Disease and Responses

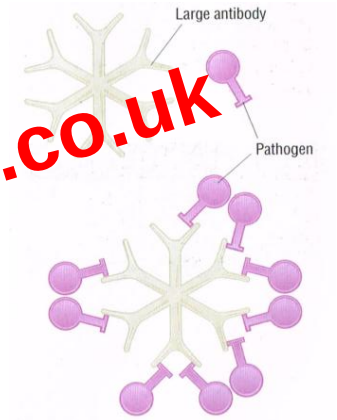
In order for a pathogen to cause harm it must enter our bodies we have a number of primary defence mechanisms to prevent this.

- The first defence is the skin that is called the epidermis and is made up of cells called keratinocytes. Which are produced by mitosis at the base of the skin and work their way up to the surface then dry out (cytoplasm is replaced by keratin) this is known as the keratinisation.
- The second defence is mucous membranes, this is due to the barrier between our environment and our blood is reduced therefore we are at risk of infection (digestive system, airways and lungs. These areas are protected by mucus where the pathogens stick to the mucus and the goblet cells and the cilia come into play.
- Other defences are tear fluid (contains antibodies) and ear wax.

Phagocytes

There are two types of Phagocyte:

1. Neutrophils are made in the bone marrow and have a multilobed nucleus. Also they travel through the blood and can be released in large numbers as a result of infection.
2. Macrophages are larger and also made in the bone marrow and travel in the blood as monocytes. However they settle in certain areas (lymph nodes) and the turn into macrophages.



(b) Agglutination – a large antibody can bind many pathogens together. The group of pathogens is too large to enter a host cell

Figure 2 Neutralisation and agglutination

Phagocytes engulf and destroy pathogenic cells.

I. Foreign cells are recognised by the antigens on their surface.
II. Antibodies then attach to the foreign antigens.
III. Phagocytes also have receptors that bind to the antibodies.
IV. The phagocyte then envelopes the pathogen so that the pathogen is trapped inside the vacuole of the phagocyte called the phagosome.
V. Lysosomes then fuse with the phagosome and release enzymes into it called lysins.
VI. These lysins then digest the bacteria.
VII. Infected cells release chemicals like histamine that attract Neutrophils. This also causes a response to make the capillaries more leaky (this is the cause of swelling) so the pathogens then pass into the lymphatic system where the macrophages are waiting for them.

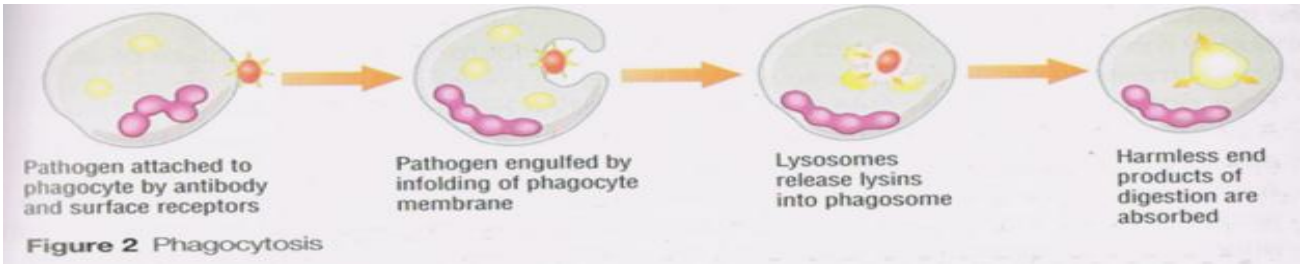


Figure 2 Phagocytosis