

① For B.Sc/M.Sc
Entrance Examination

Topic — Virus

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- Virus is a nucleoprotein entity capable of multiplication by taking over cellular machinery of the host cell without involving growth and division.
- It consists of protein and nucleic acid (nucleo-proteins).
- Virus can be defined as non-cellular submicroscopic obligate parasite reproducing only inside living host cells.
- * Virus can not multiply in-vitro (over artificial medium).
- Virus particles remain inert in extra cellular state.
- Viruses have living as well as non living characters.
- Nucleoprotein nature of virus was discovered by Bawden and Pirie (1936).
- The proteinaceous coat of virus is called capsid. It is made up of identical protein subunits called capsomeres.
- Edward Jenner developed the first successful vaccination against viral disease small pox.
- Iwanowski and Iwanowski demonstrated that the causal organism of mosaic disease of tobacco could pass through a bacteria proof filter without losing its infectivity.
- Stanley (1935) isolated and crystallized tobacco mosaic virus (TMV). He was awarded nobel prize for this work.
- ~~Sto~~ Satellite Tobacco Necrosis virus (STNV) is the smallest known plant virus.
- Foot and mouth virus of cattle is the smallest known animal virus.

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→ Citrus Tristeza is virus (CTV) is the longest known plant virus.

→ Pox viruses are the largest known animal viruses.

→ Generally animal viruses have DNA and plant viruses contain RNA.

→ The type of genetic material is variable in different viruses.

1. Double stranded DNA (Caulimoviruses)

Example — Cauliflower mosaic virus

Dahlia Mosaic virus

Herpes Simplex virus

Pox virus etc.

2. Single stranded DNA (Gemini viruses)

Example — Bacteriophage ϕ X174

Bean Golden Mosaic virus

Maize streak virus

Beet curly top virus etc.

3. Double stranded RNA (Reoviruses)

Example → Wound tumor virus

Rice dwarf virus, etc.

4. Single stranded ~~virus~~ RNA →

eg — Tobacco Mosaic virus (TMV)

Cucumber Mosaic virus (CMV)

Polio virus etc.

- TMV is the most resistant virus known so far of which thermal death point is 90°C for 10 min.

Cyanophages : → Cyanophages are the virus that attack blue green algae (Cyanobacteria)

- Cyanophages were first observed by Shaffer and Morris (1963).

- Cyanophages are DNA viruses.

Bacteriophages → Bacteriophages are the virus which infect bacteria.

- Bacteriophage was discovered by Twort.

- Term Bacteriophage was coined by de Herelle.

- Bacteriophage infecting *E. coli* are have been termed as T-type or Coliphage.

- T Phages on the basis of infection their interaction with host bacterium, are divided into two groups virulent and Temperate.

- Virulent phages normally destroyed ^{or lyse} the host bacterium (lytic cycle)

- Temperate phages adopt two modes of their multiplication

- a) They may lyse the host cell

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b) They may integrate themselves into the bacterial DNA into lysogenic cycle.

* The ~~Phase~~ Phage in integrated state is called Prophage.

Mycophages: → viruses infecting fungi (eg - Mushroom) are called mycophages or fungal viruses.

→ M. Holling (1962) first gave evidence of Mycophages in cultivated Mushroom (Die-back disease of Mushroom)

→ Mycophages possess segmented and double stranded RNA.

Important viral diseases of plants: →

① Mosaic of Tobacco and Tomato

② Bean yellow Mosaic

③ Bunchy top of Banana

④ Mosaic of Sugarcane

⑤ yellow vein Mosaic of Bhindi

⑥ Cucumber mosaic

⑦ Potato leaf roll.

⑧ Papaya leaf curl.

⑨ Cauliflower mosaic.

Interferon: → Interferon is a proteinaceous substance produced within the infected cells and interferes with the process of multiplication of virus in the host cell.

- Interferons are antiviral in action.
- Interferons are the body's first line of defence against viruses.

Important viral diseases of Man and Animals

Common cold → Rhinovirus.

Influenza → Influenza virus.

Small Pox → Variola virus.

Polio myelitis → Polio virus (Rheovirus).

Encephalitis → Encephalitis virus.

Rabies (Hydrophobia) → Rabdo virus (Reo virus).

Yellow fever → Yellow fever virus (Arbo virus).

Measles → Measles virus (Rubella virus).

Chicken Pox → Varicella virus.

- Acquired Immuno Deficiency Syndrome (AIDS) is an infectious disease caused by Human immuno-deficiency virus (HIV).

→ HIV is a retrovirus containing single stranded RNA.

- Luc Montagnier (1983) was the first to identify the AIDS virus.

- December 1 is celebrated as World AIDS day.