHINOTRACHEITIS VIRUS, NECROTIC RHINITIS VIRUS. Family *Herpesviridae*, subfamily *Alpha Herpesvirinae*). Found in cattle worldwide. Can cause a silent, mild infection or an acute disease of the respiratory tract with very high mortality. Can also cause conjunctivitis and disease of the genital tract. Experimentally, goats develop fever, whereas rabbits develop an encephalitis and paralysis. Transmission is by contact. Can be grown in bovine embryo cell cultures with cytopathic effect and in pig, sheep, goat and horse kidney cells and human amnion cell cultures. Hamster cells are transformed *in vitro* by the virus.

bovid herpesvirus 2. See BOVID (ALPHA) HERPESVIRUS 2.

bovid herpesvirus 3. Synonyms: MALIGNANT CATARRHAL FEVER VIRUS, WILDEBEEST HERPESVIRUS. Causes a widespread disease of cattle accompanied by fever, acute inflammation of nasal and oral membranes and involvement of pharynx and lungs. The disease is often fatal. It can be transmitted experimentally to cattle and rabbits. The virus grows in bovine thyroid and adrenal cell cultures.

bovid herpesvirus 4. Family *Herpesviridae*, unassigned subfamily and genus. Isolated from sheep with pulmonary adenomatosis.

bovid herpesvirus 5. Synonym: CAPRINE HERPESVIRUS 1. Family *Herpesviridae*, unassigned subfamily and genus). Isolated from kids *Capra hircus* with severe febrile disease. Can be transmitted to other kids to give similar disease and to adults in which it can cause abortion. Virus grows in many cell cultures.

bovine adeno-associated virus. Family *Parvoviridae*, genus *Dependovirus*.

bovine adenovirus. Family *Adenoviridae*, genus *Mastadenovirus*. Causes respiratory infection and conjunctivitis in cattle. Serological evidence suggests high incidence of infection. Grows with cytopathic effect in bovine kidney cells. Occurs as ten serotypes, two of which are oncogenic for

new-born hamsters.

bovine ephemeral fever virus. Family *Rhabdoviridae*, unassigned genus. Isolated in S. Africa, Australia and Japan from cattle with respiratory signs, increased salivation, joint pains, stiffness and tremors. The disease is of short duration. Virus grows in mice and BHK cell cultures, and in eggs. Transmitted by insects.

Della Porta, A.J. and Snowdon, W.A. (1982) In *The Rhabdoviruses*. ed. D.H.L. Bishop. CRC Press: Boca Raton, Florida.

bovine enterovirus. See ECBO VIRUSES.

bovine leukaemia virus. Synonyms: BOVINE LEUKAEMIA VIRUS, BOVINE TYPE C ONCOVIRUS. Family *Retroviridae*, subfamily *Oncovirinae*, genus *Type C Oncovirus*. Causes leukaemia. Cattle, sheep and goats can be infected experimentally and produce antibodies. Some animals develop lymphosarcoma. Cells from many species produce syncytia on infection. This can be prevented with antiserum.

Mussgay, M. and Kaaden, O.R. (1978) *Current Topics in Microbiol. Immunol.* **79**, 43.

bovine mammillitis virus. See BOVID (ALPHA) HERPESVIRUS 2.

bovine papilloma virus. Family *Papovaviridae*, genus *Papillomavirus*. Causes papillomas on the head and neck and in the mouth and oesophagus. Injection into hamsters and mice produces fibrosarcomas. Embryo cultures of mouse, hamster and bovine tissues are transformed.

bovine parvovirus. Synonym: HADEN VIRUS. Family *Parvoviridae*, genus *Parvovirus*. Can cause diarrhoea in young animals. Replicates in bovine embryo kidney cell cultures producing cytopathic effect.

bovine pustular stomatitis virus. Synonym: PAPULAR STOMATITIS OF CATTLE VIRUS. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Parapoxvirus*. Causes a benign non-febrile disease with ulcers in the mouth, most frequently in young animals. Some strains infect sheep and goats. May infect man.

bovine respiratory syncytial virus. Family *Paramyxoviridae*, genus *Pneumovirus*. Causes respiratory disease. Replicates in bovine kidney and lung cultures causing syncytia.

bovine rhinovirus. Family *Picornaviridae*, unassigned genus. A widespread infection causing nasal discharge. Does not infect other species.

bovine serum albumin (BSA). The major protein constituent of bovine serum. mw. 68×10^3 .

bovine syncytial virus. Family *Retroviridae*, subfamily *Spumavirinae*. Causes lymphosarcomas. Has been isolated from normal cattle. Replicates in BHK21 cells producing syncytia. Greig, A.S. (1978) *Canad. J. comp. Med.* **43**, 112.

bovine viral diarrhoea virus. See MUCOSAL DISEASE VIRUS.

Br1 mycoplasma virus group. Proposed genus of phages isolated from *Mycoplasma* which have contractile tails and resemble members of the *Myoviridae*. Proposed type member is phage MVB1.

Maniloff, J. *et al.* (1982) *Intervirology* **18**, 177.

Brazilian corn streak virus. See MAIZE RAYADO FINO VIRUS.

breakbone fever virus. See DENGUE VIRUS.

broad bean mottle virus. A *Bromovirus*.

Gibbs, A.J. (1972) *CMI/AAB Descriptions of Plant Viruses* No. 101.

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

broad bean necrosis virus. A *Furovirus*.

Inouye, T. and Nakasone, W. (1980) *CMI/AAB Descriptions of Plant Viruses* No. 223.

Brunt, A.A. and Shikata, E. (1986) In *The Plant Viruses*. Vol. 2. p. 305. ed. M.H.V. van Regenmortel and H. Fraenkel-Conrat. Plenum Press: New York.

broad bean severe chlorosis virus. An unclassified plant virus with rod-shaped particles 650-820 nm. long, 14 nm. wide. The virus is transmitted by aphids in the NON-PERSISTENT TRANSMISSION manner.

Thottappilly, G. *et al.* (1975) *Phytopath. Zeitschrift* **84**, 343.

broad bean stain virus. A *Comovirus*.

Gibbs, A.J. and Smith, H.G. (1970) *CMI/AAB Descriptions of Plant Viruses* No. 29.

30 broad bean true mosaic virus

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

broad bean true mosaic virus. *Synonym:* ECHTES ACKERBOHNENMOSAIC VIRUS. A *Comovirus*. Gibbs, A.J. and Paul, H.L. (1970) CMI/AAB Descriptions of Plant Viruses No. 20. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 1. CRC Press: Boca Raton, Florida.

broad bean wilt virus. This virus has two serotypes; serotype 1 is the type member of the *Fabavirus* group. Taylor, R.H. and Stubbs, L.L. (1972) CMI/AAB Descriptions of Plant Viruses No. 81. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 2. p. 1. CRC Press: Boca Raton, Florida.

broad bean wilt virus group. *See* FABAVIRUS GROUP.

broad bean yellow band virus. A serotype of PEA EARLY BROWNING VIRUS. Robinson, D.J. and Harrison, B.D. (1985) *J. gen. Virol.* **66**, 2003.

broad bean yellow ringspot virus. An unclassified plant virus with isometric particles 28 nm. in diameter. Doi, Y. *Personal communication*.

broad bean yellow vein virus. A plant *Rhabdovirus*. Natsuaki, K.T. (1981) *Ann. Phytopath. Soc. Japan* **47**, 410.

broccoli necrotic yellows virus. A plant *Rhabdovirus*, subgroup 1; aphid-transmitted. Campbell, R.N. and Lin, M.T. (1972) CMI/AAB Descriptions of Plant Viruses No. 85. Francki, R.I.B. *et al.* (1985) *In Atlas of Plant Viruses*. Vol. 1. p. 73. CRC Press: Boca Raton, Florida.

brome mosaic virus. Type member of the *Bromovirus* group. Lane, L.C. (1977) CMI/AAB Descriptions of Plant Viruses No. 180. Francki, R.I.B. (1985) *In The Plant Viruses*. Vol. 1. p. 1. ed. R.I.B. Francki. Plenum Press: New York.

brome stem leaf mottle virus. *See* COCKSFOOT

MILD MOSAIC VIRUS.

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

bromelain. A mixture of proteolytic enzymes derived from pineapples; different enzymes are isolated from different parts of the plant. They have been used frequently to remove the haemagglutinin from INFLUENZA VIRUS.

bromo-deoxyuridine (5-bromo-2-deoxyuridine). A pyrimidine derivative which can become incorporated into DNA in place of thymidine. Of possible use in viral CHEMOTHERAPY.

Bromovirus group. (BROME MOSAIC VIRUS). Genus of MULTICOMPONENT plant viruses with small isometric particles, 26 nm. in diameter which sediment at 85S (pH5) and band in CsCl at



1.35 g/cc. The particles are stabilised by pH-dependent protein-protein interactions and protein-RNA links; they swell and become salt labile above pH7. Capsid structure is icosahedral (T=3), the structural subunit being coat protein (mw. 20×10^3). Genomic linear (+)-sense ssRNA comprises three species, RNA-1 (mw. 1.1×10^6 ; 3,234 nucleotides), RNA-2 (mw. 1.0×10^6 ; 2,865 nucleotides) and RNA-3 (mw. 0.7×10^6 ; 2,120 nucleotides). RNAs-1 and -2 are separately encapsidated; RNA-3 is encapsidated with the coat protein mRNA, RNA-4 (mw. 0.3×10^6 ; 876 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 the MONOCISTRONIC messengers for proteins of mw. 112, 107 and 20 (coat protein) $\times 10^3$ respectively; RNA-3 is bicistronic encoding a protein of mw. 33×10^3 at the 5' end and having the coat protein cistron at the 3' end.

The natural host ranges are narrow. The particles are found in most cell types. Bromoviruses are readily transmissible mechanically. Some members are transmitted by beetles. Matthews, R.E.F. (1982) *Intervirology* **17**, 173. Lane, L.C. (1979) CMI/AAB Descriptions of

Plant Viruses No. 215. Francki, R.I.B. *et al.* (1985) In Atlas of Plant Viruses. Vol. 2, p. 69, 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.

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

Bryonia mottle 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.

BTI-EAA cells. Insect cell line from the saltmarsh caterpillar, *Estigmene acrea*.

budding. Method of release of enveloped virus particles from the cells in which they have grown. The viral nucleocapsid associates with an area of the cell membrane which closes around the virus as it leaves the cell. During budding the cellular proteins in that part of the membrane destined to become the virus coat are replaced by virus-coded proteins. In contrast the lipid in the viral envelope is host-cell derived.

buenaventura virus. Family *Bunyaviridae*, genus *Phlebovirus*.

buffalo poxvirus. Family *Poxviridae*, subfamily *Chordopoxvirinae*, genus *Orthopoxvirus*. Causes severe disease in India. Produces pocks on the chorioallantoic membrane.

buffer. A solution consisting of a mixture of an acid and a base which resists changes in pH and is therefore a suitable environment for ensuring the correct acidity or alkalinity. Many combinations of acids and bases are available to provide buffering at most required pHs.

bujaru virus. Family *Bunyaviridae*, genus *Phlebovirus*. Isolated from the rodent *Proechimys guyannensis* in Brazil.

bukalasa bat virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from bats in Africa.

bundle virion. Synonym for the MNPV subtype of subgroup A (NUCLEAR POLYHEDROSIS VIRUS) of the *BACULOVIRUS* genus.

Bung el Arab virus. Unclassified arthropod-

borne virus. Isolated from a bird *Sylvia curruca* in Egypt.

Bunyamwera virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from mosquitoes in several African countries. Causes fever in man.

Bunyaviridae. A very large family of RNA viruses with spherical or oval particles, 90-100 nm. in diameter, with a lipid envelope and glycoprotein surface projections and three ribonucleocapsids composed of circular, helical strands 2.0-2.5 nm. in diameter. There are four genera,



100nm

BUNYAVIRUS, *PHLEBOVIRUS*, *NAIROVIRUS* and *UUKUVIRUS*. The particles contain four proteins, two of which are external glycoproteins (G1, G2), a nucleoprotein (N) and a minor large protein (L). There are three species of (–)-sense ssRNA (L 3.5 x 10⁶; M 1-2 x 10⁶; S 0.4-0.8 x 10⁶). The virus RNA is transcribed by the virion transcriptase into mRNA. At least one of the members possesses AMBISENSE EXPRESSION STRATEGY. Warm and cold-blooded vertebrates and arthropods are the natural hosts. Transmission is usually by a variety of vectors including mosquitoes, ticks, *Phlebotomus* spp. and other arthropods. Aerosol infection can also occur. The viruses can be grown in tissue culture.

Bishop, D.H.L. *et al.* (1980) Intervirology, **14**, 125.

Matthews, R.E.F. (1982) Intervirology **17**, 115.

Bunyavirus. (Bunyamwera, place in Uganda where type species was isolated.) A genus in the family *Bunyaviridae*, containing 100 or more viruses which have some antigenic cross-relationship. There are ten antigenic subgroups. Some may be transmitted transovarially.

buoyant density. The density which a virus or other macromolecule possesses when suspended in an aqueous solution of a heavy metal salt such as CsCl or a sugar such as sucrose. This is the density at which the macromolecule is in equilibrium and neither sinks nor floats. See CAESIUM CHLORIDE DENSITY GRADIENT CENTRIFUGATION.

burdock mosaic virus. An unclassified plant

32 burdock mottle virus

virus with isometric particles; occurs in Japan. Doi, Y. *Personal communication*.

burdock mottle virus. An unclassified plant virus with rod-shaped particles; occurs in Japan. Doi, Y. *Personal communication*.

burdock stunt viroid. A VIROID.
Tien, P. and Cheu, W. (1987) *The Viroids*. p. 333. ed. T.O.Diener. Plenum Press: New York.

burdock 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.

Burkitt's lymphoma virus. See EPSTEIN-BARR VIRUS.

burst size. The yield of infective virus particles obtained during a lytic one-step growth infection of a host cell. Generally used to describe PHAGE infections of prokaryotes. Yields of between $5-10 \times 10^3$ virus particles per bacterial cell can be obtained with some viruses (e.g. ssRNA phages).

Bushbush virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from mosquitoes in Trinidad and Brazil.

Bussuquara virus. Family *Flaviviridae*, genus *Flavivirus*. Isolated from man, sentinel monkeys *Alouatta*, sentinel mice and *Culex* sp. in Colombia, Panama and Brazil. Causes fever in man.

butterbur mosaic virus. A *Carlavirus*; occurs in Japan.
Doi, Y. *Personal communication*.

butterbur rhabdovirus. A plant *Rhabdovirus*; occurs in Japan.
Doi, Y. *Personal communication*.

Button willow virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from rabbits, hares and *Culicoides* sp. in California, New Mexico and Texas.

BV. Abbreviation sometimes used for 'budded virus', often referring to baculovirus particles which are not incorporated within occlusion bodies during infection and which acquire their envelopes by budding through the membrane of infected cells.

Bwamba virus. Family *Bunyaviridae*, genus *Bunyavirus*. Isolated from man and *Anopheles funestus* in several African countries. Causes fever in man.