

BIOC20: Principles of Virology

Lecture 1 (Chapter 1)

The Nature of Viruses:

Basics:

- The Virion (fully intact infectious virus - has all the components to infect) consists of:
 - A nucleic acid **genome** (RNA or DNA)
 - An enclosed protective protein coat (**capsid**)
 - Every virus has a capsid - a shell
 - Some viruses contain a **lipid envelope** - outermost layer (outer-coat+ lipid bilayer taken from the host cell, which also takes protein from the host)
- Capsid could be spherical or rod-like



Dependence on hosts:

- Viruses are dependent on host cells
- Viruses are obligate **intracellular parasites** (needs to be inside a cell, and is a parasite as it steals resources from the hosts to survive)
 - Can only replicate within a living cell
- Viruses lack many essential functions, therefore cannot survive on their own
 - Synthesis of basic biological building blocks (unable to make the basic building blocks of life)
 - i.e. nucleotides, amino acids, CHO's, lipids (they can't make it but have to steal it from the host to survive)
 - Generation of useable chemical energy (ATP)
 - Protein synthesis machinery
 - i.e. ribosomes, tRNAs
 - Without these, a virus is just a package of genes!

Replication:

- Virus particles **break down** (disintegrate) and release their **genomes** inside the cell, (Uncoating) before it can replicate inside the host. Important for the particle to uncoat, because the genome inside is responsible for the transmission and infection of the virus.
 - Released from the protective protein shell
- Once uncoated, the genome can be used a template for mRNA synthesis ⇒ protein production
 - using the cell resources as a virus factory!
- Viral proteins work together to replicate virus particle
 - Newly made structural proteins (viral) encapsidate the new genomes to form progeny virions

- **Q ⇒ How is this process in contrast to unicellular organisms, like bacteria?**

- Glycosaminoglycan
- Immature virus
- Internal core
- Lateral bodies
- Mature virus
- Microvilli

- Pock
- Vaccination
- Variolation
- Viroplasm

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A Loxley



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