

Immunology and public health

NAB Revision

Non-Specific Defence

- **Mast cells** are a type of white blood cell which is present in most tissues, surrounding blood vessels and nerves.
- Mast cells are especially prominent near the boundaries between the outside world and the inside of our bodies.
- They contain **histamine** and **cytokines** which cause the typical inflammatory response.

Non-specific defence

The **inflammatory response** is triggered when something breaks the skin.

Cytokines attract white blood cells called **phagocytes** to the area and the release of **antimicrobial proteins** or **clotting elements** to the damaged area.

Histamines are also released which cause the capillary to vasodilate and become more permeable. Look at the following animation:

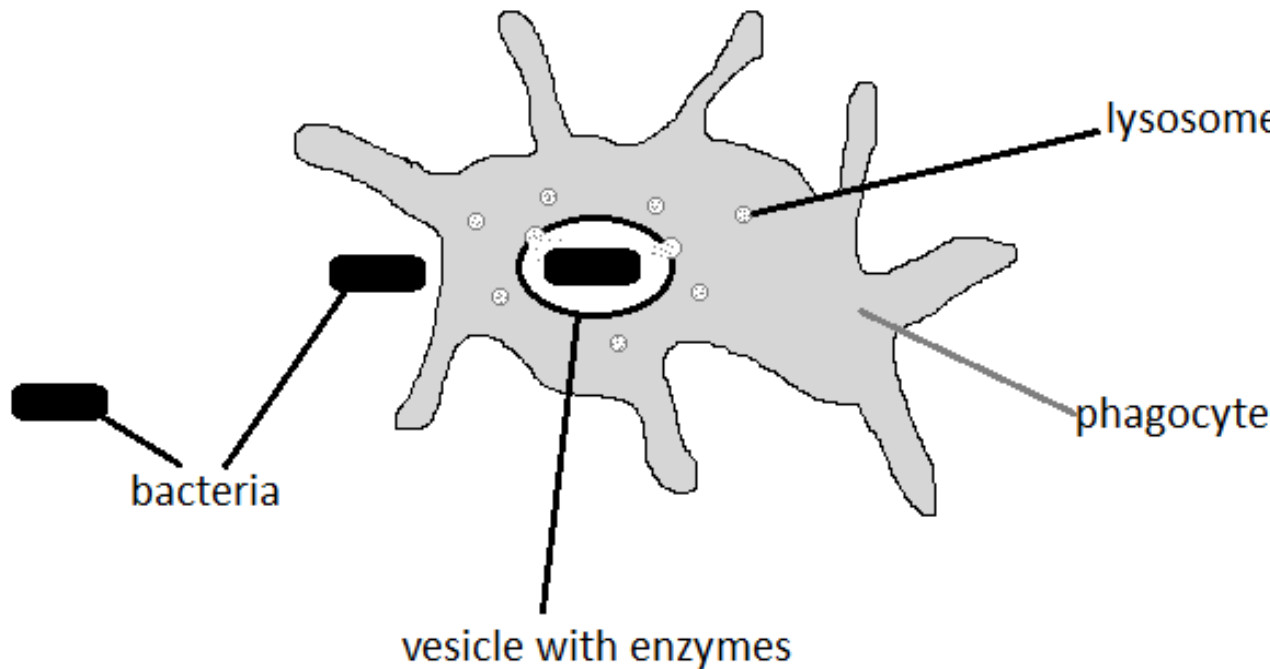
<http://www.sumanasinc.com/webcontent/animations/content/inflammatory.html>

Non-specific defence

Phagocytes

Phagocytes are cells which will **engulf** and digest a foreign particle such as bacteria.

They recognise the **foreign** antigen molecules on its surface then bind with the bacterium and engulf it by **endocytosis**.



Once the bacterium is inside the phagocyte, **lysosomes** fuse with the vesicle, digesting the bacterium.

[VIDEO](#)

Non-specific defence

Natural killer cells

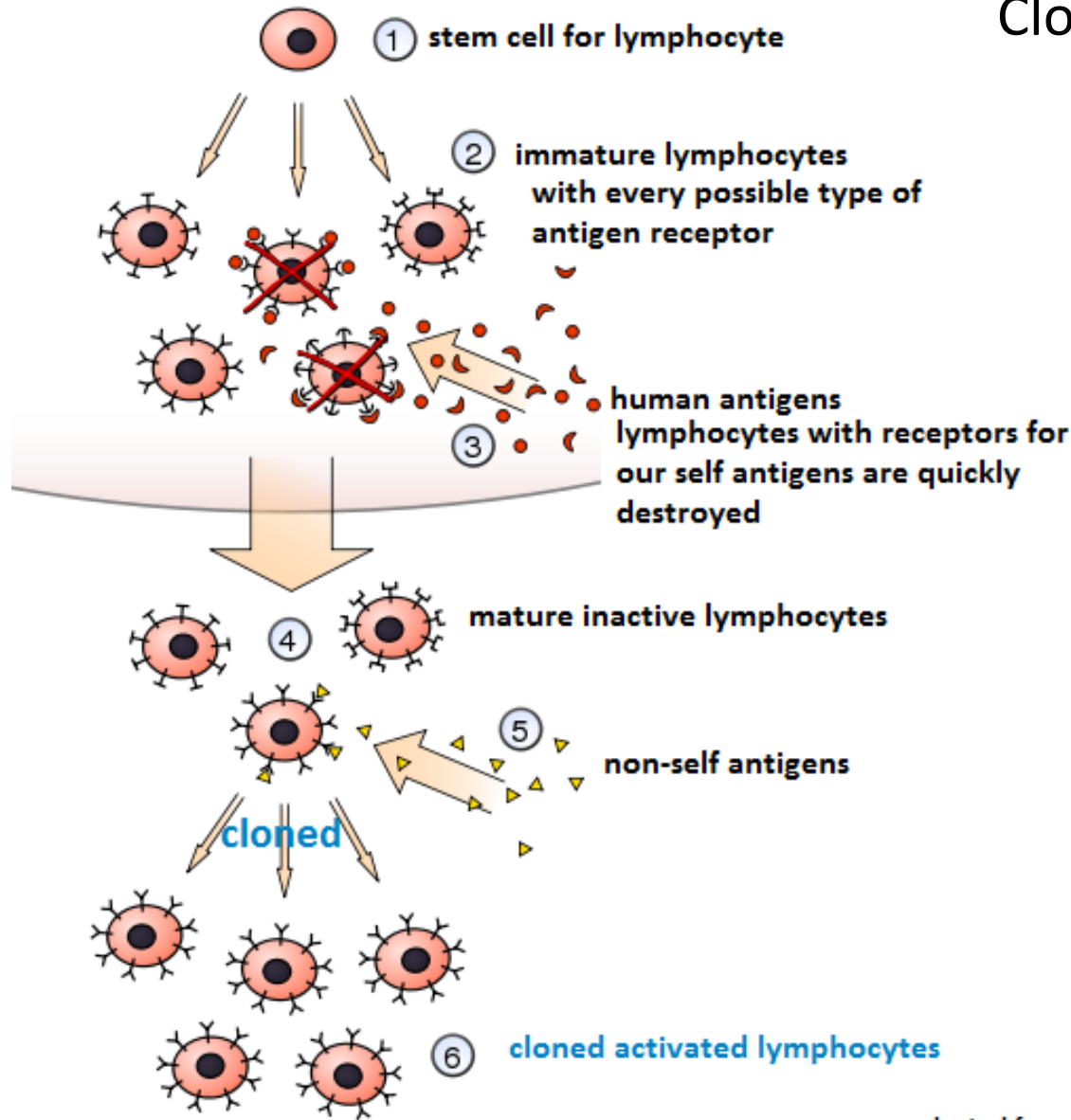
Natural killer (NK) cells are found in the blood and are constantly looking for signs of an infection. They can also release **cytokines** but they have an important role in destroying a **pathogen-infected cell**.

They look for a cell which has not got the normal surface **antigens** or **self antigens** and knows that it must be infected.

It then destroys it with **self-destructive enzymes** perforating the plasma membrane, bursting it, a process called **apoptosis**.

Specific Cellular Defence

Clonal selection theory

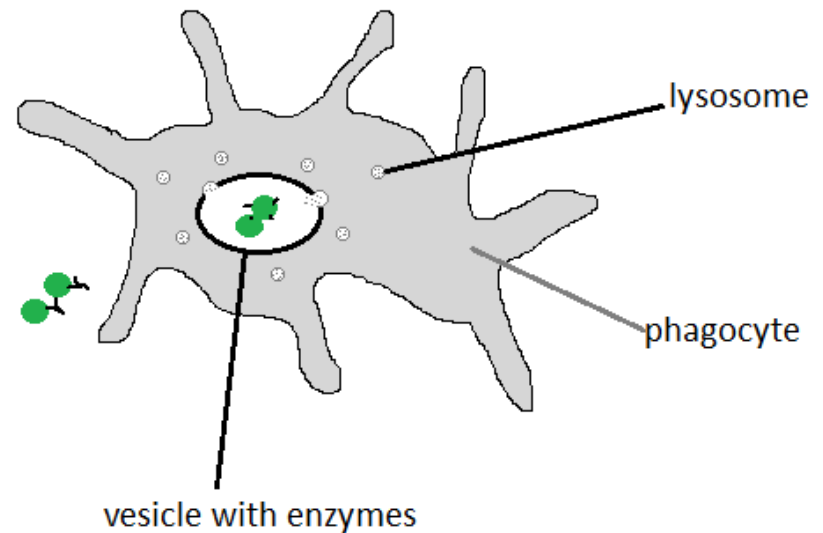
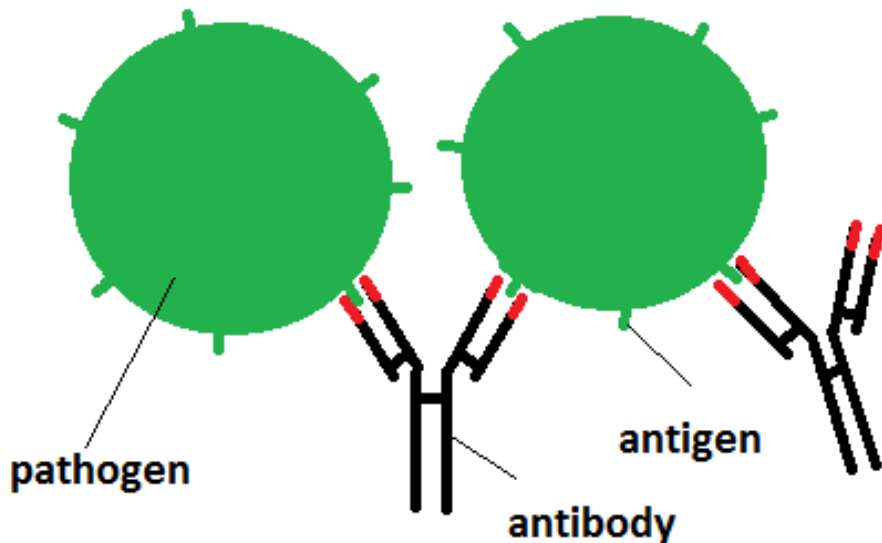


Specific Cellular Defence

Antibody action

The binding of the antibodies causes the

- **inactivation** of the pathogen (or the toxin it produces) and
- pathogen to become more susceptible to **phagocytosis**



Transmission

Patterns of distribution

Sporadic – occurs in scattered or isolated instances with **no connection** between them

Endemic – recurs as a **regular** number of cases in a particular area

Epidemic – affects an **unusually high** number of people in a particular area

Pandemic – occurs as a **series of epidemics** spreading across continents or the whole world

Vaccination

Herd immunity

Herd immunity is where most of a population have been immunised against a particular disease and they can offer protection to the few members of the population who haven't had the vaccination.

This is because their chance of coming into contact with someone with the disease is minimal.

Threshold is the percentage of the population who need to be immunised by the vaccine to offer protection for people who are not vaccinated.

Problem Solving

- Calculating percentages
- Drawing conclusions from experimental data

REMEMBER!!!!

Read the questions carefully

Good luck