VIRUSES

Viruses are non- cellular , npn- living infectious agents that are composed of nucleoproteins which can multiply inside animals and plants or bacterial cells.It consists of both living and non- living properties

LIVING_PROPERTIES OF VIRSUES	NON_ LIVING PROPERTIES OF VIRUSES
]1)They are obligate intracellular parasities,	1)They can be crystallized and stored in bottles
i.e<,cannot exists outside .	
2)They can multiply inside the living organisms	2)They cannot multiply outside the host
3)They contain a genetic material namely DNA or RNA	3)They dont have the cells

SIZE:- Virsues range in size from 300 nanometers as in TMV to 20nm as in parvoviruses.
viruses approximate the sizes of the smallest bacterial cells as mycoplasmas.
largest viruses is **vaccinia virus and pox virus,**
smallest viruses is **foot and mouth disease virus,polio virus**

SHAPE

Spherical	**polio virus**
rod shaped	**TMV virus,influenza virus**
rectangular	**vaccinia virus**
polyhedral	**adeno virus, herpes virus,polio virus**
tadpole shaped	**bacteriophages**
Helical	**Rabies virus , TMV**

classification of viruses
phytophages viruses that infect plants
zoophages viruses that infect animals
bacteriophages viruses that infect bacteria
cyanophages viruses that infect blue green algae
zymophages viruses that infect yeast cells
mycophages viruses that infect fungi

NUCELIC ACID

Generally plant virus consists of **RNA** but in **cauliflower mosaic virus** and **dahila mosaic virus**the genetic material is **double standard DNA**

Generally animal virus consists of **DNA** but in **polio virus**,**flue virus** it is single standard **RNA**

A single standard DNA is present in bacteriophage **M14** and coliphage **S13**

A double standard RNA is present in **Wound tumor virus** ,**Rice dwarf virus**, **Maize dwarf virus**, **Reo virus**

CAPSID

1) Chemically viruses contain a protein coat called **capsid**.The capsid consists of many protein subunits called **capsomere**. The number of capsomere varies from one virus to another virus

eg:- **TMV** capsid contains **2130** capsomeres.

Adeno virus contains **252** capsomeres.

2) Some animal viruses like **influenza virus** and **AIDS** contain aalipid-protein complex external to capsid. this is called **peplos or envelope**.

The capsomeres in capsid may be arranged in helically **(eg:-TMV)** polyhedral **(eg:- adeno virus)** and binal symmertry **(eg:- TMV)**

DIFFERENT TYPES OF VIRUSES

TMV VIRUS	BACTERIOPHAGE	POX VIRUS	AIDS VIRUS
TMV is most extensively studied plant virus.	They are pathogenic virus infecting bacteria	**POX** virus is aa casual agent of small pox.	Acquired immune deficiency syndrome**(AIDS)**is an infectious diseases is caused by a virus known as human immunodeficiency virus **(HIV)**
It is elongated rod-like,3000A^0long ,180A^0 in diameter, molecular weight being 39.4*10^6, 95%protein and 5% RNA by weight interwined to form helical ,grooved,cylinderical rods.	**Twort** discovered the bacteriophages. The structure of T4 bacteriophage contains head and tail regions.	pox virus are among the largest of animal virus ,have complex structure and rectangular shaped	This virus also called as Human T lymphotropic virus 3 or AIDS related retrovirus (ARV)
The walls of the cylinder are 70A^0 thick.2130 capsomers are arranged helically to form aa capsid .	Head is folded **double standard DNA** is packed in head.Head is hexagonal with around 2000 capsomeres.	This is rectangular shaped (300*2-30mU) in size ,6% double standard DNA ,89% protein ,5% lipids.	AIDS virus consists of **single standard RNA** surrounded by protein coat(core shell) the entire structure is wrapped around in an envelope.
49 capsomers are present in 3 turns and 130 turns in complete virus capsid. Each capsomere has a molecular weight of 17,400 and is formed by condensation of **158 aminoacids**	Tail is helically symmetrical with a core tube surrounded by a protein tail sheath consists of 144 capsomeres arranged in 24 rings of 6 subunits. The sheath is connected to collar at its upper end and base plate at lower end.	Genome is dumb bell shaped;ce-ntral core has dsDNA.	After entering the blood, AIDS virus infects the helper T-LYMPHOCYTE-S(not the suppressor T-cells) and destroy them. Helper T cell plays an essential role in antibody produc-tion.

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DIFFERENT TYPES OF VIRUSES (cont)

RNA strand is embeddedin furrow and therefore,it is helica-l;ssRNA consists of 6400 nucleo-tides.Thus , the approximate ratio of **nucleotides and capsomers is 3:1**

basal plate is hexagonal with single pin or spike at each corner. A thin tail fibre is also given out of the corner . A enzyme **lysozyme** is responsible for dissolving the bacterial cell wall is present in tail fibers.

The core contains two enzymes - **RNA polymerase** and **ATP-phosphohydra-lase.On both sides of the core lie lateral bodies one on each side.

Thus, AIDS virus destroy an important link in immune defence rendering the indivi-duals prone to infectious diseases and tumour formation.

VIRIODS

★ **DIENER** discovered the viroids .They are small, circular, single standard RNA molecules without protein coat . they cause many plant diseases .

Eg:- **Citrus exocotosis viroid , potato spindle tuber viroid**

★Although the viroid RNA (300 to 400) nucleotides is single standard circle but can exhibit considerable secondary structure and resembles the short standard molecules with close ends.

★ viroids enter the plant through wound or by insects. It replicates in the host cell nucleus with the help of one plant of RNA polymerases.

PRIONS

★**PRUSINER** discovered the prions. The infectious proteins are called **prions**. Nucleic acid is absent. Protein coat is infectious and cause variety of diseases. The **mad cow disease** causing prion may reach man through beef cause**Creutzfeldt-Jakob disease**in him. eg:- **MAD COW** disease (**Bovine spongiform encephalitis**) and **Scrapie** disease in sheep.

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