VIRUS

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- Concept of virus
- Structure of virus
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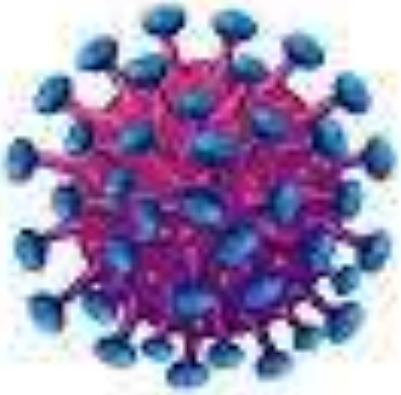
- Virus: A microscopic particle that gets inside a cell and often destroys the cell
- Viruses are tiny
- Smaller than the smallest bacteria
- Change rapidly
- So small and change so often that scientists don't know exactly how many types exist
- These properties make viruses difficult to fight
- Like living things, viruses contain protein and genetic material. But viruses don't act like living things . Can't eat, grow, or break down food Can't use oxygen . Cannot function on its own
- Can only reproduce inside a living cell that serves as a host. Host: an organism from which a parasite takes food or shelter. Virus uses host's cell as a tiny factory, and forces host to make viruses rather than healthy new cells

CONCEPT OF VIRUS

- Edward Jenner (1798), introduced the term virus in microbiology. Virus in Greek means poison. Edward Jenner noticed that milk maids who infected with cowpox develop immunity against smallpox. He inoculated a boy with the vesicle fluid taken from the hand of infected maid. The boy developed sustained immunity against smallpox.
- Edward Jenner assumed that the vesicle fluid that has been taken from the hand of the milk maid contained a poison (virus), that was responsible for immunity.

Structure of virus

- Viruses composed of nucleic acid either DNA or RNA, surrounded by a protein coat called the capsid. The capsid is composed of small structural units called capsomeres. The capsid protects nucleic acid from inactivation by the outer physical conditions.
- Some viruses have additional lipoprotein envelope , composed of virally coded protein and host lipid. The viral envelope is covered with glycoprotein spikes
- Some viruses have enzymes inside the virion. All ss- RNA viruses with negative polarity have the enzyme transcriptase (RNA dependent RNA polymerase) inside virions. Retroviruses and hepatitis B virus contain the enzyme reverse transcriptase.



HIV

Hepatitis B

Ebola Virus

Adenovirus

Influenza

Bacteriophage

Animal Virus

- Animal virus capsids come in many shapes. One of the craziest-looking (to me, at least) is the Ebola virus, which has a long, thread-like structure that loops back on itself.
- A more "standard-looking" virus, chikungunya, is shown below for comparison: chikungunya looks like a sphere, but is actually a 20sided icosahedron. Animal virus genomes consist of either RNA or DNA, which may be single-stranded or double-stranded. Animal viruses may use a range of strategies (including some surprising and bizarre ones) to copy and use their genetic material, as we'll see in sections below.

- Animal virus genomes consist of either RNA or DNA, which may be single-stranded or double-stranded. Animal viruses may use a range of strategies (including some surprising and bizarre ones) to copy and use their genetic material, as we'll see in sections below.

Plant virus

- Plant viruses are viruses that affect plants. Like all other viruses, plant viruses are obligate intracellular parasites that do not have the molecular machinery to replicate without a host. Plant viruses can be pathogenic to higher plant.

- Most plant viruses are rod-shaped with protein discs forming a tube surrounding the viral genome; isometric particles are another common structure. They rarely have an envelope. The great majority have an RNA genome, which is usually small and single stranded (ss), but some viruses have double-stranded (ds) RNA, ssDNA or dsDNA genomes. Although plant viruses are not as well understood as their animal counterparts, one plant virus has become iconic: *tobacco mosaic virus* (TMV), the first virus to be discovered

Bacteriophage

- Bacteriophages are viruses that can infect and destroy bacteria. They have been referred to as bacterial parasites, with each phage type depending on a single strain of bacteria to act as host.
- Like most viruses, bacteriophages typically carry only the genetic information needed for replication of their nucleic acid and synthesis of their protein coats.. They require precursors, energy generation and ribosomes supplied by their bacterial host.
- Composition and Structure − Nucleic acid Head/Capsid ,Genome size ,Modified bases Contractile Tail Sheath , Protein −Structure (T) 4 Size, Tail Fibers .
- Bacteriophages - Used for cloning foreign genes among other applications . Proteins and peptides are fused to the Capsid(surface) of the phage .The combination of the phage and peptide is known as a Fusion Protein.
- Once these Phages are isolated and recovered they can be used to infect bacteria which will create a particle similar to a monoclonal antibody.


thank you