

T cells see Ag only when presented by APCs

What's an antigen?

- Molecule that can stimulate the immune system
- Generally part of a microbe
- For a T-cell, must be a protein
- Specific portion of Ag recognized by immune cell = epitope

virus

antigens

epitope

T cell

T cells see Ag only when presented by APCs

- Peptides – fragments of protein
- Bound to MHC proteins
- Recognized by specific T cell receptor (TCR)
- CD4 (T_H) or CD8 (T_C) co-receptor recognizes MHC

T cell contact residue of peptide

T cell receptor

Polymorphic residue of MHC molecule

Anchor-residue of peptide

"Pocket" of MHC molecule

MHC

Peptide

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Dendritic cells are key APCs

- Peripheral lymphoid tissue
 - SALT, GALT, MALT...
- "Immature" cells capture Ag
- Carry Ag to lymph nodes
 - High conc. of T cells
- "Mature" cells stimulate T cells

Dendritic cells are not Ag-specific;

T cells are Ag-specific

Microbe

Epithelium

Free antigen in tissue

Dendritic cell-associated antigen

Connective tissue

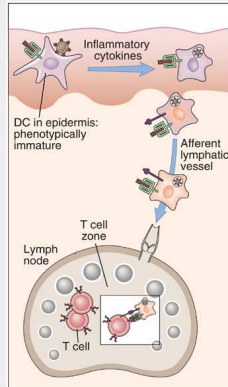
Lymphatic vessel

To lymph node

Lymph node

How do dendritic cells find Ag-specific T cell?

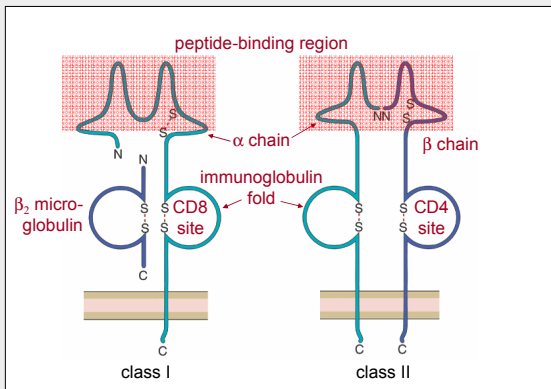
- Respond to TNF and IL-1
 - Lose adhesion to epithelium
- Migrate in lymph system
 - Attracted to chemokines in T-cell areas of lymph nodes
- Mature and express MHC class II
- T cells cycle through lymph nodes
 - Respond within 12-18 hours of infection



APCs

	<u>MHC</u>	<u>target</u>
Professional APCs		
• Dendritic cells	MHC II	CD4+ T _H cells
• Macrophages	MHC II	CD4+ T _H cells
• B-cells	MHC II	CD4+ T _H cells
• Macrophages	MHC I	CD8+ T _H cells
Any nucleated cell	MHC I	CD8+ T _H cells

MHC structure



MHC function

MHC class I

- Intracellular pathogens
- Encounters Ag in ER
- Presents Ag to CD8+ T_C cells (CMI)

MHC class II

- Extracellular pathogens
- Encounters Ag in endosome (phagolysosome)
- Presents Ag to CD4+ T_H cells (humoral + CMI)