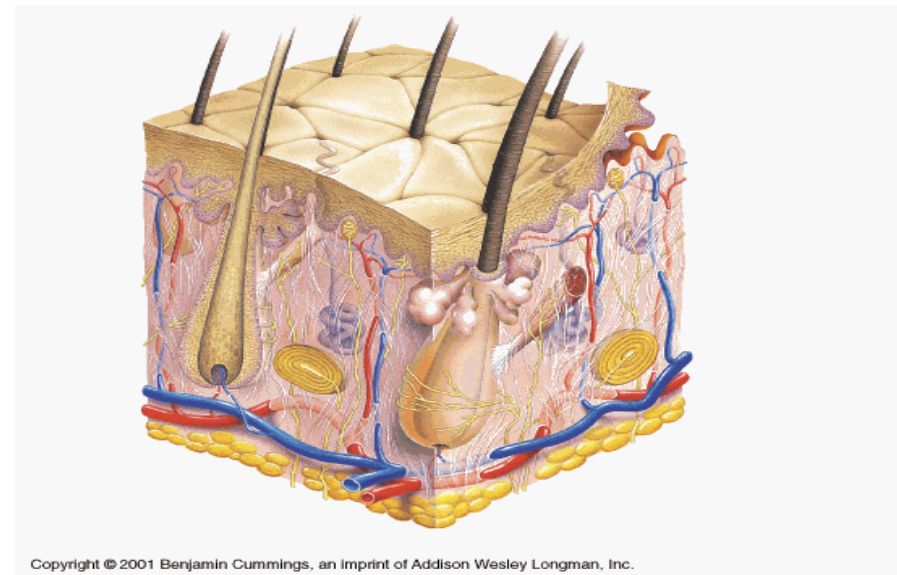
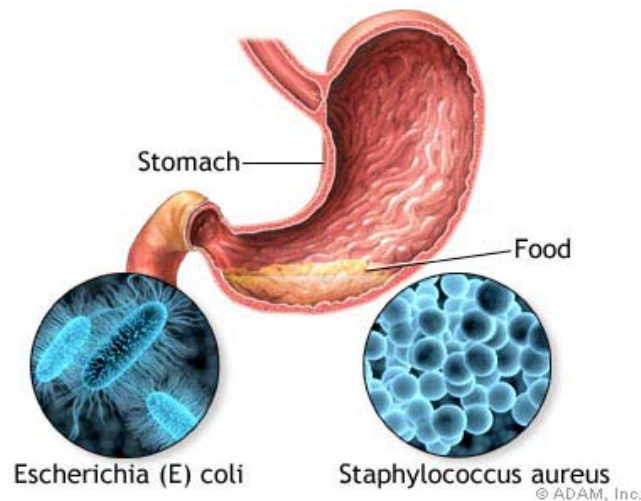


**UNIT#5 MINI LESSON#2**  
**IMMUNE RESPONSE**

# 1. The First Line of Defense

- NON-Specific
- Physical Barriers- Skin
- Chemical Barriers-EX: Saliva, Stomach acid



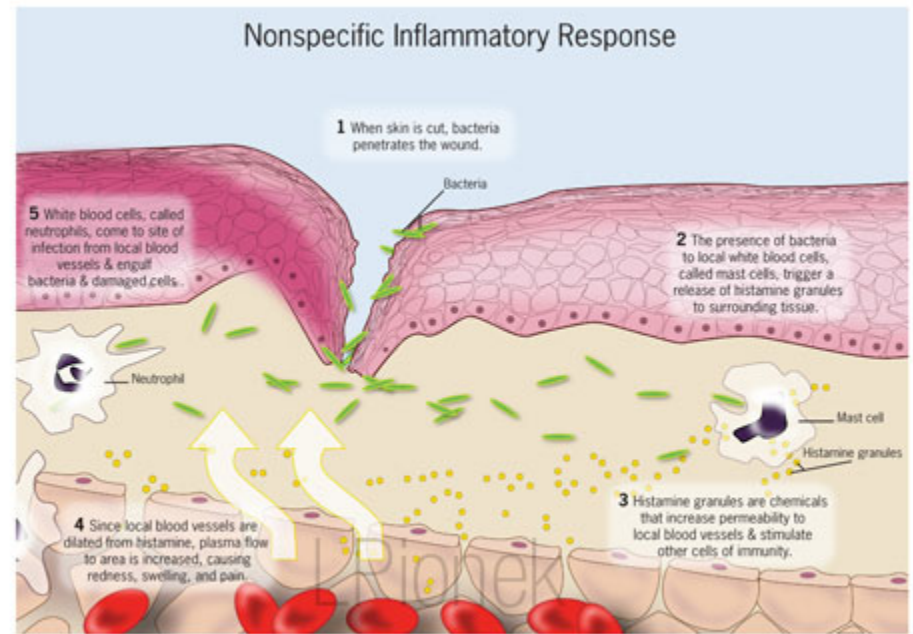
# 2. The Second Line of Defense

## Non-Specific

and

## Inflammatory response-

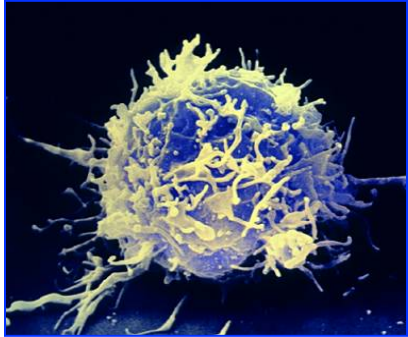
reaction of the body that causes fever, swelling, and redness.



*Handwritten signature*

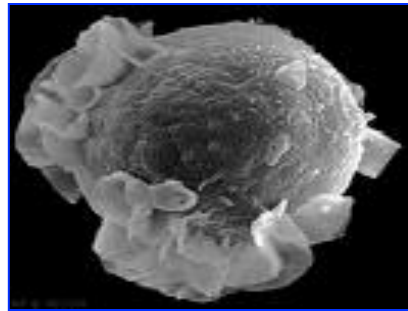
- When a pathogen gets past the first and second lines of defense then the Third Line of Defense kicks in

# Types of WBC (Lymphocytes)



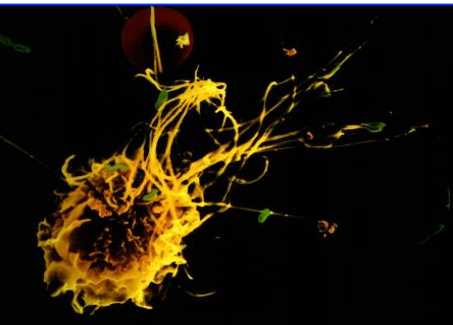
## T cells -

Identify Pathogens by recognizing their Antigens



## B cells -

Produce chemicals called Antibodies



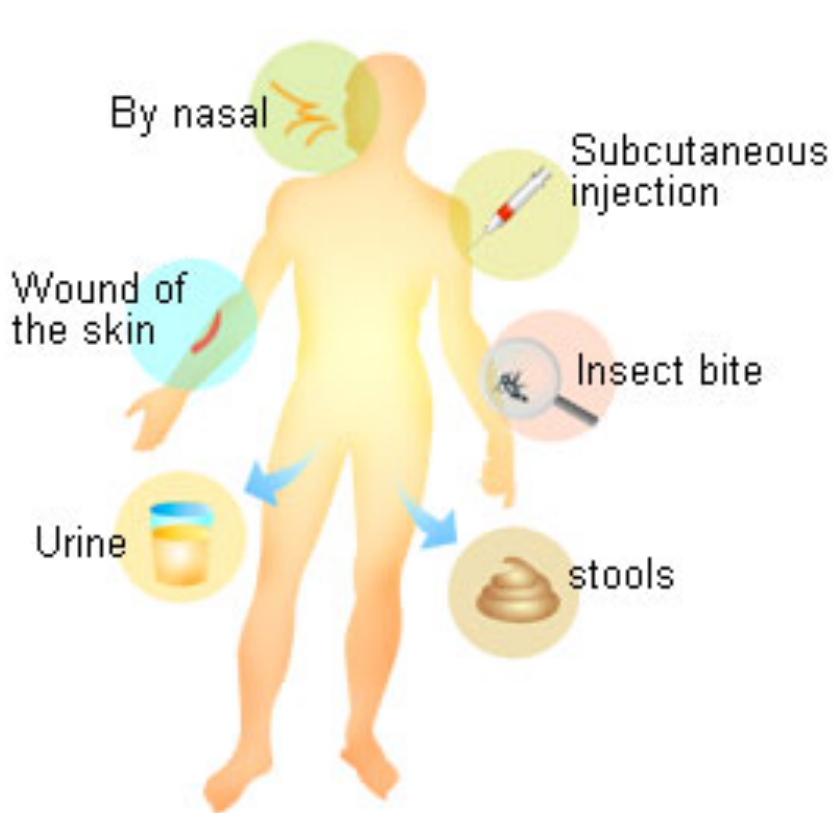
## Macrophages (Phagocytes)

Surround pathogen and digest or eat it

# The Third Line of Defense

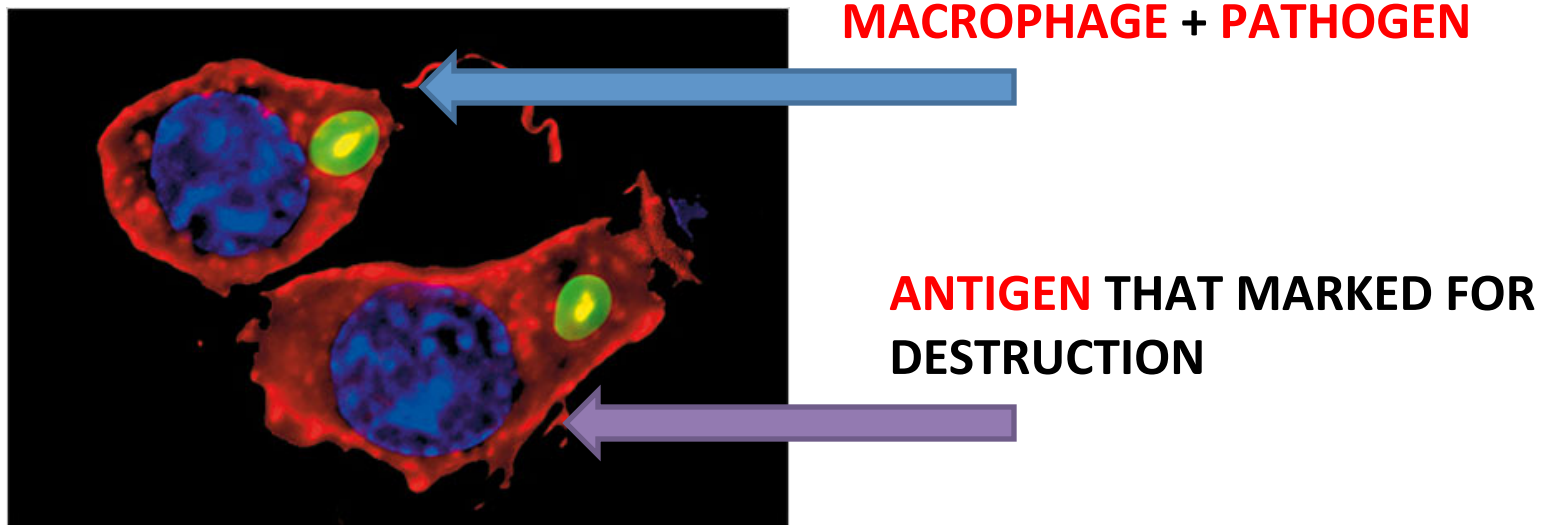
## Steps of the Immune Response:

- 1. **Pathogen** enters the body.



**EXAMPLES: VIRUS, BACTERIA, FUNGUS**

- 2. White blood cells called **macrophages** “mark” the pathogen for destruction. These are now known as “**antigens.**”



- 3. **Helper T-Cells** are alerted and they start multiplying.

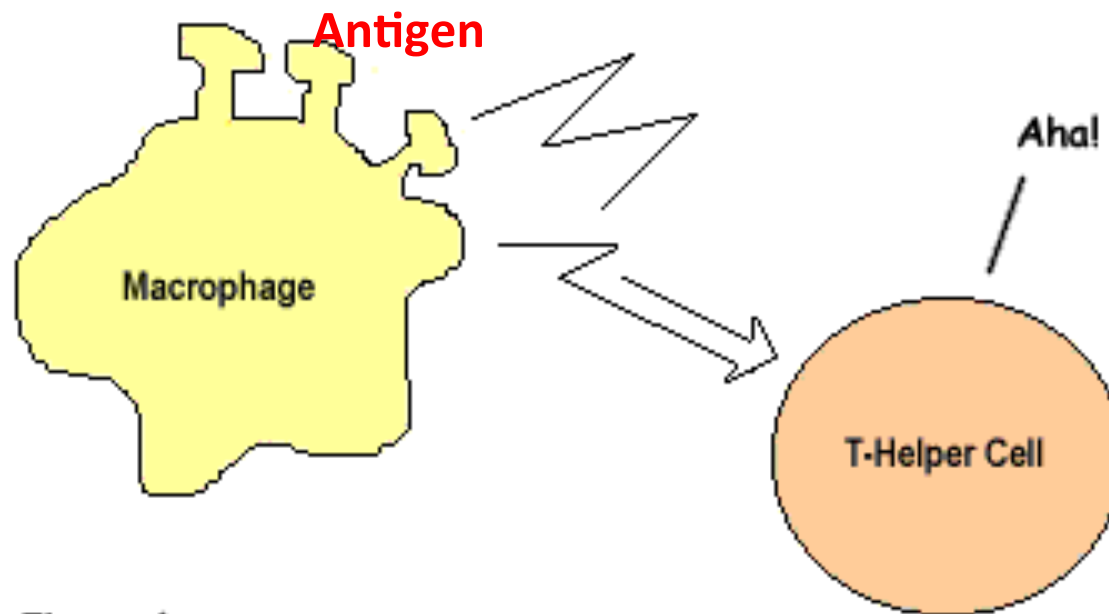


Figure 4

T-helper cell reads and recognizes the antigens



- 4. Helper T-Cells recruit the
  - **Killer T-cells: kill** all cells affected by **antigen**



Killer T-Cell

- 5. Helper T-Cells also recruit the **B-cells**.

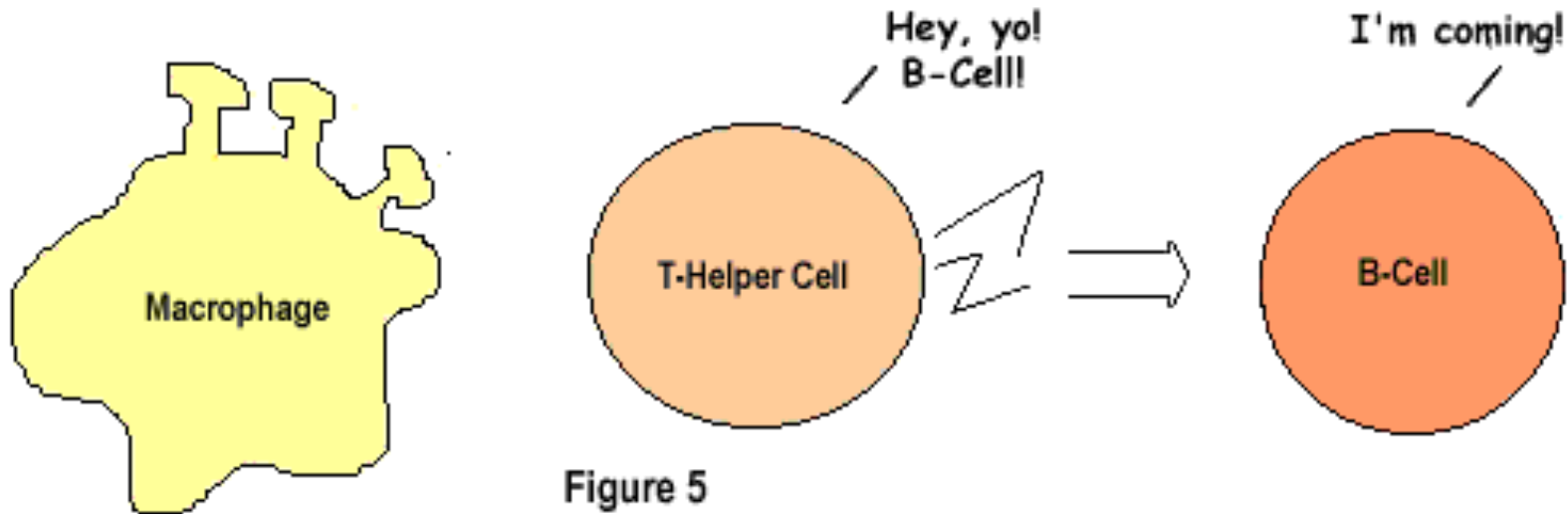


Figure 5

T-helper cell is activated and triggers the immune response, sending out messages to activate the B-cells.

- 6. B-cells create millions of **antibodies** – shape-specific proteins.

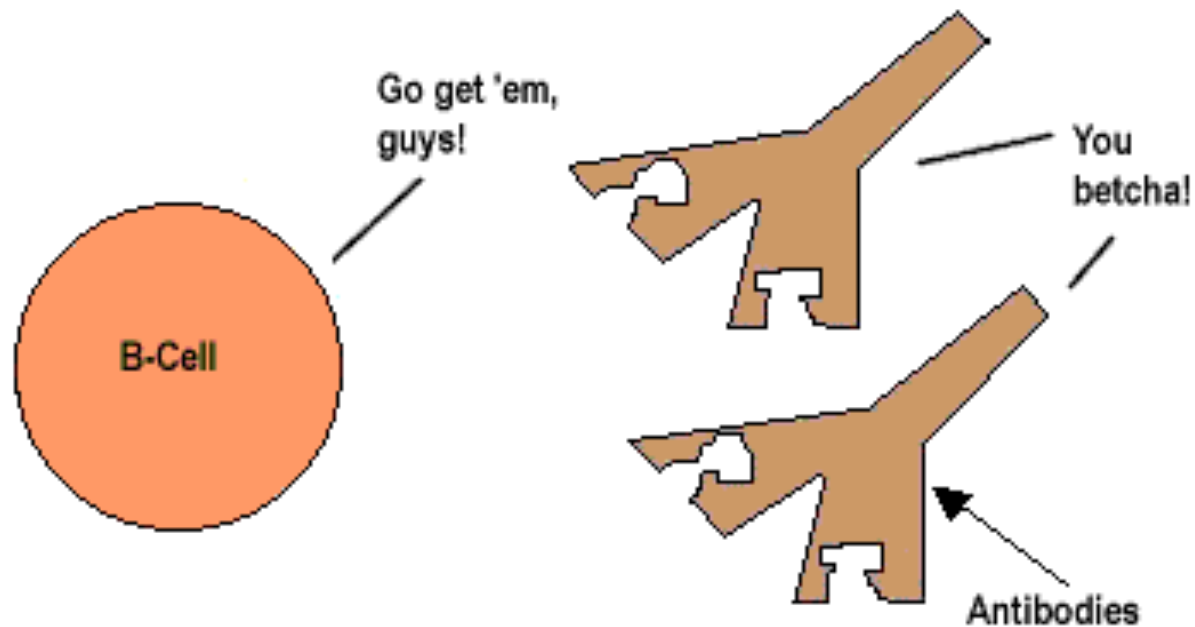


Figure 7

- 7. **Antibodies** bind to **antigens**.

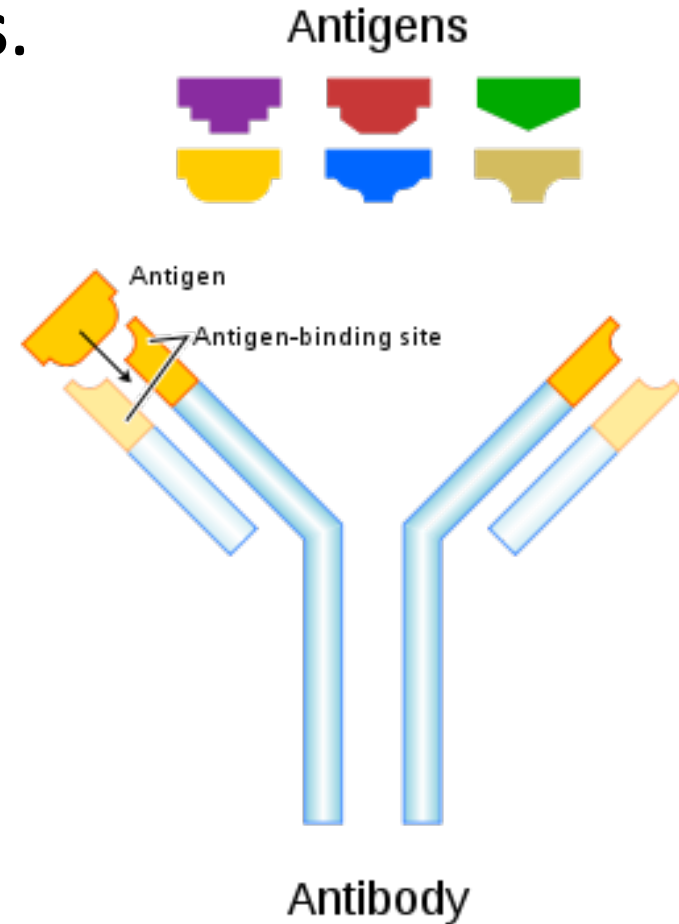
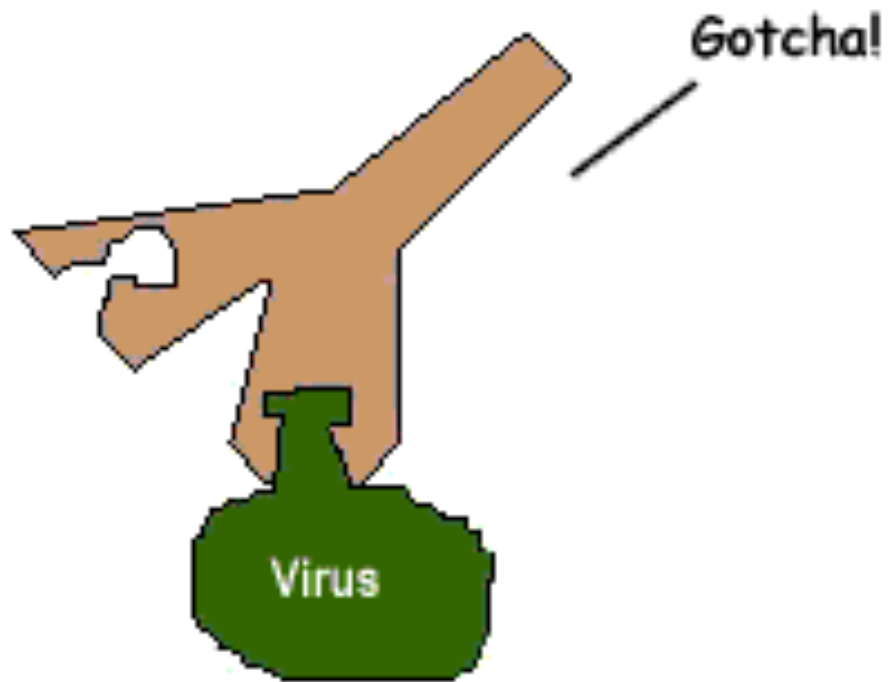


Figure 8

**SHAPE DETERMINES FUNCTION**

- 8. **Macrophages** are alerted to engulf the antibody-antigen complex.

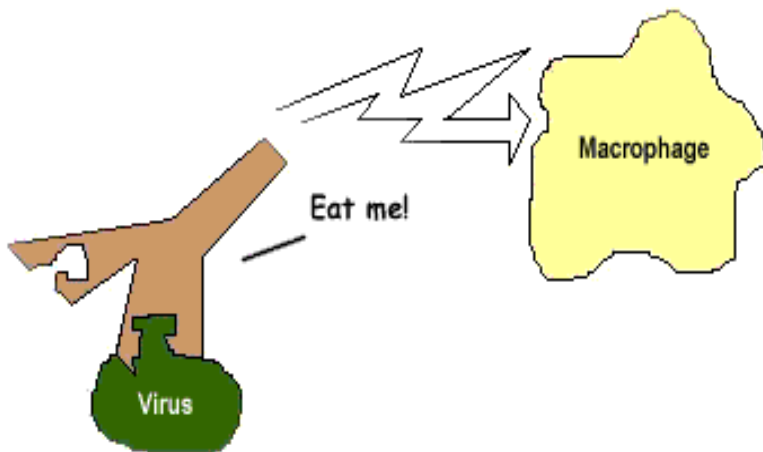


Figure 9

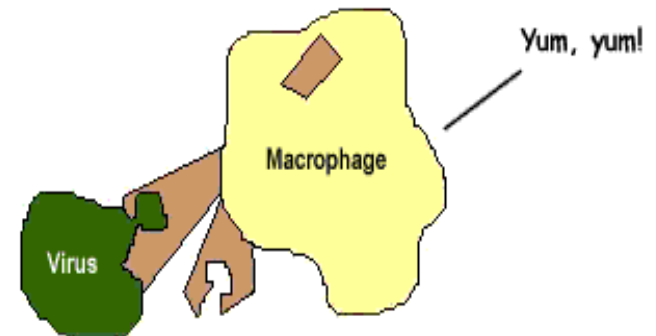


Figure 10

- 9. **T-Suppressor cells** “deactivate” the immune response.

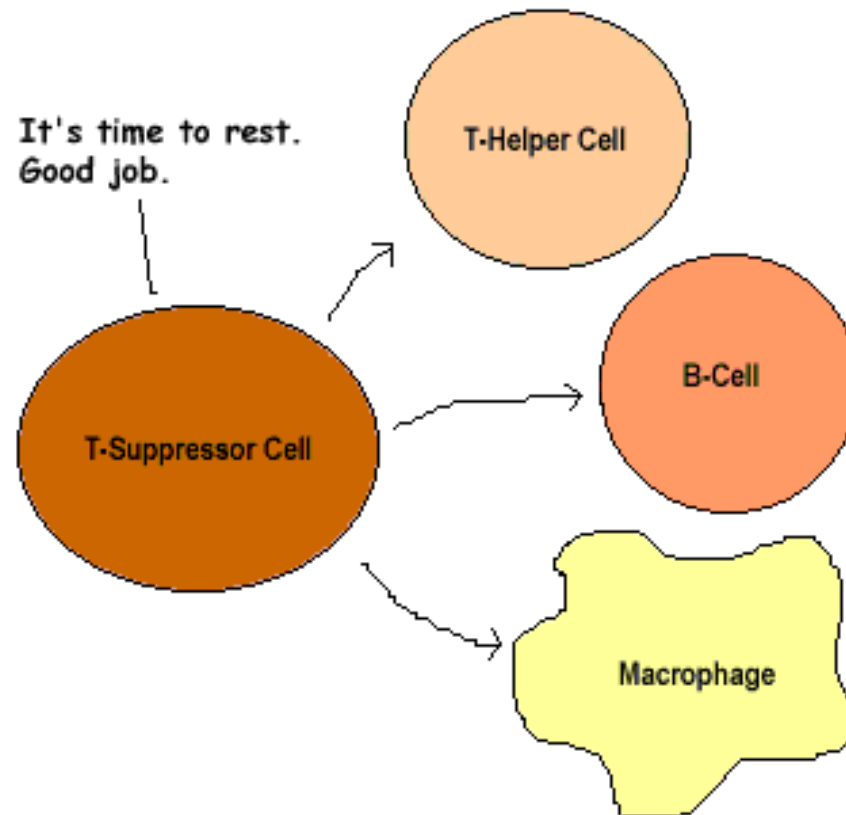
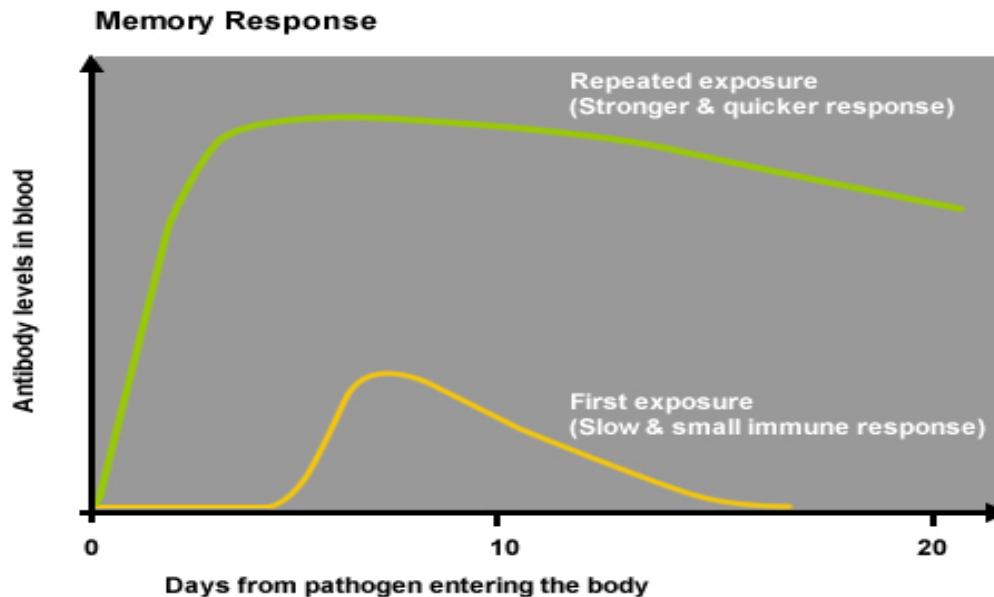


Figure 11

# Steps of the Immune Response:

- 10. Meanwhile, **Memory B-Cells** were “memorizing” how to create **antibodies** for this **antigen**.





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This means that the next time this same **pathogen** tries to make you sick, your white blood cells will be able to make **antibodies** much more quickly!

**YOU HAVE DEVELOPED ACTIVE IMMUNITY TO THIS PATHOGEN!**