Immunity = where the bodies defences seem better prepared for a second infection from the same pathogen and can destroy it before it can cause any harm.

Defence mechanisms:

Some are general and immediate defences like the skin forming a barrier tot the entry of pathogens and phagocytosis. Others are more specific, less rapid but longer lasting. These responses involve a type of white blood cell called a lymphocyte and takes two forms:

Cell-mediated responses involving T-Lymphocytee Humoral responses involving B-Lymphocities Recognising your manager

Lymphocytes must be able to distinguish the bodies own cells and molecules (self) from those that are foreign (non-self). If they couldn't do this, the lymphocytes would destroy the organisms own tissues.

Each type of cell (self or non-self) has specific molecules on its surface that identify it. Proteins are important as there are an enormous variety and have highly specific tertiary structures.

It is this variety of specific 3D structures that distinguishes one cell from another. These protein molecules usually allow the immune system to identify:

Pathogens (like HIV)

Non-self material such as cells from other organisms of the same species

Toxins (like the product from the bacteria that causes cholera)

Abnormal body cells (cancer cells)

10 million types of lymphocyte exist in the body. There is a high probability that when a pathogen gets into the body, one of these lymphocytes will have a protein on its surface that is complementary to one of the proteins of the pathogen = the lymphocyte recognises the pathogen.

With so many lymphocytes, there erv few of each type. When an infection occurs, the one type already present the complementary proteins is stimulated to wae to build up its numbers to a level where it can be exective in destroying it. This is called clonal selection.

The immune system recognises organ transplants as nonself material even though they come from individuals of the same species so it attempts to destroy the transplant. To minimise the effect of tissue rejection, donor tissues are usually matched as closely as possible to those of the recipient (relatives that are genetically close usually).

How Lymphocytes recognise cells belonging to the body:

10 million lymphocytes present at any time = each capable of recognising a different chemical shape

In the foetus, these lymphocytes are constantly colliding with other cells

Some of the lymphocytes will have receptors that exactly fit those of the bodies own cells

These lymphocytes either die or are suppressed

The only remaining lymphocytes are those that might fit foreign material (non-self) = only respond to foreign material

Defence Mechanisms