

## T-lymphocytes

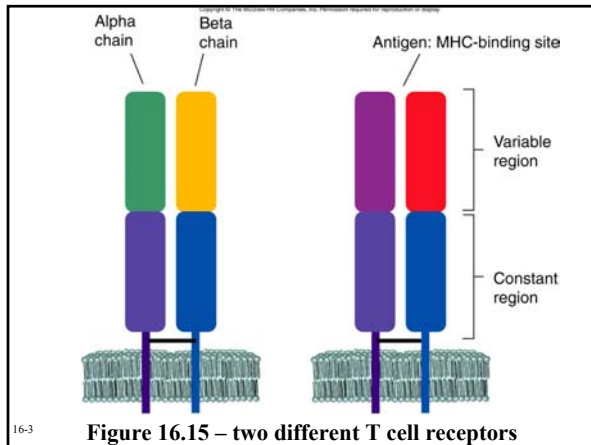
- T cell receptor
- T – cytotoxic (CD8) cells
- T – helper (CD4) cells
- Activation of T cells

16-1

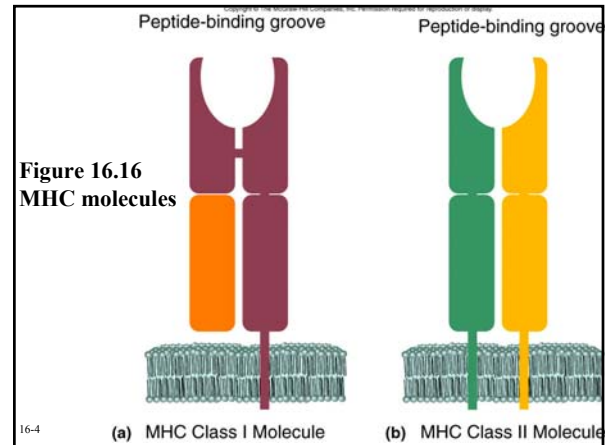
## T cell receptor

- Alpha and beta polypeptide chains
- Antigen - major histocompatibility (MHC) binding site

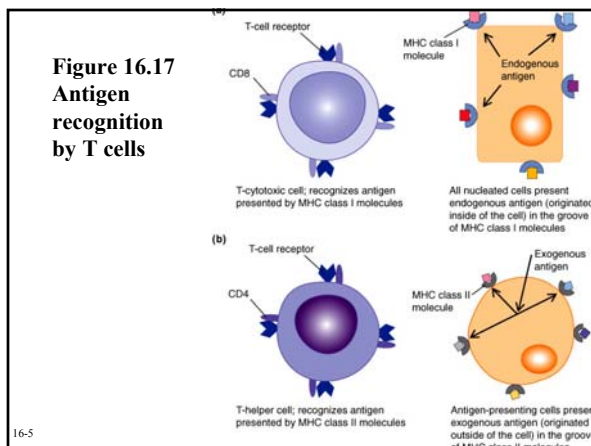
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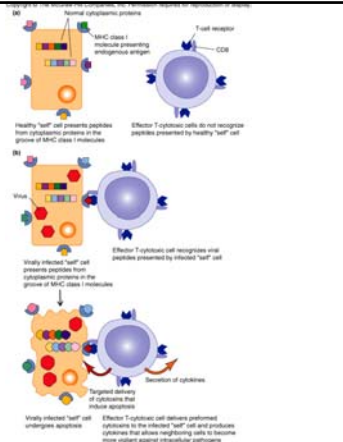
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## T – cytotoxic cells

- Induce apoptosis
- Produce cytokines
- Recognize MHC class I molecules and endogenous antigen

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**Figure 16.18**  
T-cytotoxic cells



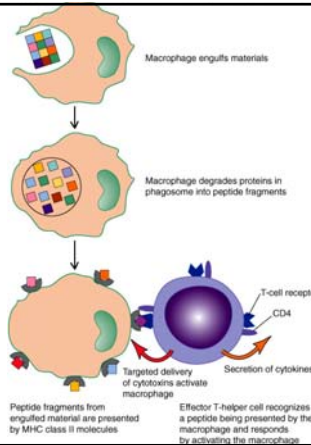
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**T – helper cells**

- Recognize MHC class II and exogenous antigen
- Ex. Th1 cells recognize antigens bound to MHC II molecules on macrophages
- Ex. Th2 cells recognize antigens bound to MHC II molecules on B cells

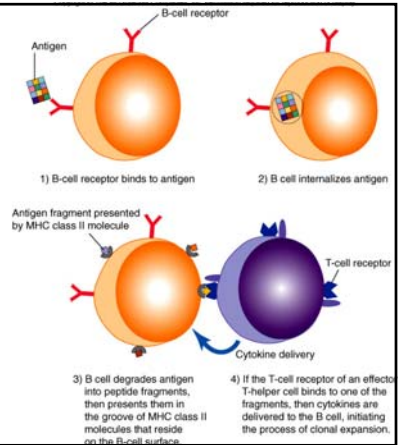
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**Figure 16.19**  
T-helper cells



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**Figure 16.9 B cell, T cell interactions**



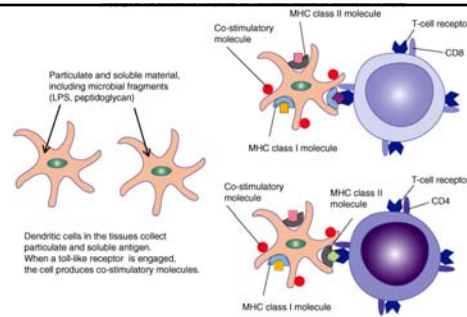
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**Activation of T cells**

- Dendritic cells
- Activated macrophages

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**Figure 16.20**  
Activation of T cells



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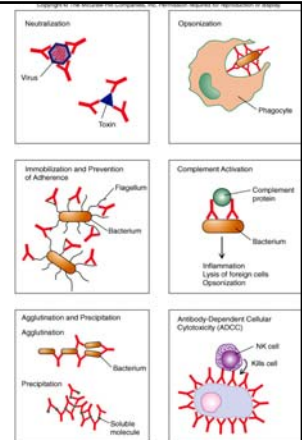
En route to the secondary lymphoid organs, the dendritic cells mature to become antigen-presenting cells. Peptides from the collected material can be presented by both MHC class I and MHC class II molecules. Dendritic cells that have engulfed microbial fragments produce co-stimulatory molecules. Naive T cells that recognize antigen presented by a dendritic cell that expresses co-stimulatory molecules may become activated, allowing them to proliferate and develop their effector function.

## Natural Killer (NK) cells

- Antibody – dependent cellular cytotoxicity (ADCC)
- Kill cells that do not have the MHC class molecules

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Figure 16.6  
Protective outcomes  
of Ab-Ag binding



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## Lymphocyte development

- Generation of diversity
- Negative selection of self – reactive B and T cells

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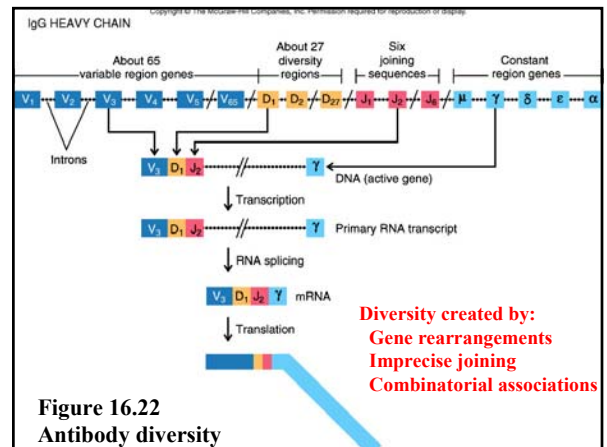


Figure 16.22  
Antibody diversity

## Negative selection

- Eliminate B cells that recognize “self” molecules (ie, “clonal deletion”; failure creates autoantibodies)
- B cells do not respond (no specific T cell interaction)
- Eliminate T cells that do not recognize MHC (“positive selection”)
- Eliminate T cells that bind to self peptides presented by MHC molecules (“negative selection”)

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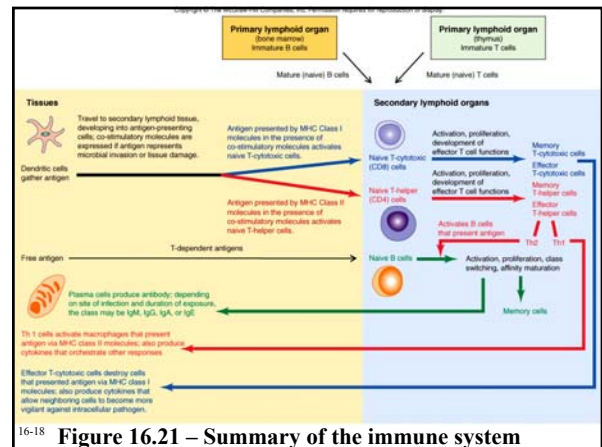


Figure 16.21 – Summary of the immune system