defenses against disease 11-16-01 (part 2 of 3)

• specific (adaptive) defenses following infection
  – characteristics of adaptive immunity
  – general principles of lymphocyte activation
  – role of lymphatics
  – antigen recognition by, and activation of, B and T cells
  – targeting the response to the problem
  – effector activities of antibodies and T cells

next week:
  – lymphocyte development, immune failures/defects
clonal selection

repertoire development

clonal expansion and differentiation

lymphocyte differentiation

naïve B cell (surface Ig)

plasma cell (secreted Ab)

antibody
lymph vessels

subclavian vein

thoracic duct

Blood capillary bed

lymph capillary

interstitial fluid

flap-like "valve" formed from overlapping cells at the tip of a lymph capillary

Antigen uptake by Langerhans' cells in the skin

Langerhans' cells leave the skin and enter the lymphatic system

Langerhans' cells enter the lymph node to become dendritic cells expressing B7

B7-positive dendritic cells stimulate naive T cells
“secondary” lymph tissue

lymph nodes
spleen

mucosal associated lymphoid tissue (MALT)
B cell activation requirements
B cells see Ag in fundamentally different way from T cells

B cell antibody recognizes “native” antigen. TCR of T cells recognizes antigen only following processing and presentation.
Antigen “processing” and “presentation”

Class I and II MHC proteins

Presenting “exogenous” antigens on class II MHC

Presenting “endogenous” antigens on class I MHC
lymphocyte trafficking: naïve v. activated lymphocytes

**T cell effector activities:**

$T_{H2}^+ (CD4^+)$

$T_{H1}^+ (CD4^+)$

$T_{C}^+ (CD8^+)$

CD4 restricts to class II MHC, CD8 restricts to class I MHC

Lymph node

Site of inflammation