CARD F: Natural Killer (NK) Cells

**Roles:**
- Release enzymes that cause infected cells to die
- Release cytokines (chemicals) that attract other immune cells to the site of infection and may cause fever and inflammation

**Specificity:**
Each NK cell recognizes a variety of antigens on infected cells

---

CARD C: Phagocytes

**Examples:**
Macrophages, neutrophils, dendritic cells

**Roles:**
- Ingest and destroy pathogens
- Release cytokines (chemicals) that attract other immune cells to the site of infection and may cause fever and inflammation

**Specificity:**
Each phagocyte recognizes a variety of antigens on pathogens
**CARD B: Antigen-Presenting Cells (APCs)**

**Display antigens**

- Virus
- Dendritic cell
- Viral antigen
- Antigen-presenting cell
- Cytokines

**Examples:**

Dendritic cells (in some cases, also macrophages and B cells) that ingested a pathogen and display (present) a piece of the pathogen, called an antigen, on the surface

**Roles:**

- Display antigen attached to proteins on the cell surface
- Activate T cells that recognize that specific antigen

**Specificity:**

Each APC recognizes and displays a variety of antigens on its surface

---

**CARD E: Cytotoxic T Cells**

**Destroy infected cells**

- Antigen-presenting cell
- Virus
- Cytotoxic T cell
- Targeted killing of infected cells
- Thousands of cytotoxic T cells specific for antigen

**Examples:**

T cells activated by an antigen-presenting cell (APC)

**Roles:**

Kill cells infected with a pathogen that the cytotoxic T cell recognizes

**Specificity:**

Each cytotoxic T cell only recognizes a specific antigen on infected cells
### CARD A: B and Plasma Cells

**Examples:**
- B and Plasma Cells

**Roles:**
- Produce antibodies
- B cell activation
- Multiplication
- Differentiation (change)

**Specificity:**
- Each B cell and each antibody only recognize a specific antigen

### CARD D: Helper T Cells

**Examples:**
- T cells activated by an antigen-presenting cell (APC)

**Roles:**
- Activate other immune cells
- Produce cytokines (chemicals) that boost the action of B cells, cytotoxic T cells, and macrophages

**Specificity:**
- Each helper T cell only recognizes a specific antigen

### CARD A: B and Plasma Cells

**Examples:**
- B cells activated by an antigen that matches the B cell's specific receptor and by cytokines from helper T cells

**Roles:**
- B cells multiply and change (differentiate) into plasma cells that produce antibodies that bind to a particular antigen
- Antibodies keep pathogens from infecting more cells and target pathogens for destruction

**Specificity:**
- Each B cell and each antibody only recognize a specific antigen

### CARD D: Helper T Cells

**Examples:**
- T cells activated by an antigen-presenting cell (APC)

**Roles:**
- Activate other immune cells
- Produce cytokines (chemicals) that boost the action of B cells, cytotoxic T cells, and macrophages

**Specificity:**
- Each helper T cell only recognizes a specific antigen
**Examples:**

T cells and B cells that stay in the body long after an infection is over

**Roles:**

Protect the body from future infections with the same pathogen

**Specificity:**

Each memory cell recognizes a specific antigen