

MADE WITH LOVE ❤️



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MOBILE APP - ISHITA KHURANA



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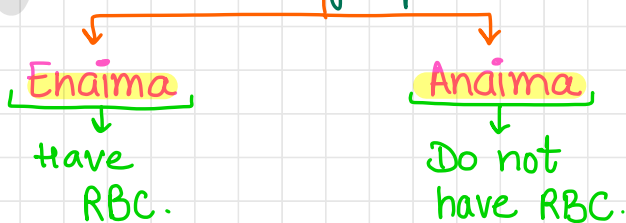
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INTRODUCTION:-

Biological classification is the scientific way of orderly arranging the organisms into groups on the basis of their similarities and differences in a certain easily observable but fundamental characters.

• Father of BIOLOGY:- **ARISTOTLE**

He used morphological characters to classify plants into trees; shrubs & herbs. He also divided animals into two groups



NOTE

FATHER OF BOTANY → THEOPHRASTUS
FATHER OF MEDICINE → HEPOCRATES

TWO KINGDOM CLASSIFICATION:- **C. LINNAEUS**

KINGDOM PLANTAE AND ANIMALIA

This classification

did not include:-

- ① Eukaryotes & Prokaryotes
- ② Unicellular & Multicellular
- ③ Photosynthetic & Non-Photosynthetic

⇒ **[DRAWBACK]**

THREE KINGDOM CLASSIFICATION :- ERNST HACKEL

KINGDOM PLANTAE ; ANIMALIA ; PROTISTA ↳ [ZOOLOGIST]
↳ [included uni. Euk.]*

FOUR KINGDOM CLASSIFICATION :- COPELAND

KINGDOM PLANTAE ; ANIMALIA ; PROTISTA AND MONERA ↳ [BOTANIST]

FIVE KINGDOM CLASSIFICATION :- R.H WHITTAKER

KINGDOM MONERA ; KINGDOM PROTISTA ;
KINGDOM FUNGI ; KINGDOM PLANTAE
AND ANIMALIA! ↳ [9th 1969]*

↓
[Multi., cell
wall made of chitin ;
Heterotrophic + no
movement]

[Imp.]

THE MAIN CRITERIA FOR CLASSIFICATION USED BY HIM WERE:-

- Cell structure
- Body organisation
- Mode of Nutrition
- REPRODUCTION
- Phylogenetic Relationship. → Evolutionary Relationship!



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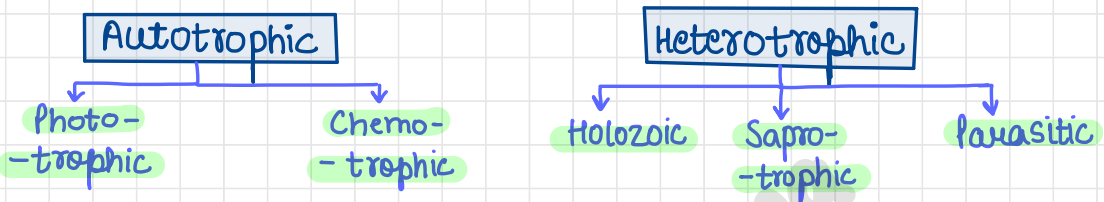
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TABLE 2.1 Characteristics of the Five Kingdoms

Characters	Five Kingdoms				
	Monera	Protista	Fungi	Plantae	Animalia
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Cell wall	Noncellular (Polysaccharide + amino acid)	Present in some	Present (without cellulose)	Present (cellulose)	Absent
Nuclear membrane	Absent	Present	Present	Present	Present
Body organisation	Cellular	Cellular	Multicellular/ loose tissue	Tissue/ organ	Tissue/organ/ organ system
Mode of nutrition	Autotrophic (chemosynthetic and photosynthetic) and Heterotrophic (saprophyte/parasite)	Autotrophic (Photosynthetic) and Heterotrophic	Heterotrophic (Saprophytic/ Parasitic)	Autotrophic (Photosynthetic)	Heterotrophic (Holozoic / Saprophytic etc.)

NOTE

Mode of Nutrition :-



Virus have not been included in 5 kingdom system of classification.

↓
connecting link b/w living and non-living!

All prokaryotes were → grouped under kingdom Monera!

All unicellular eukaryotes were → were placed in kingdom Protista!

↓
has brought together :-

Chlamydomonas;
Chlorella with

Paramecium & Amoeba!

Fungi were placed in a separate kingdom for Non-photosynthetic plants and showed a characteristic difference → in their wall composition :- of chitin!

→ An attempt have been made to evolve a classification system which reflects not only morphological; physiological and reproductive similarities, but also phylogenetic :- based on evolutionary relationship!

↓
was an integral part of
5 kingdom system of classification!



MONERA

→ consist of Prokaryotic organisms only

Carl Woese :- 6 kingdom Classification
[3 Domain system]

kingdom MONERA

ARCHAEBACTERIA

EUBACTERIA

Bacteria

Cyanobacteria

• some other group of monerans are mycoplasma; rickettsiae and actinomycetes.

• Archaeobacteria :-

- most primitive prokaryotes found in most harsh habitats.
- Archaeobacteria are of 3 major types:-
 - (A) Methanogens → (Obligate anaerobes)
 - (B) Halophiles → in salty Area
 - (C) Thermo acidophiles → in Hot thermal Springs.

* Peptidoglycan is absent in cell wall of Archaeobacteria!

Can survive in extreme conditions.

Obligate → iske Saath hi rhena pdega*
Facultative → Kaam chla lenge.



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• Eubacteria :-

- characterized by presence of a rigid cell wall.
 - ↳ made of peptidoglycan. & Te-choic Acid!
- Divided into 4 categories:-
 - (A) Coccus → Spherical → Streptococcus
 - (B) Rod Shaped → Bacillus → Bacillus
 - (C) Comma shaped → Vibrio → Vibrio cholera
 - (D) Spiral → Spirillum → Spirillum volutans.

• Bacterial str. is very simple, but are complex in behaviour. Compared to many other organisms, bacteria as a group show the most extensive metabolic diversity.

Bacteria → show both autotrophic and heterotrophic nutrition.

Auto-Trophic

- chemo. [nitrifying bacteria]
- photo. [Purple & green sulphur bacteria]

Also works in Phosphorus and Carbon cycle.

Chemosynthetic Autotrophs oxidise various inorganic Subs. such as nitrates; nitrites and ammonia and use the released energy for ATP production.

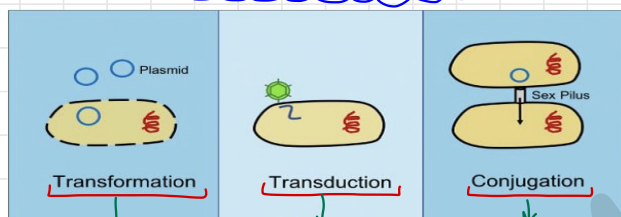
Hetero-trophic

- Saprophytic
- symbiotic → Rhizobium
- parasitic → Pathogens!

→ Bacteria reproduce mainly by → Binary fission
 → But sometimes, under unfavourable conditions, they produce → spores!

They also Reproduce by a sort of Sexual Reproduction by adopting a primitive type of DNA transfer from one bacterium to the other!

SEXUAL REPRODUCTION



The Donor and Recipient do not come in contact.

Blw bacteria & virus
 [Ecoli & Bacteriophage]

The donor & the Recipient bacteria comes in contact!

→ Some of these organisms can fix atmospheric nitrogen in some specialized cells called **Heterocysts**!
ex Nostoc & Anabena.

• **Cyanobacteria** → Blue green Algae → photosynthetic in nature.

↳ Have chlorophyll a similar to green plants and are photosynthetic in nature!

↳ Can be:- unicellular; colonial or filamentous!

Cause

Algal Bloom.

are surrounded by a gelatinous sheath!
 [Jelly Like]

→ Mycoplasma or PPLO lacks cell wall & are insensitive to antibodies.

↳ can live without* Oxygen [facultative! :)]

* Some bacteria are Pathogen [which causes diseases]

(1) Cholera → *Vibrio cholera*

(2) Typhoid → *Salmonella Typhi*

(3) Tetanus → *Clostridium Tetani*

(4) Citrus Canker → *Xanthomonas Citri*

PROTISTA



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→ All single cell eukaryotes are placed under kingdom Protista.

→ This kingdom forms a link with the others dealing with plants; animals and fungi.

→ Cell body contains a well defined nucleus and other membrane bound organelles. → Eukaryotic Cell.

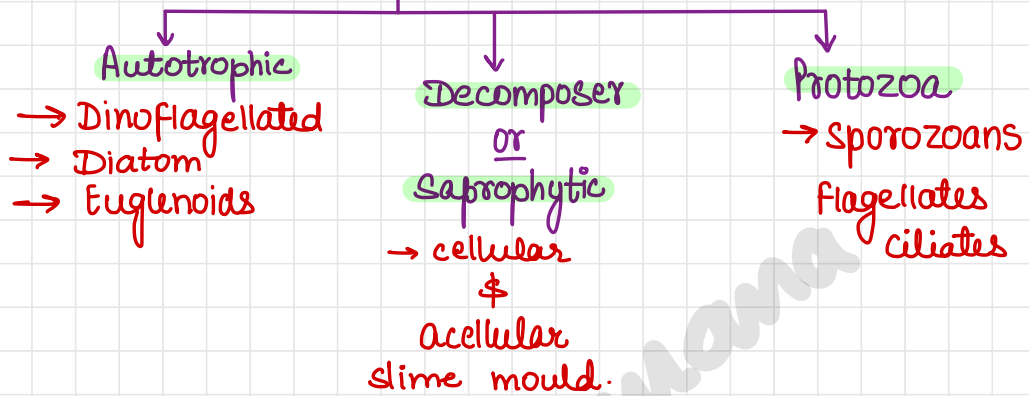
→ Some have flagella or cilia. Protista reproduce asexually and sexually by a process involving cell fusion and zygote formⁿ.

• Mode of Nutrition :- Parasitic ; photosynthetic ; Sapro.
or mixotrophic → both hetero. & auto.

→ includes photosynthetic phytoplanktons, non-photosynthetic zooplankton & disease causing parasites.

→ food reserve is starch ; glycogen ; paramylon & fat.

PROTISTA



Chrysophytes; Dinoflagellates; Euglenoids; slime moulds and protozoans are included under kingdom Protista.

(A) CRYSTOPHYTES :-

- include diatoms and golden algae (desmids)*
- found in fresh water as well as marine water
- are microscopic and float passively in water current.
- Majority of them are photosynthetic. They are the chief producers in oceans.
- its cell wall forms two thin overlapping shells, which fits together like a soap box.
 - ↓
 - are enclosed with silica and are indestructible
 - [Diatomaceous Earth] → used in Polishing; filtration of oil and Syrup.



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(B) DINOFLAGELLATES :- Golden Brown photosynthetic Protists!
↳ Are mostly marine and photosynthetic.

→ Appear yellow; green; brown; blue or red due to change in proportion of various pigments present in their cell.

→ cell wall has stiff cellulose plates on outer surface.

→ They have two flagella. One lies longitudinally and the other transversely in furrow b/w the wall plates.

[perform whirling whip movement]

↳ [i.e why :- are colourful whirling whips]

* Red Dinoflagellates → Gonyaulax

↓
Red tides → release toxins → which can kill large animals.

→ They show Bioluminescence due to photogenic granules in cytoplasm. Some species of dinoflagellates are taken as food by mussels.

(C) EUGLENIDS :-

→ majority are fresh water animal and found in stagnant water.

→ have 2 flagella.

• Nutrition :- mixotrophic

→ Instead of cell wall, they have protein rich layer called pellicle!

→ its photosynthetic pigments → resembles with higher plants.

Ex. Euglena

(D) Slime Mould:-

↳ Are saprotrophic protists!

→ under favourable conditions → forms plasmodium which may grow over several feet.

→ during unfavourable conditions → fruiting bodies bearing spores are formed.

↓
have true walls
and are extremely resistant
to abiotic stress!

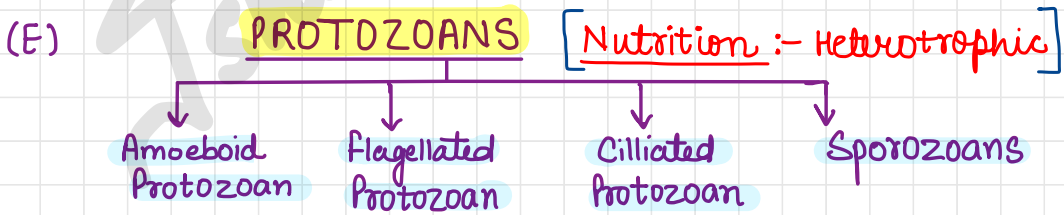
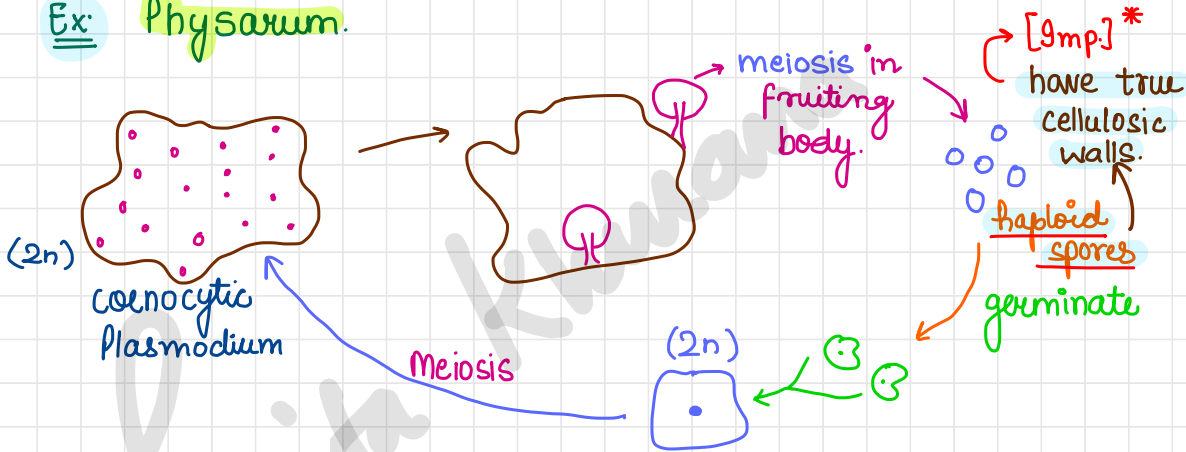


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Ex: Physarum.



• Amoeboid Protozoan:-

→ Live in fresh water; sea water; and moist cells.

→ Have pseudopodia!

→ Marine forms have silica*

→ And *Entamoeba* is Parasitic

• Flagellated Protozoans :-

→ either free living or parasitic.
↳ Flagella present!

Ex: Trypanosoma (cause sleeping sickness); Trichomonas.
↳ its vector :- Tse Tse Fly!

• Ciliated Protozoans :-

→ Aquatic

→ Cilia present!

→ food stored into gullet with the help of cilia.
→ 2 types of nuclei are present.

Ex: Paramecium

• Sporozoans :-

→ infectitious spore like stage present in its life cycle.

Ex: Plasmodium. (cause malaria)

FUNGI

→ can be harmful [like rust; smut] as well as beneficial [like yeast; penicillium]

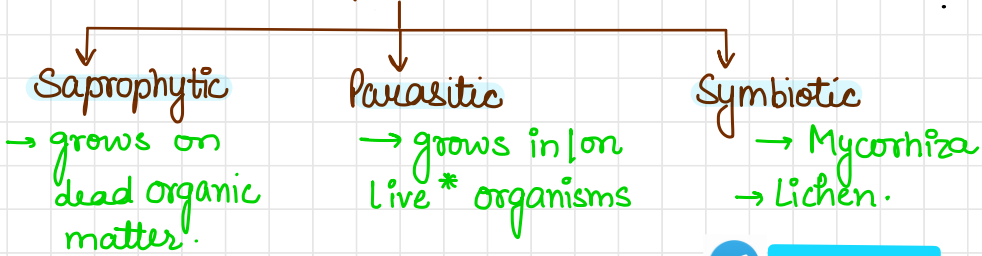
→ Eukaryotic; multicellular organism.

[Yeast is unicellular]

Ex: Saccharomyces Cerevisae!

↳ [Baker's / Brewer's Yeast!]

Mode of Nutrition

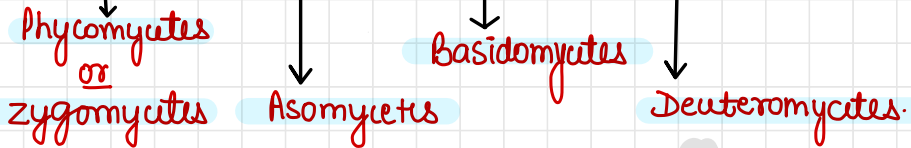


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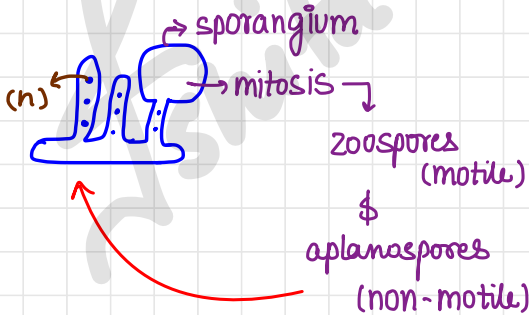
FUNGI



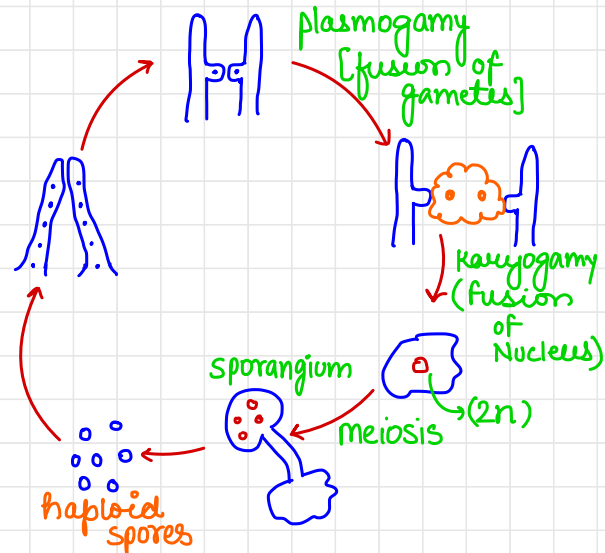
(A) Phycomycetes / Zygomycetes

only group to have aseptate & coenocytic hyphae.

ASEXUAL REPRODUCTION



SEXUAL REPRODUCTION

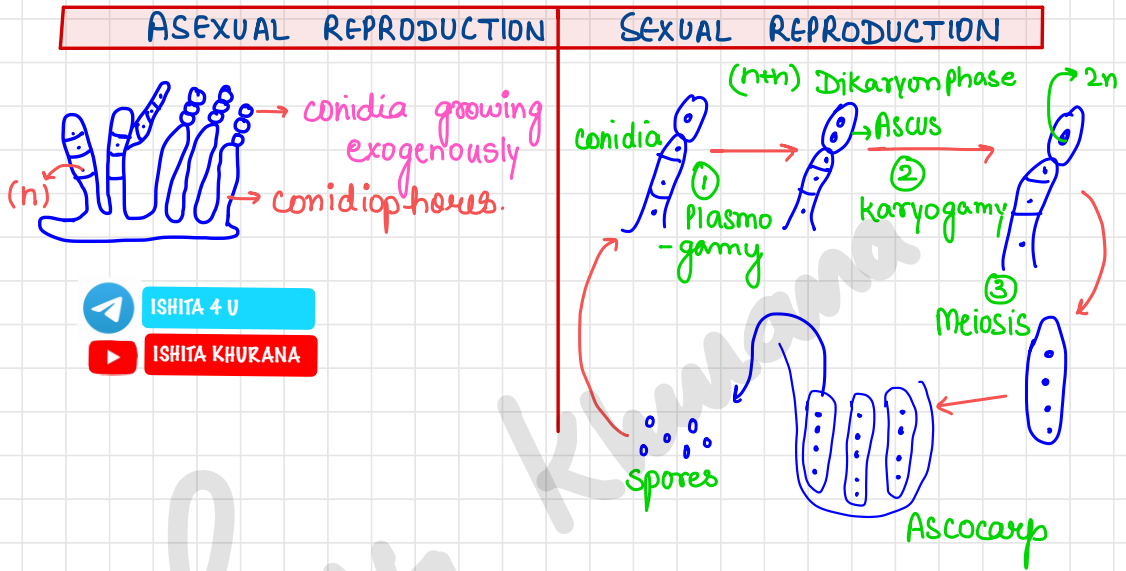


eg: $\frac{R}{\downarrow}$ $\frac{A}{\downarrow}$ $\frac{M}{\downarrow}$ $\frac{\quad}{\downarrow}$ Mucor
Rhizopus Albigo

(B) Ascomycetes:- [Sac Fungi]

Ex. Yeast ; Penicillium & Morels & truffles ;
Aspergillus ; Claviceps ; Neurospora (used
in biochemical
and genetic work)

Septate &
branched hyphae
are (+ve)



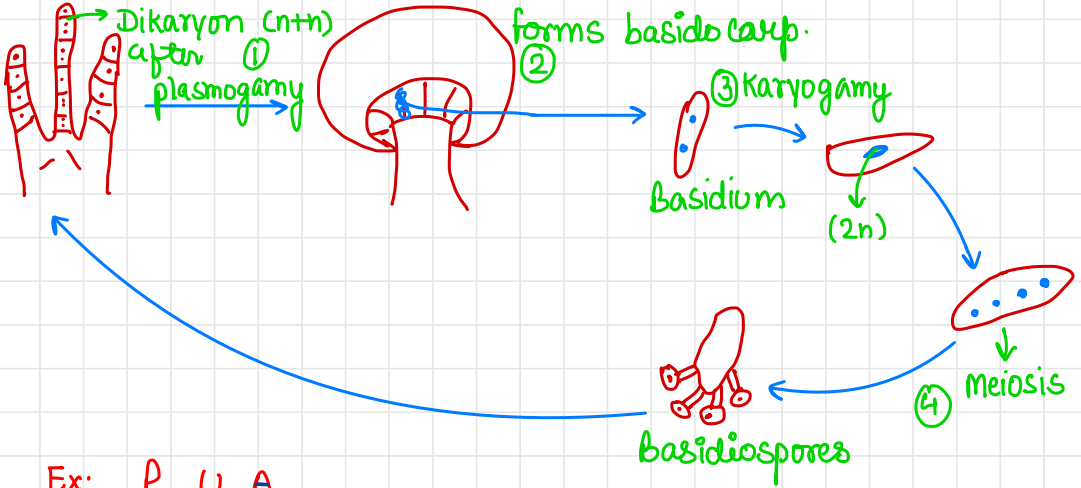
(C) Basidiomycetes:-

→ commonly known forms are mushrooms ;
bracket fungi , puffballs.

→ have branched and septate* hyphae.

→ No asexual spores.

→ Do vegetative reproduction
by fragmentation.



Ex:

P	U	A	
↓	↓	↓	→
Puccinia (Rust)	Ustilago (Smut)		Agricus (mushroom)

(D) Deuteromycetes :-

↓ ↳ imperfect fungi as only asexual phases are known.
then moved to other classes when once, sexual forms are known.

→ Asexual spores are conidia.

→ Are mycelium branched and septate.

Ex:

C	A	T	
↓	↓	↓	→
Colletotrichum	Trichoderma	Alternaria	



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VIRUS ; VIROIDS ; PRIONS

connecting link b/w
Living and non-living.

Term given by :- Louis Pasteur!

Composed of 2 things

Genetic Material

Protein coat.

could be
DNA or RNA

Majority of plant virus have
genetic material
RNA*

Exception :- CFMV
[Cauliflower
Mosaic virus]

Majority of Animal virus
have Genetic
material DNA*

Exception :- Retrovirus ;
Rhinovirus

Discovery :-

DJ Ivanowski [1892]

Discovered TMV [TOBACCO MOSAIC VIRUS]

M.W Beijerinck [1898]

Contagium fluidum
vivum → infectious fluid

that can cause disease in plant!

WM STANLEY [1935] → isolated & crystallized TMV.

Discovered by T.O

Diener in 1971 as
casual agent of
potato spindle tuber
disease!

RNA of viroid is of
low molecular
weight.

TOBACCO MOSAIC VIRUS

Genetic Material :- ss RNA

Whole protein coat (tnt)
(6400)

then
Caspid
(2130)

(2130)
Capsomere

Nucleotide : Capsomere
3:1

BACTERIOPHAGE

(dsDNA) Genetic Material

Head

Protein Coat

Neck

Tail

Repro. by

Lytic cycle

Lysogenic cycle.

• LICHEN :- Air Pollution indicator!

→ Not grow in polluted area.

Fungi + Algae → Photosynthetic
(Phycobiont)
↓
water & minerals
uptake
(mycobiont)



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