YAKEEN NEET 2.0

2026

Biological Classification

Botany | Lecture - 04

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Topics to be covered

1. VIRUS, VIROID, PRIONS, LICHEN
2. PROTOZOA
3.
4.

PROTOZOA

Primitive Relative of animal: Cell wall ✗ Hetrotrophs

4 Group

Amoeboid Protozoa

* fresh, marine H_2O, moist soil.

CYTOPLASM
Cell membrane

Pseudopodia (Temporary)

- movement
- false feet
- capture food/ PREY

* marine forms: SILICA SHELL ON SURFACE

eg: Entamoeba: parasite

↓ Dysentary (contaminated H_2O, Food)

FLAGELLATED

* Free living / parasitic
* Flagella ✓

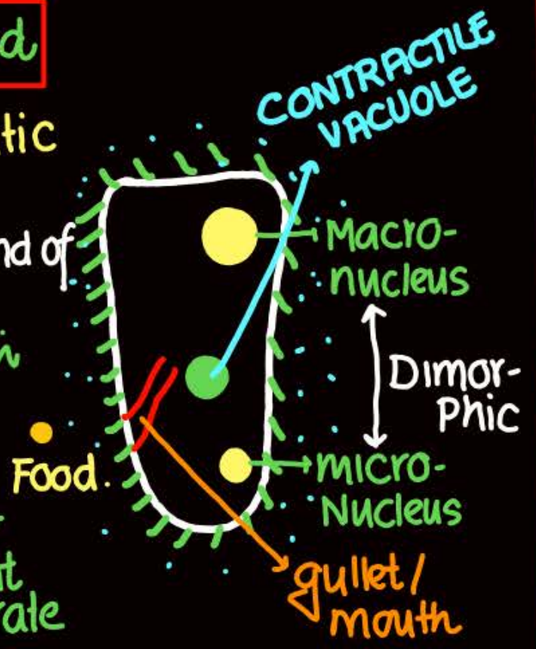
eg: Trypanosoma (parasite)

↓ Sleeping sickness (Muscle, Joint: Pain)

↓ Transfer to human By tse-tse fly (Arthropoda)

Ciliated

* aquatic



① Thousand of Cilia Beat in H_2O

② Water Current generate

③ FOOD & H_2O Enter into it through gullet

④ Excess H_2O pump outside By contractile vacuole. (Osmoregulation)

eg: Paramecium

SPOROZOAN.

eg Plasmodium (malarial parasite)

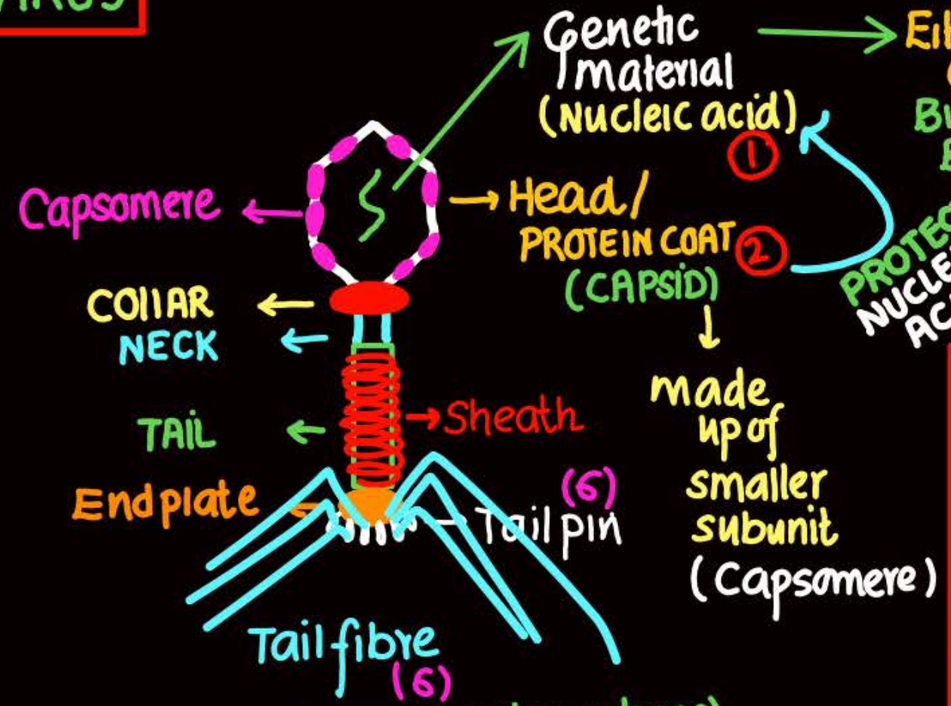
↓ LIFE CYCLE

↓ Infectious spore (merozoites)

↓ Staggering / Harmful effect on Human.

VIRUS

- VIRUS, Viroid, prions (Non-cellular)
  LICHEN: NO PLACE IN 5K Classifn.
- venom / poisonous fluid / obligate intracellular parasite
- Link b/w LIVING (genetic material present) & non living (protoplasm X)



- ① + ② → Nucleoprotein
- Take over host machnesy & Replicate & Kill host
- VIRUS: Outside Body: Inactive (inert)
- **VIRAL SYMPTOMS IN PLANT**

Mosaic pattern (Two diff colour in leaf)
Vein clearing & yellow of leaves (loss of chlorophyll)
Dwarfing / Stunted growth
Curling & Rolling of leaf

- Geometry (protein)
  - Polyhedral (Bacteriophage)
  - helical (TOBACCO MOSAIC VIRUS (SSRNA))

- STANLEY: VIRUS CRYSTALISED (PROTEIN: CRYSTAL)
- IVANOWSKY: Tobacco mosaic Disease: Tobacco mosaic VIRUS
  Virus pass through Bacterial filter
  So smaller than Bacteria.

VIRUS
↓
Infection

- Plant (Plant Virus) — SSRNA
- Animal (animal Virus) — SS/DSRNA & DSDNA
- Bacteria (Bacteriophage) — Usually dsDNA

- Mumps — SSRNA
- Small POX — dsDNA
- Herpes — dsDNA
- Influenza — SSRNA

★ Beljerynck : Term VIRUS

Infected Plant

Cell/Fluid extract (contagium vivum Fluidum) (VIRUS Present)

Transfer

Into healthy plant

Become infected.

LICHEN

Symbiotic

algae 5l.	fungi 95l.
★ autotroph	hetrotroph
★ Phycobiont	Mycobiont

PROVIDE FOOD

★ shelter
★ absorption of H_2O, minerals

★ DO not grow in Polluted area (AIR POLLUTION SO_2)
★ Indicator of SO_2 poll^n.

VIROID

★ Diener
★ Infectious RNA (No protein Coat)
↓
Low molecular weight
★ Smaller than virus
★ Potato spindle tuber disease (plant)

PRIONS.

★ Alper.
★ abnormal folded protein (amino acid chain not folded properly)
↓
degenerate Neuron (Neurological disorder)
★ Mad cow disease (Bovine spongiform encephalopathy)
★ Creutz Feldtz Jacob disease in human.
★ size similar to virus.

MOSAIC PATTERN (TWO DIFFERENT COLOUR)

VEIN CLEARING & YELLOWING OF LEAVES.

SYMPTOMS OF VIRAL DISEASE

STUNTED GROWTH

CURLING & ROLLING OF LEAF.

2.6 Viruses, Viroids, Prions and Lichens

In the five kingdom classification of Whittaker there is no mention of lichens and some acellular organisms like viruses, viroids and prions. These are briefly introduced here.

All of us who have suffered the ill effects of common cold or 'flu' know what effects viruses can have on us, even if we do not associate it with our condition. Viruses did not find a place in classification since they are not considered truly 'living', if we understand living as those organisms that have a cell structure. The viruses are non-cellular organisms that are characterised by having an inert crystalline structure outside the living cell.

inactive

Once they infect a cell, they take over the machinery of the host cell to replicate themselves, killing the host. Would you call viruses living or non-living?

Virus means venom or poisonous fluid. Dmitri Ivanowsky (1892) recognised certain microbes as causal organism of the mosaic disease of tobacco (Figure 2.6a). These were found to be smaller than bacteria because they passed through bacteria-proof filters.

M.W. Beijerinck (1898) demonstrated that the extract of the infected plants of tobacco could cause infection in healthy plants and named the new pathogen "virus" and called the fluid as *Contagium vivum fluidum* (infectious living fluid).

W.M. Stanley (1935) showed that viruses could be crystallised and crystals consist largely of proteins. They are inert outside their specific host cell. Viruses are obligate parasites.

In addition to proteins, viruses also contain genetic material, that could be either RNA or DNA. No virus contains both RNA and DNA. A virus is a nucleoprotein and the genetic material is infectious. In general, viruses that infect plants have single stranded RNA and viruses that infect animals have either single or double stranded RNA or double stranded DNA.

Bacterial viruses or bacteriophages (viruses that infect the bacteria) are usually double stranded DNA viruses (Figure 2.6b). The protein coat called capsid made of small subunits called capsomeres, protects the nucleic acid. These capsomeres are arranged in helical or polyhedral geometric forms.

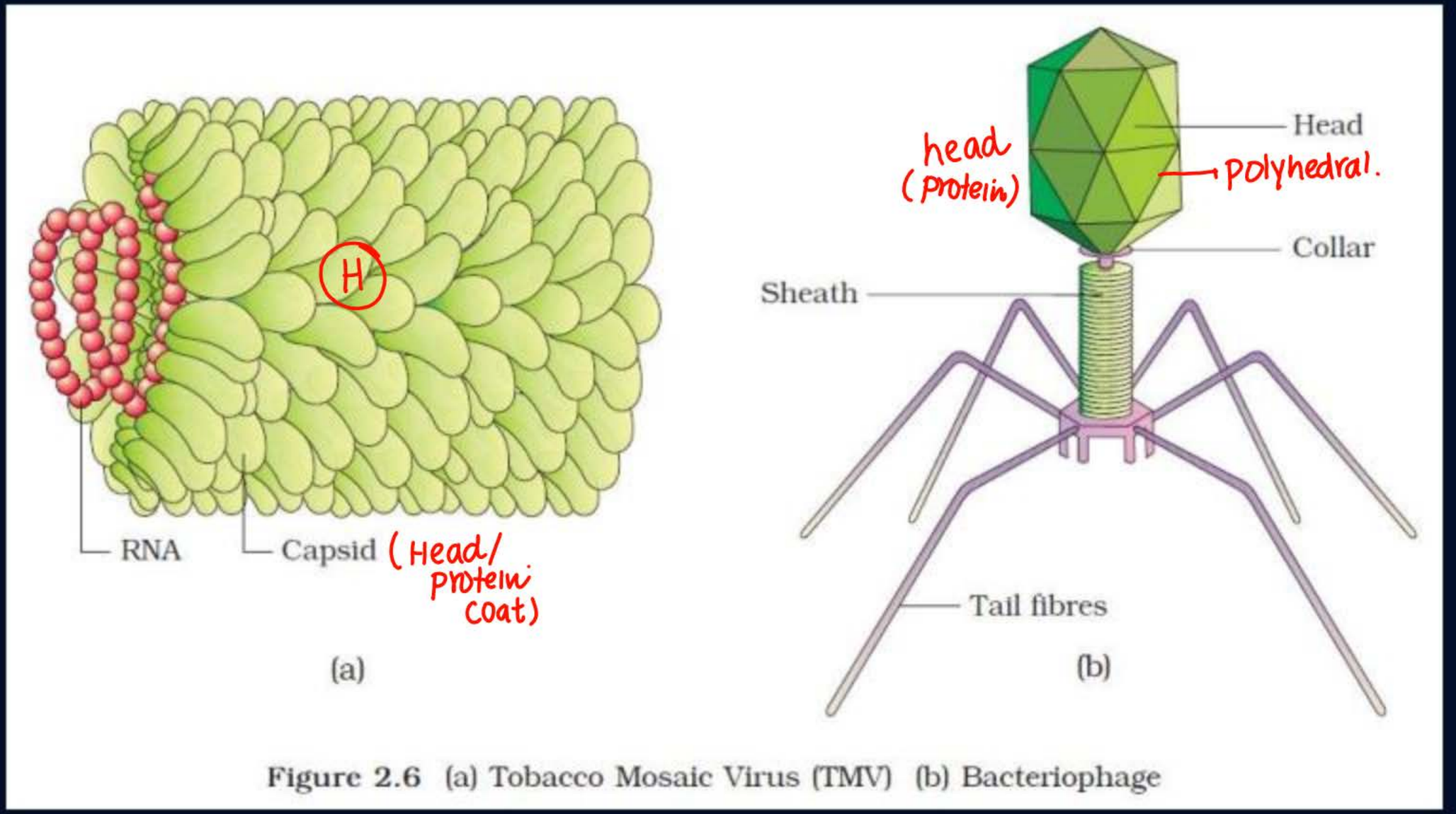


Figure 2.6 (a) Tobacco Mosaic Virus (TMV) (b) Bacteriophage

Viruses cause diseases like mumps, small pox, herpes and influenza. AIDS in humans is also caused by a virus. In plants, the symptoms can be mosaic formation, leaf rolling and curling, yellowing and vein clearing, dwarfing and stunted growth.

Viroids : In 1971, T.O. Diener discovered a new infectious agent that was smaller than viruses and caused potato spindle tuber disease. It was found to be a free RNA; it lacked the protein coat that is found in viruses, hence the name viroid. The RNA of the viroid was of low molecular weight.

Prions : In modern medicine certain infectious neurological diseases were found to be transmitted by an agent consisting of abnormally folded protein. The agent was similar in size to viruses. These agents were called prions. The most notable diseases caused by prions are bovine spongiform encephalopathy (BSE) commonly called mad cow disease in cattle and its analogous variant Creutzfeldt¬Jacob disease (CJD) in humans.

Lichens : Lichens are symbiotic associations i.e. mutually useful associations, between algae and fungi. The algal component is known as **phycobiont** and fungal component as **mycobiont**, which are autotrophic and heterotrophic, respectively. Algae prepare food for fungi and fungi provide shelter and absorb mineral nutrients and water for its partner. So close is their association that if one saw a lichen in nature one would never imagine that they had two different organisms within them. Lichens

are very good pollution indicators – they do not grow in polluted areas.

1. Correct
(A) most of Protozoa : hetrotrophs — All
(B) Protozoa : primitive relative of plants
(C) amoeboid : fresh, marine water not moist soil
(D) pseudopodia / false feet present

2. Correct
(A) fresh water form has silica shell in amoeboid Protozoa — Marine
(B) entamoeba is not parasite
(C) trypanosoma : African sleeping sickness
(D) flagellated protozoa : free living not parasite

3. Ciliated protozoa
(A) 100 of cilia present
(B) two types of nucleus not absent
(C) terrestrial, gullet open to outside of cell surface
(D) example : plasmodium

4. Sporozoans
(A) infectious spore like stage absent
(B) plasmodium (malarial parasite) cause malaria
(C) no staggering effect on human
(D) None

5. Viroid
(A) new infectious agent larger than virus discovers by Diener
(B) RNA : high molecular weight
(C) both RNA and protein coat absent
(D) cause potato spindle tuber disease in animal
(E) None

6 Prions (Incorrect)

(A) normally folded protein
(B) neurological disorder
(C) similar in size to virus
(D) mad cow disease in cattle & Creutz feldt disease in human

7 Lichen

(A) parasitic association between algae and fungi
(B) symbiotic between heteotrophs and photosynthetic autotrophs
(C) phycobiont : fungi & mycobiont : algae
(D) SO_2 pollution indicator & grow in polluted area
(E) fungi prepare food & algae helps in absorption

8 Correct

(A) virus viroid prions lichen placed in ~~monera~~
(B) virus : poisonous fluid / venom / obligate ~~intercellular~~ parasite
(C) link between living & non living
(D) virus is inert / inactive ~~inside~~ living cell

9 Correct

(A) virus take over the machinery of host to ~~relocate~~ replicate but don't kill host
(B) Tobacco Mosaic disease cause by TMV, virus can pass through bacterial filter so ~~larger~~ than bacteria : Ivanowsky
(C) Beijerinck : Contagium ~~bicim~~ vivum fluidum, term virus
(D) Stanley : Crystallised virus & crystal mainly consist of ~~DNA~~ Protein

Correct virus

(A) both DNA and RNA present

(B) Nucleoprotein

(C) protein coat : capsid made up of capsomere do not protect nucleic acid

(D) infectious part is protein

Viral symptoms in plant

(A) yellowing of leaf and vein clearing

(B) mosaic pattern

(C) stunted growth

(D) leaf rolling & curling

(E) all

Homework from YAKEEN NEET 2.0 2026 Module

Module (India's Best module) → Question Topic VIRUS, PROTOZOA.

M : Virus, protozoa, Euglena, diatom.

T : Fungi, virus, slimemould, Dinoflag.

W : Taxo category

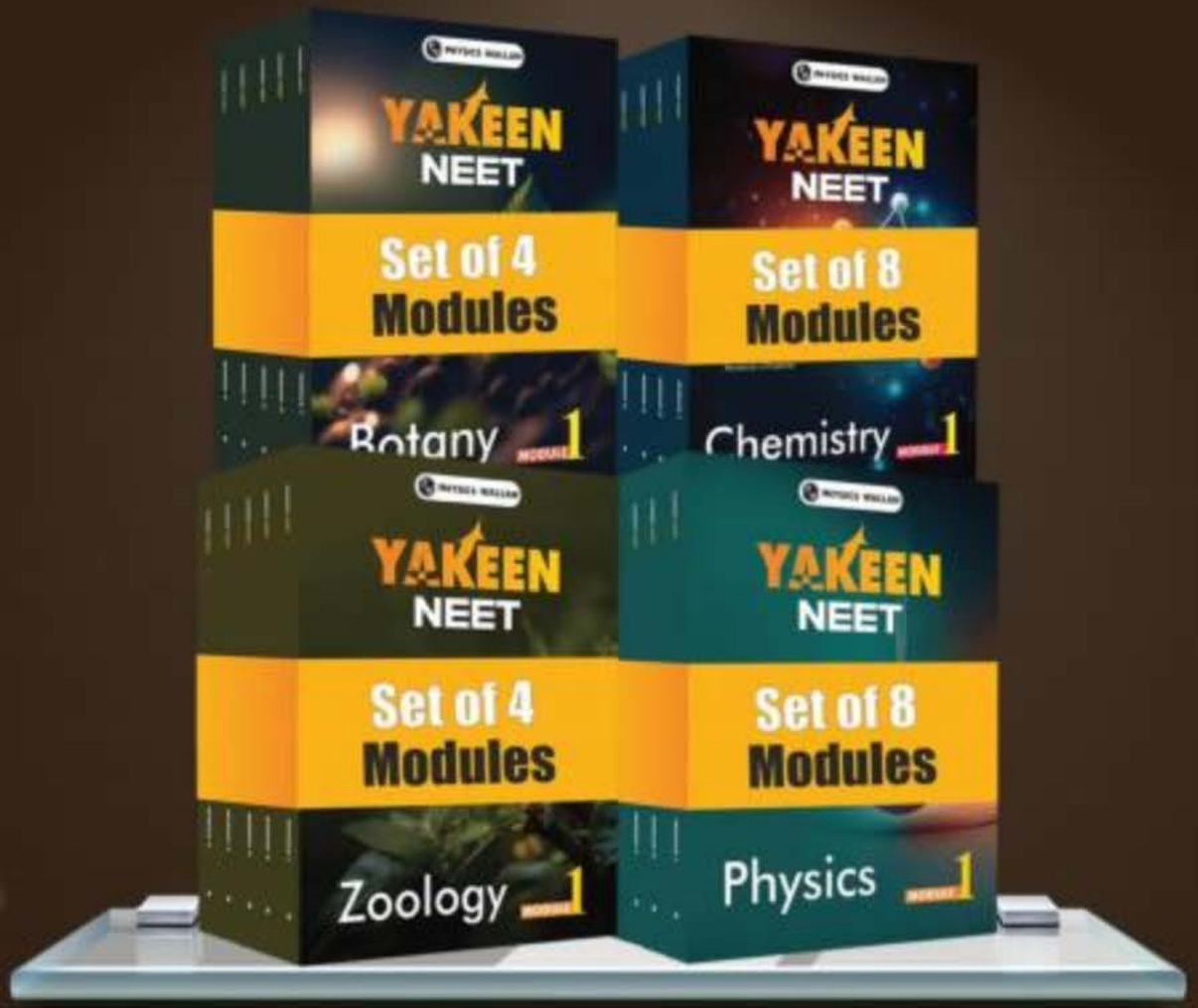
T : Meiosis-I

F : Meiosis-II

S : Fungi complete.

PHYSICS WALLAH

Yakeen Leads, You Achieve



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