

3.1 Defence mechanisms

Pathogen	a microorganism that can cause an infectious disease
Immunity	the ability of an organism to resist a particular infection or toxin 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

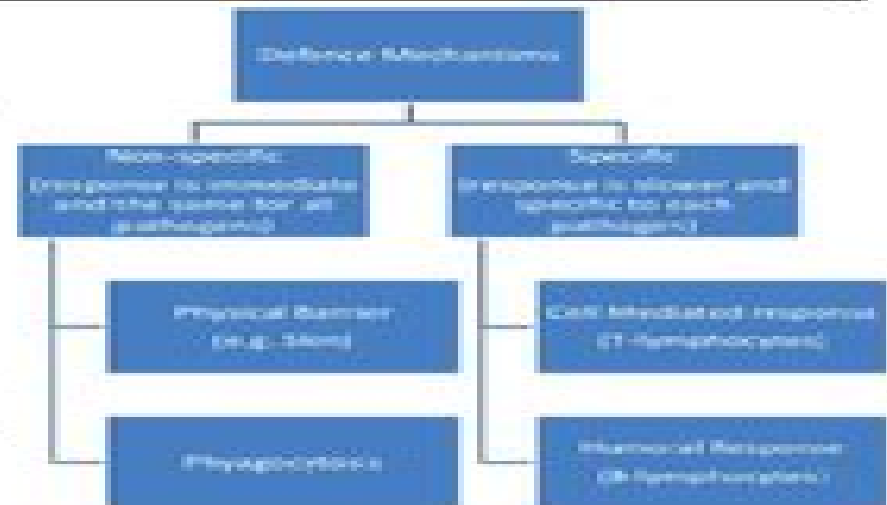
Recognising your own cells

- 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 self material
- Some lymphocytes will have receptors that fit exactly to self material
- These are then far suppressed or die
- In adults lymphocytes produced in the same manner encounter self antigens at the start
- Any lymphocytes that show an immune response will then undergo programmed cell death (apoptosis) before they mature



3.2 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 recognise 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. Lysosomes destroy ingested bacteria by hydrolysing 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)

3.3 T lymphocytes and cell-mediated immunity

Cytotoxicity

- produced by stem cells in the same manner

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 these antigens
4. The attachment activates T cells to divide by mitosis and clone itself
5. The cloned T cells

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