



Lecture Three

Virus Classification

By

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Basis of virus classification

International Union of Microbiological Societies (1927).

The International Classification of Viruses (1966).

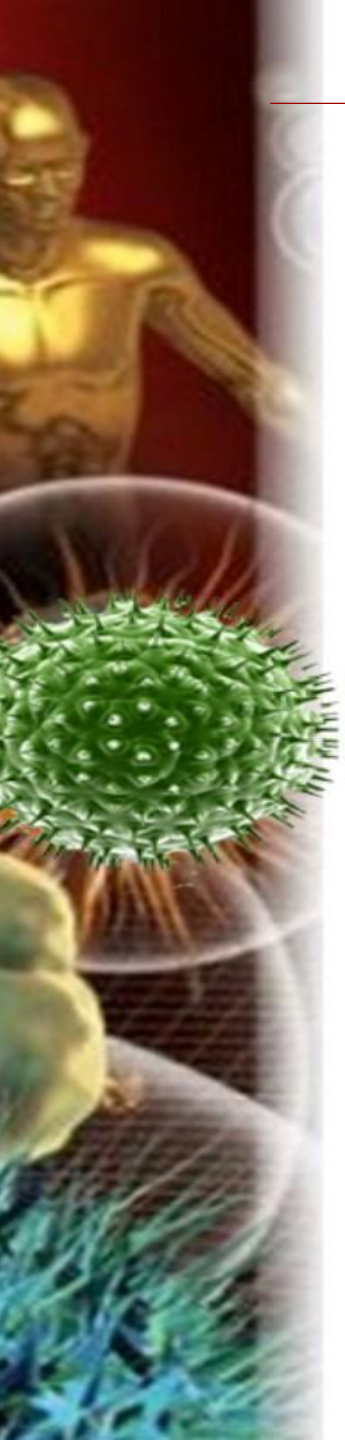
International committee on the taxonomy of viruses (ICTV) (1975).

10 reports: the first report released in **1971** and the last was in **2018**.

Basis of virus classification

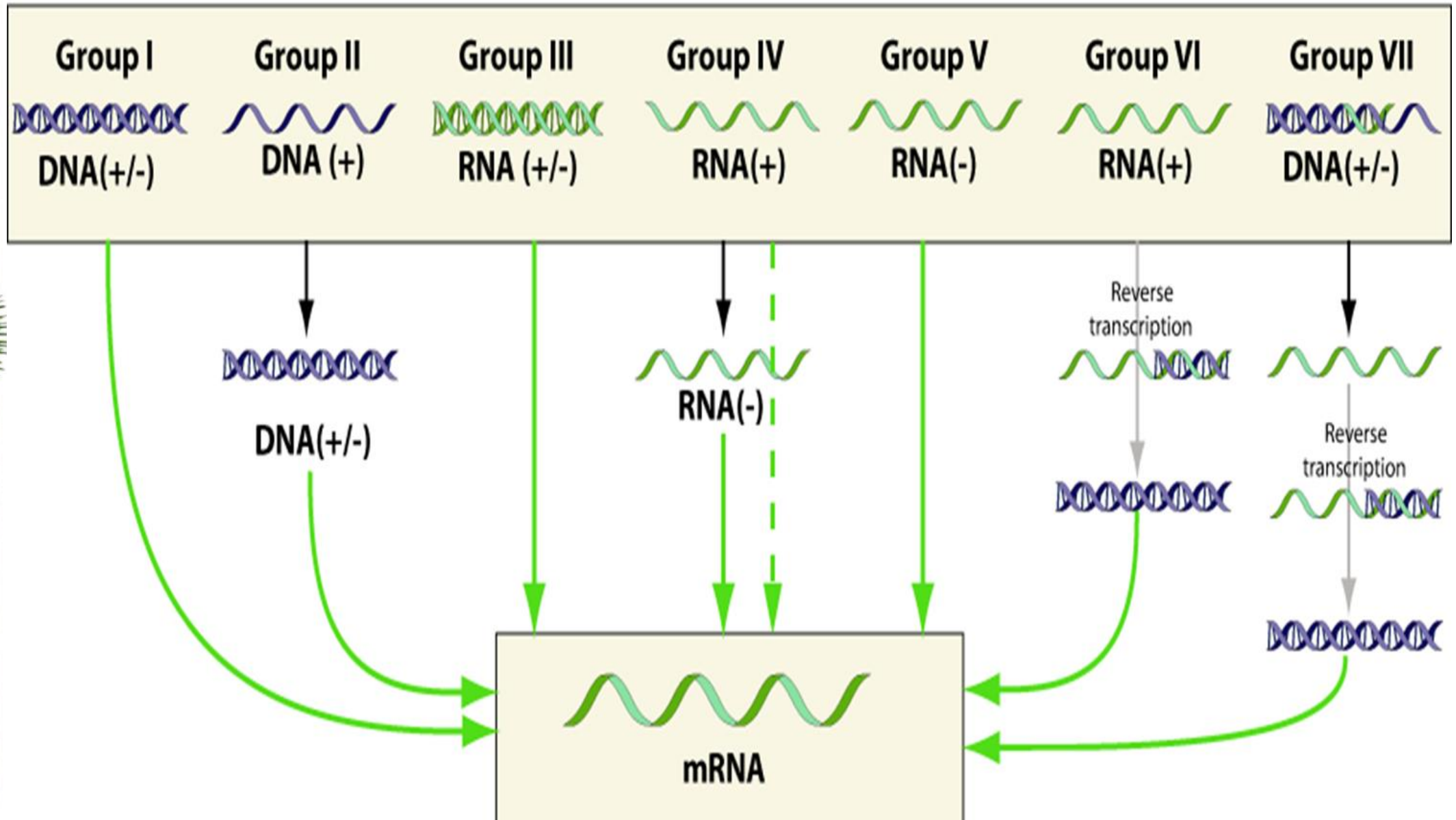
Established by **international committee on the taxonomy of viruses (ICTV)**:

- Virus size, shape and stability (morphology).
- Capsid symmetry (helical – icosahedral – complex).
- Presence or absence of virus envelope (**naked – enveloped**).
- Type and characteristics of the viral genome (ssRNA (+ or -), dsRNA, ssDNA, dsDNA, segmented or non-segmented).
- Strategy of virus replication (**Baltimore classification**).

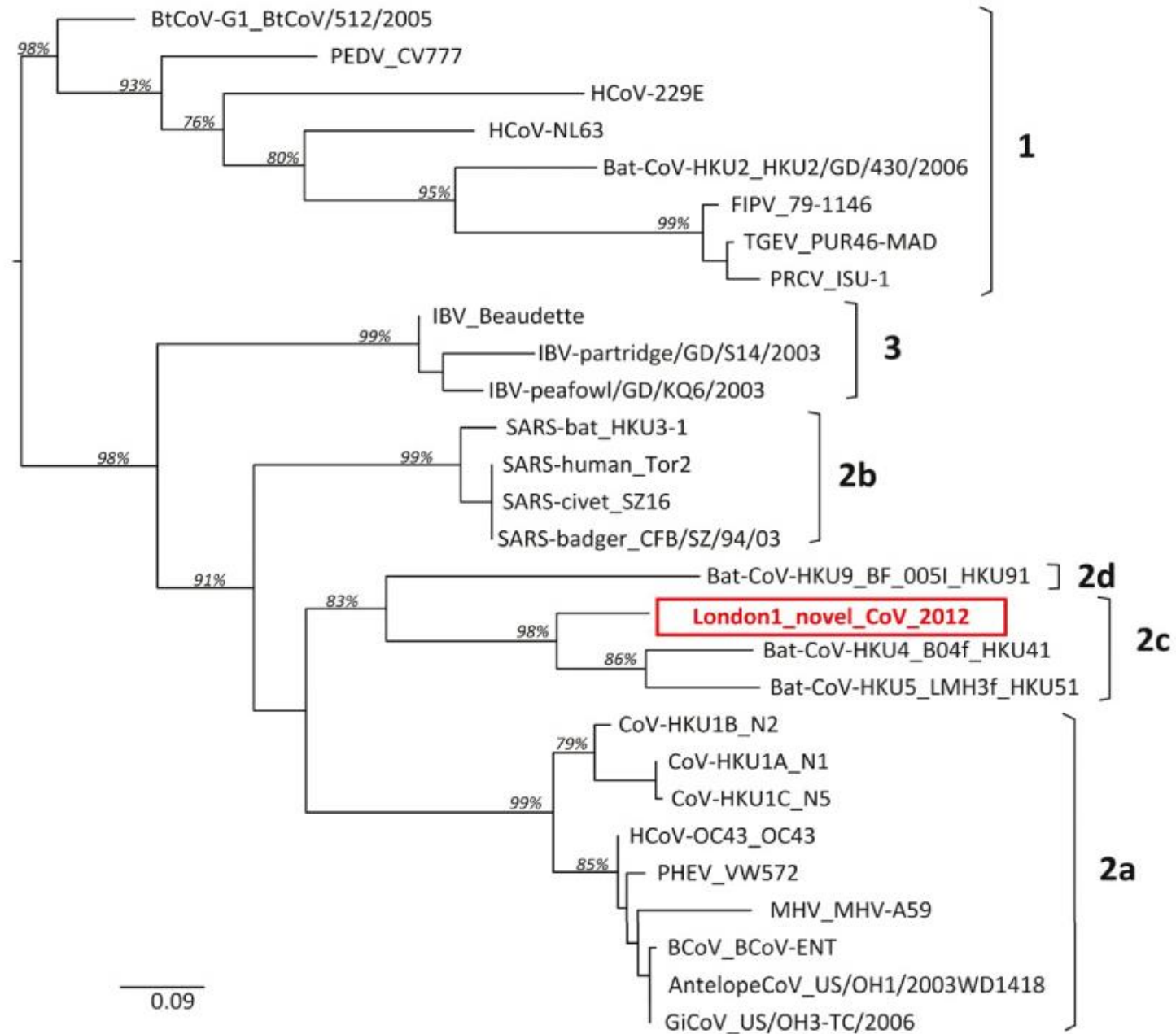


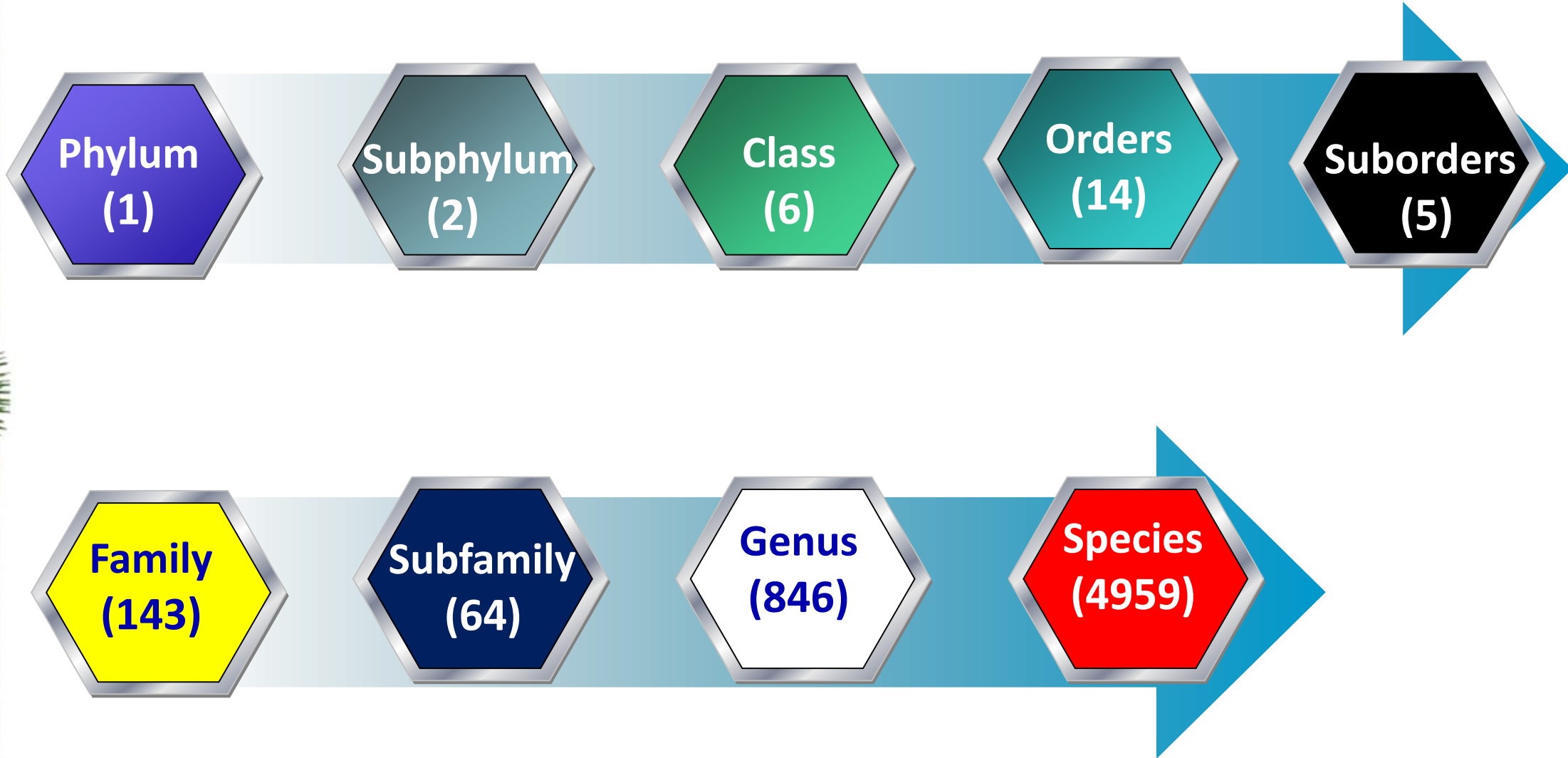
Baltimore classification

Genetic material present in the virion



Phylogenetic Classification





ICTV, 2018

Phylum (-viricota)

Negarnaviricota

Subphylum (-viricotina)

Haploviricotina

Polyploviricotina

Order (-viraes)

Nidovirales

Suborder (-virineae)

Cornidovirineae

Family (-viridae)

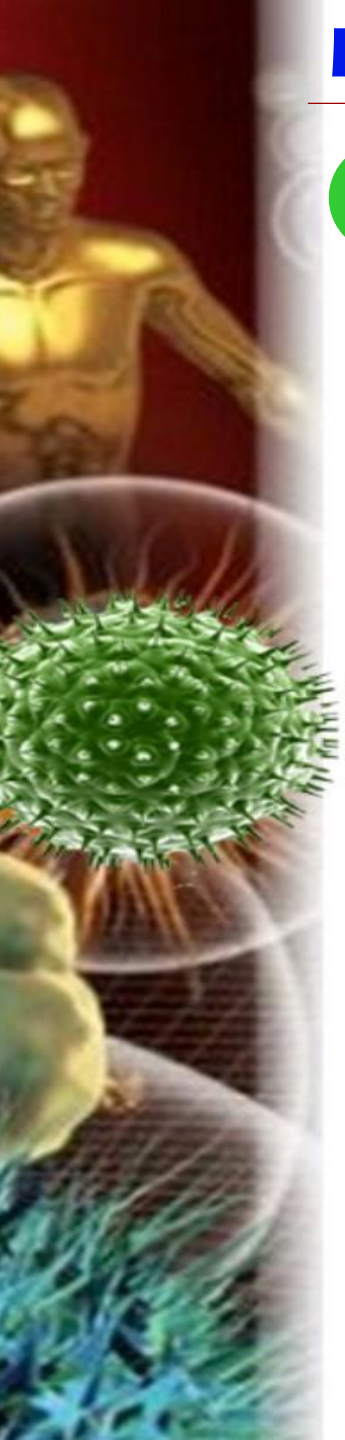
Cornidovirineae

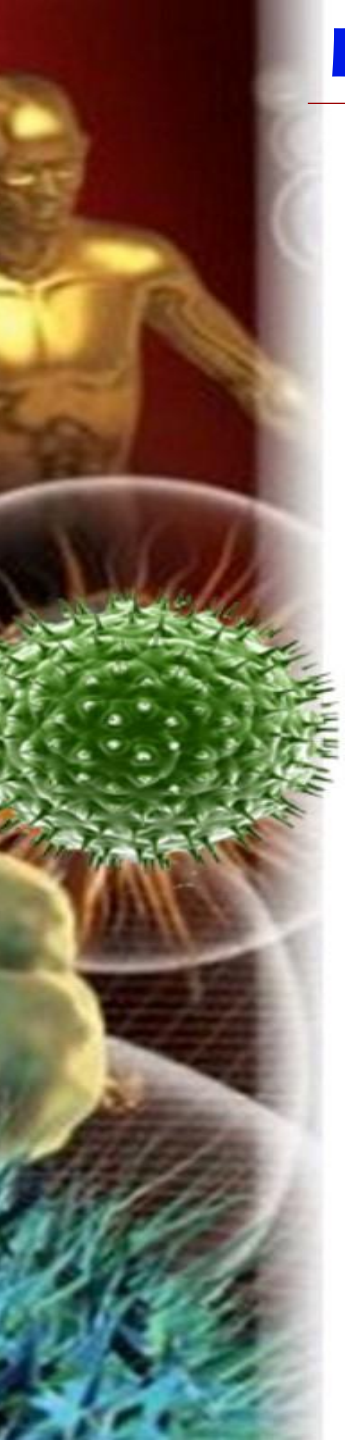
Subfamily (-virinae)

Orthocoronavirinae

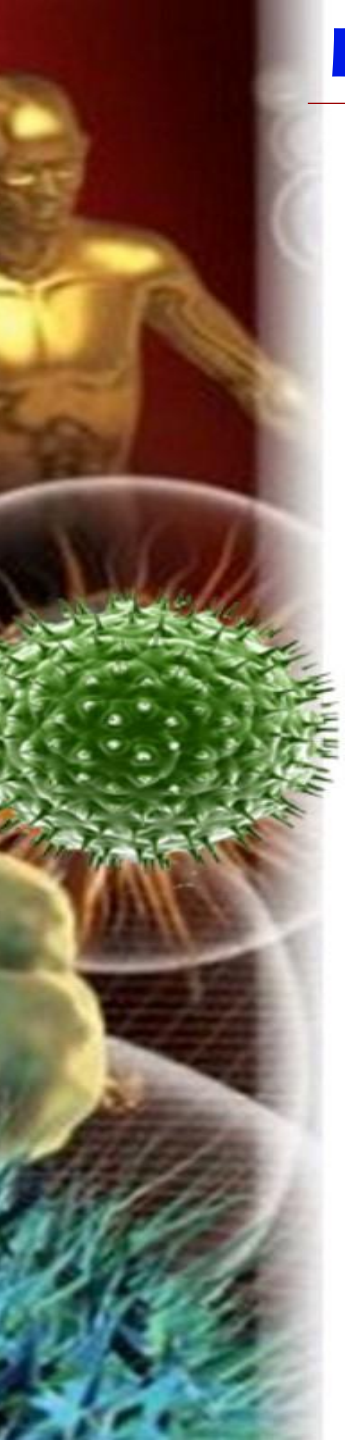
Genus (-virus)

Species





- Phylum: *Negarnaviricota*
 - Subphylum: *Haploviricotina*
 - Class: *Chunqiuviricetes*
 - + Order: *Muvirales*
 - Class: *Milneviricetes*
 - + Order: *Serpentovirales*
 - Class: *Monjiviricetes*
 - + Order: *Jingchuvirales*
 - + Order: *Mononegavirales*
 - + Class: *Yunchangviricetes*
 - Subphylum: *Polyploviricotina*
 - + Class: *Ellioviricetes*
 - Class: *Insthoviricetes*
 - Order: *Articulavirales*
 - + Family: *Amnoonviridae*
 - + Family: *Orthomyxoviridae*



— Order: *Nidovirales*

+ Suborder: *Abnidorvirineae*

+ Suborder: *Arnidorvirineae*

— Suborder: *Cornidovirineae*

— Family: *Coronaviridae*

+ Subfamily: *Letovirinae*

— Subfamily: *Orthocoronavirinae*

+ Genus: *Alphacoronavirus*

— Genus: *Betacoronavirus*

— Subgenus: *Embecovirus*

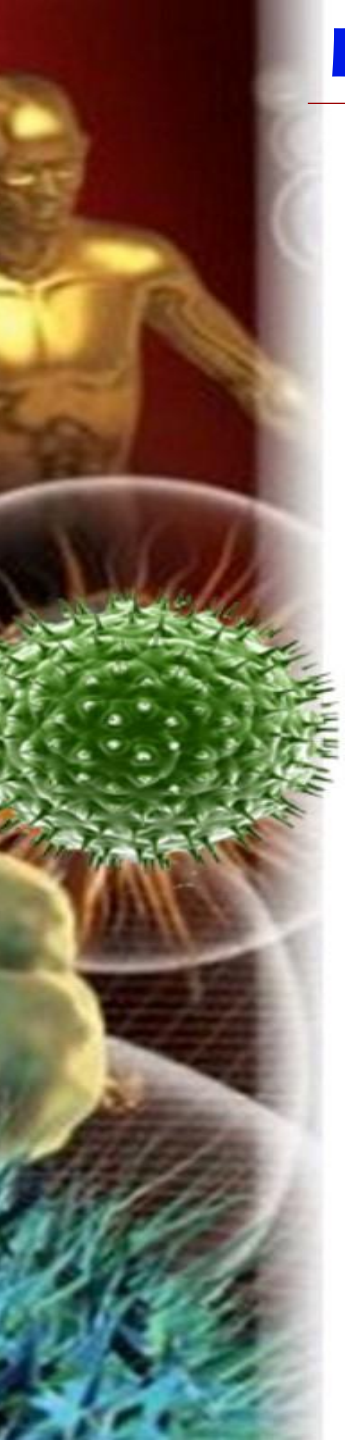
Species: *Betacoronavirus 1*

Species: *China Rattus coronavirus HKU24*

Species: *Human coronavirus HKU1*



Species: *Murine coronavirus*



+ Order: *Caudovirales*

+ Order: *Herpesvirales*

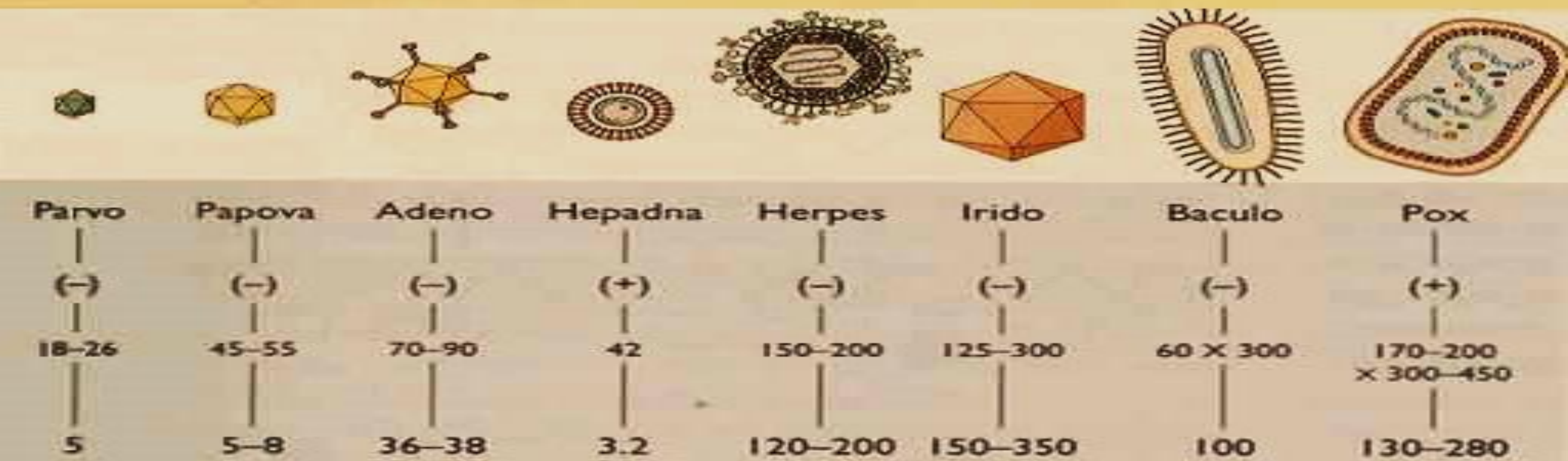
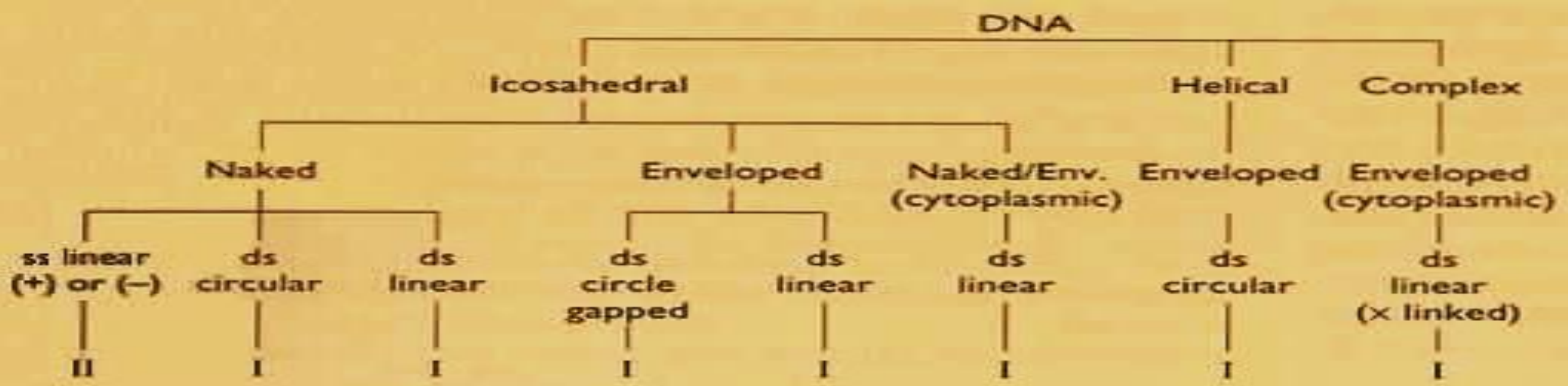
+ Order: *Ligamenvirales*

+ Order: *Nidovirales*

+ Order: *Ortervirales*

+ Order: *Picornavirales*

+ Order: *Tymovirales*



Nucleic acid

Symmetry of capsid

Naked or enveloped

Genome architecture

Baltimore class

RNA

Icosahedral

Helical

Naked

Enveloped

Enveloped

ds 10–18 seg.	ds 2 seg.	(+) ss cont.	(+) ss cont.	(+) ss cont.	(+) ss cont.	(+) ss 2 copies	(+) ss cont.	(-) ss cont.	(-) ss cont.	(-) ss 3 seg.	(-) ss 8 seg.	(-) ss cont.	(-) ss 2 seg.
III	III	IV	IV	IV	IV	VI	IV	V	V	V	V	V	V



Family name

Virion polymerase

Virion diameter (nm)

Genome size (total in kb)

Reo	Birna	Calici	Picorna	Flavi	Toga	Retro	Corona	Filo	Rhabdo	Bunya	Orthomyxo	Paramyxo	Arena
(+)	(+)	(-)	(-)	(-)	(-)	(+)	(-)	(+)	(+)	(+)	(+)	(+)	(+)
60–80	60	35–40	28–30	40–50	60–70	80–130	80–160	80 × 790–14,000	70– 85 × 130–380	90–120	90–120	150–300	50–300
22–27	7	8	7.2–8.4	10	12	3.5–9	16–21	12.7	13–16	13.5–21	13.6	16–20	10–14

