

Diseases and Immunity

Pathogen and Disease:

- Pathogens are organisms that cause disease and have unique surface antigens.
- Transmissible diseases can spread through direct (e.g., blood) or indirect (e.g., air, food) contact.

Body Defenses:

- Mechanical Barriers: Physical protection like skin and nose hairs.
- Chemical Barriers: Mucus traps pathogens; stomach acid kills pathogens.
- Cellular Barriers: Cells like lymphocytes (produce antibodies) and phagocytes fight pathogens.

Phagocytosis:

- Phagocytes engulf and digest pathogens in a process involving vesicles and digestive enzymes.

Antibodies:

- Produced by lymphocytes, antibodies bind to antigens on pathogens to destroy them or signal phagocytes.
- Antibodies are specific to the shape of antigens, and memory cells are produced to remember pathogens for future defense.

Vaccination:

- A vaccine introduces a harmless antigen to trigger an immune response, creating antibodies and memory cells for long-term immunity.
- Herd immunity protects the population when most people are immunized.

Passive Immunity:

- Temporary immunity from antibodies transferred from another individual, such as from a mother's breast milk.

Autoimmune Diseases:

- In autoimmune diseases, the immune system mistakenly attacks the body's own cells, such as in Type 1 diabetes, where immune cells destroy insulin-producing cells.



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