

## Cells of the Immune Response

- The main part of the Immune response involves lymphocytes

- Two types of lymphocytes

- T cells
- B cell

- T cells

- Produced in the bone marrow and are stored and mature in the thymus gland.
- Function: find invader and signal the attack.
- Once T cells find the invader and identify the antigen, another T cell passes the information to the B cells.

1. Helper T cells → present infected cells to killer T cells and B cells.

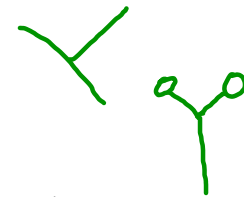
2. Killer T cells → cause lysis of the infected cell.  
*Cytotoxic*

3. Suppressor T cells → once the invader is removed, this cell turns the immune system off.

- B cells

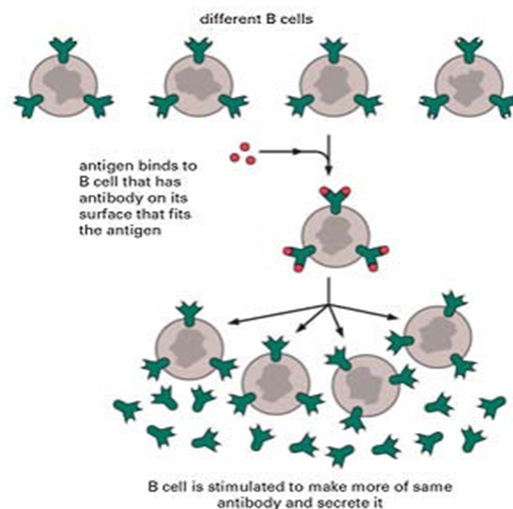
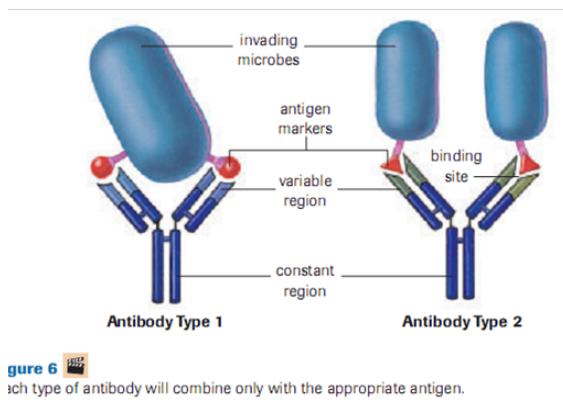
- Function: produce antibodies.
- Each B cell produces a *specific* antibody.
- Made in the bone marrow.  
*and mature*

*protein attaches to antigens*



- Antibodies:

- Antibodies are Y shaped and designed to target foreign invaders.
- Specific antibody = specific antigen
- Tails are constant; variable region at outer ends of the arms.
- Each antibody can only attach to its complementary marker.



## How the Immune Response Works:

1. **Macrophages** attack the invader and engulf and digest them
2. The antigen markers from the invader are pressed into the cell membrane of the macrophage
3. **Helper** T cells attach to the antigen marker and “read” it
4. Helper T cells send a chemical signal to **B cells** to clone and produce **antibodies** matching the antigen marker of the invader
5. Helper T cells send signals to **killer** T cells which search and destroy the specific invader
  - a. It knows the invader by the antigen marker on the invaders cell membrane
6. **Suppressor** T cells ‘turn off’ the immune response once the invading microbe has been defeated.
7. **Memory** B cells remain afterwards to protect against another infection of the invader
  - a. This is the reason vaccines are effective

