Edexcel (B) Biology A-level

2.2 - Viruses

Flashcards

How are viruses classified?

How are viruses classified?

According to structure & type of nucleic acid.

Name 3 types of virus and give examples.

Name 3 types of virus and give examples.

- DNA virus e.g. lambda (ƛ) phage.
- RNA virus e.g. tobacco mosaic virus & Ebola.
- RNA retrovirus e.g. human immunodeficiency virus (HIV).

Describe the structure of a DNA virus.

Describe the structure of a DNA virus.

Nucleic acid: DNA (which can act directly as a template for mRNA transcription/ DNA replication).

Geometrical shape.

Compare and contrast the tobacco mosaic virus and Ebola.

Compare and contrast the tobacco mosaic virus and Ebola.

Both are RNA viruses.

Tobacco mosaic virus contains ssRNA, which can be directly translated into proteins by ribosomes.

Ebola contains negative ssRNA, which needs to be transcribed to produce mRNA before translation.

Describe the features of an RNA retrovirus.

Describe the features of an RNA retrovirus.

Single strand of RNA.

Reverse transcriptase enzyme produces cDNA from RNA template.

Double-stranded viral DNA integrates into host cell's genome.

Describe the lysogenic pathway.

Describe the lysogenic pathway.

1. Non-virulent viruses inject DNA into host cell DNA as provirus. Viral DNA replicates when host cell divides.
2. Virus produces repressor proteins to inhibit transcription.
3. Latent virus enters lytic pathway when host cell is damaged or immune system weakens.

Describe the lytic cycle.

Describe the lytic cycle.

1. Virulent viruses inject nucleic acid into host cell cytoplasm. Viral genetic information replicates immediately, independent of host cell DNA.
2. Many virions assemble, causing cell lysis.

Why are viruses classified as non-living?

Why are viruses classified as non-living?

They are acellular: no cytoplasm, no metabolism & cannot self-replicate.

How do antivirals work?

How do antivirals work?

Viruses have no metabolism = difficult to treat infection after initial contact. Antivirals inhibit viral replication by:

- Targeting viral antigens to prevent entry into host cell.
- Targeting viral enzymes to prevent DNA replication & virion assembly.

What is the focus of disease control for viral infections?

What is the focus of disease control for viral infections?

Preventing spread (especially when there is no effective vaccine).

Outline what happened during the 2014 Ebola outbreak.

Outline what happened during the 2014 Ebola outbreak.

Virus spread rapidly through areas of West Africa with poor hygiene. 4877 deaths. No effective vaccine, so disease control measures aimed to reduce spread.

Outline common methods of controlling viral outbreaks.

Outline common methods of controlling viral outbreaks.

- Rapid identification & testing the individual's contacts for disease.
- Reduce person-to-person contact with virus:

a) Quarantine
b) Sterilisation of equipment
c) Protective clothing

Suggest the ethical issues surrounding the use of untrialled drugs during epidemics.

Suggest the ethical issues surrounding the use of untrialled drugs during epidemics.

- Severity of outbreak
- How effective other available treatments are
- Difficulty obtaining informed consent

Suggest arguments against the use of untrialled drugs during epidemics.

Suggest arguments against the use of untrialled drugs during epidemics.

- Unanticipated severe side effects.
- Difficult to decide which individuals to treat first.
- Drug may be falsely attributed as the cause of death.
- Severely ill patients cannot give informed consent.