

Cell Mediated Cytotoxicity.

- **Objectives:**

- To learn about cells involved in cell mediated cytotoxicity
- Mechanism of cell mediated cytotoxicity.
- Protection induced by cell mediated immunity.
- Immunopathological conditions resulting from cell mediated cytotoxicity.

Ags are Internalized, Processed and Presented by APC

MHC+Epitope complex is recognized by T cells

Specific T cells become activated

HELP for B cells

HELP for T cells

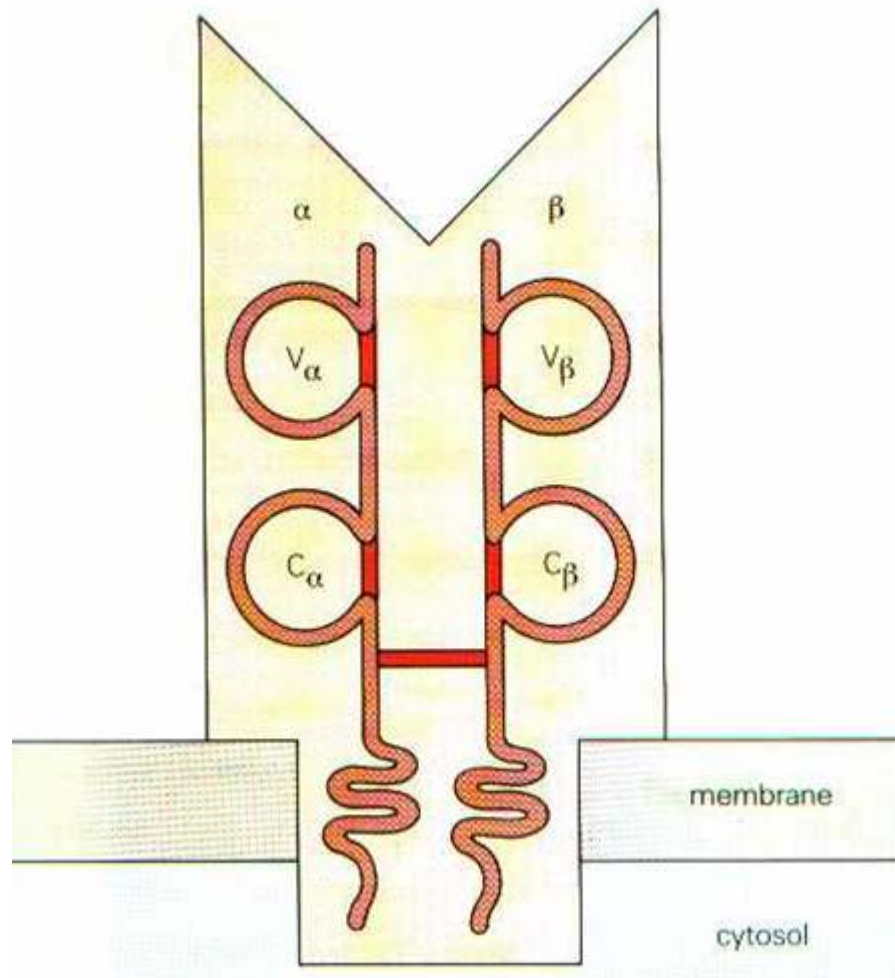
B cells produce antibodies

T cells activate other T cells and macrophages

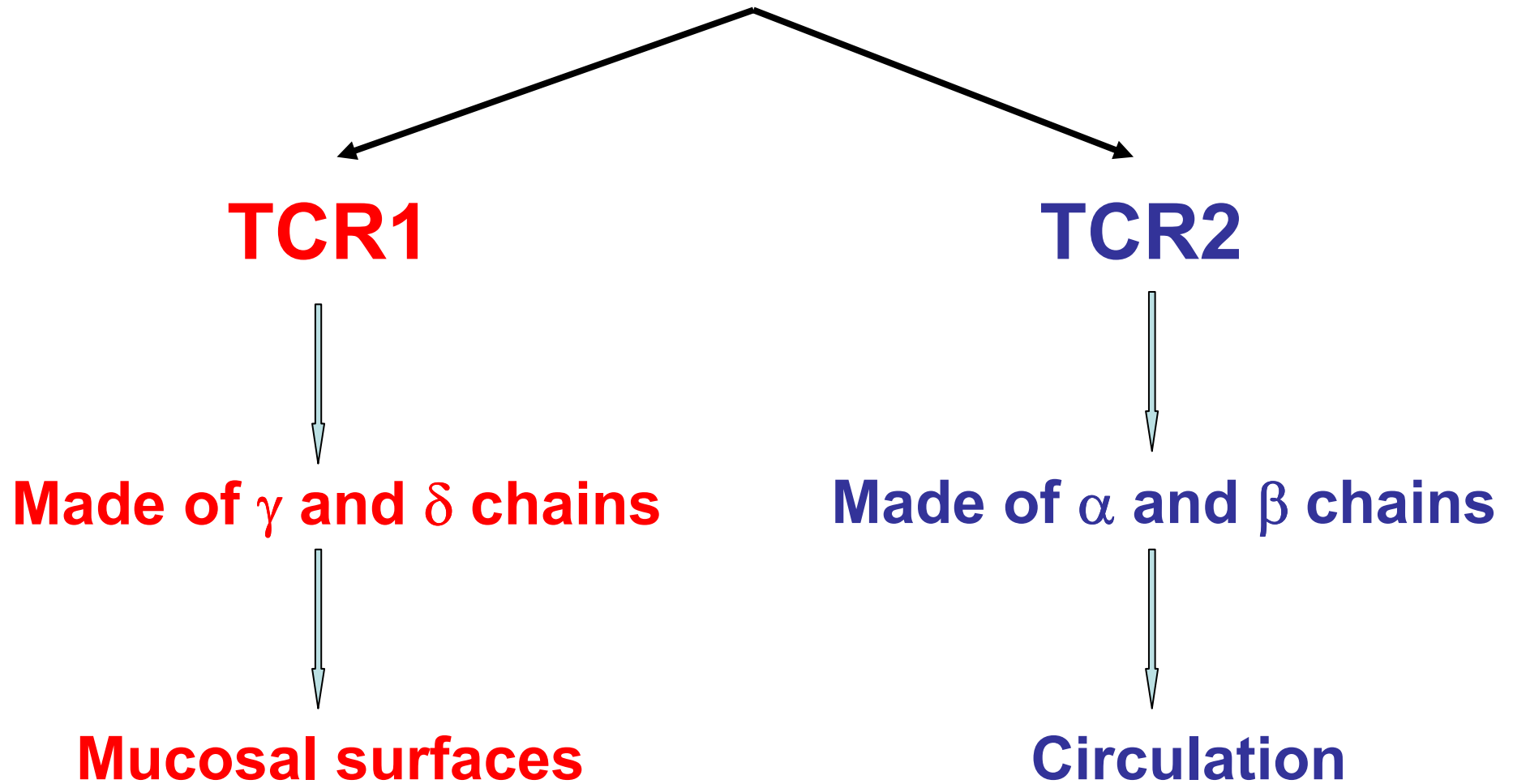
HUMORAL Immunity

CELL-MEDIATED Immunity

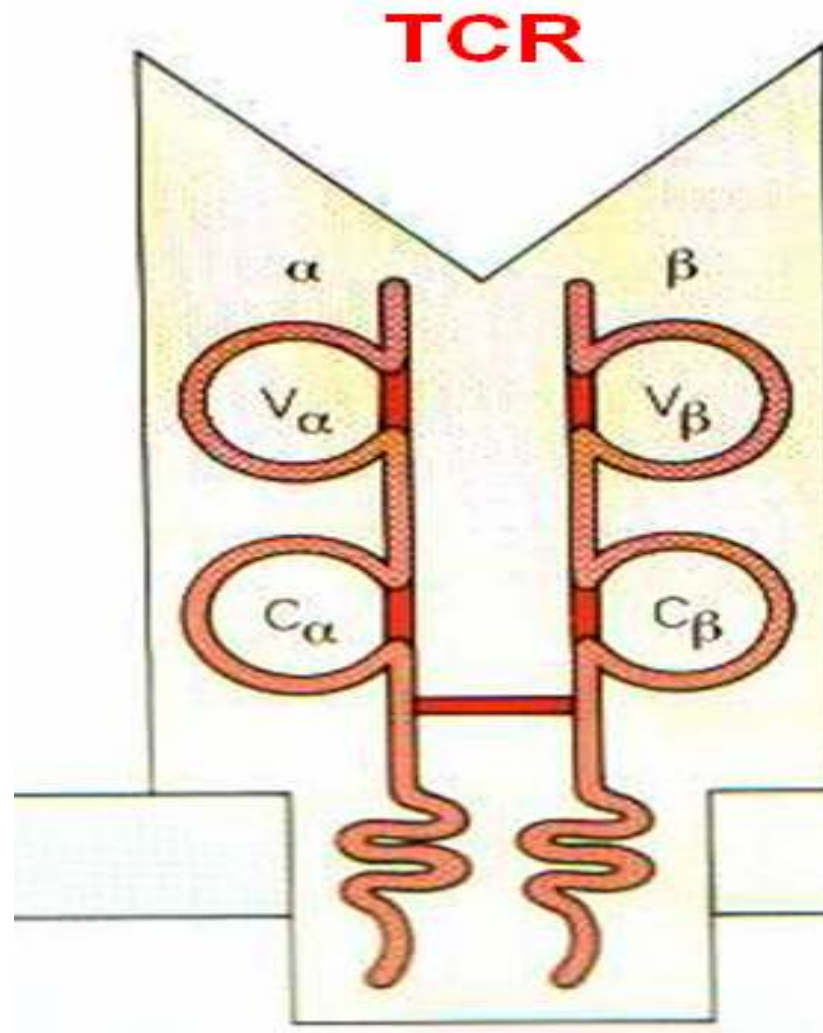
How do T cells recognize MHC+Ag? Via the T Cell Receptor (TCR)

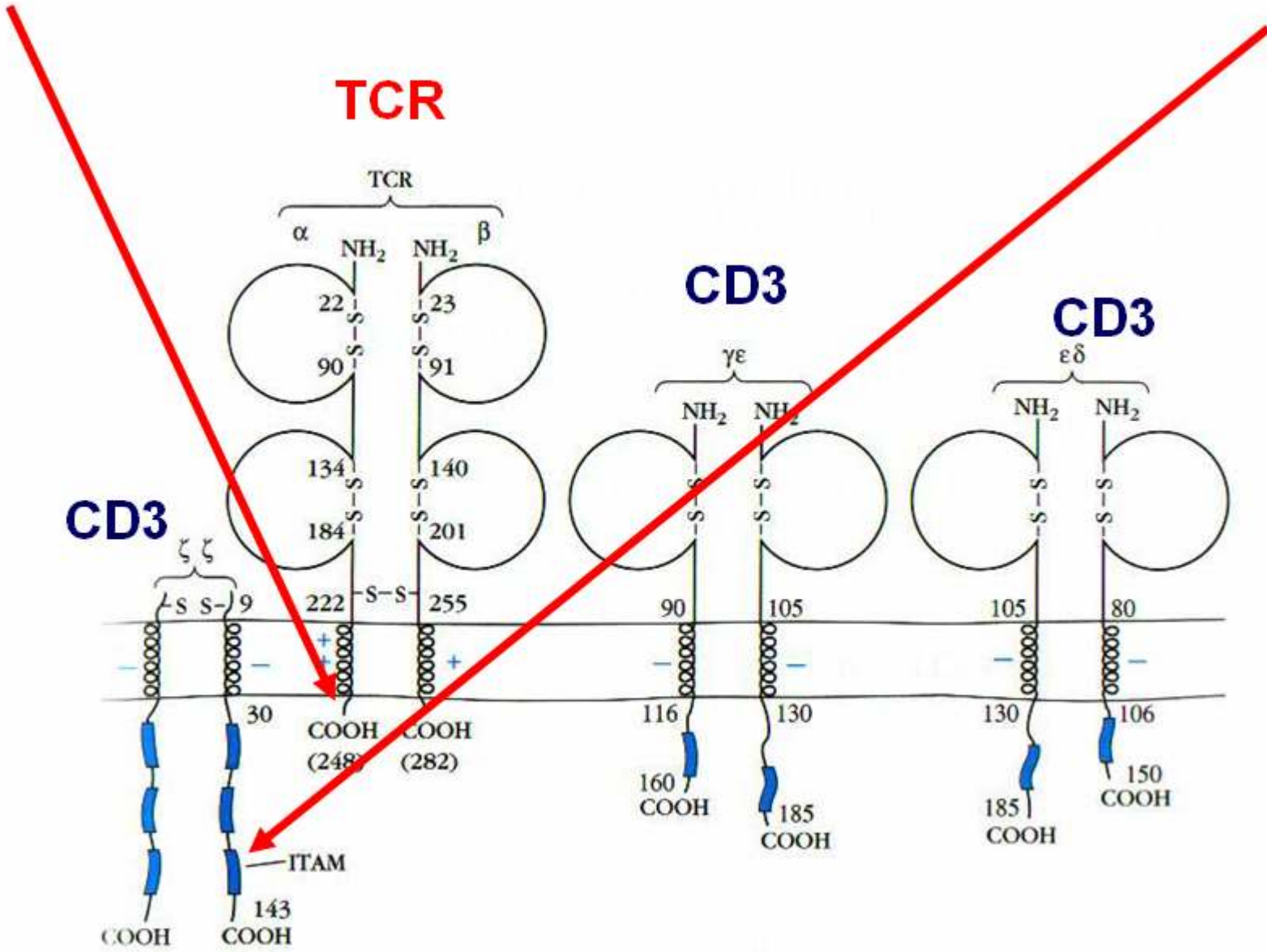


TCR Molecules – 2 types

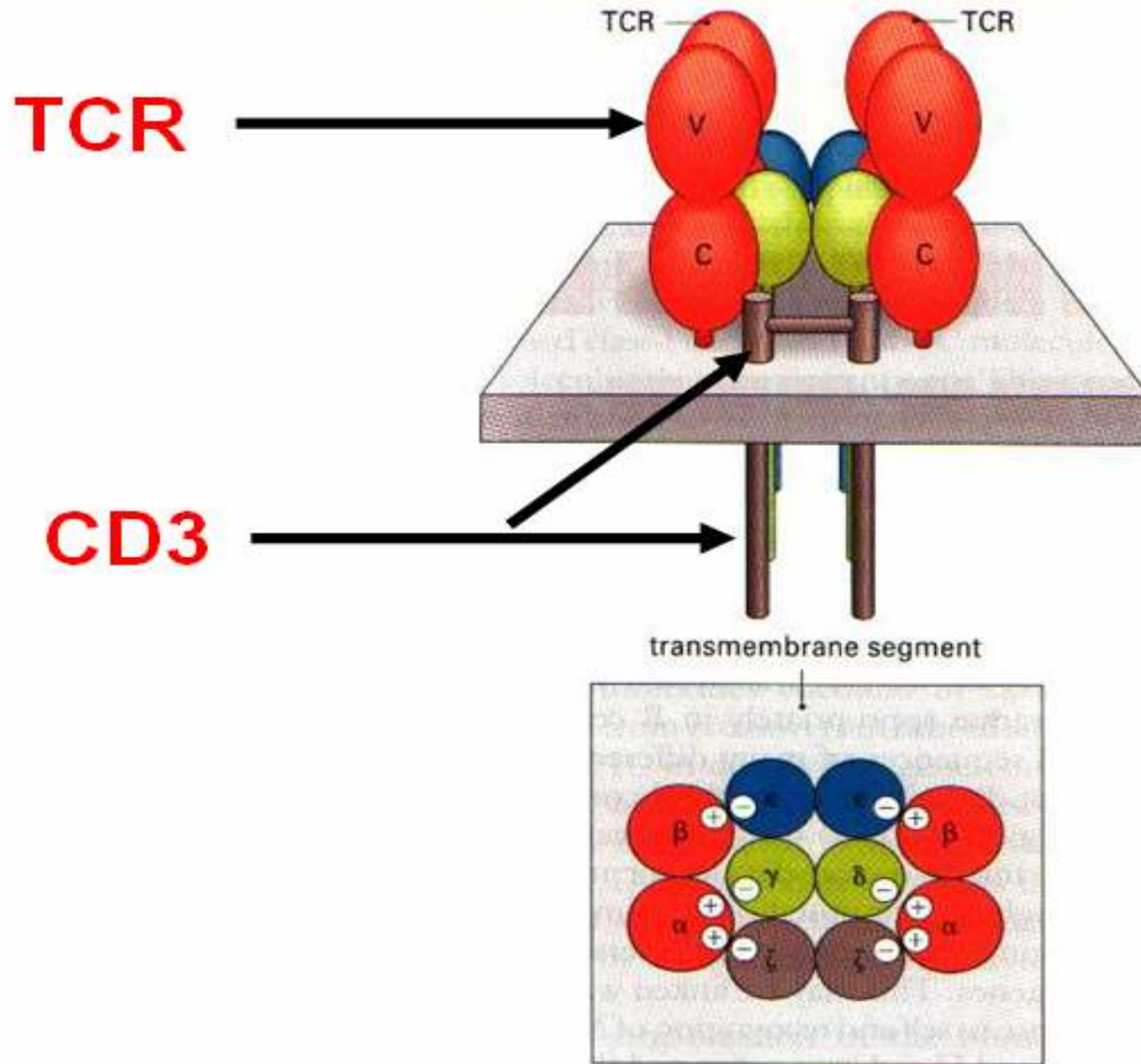


TCR2

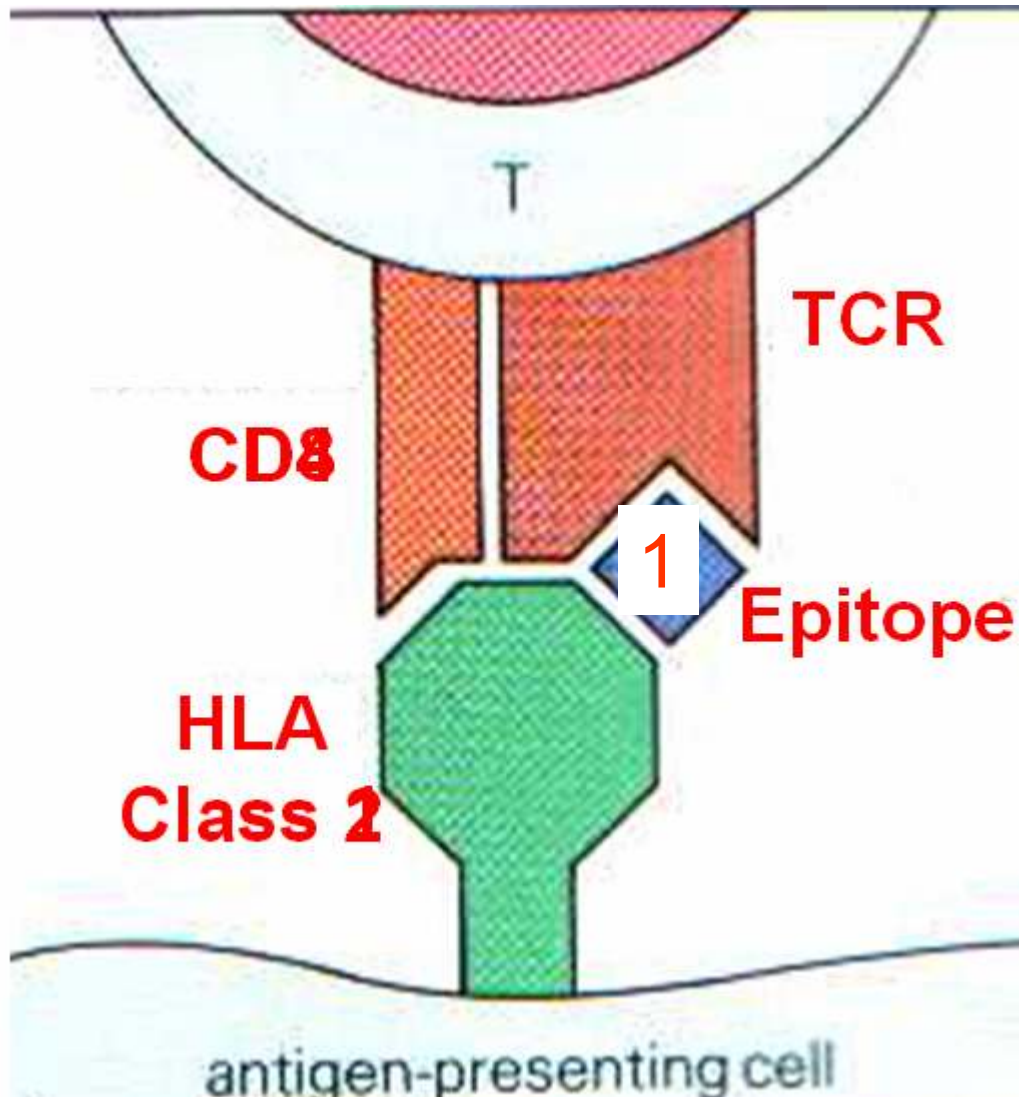


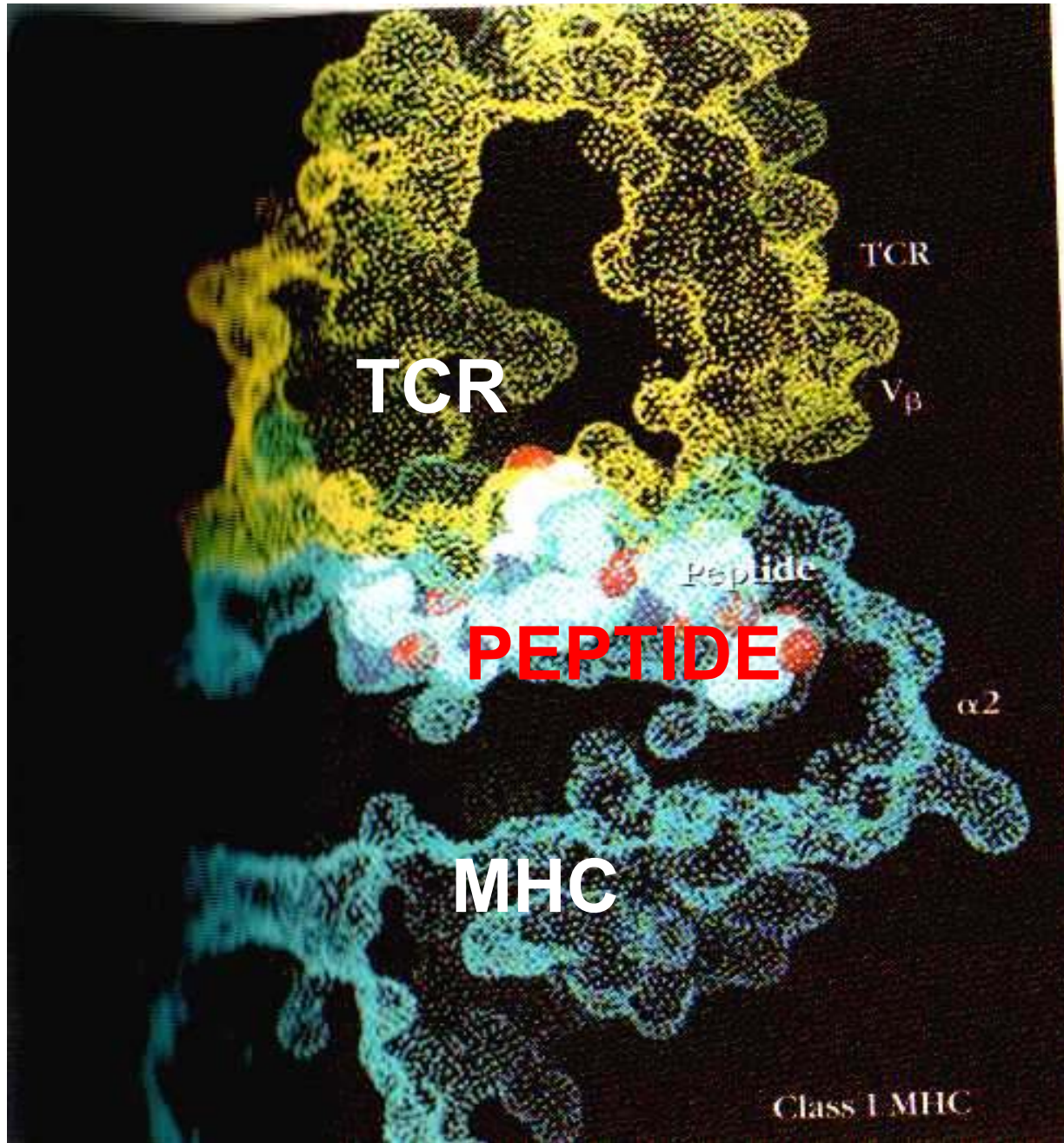


The T-cell receptor complex



Co-receptor a condition for MHC-Ag recognition by TCR.

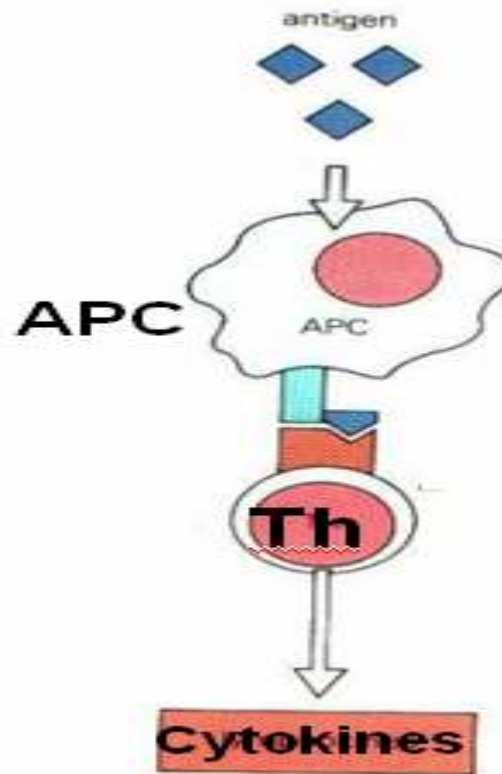
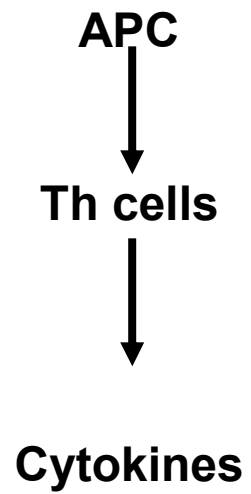




Effectors of Cell-mediated Immunity

- **Which cells are involved in CMI?**
- **How do they function in immunity?**

Effectors of Cell-mediated Immunity



APC

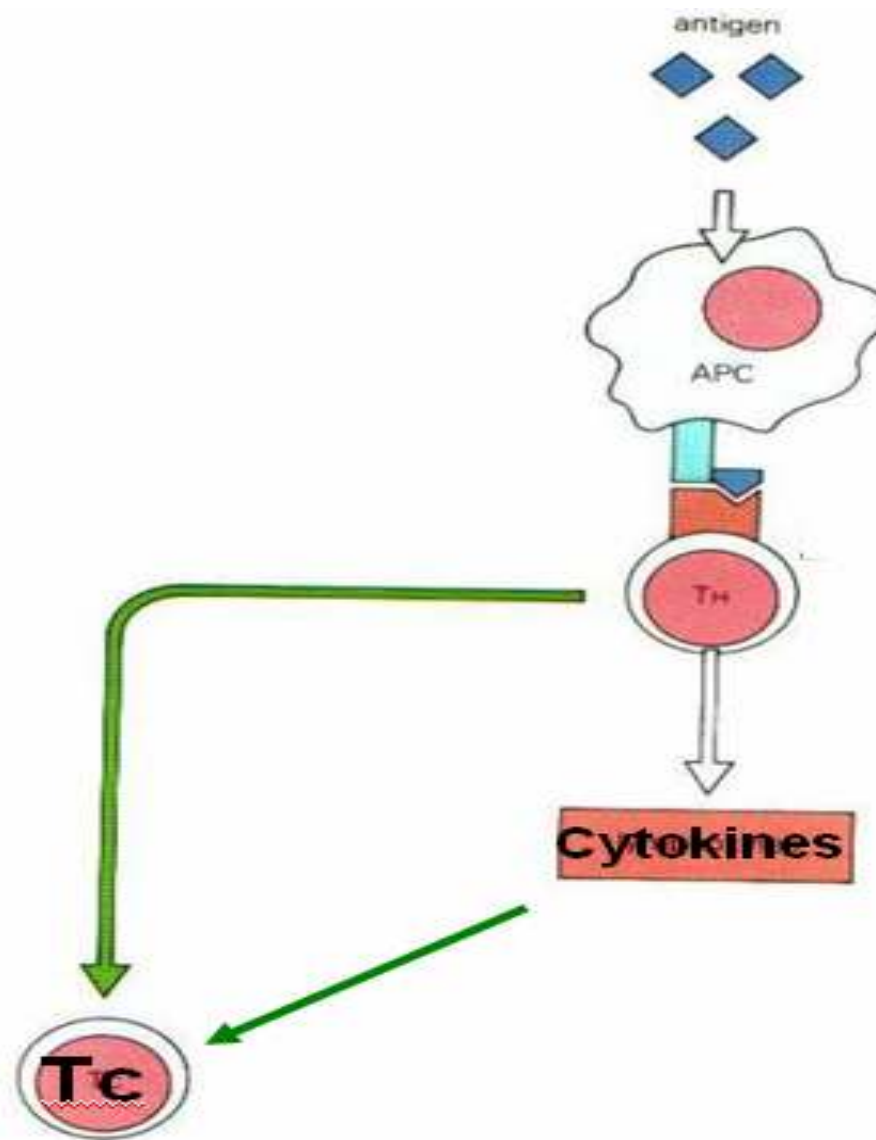


Th cells



Tc cells

Effectors of Cell-mediated Immunity

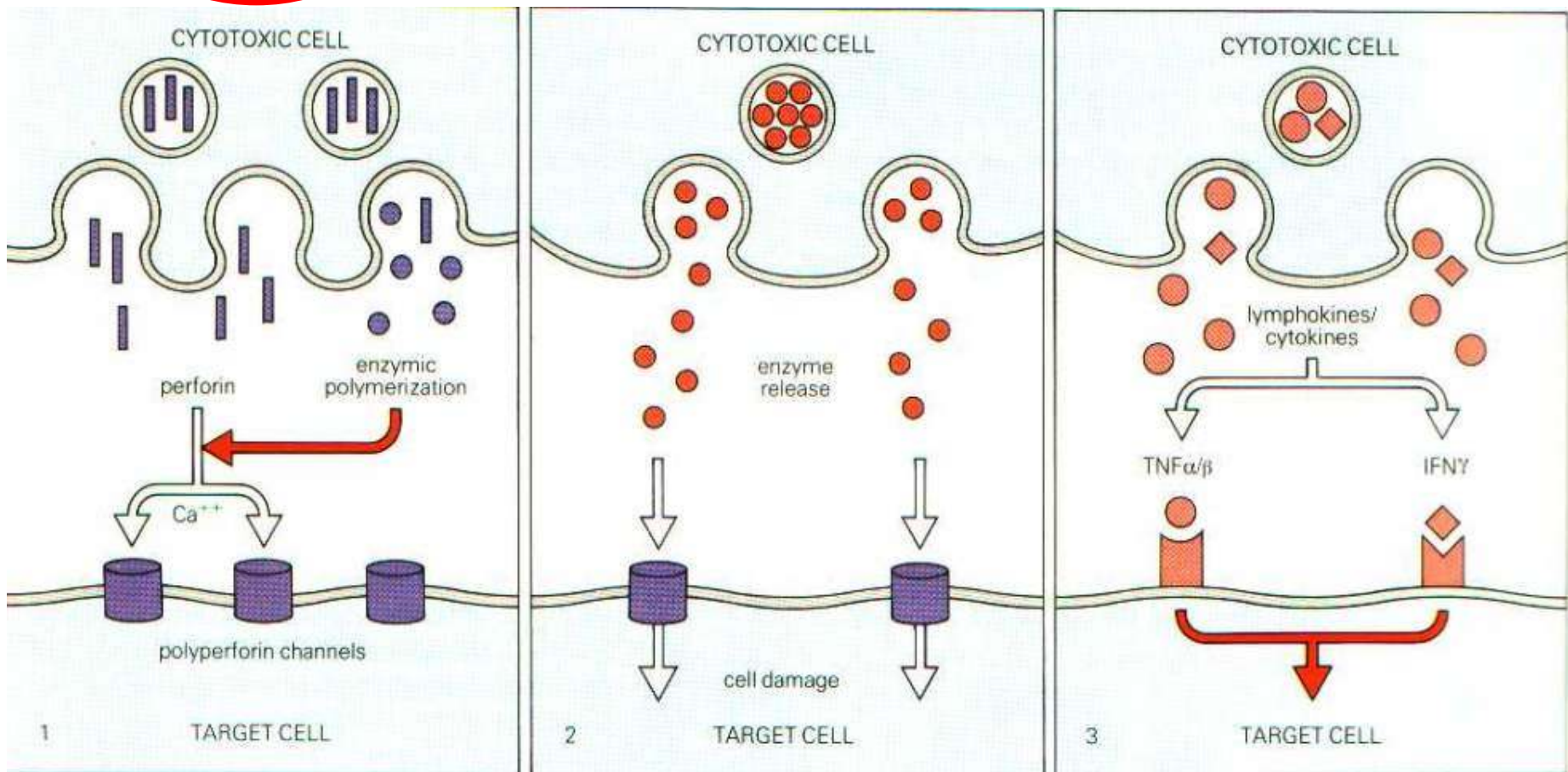


Cell-mediated Cytotoxicity by Tc cells- Effector molecules.

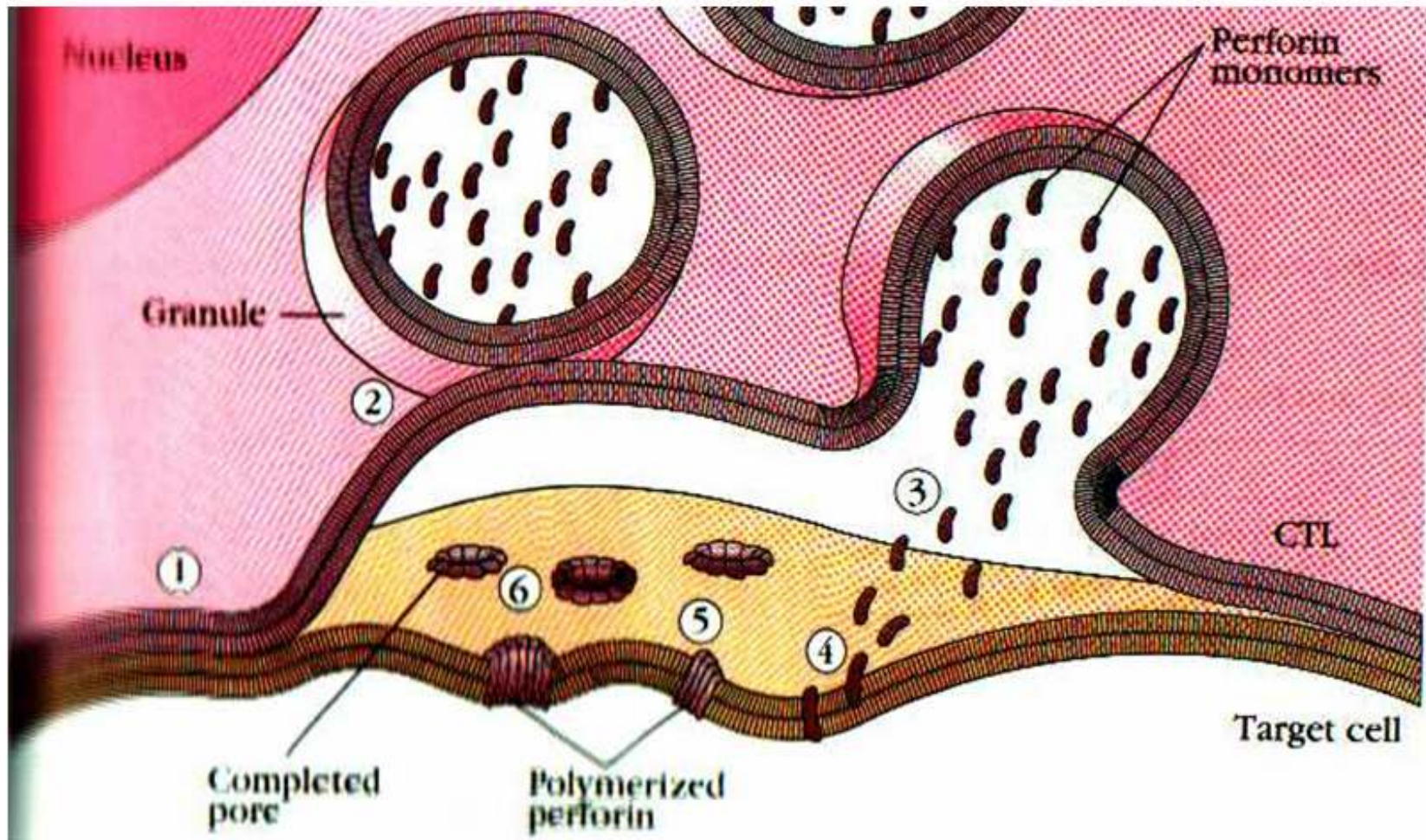
Perforin

Enzymes

Cytokines



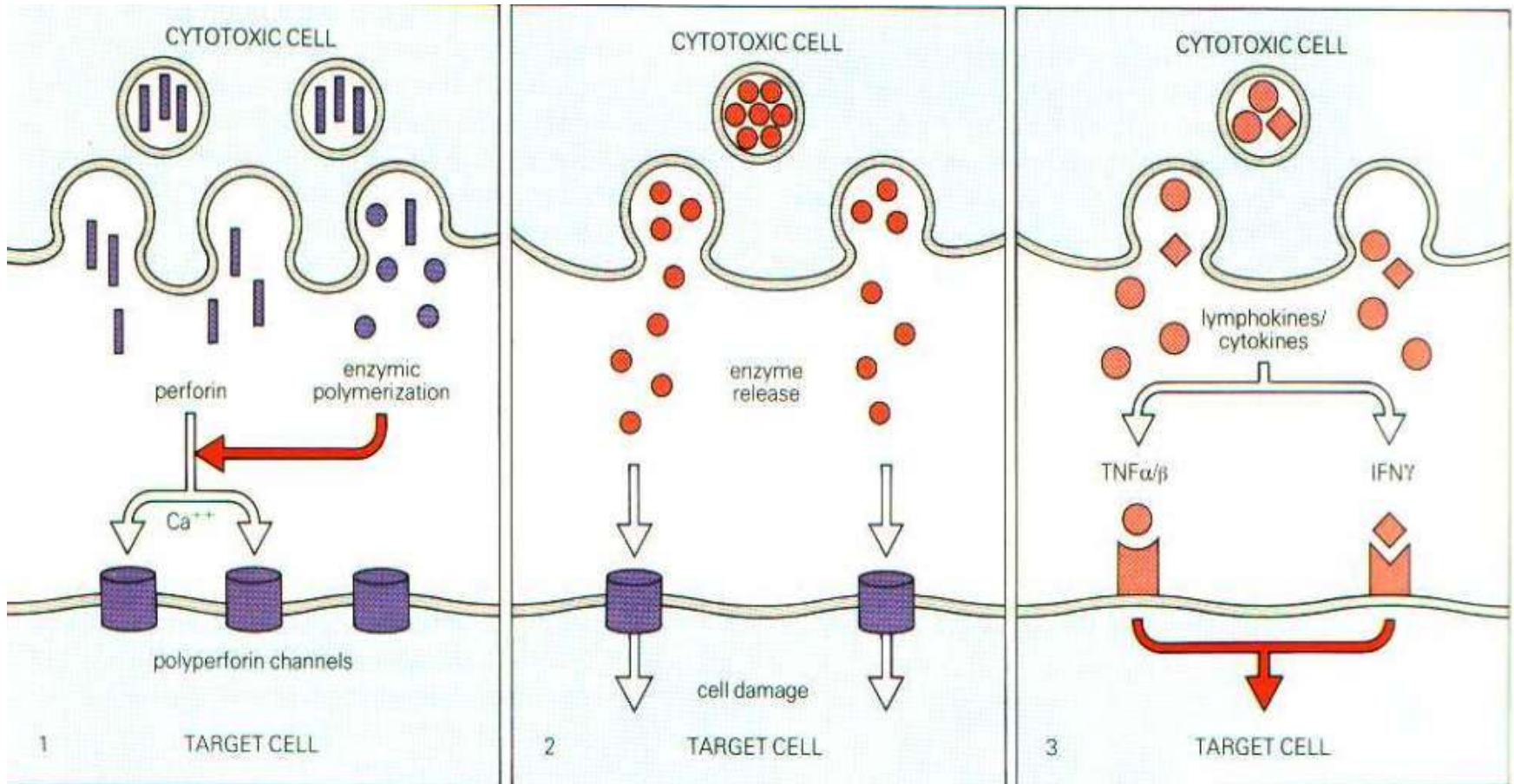
Mechanism of perforin induced cytotoxicity.



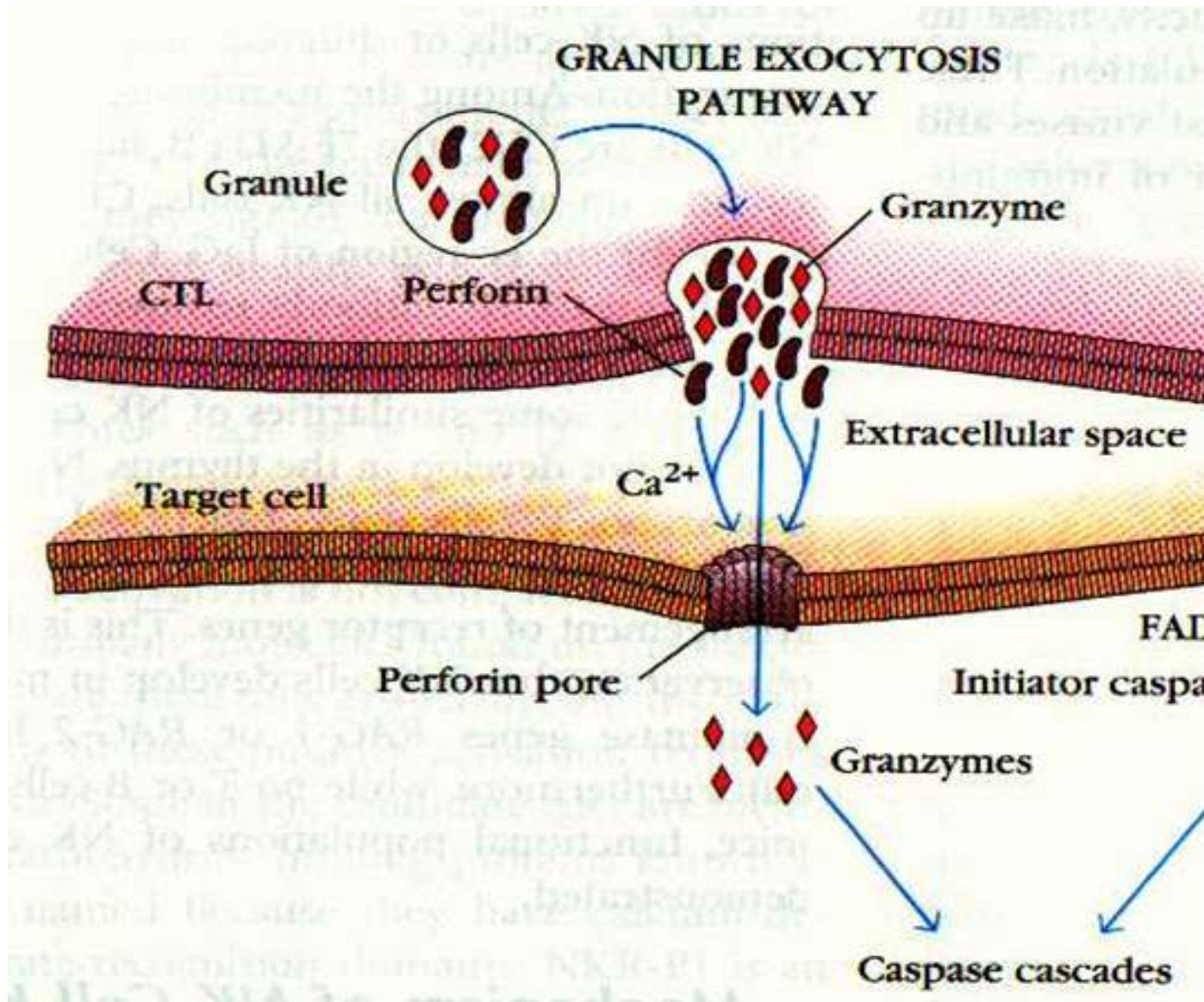
Perforin

Enzymes

Cytokines



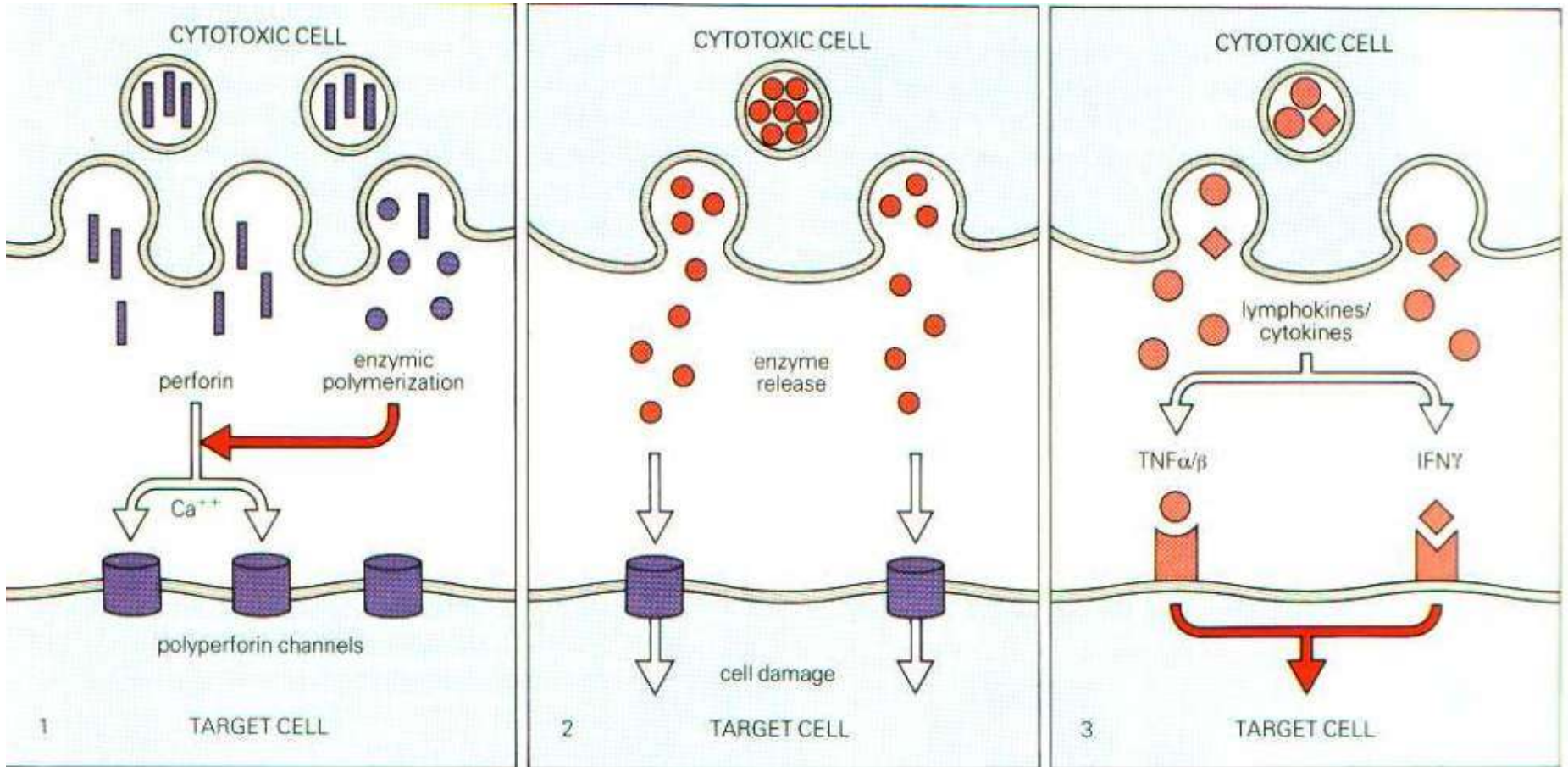
Mechanism of enzyme induced cytotoxicity.



Perforin

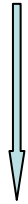
Enzymes

Cytokines



Granzymes

Cytokines



T cell cytotoxicity (killing)



Programmed cell death

=Cell Suicide

=Apoptosis

APC

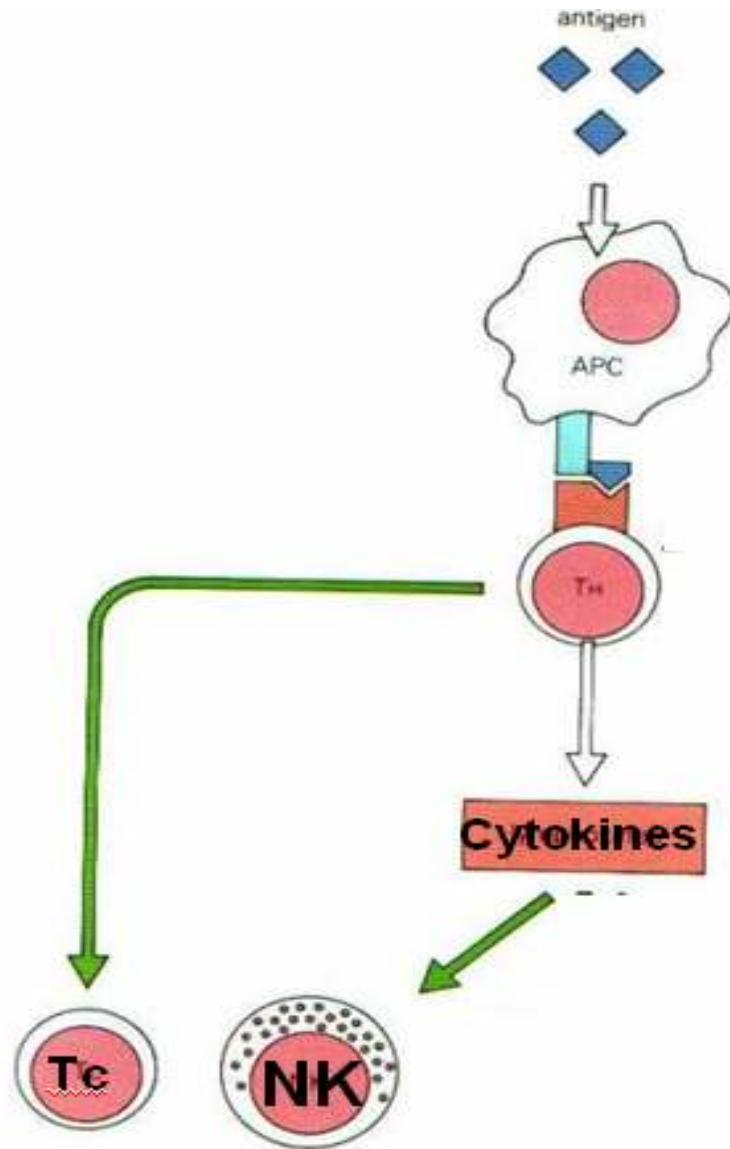


Th cells

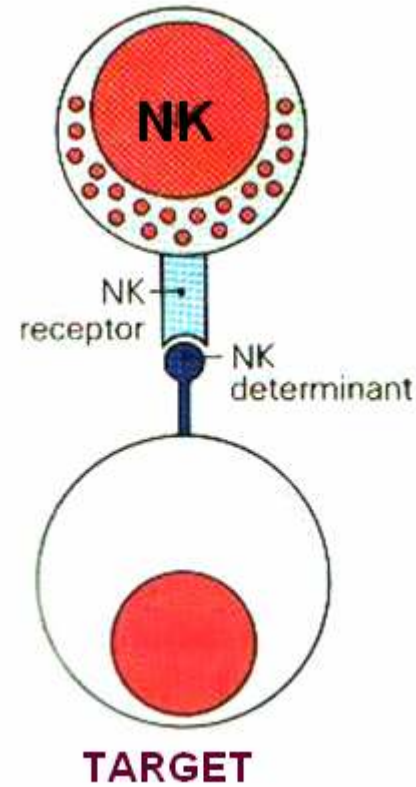


NK cells

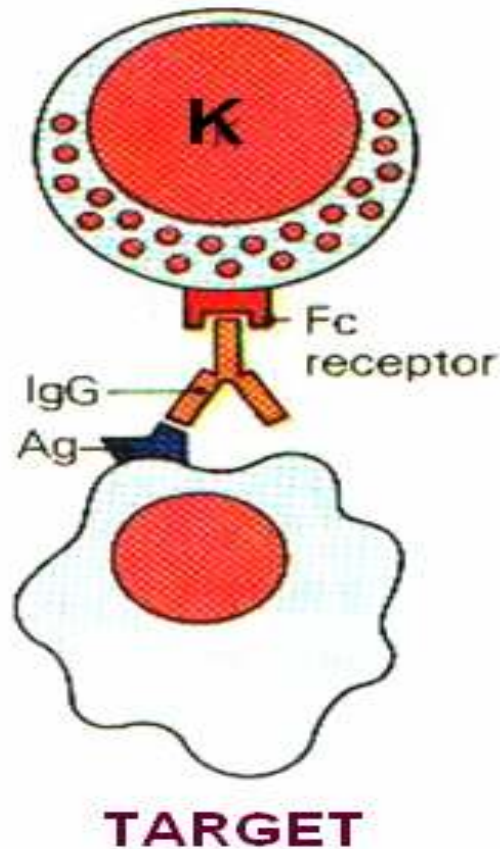
Effectors of Cell-mediated Immunity



Cell-mediated Cytotoxicity - NK



Cell-mediated Cytotoxicity – K (ADCC).

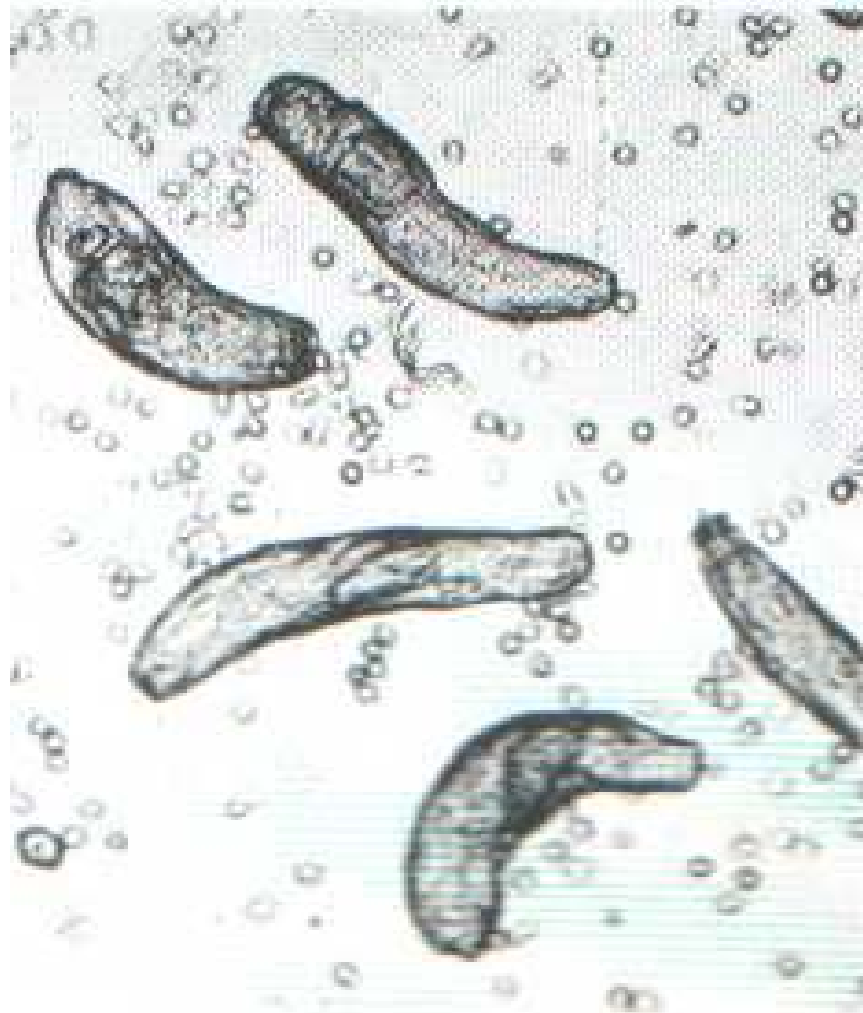


K cells may refer to:

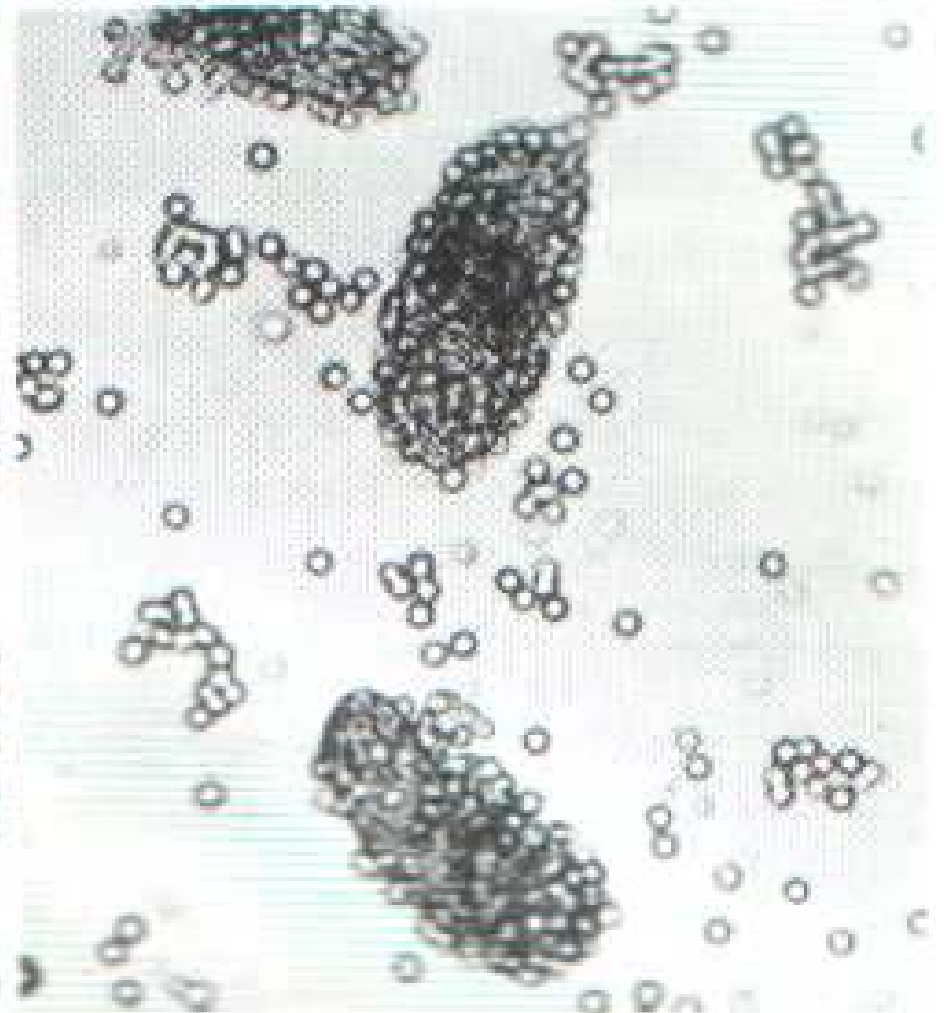
- Cells of the digestive system that synthesize gastric inhibitory polypeptide
- Natural killer cells
- Knudson cells

Antibody-dependent Cellular Cytotoxicity (ADCC)

No antibodies added



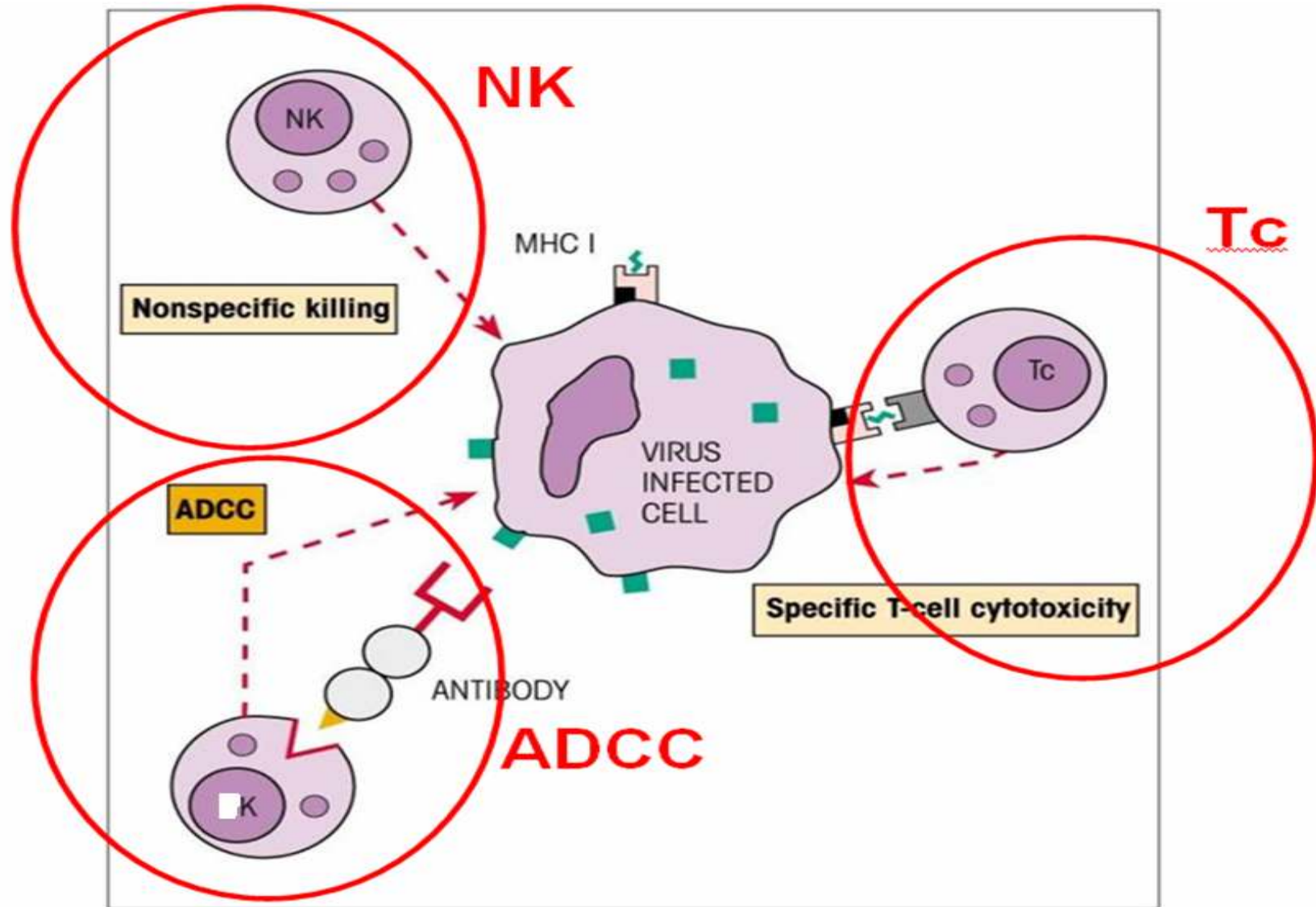
Antibodies present



So, three types of Cytotoxic Cells.

- **T cytotoxic (Tc) cells**
- **Natural Killer (K) cells**
- **K (ADCC) cells**

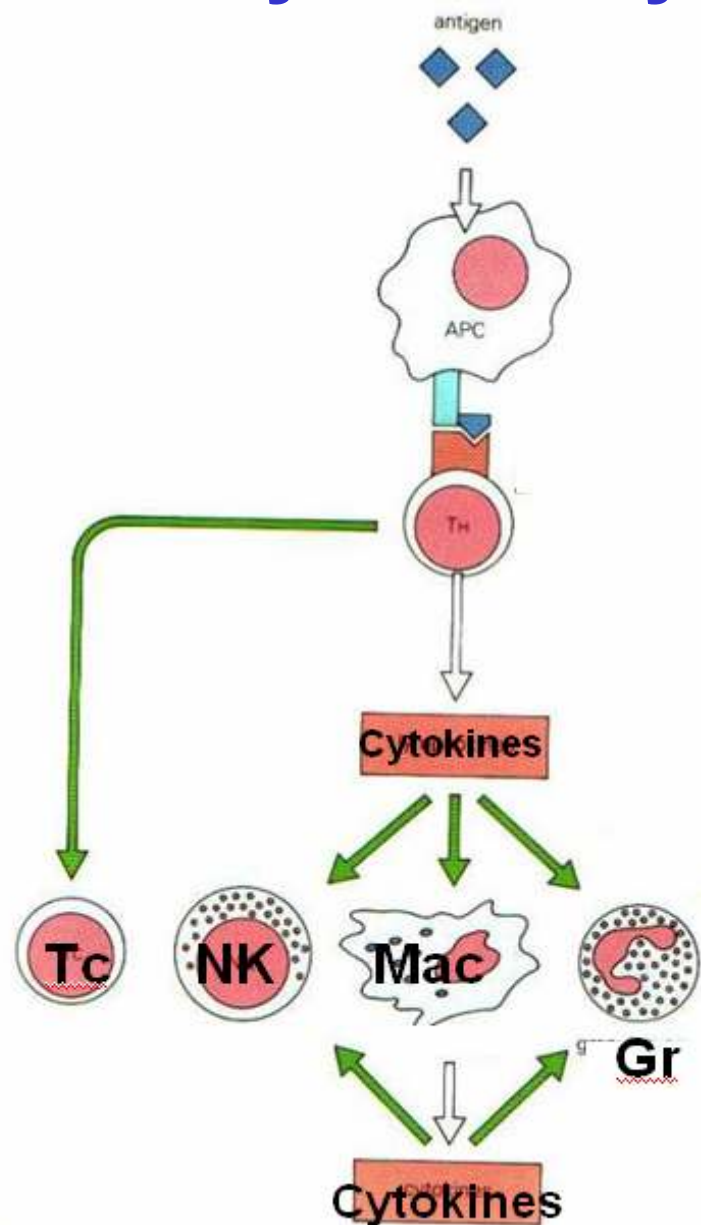
Cytotoxic cells work in inter-link.



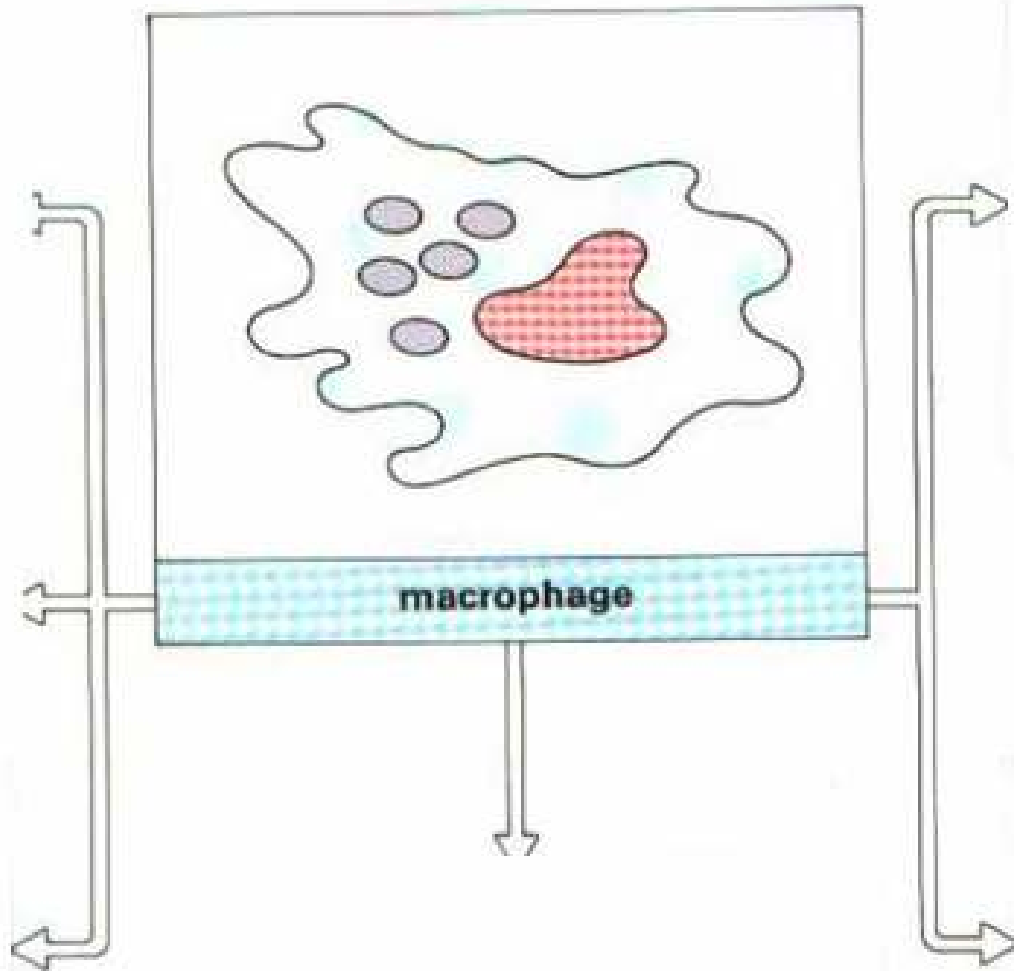
Role of macrophages in cell mediated cytotoxicity.

Effectors of Cell-mediated Immunity

APC
↓
Th cells
↓
Granulocytes

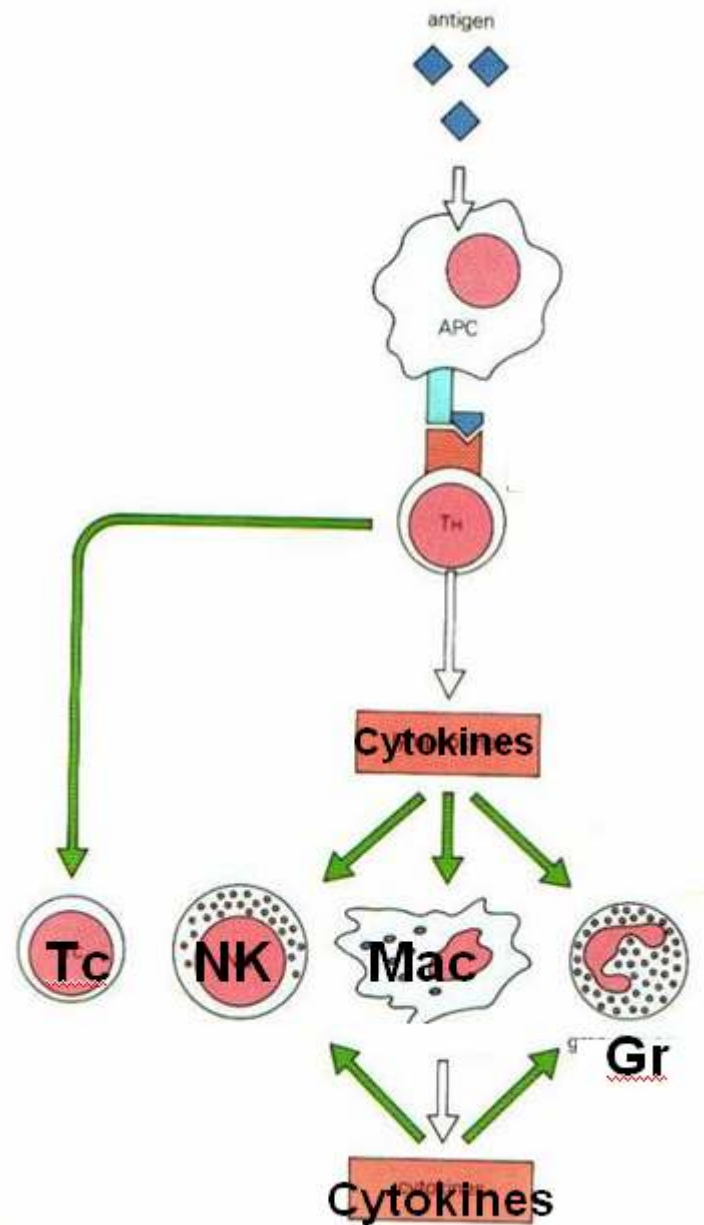


Macrophages are Central to CMI



Effectors of Cell-mediated Immunity

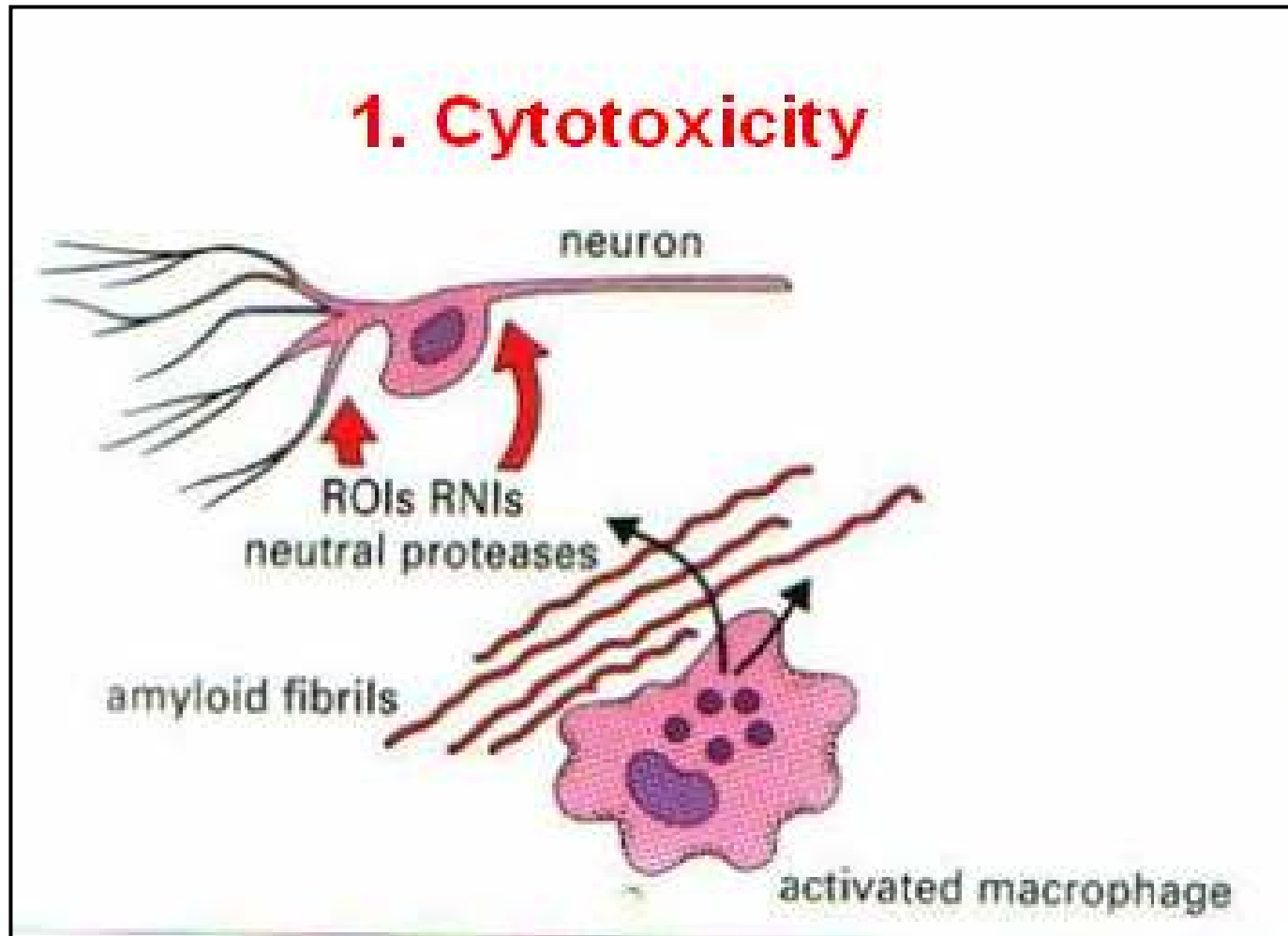
APC
↓
Th cells
↓
Granulocytes



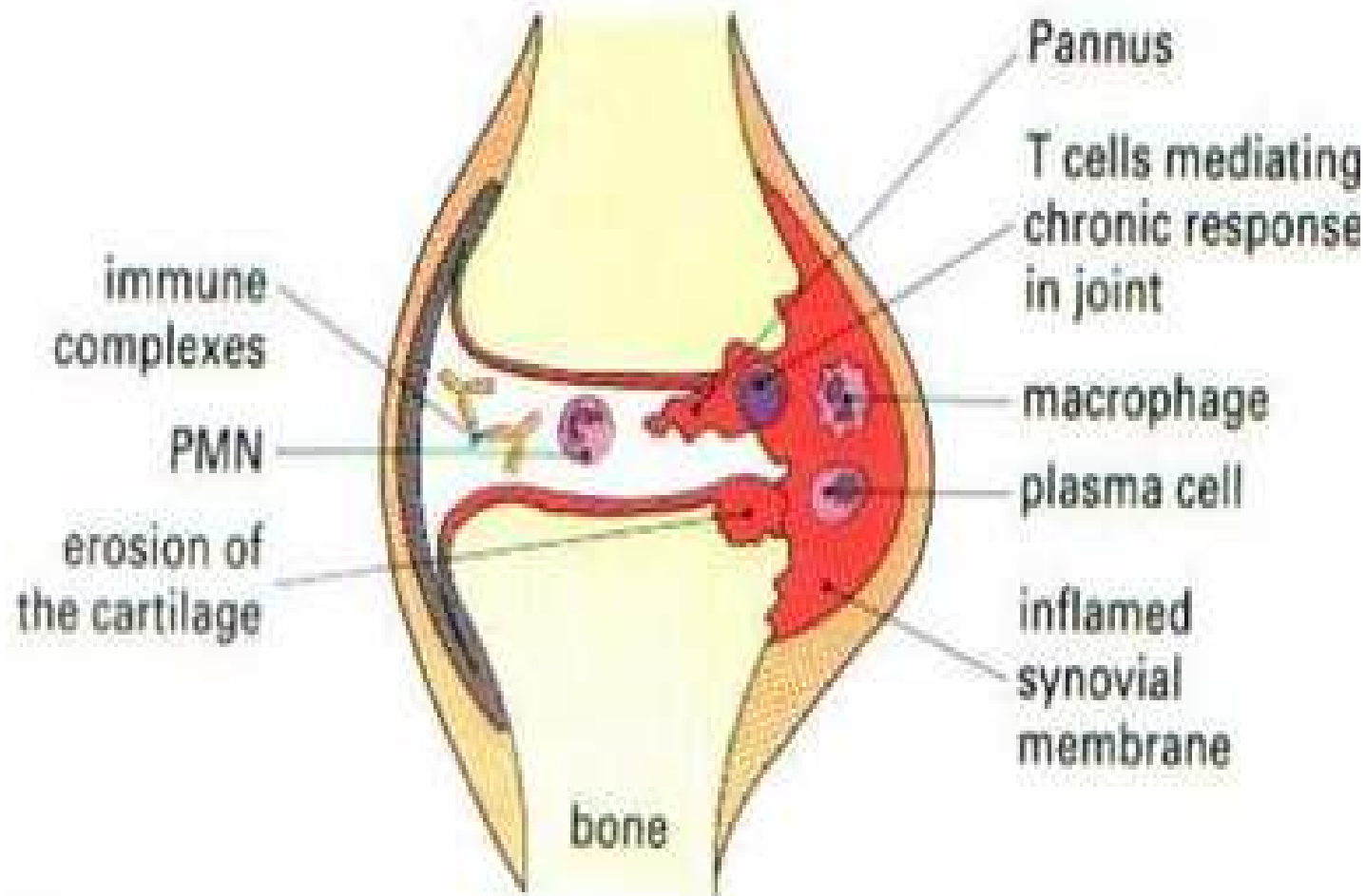
How does CMI defend us?

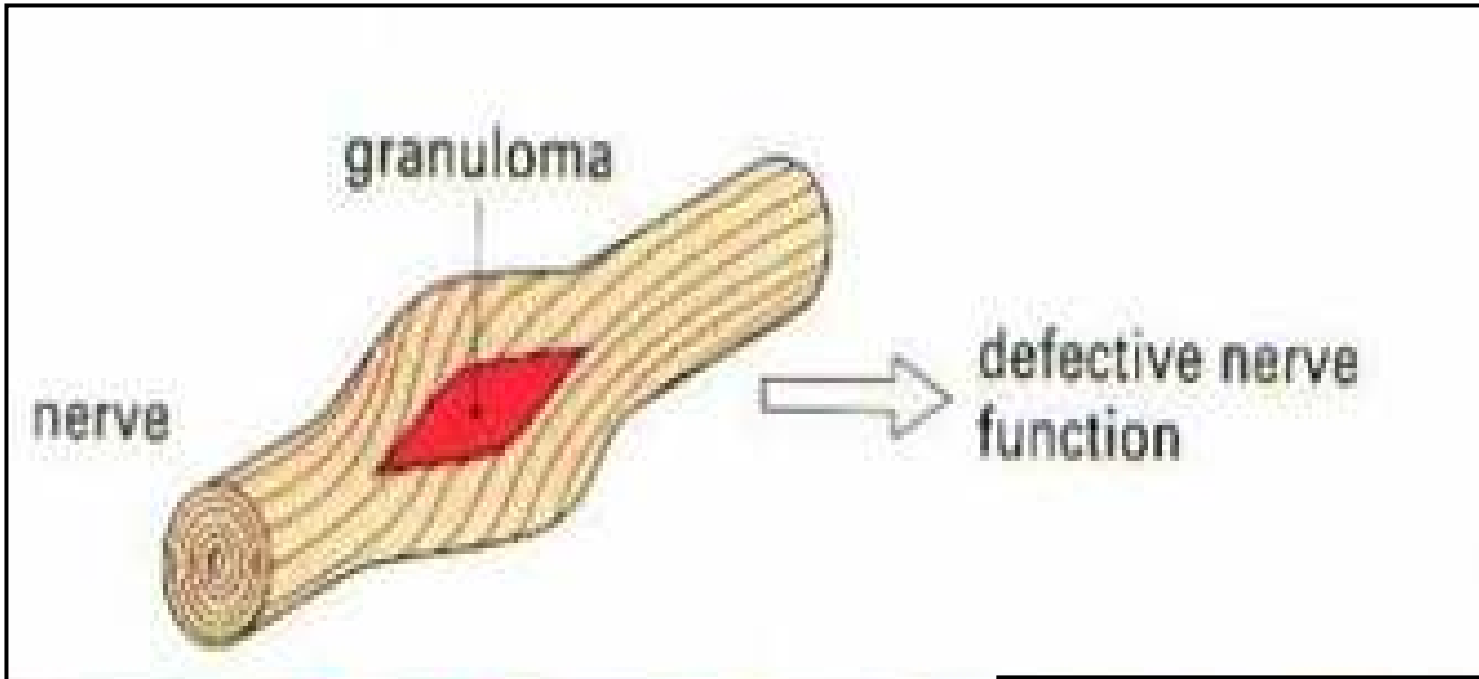
- **Cytokines – activate effector cells**
- **Tc – kill virus-infected cells, tumour cells**
- **NK cells – kill virus-infected cells, tumour cells**
- **Macrophages – phagocytosis, killing of bacteria**
- **ADCC – kill target cells**
- **Granulocytes – phagocytosis, killing of bacteria**

Immunopathological Reactions due to Cell mediated cytotoxicity.

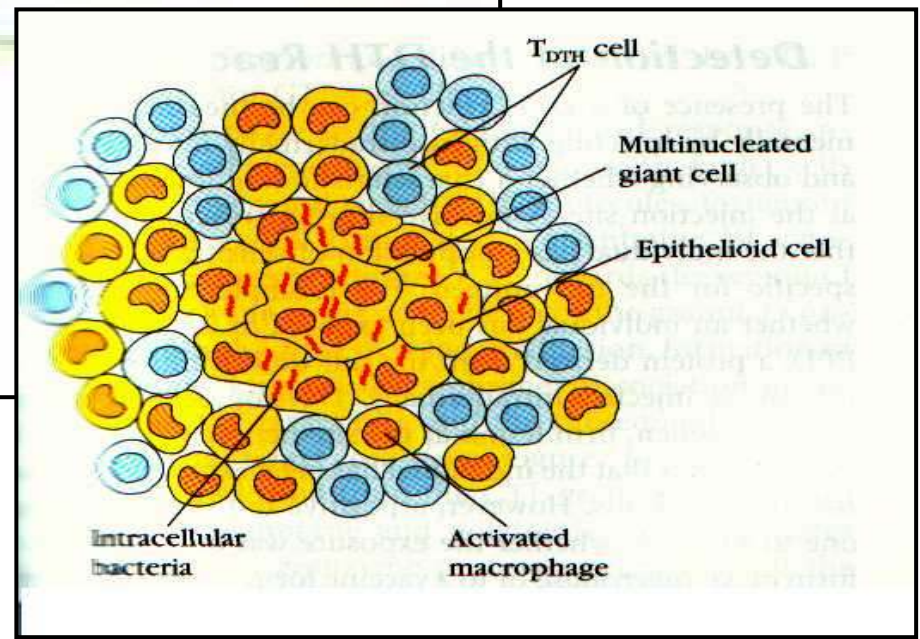


2. Chronic inflammation





3. Granuloma



Summary.

