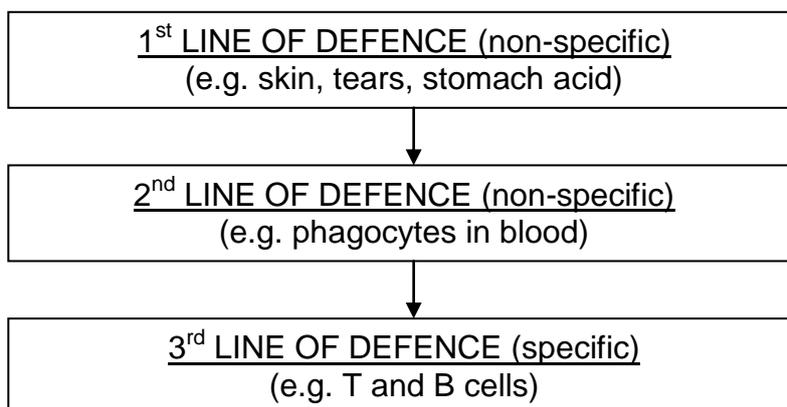


## THE BODY'S DEFENCES AGAINST INFECTION

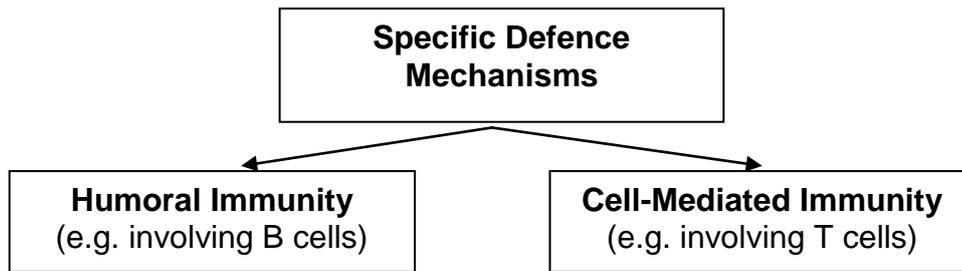


### NON-SPECIFIC RESPONSE MECHANISMS

- ◆ Non-specific defence mechanisms are those which operate against a range of pathogens and foreign particles such as dust and cigarette \_\_\_\_.
- ◆ There are several non-specific defence mechanisms:
  1. **Intact skin** - The intact skin provides a barrier to invading pathogens. Also damaged blood vessels rapidly contract to reduce blood loss, and platelets accumulate to create a \_\_\_\_\_ to prevent further blood loss and invasion of foreign particles.
  2. **Mucus-secreting membranes** - Mucus of the \_\_\_\_\_ traps dust and smoke.
  3. **Ciliated membranes** - Hairs of the \_\_\_\_\_ tract also trap dust and smoke.
  4. **Tears containing lysosyme enzymes and lactic acid** - These chemicals are very effective in destroying bacterial cell walls.
  5. **Phagocytes** - The inflammatory response involves an increase in blood flow to the area, and \_\_\_\_\_ blood cells called phagocytes engulf and digest foreign particles that enter the body tissues.
  6. **Complement system** - The inflammatory response also involves transporting large blood proteins that break open or lyse the bacterial cell walls, and attracts phagocytes to the area.
  7. **Interferon** - Viral-infected body cells secrete interferon against viruses.

### SPECIFIC DEFENCE MECHANISMS

- ◆ The specific defence mechanisms involve 2 factors:
  1. the ability to '**recognise**' and **respond** specifically against an **antigen** (a molecule on the \_\_\_\_\_ of an invading bacteria, a toxin produced by the bacteria, or a foreign \_\_\_\_\_)
  2. the ability to '**remember**' the chemical structure of the \_\_\_\_\_ so the immune response is more rapid at the next encounter



◆ **HUMORAL IMMUNITY**

**B-lymphocytes (B cells)** produce specific **antibodies** that can bind to antigens. Most antibodies are large globular \_\_\_\_\_ called **immunoglobulins** that are released into blood. Antibodies also coat foreign particles so that they are recognised and \_\_\_\_\_ by white blood cells called **macrophages**.

B cells are formed in bone marrow and the spleen, and when they become active, they form 2 types of daughter cells - **plasma cells** (which make antibodies) and **memory cells** (which remain in the body for some time and provide a \_\_\_\_\_-term immunity after a person has encountered a disease).

◆ **CELL-MEDIATED IMMUNITY**

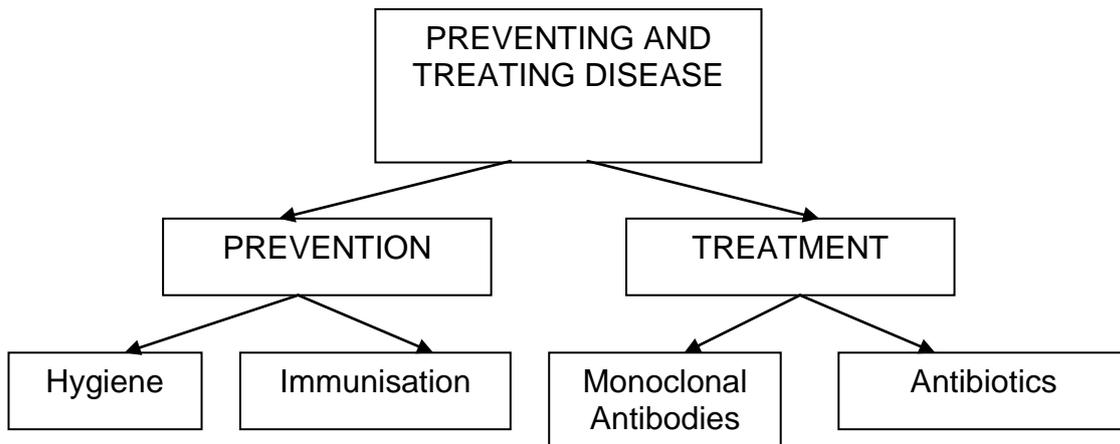
**T-lymphocytes (T cells)** are produced in the **thymus gland** and act against infected or cancerous cells.

There are 2 types of T cells - **Cytotoxic T cells** (directly \_\_\_\_\_ infected or foreign cells) and **Helper T cells** (assist in regulating the B cells and the cytotoxic T cells).

## REJECTION OF TRANSPLANTED ORGANS

- ◆ All body cells have a group of antigens on their surface that distinguish them as unique ('self' recognising cells). Identical twins have \_\_\_\_\_ antigens. These antigens are the result of linked genes called the major histocompatibility complex.
- ◆ After an organ such as a heart or kidney is \_\_\_\_\_ from one person to another person who is not an identical twin, the immune system is triggered. The recipient's immune system identifies the 'non-self' cells of the donor organ. The organ may be \_\_\_\_\_ by the body's immune system
- ◆ To prevent this from happening, **immuno-suppressant drugs (e.g. cyclosporin)** are given for the rest of the transplant recipient's \_\_\_\_\_. Because these drugs reduce the effectiveness of the immune system, the transplant recipient is in danger of contracting other \_\_\_\_\_.

## PREVENTING AND TREATING DISEASE



### HYGIENE

- ◆ Hygiene involves purification of \_\_\_\_\_ water, sanitation of sewage and personal hygiene practices (e.g. regular bathing, thorough hand-washing after going to the \_\_\_\_\_).

### IMMUNISATION

- ◆ Immunity may be **natural** (where a person has suffered and recovered from the disease and sufficient memory B cells to \_\_\_\_\_ the antigenic molecule and rapidly set up a specific defence against the \_\_\_\_\_) or **artificial** (following the injection of a specific vaccine, made of altered \_\_\_\_\_ or killed bacteria, or inactivated forms of the toxin released by some bacteria).
- ◆ **Active Immunity** occurs when an individual's own immune system 'recognises, responds and remembers' the invading \_\_\_\_\_. This is more long-lasting. For example, the triple antigen injections given to young children provide long-term \_\_\_\_\_ against diphtheria, tetanus and whooping cough.
- ◆ **Passive Immunity** occurs when an injection contains the actual \_\_\_\_\_ or when a baby receives antibodies via the umbilical \_\_\_\_\_ blood or breast milk. It is short-term only and requires \_\_\_\_\_ injections. For example, the tetanus injection given immediately following a deep wound contains antibodies for immediate treatment.

### MONOCLONAL ANTIBODIES

- ◆ These are antibodies produced by cloning plasma B cells, and can be produced in large quantities for immunisation. They are also used in pregnancy tests.

### ANTIBIOTICS

- ◆ An antibiotic is any chemical used to \_\_\_\_\_ or inhibit the growth of a living micro-organism. They are more toxic to the invading pathogen than they are to the host.
- ◆ Antibiotics are ineffective against \_\_\_\_\_.