

5.1 Defence mechanisms

Pathogen	a microorganism that can cause an infectious disease
Immunity	the ability of an organism to resist a particular infection or toxins by antibodies or white blood cells
Infection	process of a pathogen invading and multiplying in the body tissue of the host
Antigen	a foreign protein found on the cell surface membrane which triggers an immune response
Phagocytosis	mechanisms by which cells engulf particles to form a vesicle or a vacuole
Phagocytes	ingest and destroy the pathogen
Lymphocytes	cells involved in immune responses
Antigen-presenting cell	cells that display foreign antigens on the surface
Monoclonal antibody	a collection of identical antibodies cloned from a single antibody
Vaccination	introduction of a vaccine containing appropriate disease antigens injected into the body in order to induce artificial immunity
Antibody	a protein produced by lymphocytes (B cells) in response to the presence of a specific antigen which stimulates an immune response

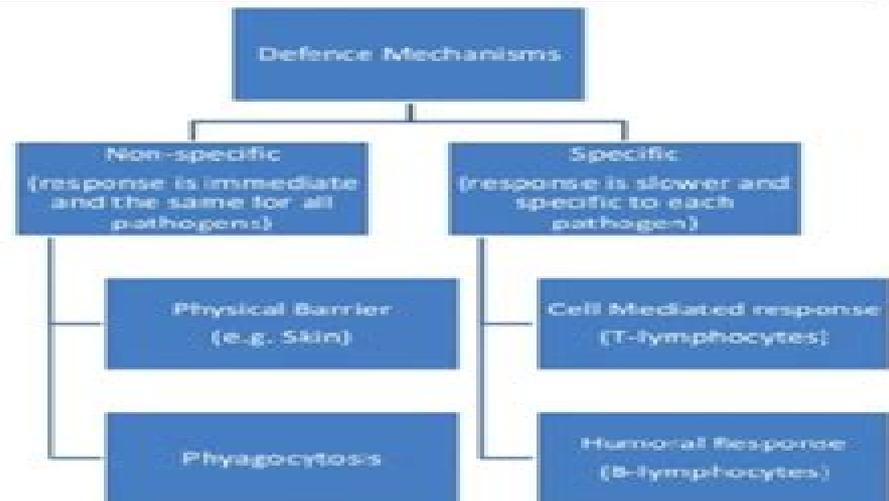
Recognising your own cells

- If the lymphocytes couldn't identify self from non-self-molecules then the lymphocytes would destroy the organism's own tissue.
- Each cell has specific molecules on its surface to identify it, this is why a transplant donor has to be genetically similar to the recipient or the organ might be rejected and the person will die

Humoral response secretes antibodies; cell-mediated response secretes cytokines (signals cells about a potential pathogen)

How does the body learn to identify its own molecules?

- In the fetus lymphocytes are always colliding with other cells
- Infections are rare as the fetus is protected by a placenta
- Lymphocytes will collide mostly with own material
- Some lymphocytes will have receptors that fit exactly its own material
- These are there for suppressed or die
- In adults lymphocytes produced in the bone marrow encounter self-antigens at the start
- Any lymphocytes that show an immune response will then undergo programmed cell death (apoptosis) before they mature



5.2 Phagocytosis

The process of phagocytosis

1. Chemical products of pathogen act as attractants causing phagocytes to follow it
2. Phagocytes have several receptors on their cell surface membrane that recognize and attach to chemicals on the surface of the pathogen
3. The phagocyte engulfs the pathogen to form a vesicle (phagosome)
4. Lysosomes move in to fuse with the vesicle
5. Lysozymes destroy ingested bacteria by hydrolyzing the pathogen's cell walls
6. The soluble products from the breakdown of the pathogen are absorbed into the cytoplasm of the phagocyte
7. The antigen is then presented on the cell surface membrane of the phagocyte

2 types of white blood cells:

- Phagocytes (Ingest & destroy)
- Lymphocytes (Involved in immune responses)

5.3 T lymphocytes and cell-mediated immunity

Lymphocytes

- produced by stem cells in the bone marrow

The stages of T cells in response to a pathogen:

1. The pathogens invade body cells or are taken in by phagocytosis
2. Phagocyte becomes an antigen presenting cell
3. Receptors on a specific helper T cell fit exactly onto those antigens
4. The attachment activates T cells to divide by mitosis and clone itself
5. The cloned T cells:

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Table of Contents A2 Level A Level Biology

1. Understanding the eBook A2 Level A Level Biology
 - The Rise of Digital Reading A2 Level A Level Biology
 - Advantages of eBooks Over Traditional Books
2. Identifying A2 Level A Level Biology
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an A2 Level A Level Biology
 - User-Friendly Interface
4. Exploring eBook Recommendations from A2 Level A Level Biology
 - Personalized Recommendations
 - A2 Level A Level Biology User Reviews and Ratings
 - A2 Level A Level Biology and Bestseller Lists
5. Accessing A2 Level A Level Biology Free and Paid eBooks
 - A2 Level A Level Biology Public Domain eBooks
 - A2 Level A Level Biology eBook Subscription Services
 - A2 Level A Level Biology Budget-Friendly Options

6. Navigating A2 Level A Level Biology eBook Formats
 - ePub, PDF, MOBI, and More
 - A2 Level A Level Biology Compatibility with Devices
 - A2 Level A Level Biology Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of A2 Level A Level Biology
 - Highlighting and Note-Taking A2 Level A Level Biology
 - Interactive Elements A2 Level A Level Biology
8. Staying Engaged with A2 Level A Level Biology
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers A2 Level A Level Biology
9. Balancing eBooks and Physical Books A2 Level A Level Biology
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection A2 Level A Level Biology
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine A2 Level A Level Biology
 - Setting Reading Goals A2 Level A Level Biology
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of A2 Level A Level Biology
 - Fact-Checking eBook Content of A2 Level A Level Biology
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements

- Interactive and Gamified eBooks

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