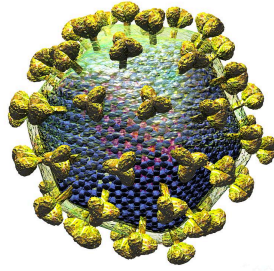


Key Terms:

Capsid
 Bacteriophage
 Host range
 Lytic cycle
 Lysogenic cycle
 HIV
 Transposon
 Transduction
 Transformation
 Conjugation
 Vaccine
 Epidemic
 Pandemic
 Taxis
 Nucleoid
 Plasmid
 Archaeobacteria
 Eubacteria
 Active immunity
 Passive immunity
 AIDS
 Antibody
 (=immunoglobulin)
 Allergy
 Antigen
 Autoimmune disease
 B cells (=B lymphocytes)
 Cell mediated immunity
 Disease
 Humoral immunity
 Immune response
 Immunity
 Immunological memory
 Infection
 Inflammation
 Interferon
 Complement system
 Leukocytes
 Lymphocytes
 Monoclonal antibody
 Non-specific defense
 Passive immunity
 Pathogen
 Phagocyte
 Phagocytosis
 Primary response
 Secondary response
 Specific defense
 T cells (=T lymphocytes)
 Vaccination
 (=immunization)

**Essential Knowledge:****Bacteria (1A, 3C.2)**

- Describe the basic features of prokaryotic cells
- Describe how prokaryotic organisms change over time, including horizontal gene transfer by **transformation, transduction, conjugation, transposition**.

Viruses (3C.3)

- Describe the key features of viruses
- Describe the nature of replication in viruses. Explain how the features of the **viral replication** enable rapid evolution and acquisition of new phenotypes.
- Describe examples of replication in viruses. Examples include
 - (a) Bacteriophage with **lytic** and **lysogenic** phases
 - (b) Replication in RNA viruses (**HIV**). How does this mechanism lead to rapid evolution?

Non-Specific Defense (2D.4a)

- Describe the range of **pathogens** that affect organisms and their distinguishing features with respect to **infection, disease**, and treatment. This includes bacteria, viruses, protozoans, and fungi. Understand how they are transmitted between individuals.
- Describe passive and **active defenses** in plants, recognizing chemical defenses operating at the cellular level after passive defenses have been breached.
- Describe **non-specific defenses** in invertebrates and compare it to what happens in vertebrates
- Describe non-specific defenses in vertebrates, e.g. **antimicrobial substances, inflammation, and phagocytosis**. Recognize that these represent the first and second lines of defense.

The Mammalian Immune system

- Explain how the body distinguishes self from non-self and why this is important.
- Describe the immune response, including the importance of both **specificity** and **memory**. Distinguish between **active** and **passive immunity**.
- Describe **cell-mediated** and **humoral** immunity. Identify the specific white blood cells involved in each case.
- Explain antibody production, including how B cells bring about humoral immunity to specific **antigens**.
- Explain the principles of **vaccination**, including reference to **primary** and **secondary response** to infection.

Immune Dysfunction and Disease

- Describe the consequences of inappropriate immune responses, e.g. allergies and other **hypersensitivity** reactions.
- Describe the effects of **HIV** on the immune system, including the reduction in the number of active lymphocytes and the loss of immune function.

Key Concepts

- Modes of replication in bacteria and viruses can lead to rapid evolution.
- The body can distinguish self from non-self
- Organisms have a variety of mechanisms to defend themselves
- Non-specific defense targets any foreign material
- Some pathogens can cause immune system failure
- The immune response in mammals targets specific antigens and remembers previously encountered antigens