

**Lecture Four:**  
**Virus Classification**

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## **Basis of virus classification**

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**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

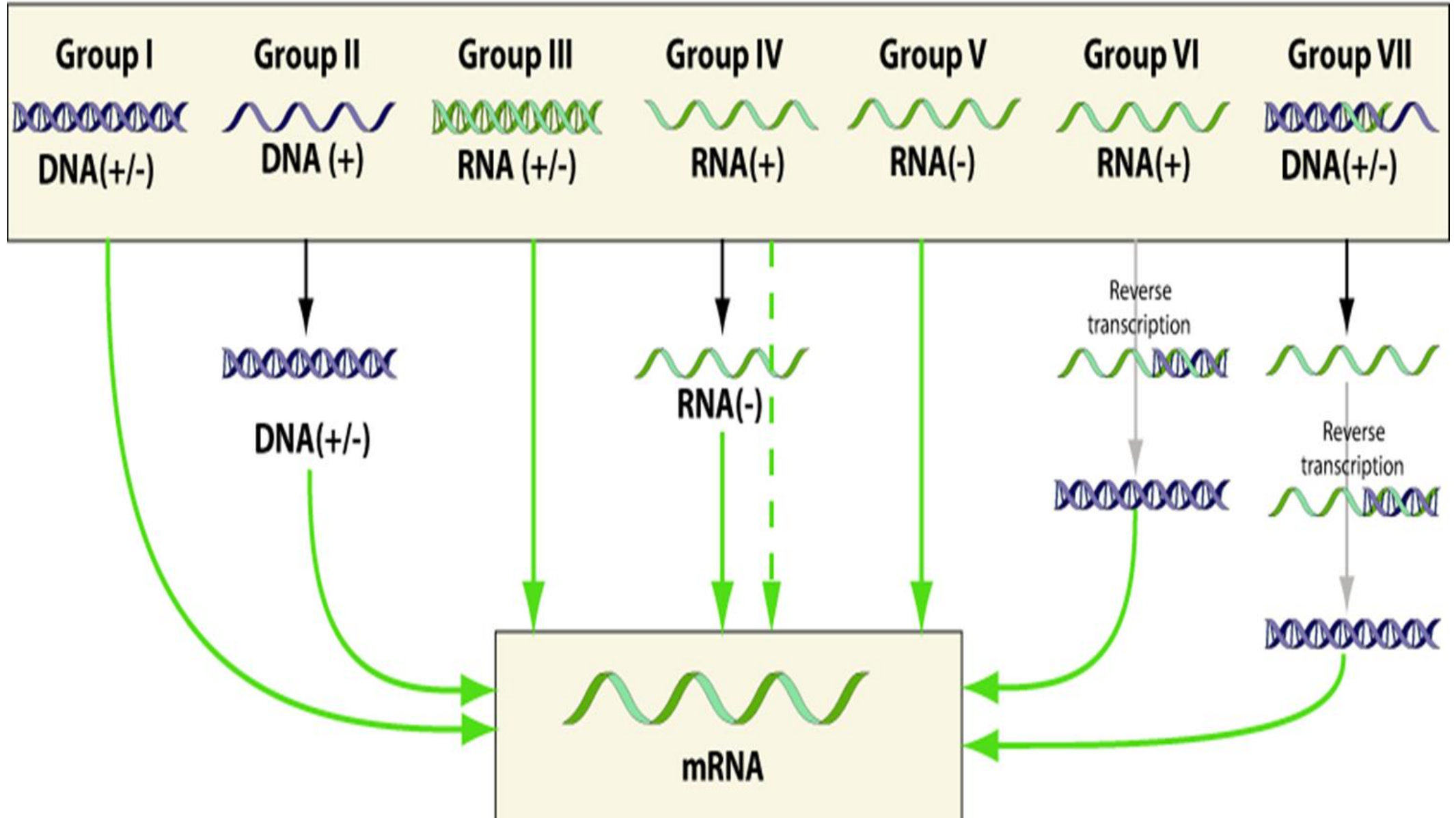
Established by **international committee on the taxonomy of viruses (ICTV)**:

- 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**).

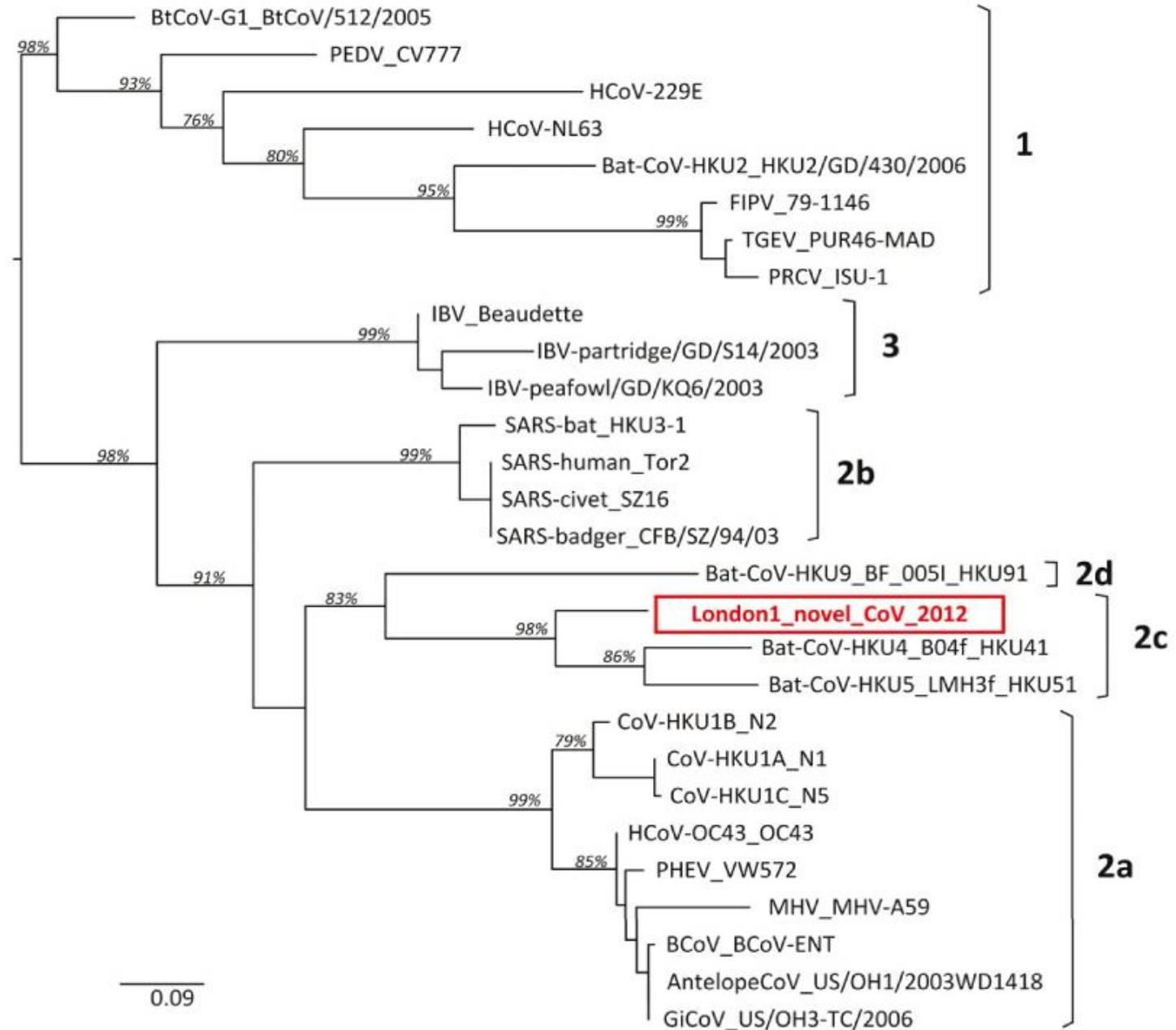


# Baltimore classification

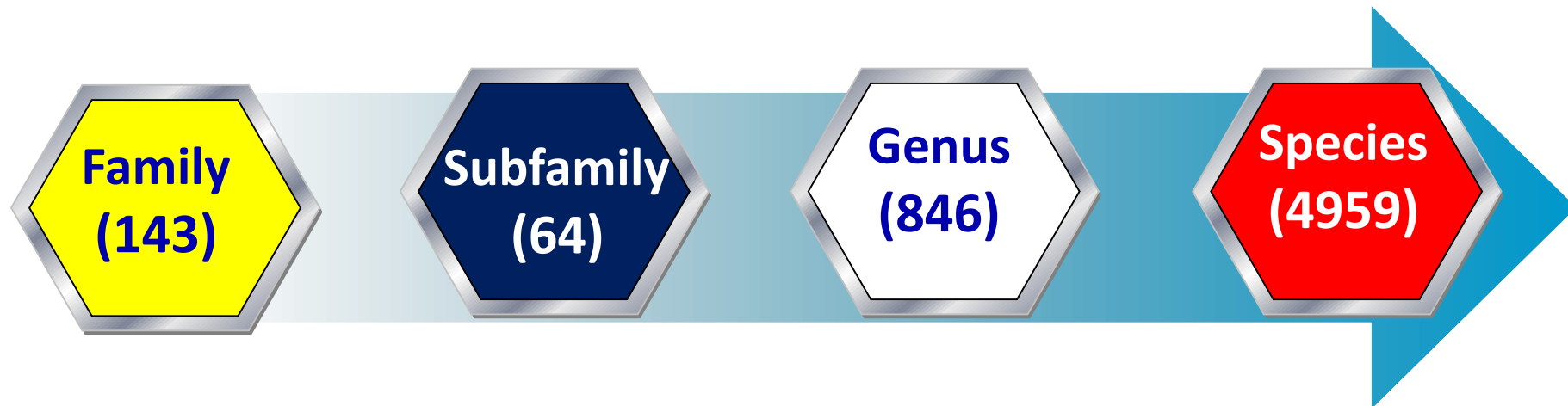
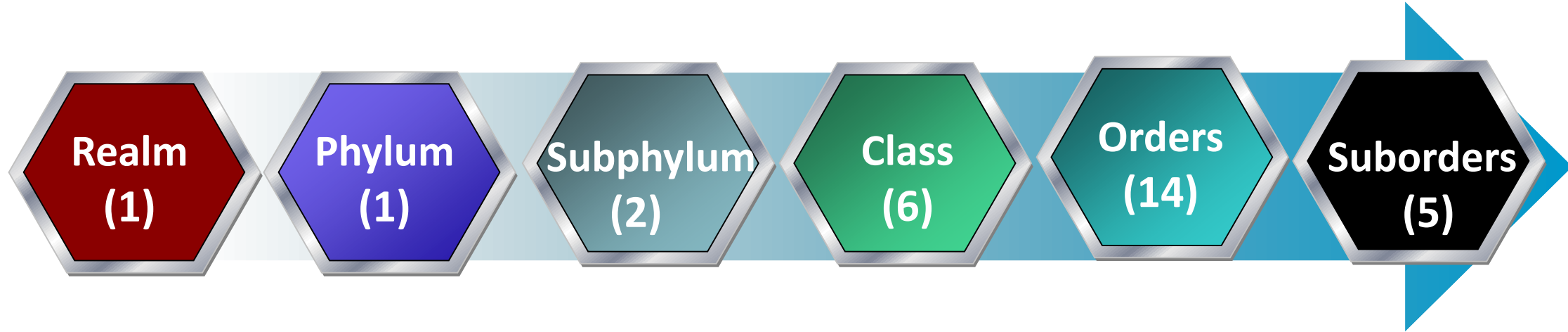
Genetic material present in the virion



# Phylogenetic Classification



# ICTV, 2019



# ICTV, 2019

Realm (-vira)

Riboviria

Phylum (-viricota)

Negarnaviricota

Subphylum (-viricotina)

Haploviricotina

Polyploviricotina

Class (-viricetes)

Ellioviricetes

Order (-virales)

Nidovirales

Suborder (-virineae)

Cornidovirineae

Family (-viridae)

Cornidoviridae

Subfamily (-virinae)

Orthocoronavirinae

Genus (-virus)

Species



— Realm: *Riboviria*

— Phylum: *Negarnaviricota* Realm: *Riboviria*

— Subphylum: *Haploviricotina* Phylum: *Negarnaviricota*

— Class: *Chunqiuviricetes* Subphylum: *Haploviricotina*

+ Order: *Muvirales* Class: *Chunqiuviricetes*

— Class: *Milneviricetes* Subphylum: *Haploviricotina*

+ Order: *Serpentovirales* Class: *Milneviricetes*

— Class: *Monjiviricetes* Subphylum: *Haploviricotina*

+ Order: *Jingchuvirales* Class: *Monjiviricetes*

+ Order: *Mononegavirales* Class: *Monjiviricetes*

— Class: *Yunchangviricetes* Subphylum: *Haploviricotina*

+ Order: *Goujianvirales* Class: *Yunchangviricetes*

— Subphylum: *Polyploviricotina* Phylum: *Negarnaviricota*

— Class: *Ellioviricetes* Subphylum: *Polyploviricotina*

+ Order: *Bunyavirales* Class: *Ellioviricetes*

— Class: *Insthoviricetes* Subphylum: *Polyploviricotina*

+ Order: *Articulavirales* Class: *Insthoviricetes*





– Order: *Nidovirales*

+ Suborder: *Abnidovirineae*

+ Suborder: *Arnidovirineae*

– 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***

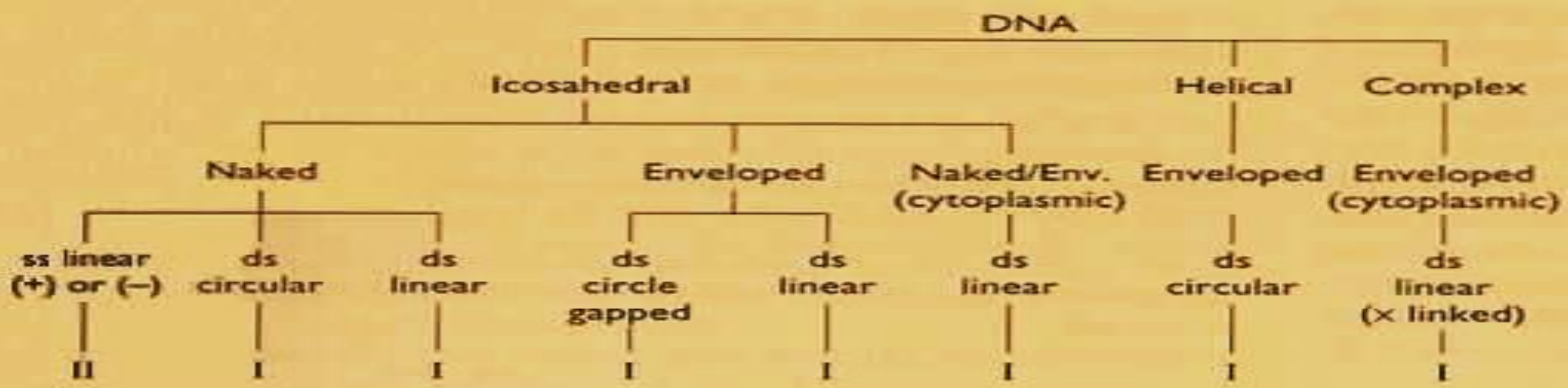
**+ Order: *Ligamenvirales***

**+ Order: *Nidovirales***

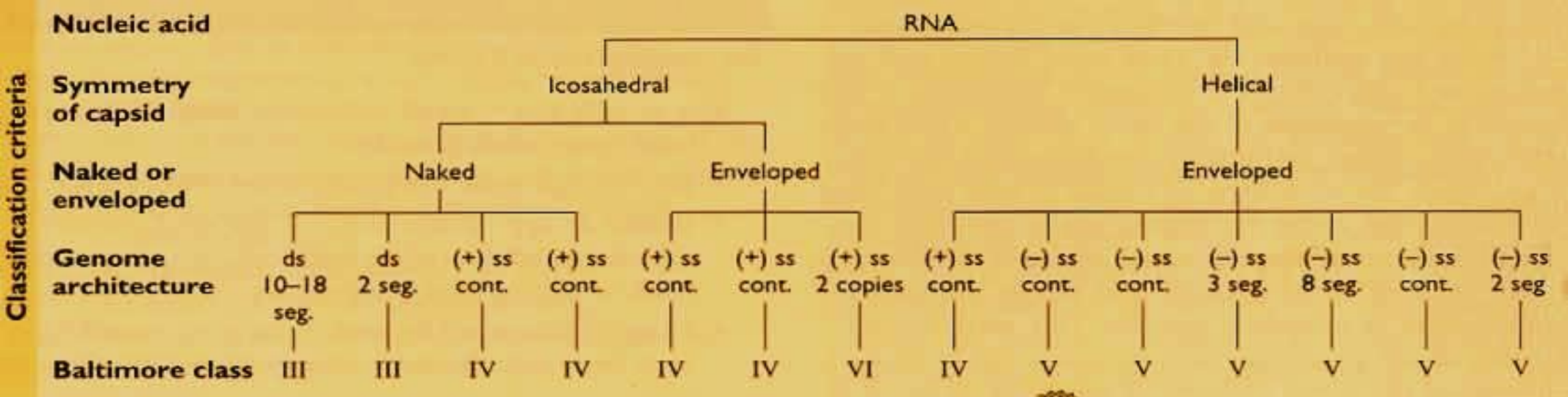
**+ Order: *Ortervirales***

**+ Order: *Picornavirales***

**+ Order: *Tymovirales***



Parvo	Papova	Adeno	Hepadna	Herpes	Irido	Baculo	Pox
(-)	(-)	(-)	(+)	(-)	(-)	(-)	(+)
18-26	45-55	70-90	42	150-200	125-300	60 x 300	170-200 x 300-450
5	5-8	36-38	3.2	120-200	150-350	100	130-280



**Properties**

<b>Family name</b>	Reo	Birna	Calici	Picorn	Flavi	Toga	Retro	Corona	Filo	Rhabdo	Bunya	Orthomyxo	Paramyxo	Arena
<b>Virion polymerase</b>	(+)	(+)	(-)	(-)	(-)	(-)	(+)	(-)	(+)	(+)	(+)	(+)	(+)	(+)
<b>Virion diameter (nm)</b>	60-80	60	35-40	28-30	40-50	60-70	80-130	80-160	80 x 790-14,000	70- 85 x 130-380	90-120	90-120	150-300	50-300
<b>Genome size (total in kb)</b>	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



Thank  
You