Immune Response

Our immune system responds to foreign invaders in two ways: via a non-specific defence (guards against all pathogens) and a specific defence (directed towards a particular disease causing agent).

Non-specific defences include measures such as your skin, mucus, digestive enzymes, phagocytes, neutrophil, basophil and eosinophil blood cells. No matter which foreign invader enters the body, these devices will attack and defend.

Specific defences involve the lymphocytes (B cells and T cells) and will only occur once a specific antigen comes in contact with the specific lymphocyte for which it has been coded. This triggers a chain reaction of events including the primary immune response and the initiation of cell mediated immunity.
**Steps in Specific Defence**

Antigen enters the body

Macrophage engulfs the antigen, destroys it and displays pieces of the antigen on its membrane

The macrophage travels to the lymph nodes where the lymphocytes are waiting

The macrophage presents the antigen to the Helper T cell that is specific to that antigen

[Primary Immune Response]

The Helper T cell then does 2 things

- Activates the B cell that is also specific to the antigen

  The B cell then divides by mitosis producing many clones

  (lymph glands swell because of this)

  The clones then differentiate into 2 types of B cells

  - Plasma cells
    - Mass produce Antibodies
    - released into lymph and blood
      - antibodies bind to antigens
        - (lock + key)
        - immobilize antigens
          - prevent entering cells - attract too large phagocytes
  - Memory cells
    - Circulate to lymph nodes and blood frequently
      - initiate a quick, intense response to subsequent exposure to the same antigen

[Cell-mediated Response]

- Activates the T cells

  - Produce Killer T cells (cytotoxic)
    - Inject protein into infected cells causing them to leak and die with the pathogen inside
  - Produce Suppressor T cells
    - Slow down the immune response once the infection is over

Once exposed, the B cells and T cells remember the antigen.

From this memory, the response is stronger and faster the second time, preventing the antigen from developing at all. This is referred to as immunity.