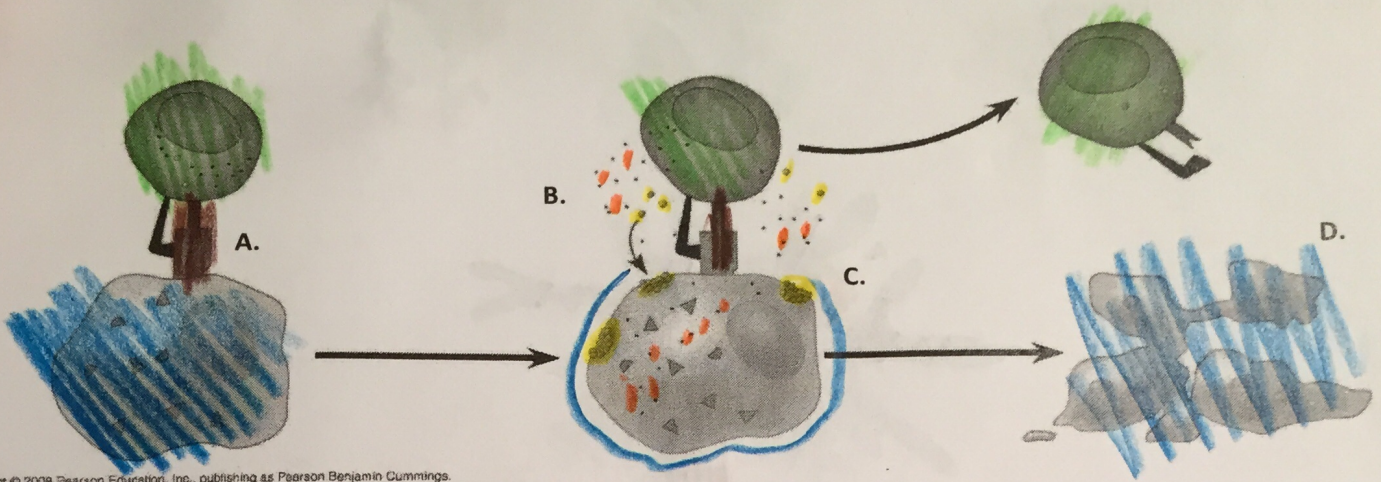


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- Color the following according to the color code listed:
 - Macrophage- purple
 - Helper T Cell locking and keying with macrophage- brown
 - Helper T Cell- green
 - Cytokines- yellow
 - Pathogen- orange
 - Cytotoxic T Cell- red
 - Plasma B Cell- blue

2. Describe what is occurring in each lettered part of the diagram.

- Macrophage engulfs pathogen
- Macrophage locks & keys w/ Helper T Cell
- Helper T cell releases cytokines
- Cytokines activate & recruit ^{Cytotoxic} T Cells & Plasma B Cells



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- Color the following structures according to the color code provided.
 - Cytotoxic T cell locking and keying with virus-infected cell- brown
 - Cytotoxic T Cell- green
 - Virus infected cell- blue
 - Perforin- yellow
 - Lymphotoxin- orange

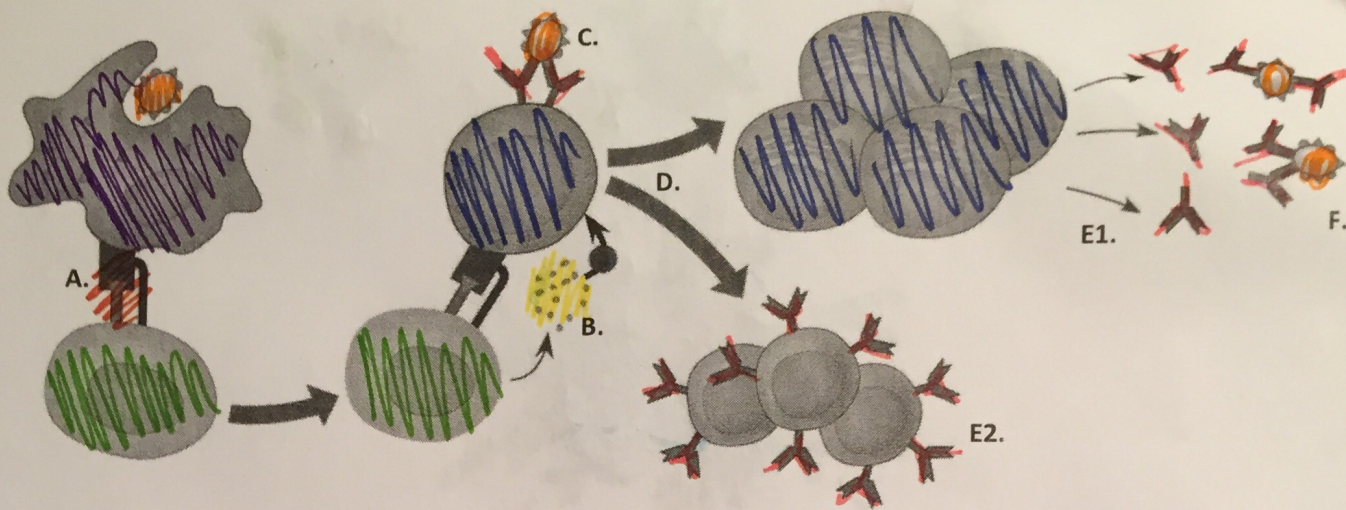
2. Explain what must occur BEFORE cytotoxic T cells can function.

Activation- macrophage engulfs pathogen and presents antigen to Helper T, helper T releases cytokines

3. Explain what is occurring in each of the lettered steps in the diagram.

- Cytotoxic T cell locks on keys of virus-infected cell
- Cytotoxic T cell releases perforin and lymphotoxin
- Perforin punches holes in cell membrane of infected cell, lymphotoxin enters cell
- Lymphotoxin kills virus-infected cell

III. Activation of B Cells and B Cell Function (Humoral Immunity)



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1. Color the following according to the color code listed:

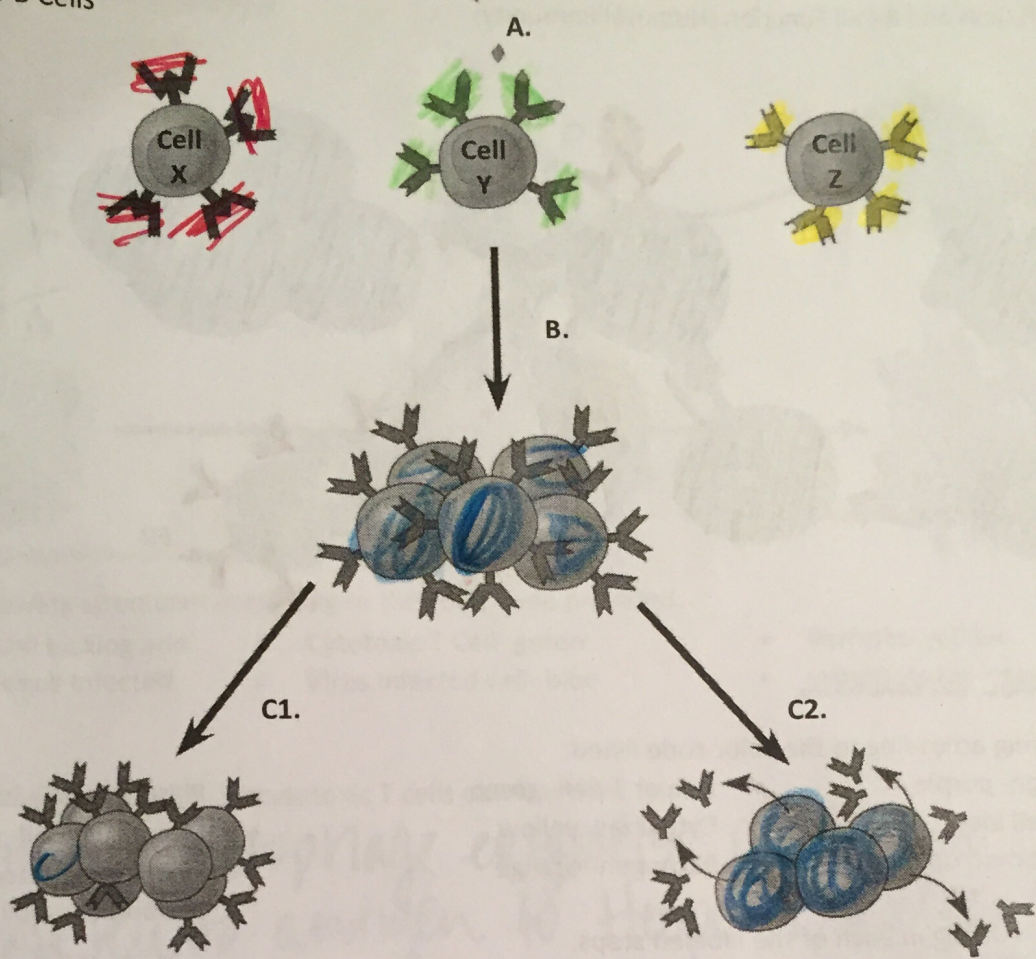
- Macrophage- purple
- Helper T Cell- green
- Plasma B Cell- blue
- Helper T Cell locking and keying with macrophage- brown
- Cytokines- yellow
- Memory B Cell- gray
- Pathogen- orange
- Antigen receptor and antibodies- pink

2. Explain what is occurring in each of the labeled steps.

- A. Macrophage engulfs pathogen and locks and keys w/ Helper T cell
- B. Helper T cell releases cytokines and locks and keys with Plasma B cell
- C. Plasma B cell locks and keys with pathogen
- D. Clonal selection and differentiation into plasma B cells & memory cells

- E1) Plasma B cell releases antibodies
- E2) Memory B cells circulate for future attacks
- F. Antibodies bind to pathogen to disable pathogen and attract macrophages to infect

7. Clonal Selection of B Cells



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1. Color the following according to the color code listed:
- Antigen- orange
 - Antibodies on cell X- red
 - Antibodies on cell Y- green
 - Antibodies on cell Z- yellow
 - Plasma B Cell- blue
 - Memory B Cell- gray

3. Explain what is occurring in each of the labeled steps.

A. Cell Y locks and keys with a specific pathogen

B. Cell Y proliferates

C. 1) ~~Plasma~~ Memory B cells (of cell Y) ~~are~~ circulate for future attacks.

2) Plasma B cells (of cell Y) release ~~antibodies~~ antibodies