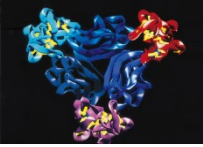


# Lecture 10

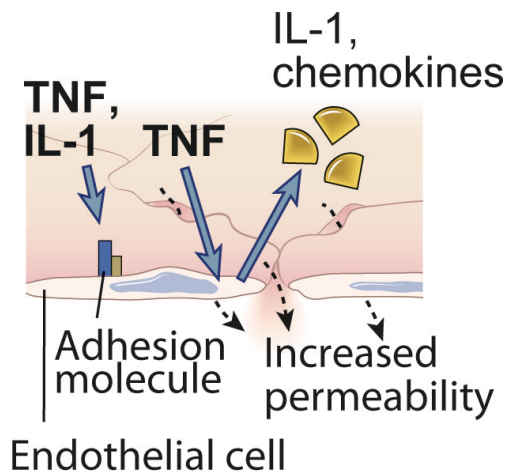
## 21 Aug 2023



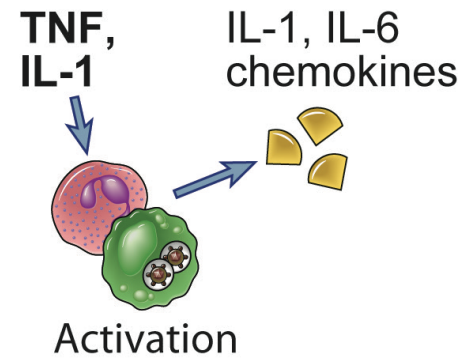
# Actions of Cytokines in Inflammation (1)

## Local inflammation

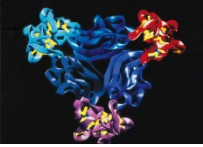
### Endothelial cells



### Leukocytes



**Pro-inflammatory cytokines:**  
Tumor necrosis factor (TNF, Interleukin-1, Interleukin-6)



## Actions of Cytokines in Inflammation (2)

### Systemic protective effects

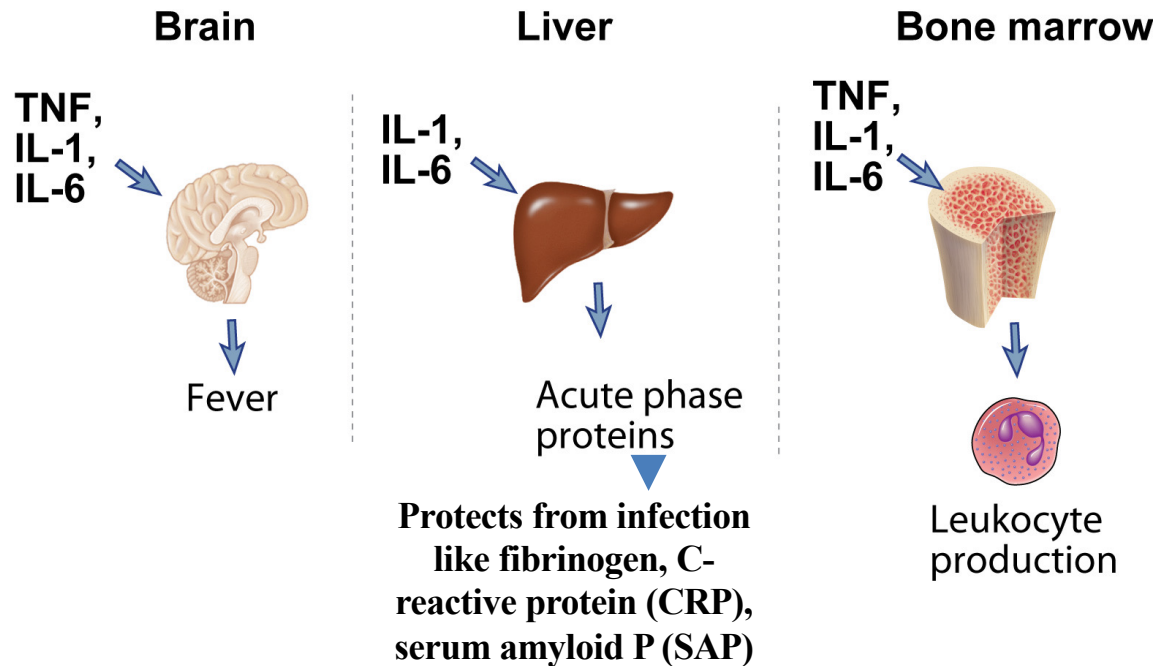
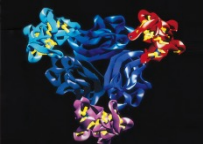
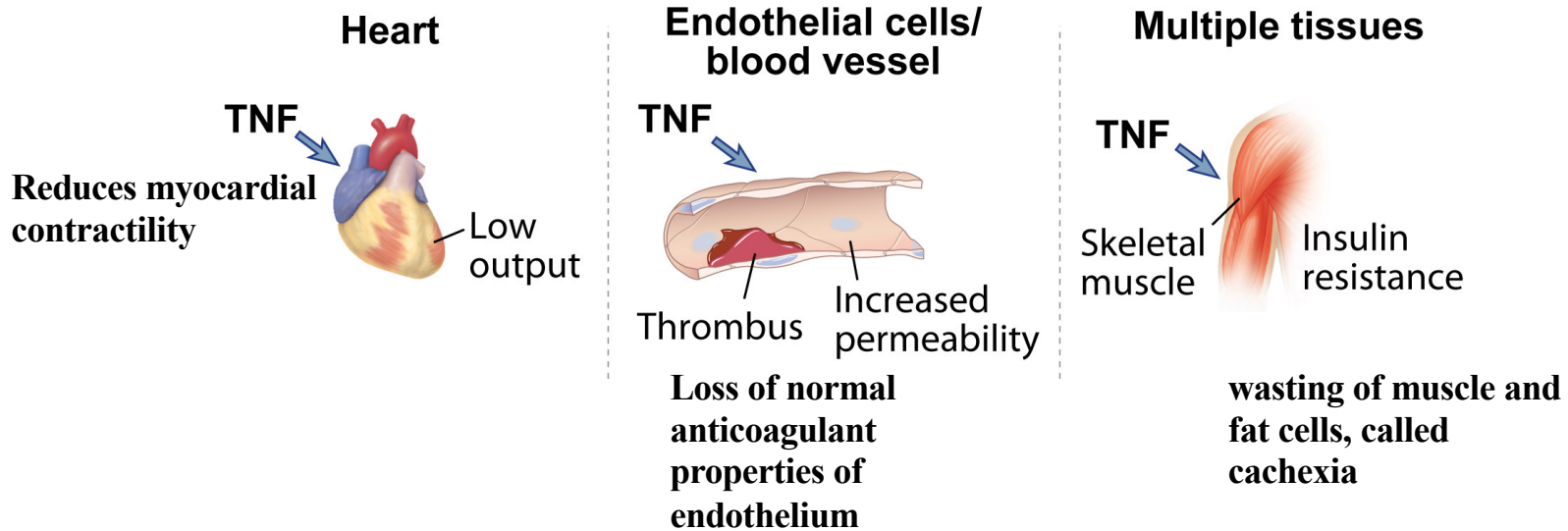


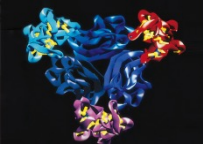
Fig. 4-14



## Actions of Cytokines in Inflammation (3)

### Systemic pathological effects





## Biologic Actions of Type I Interferons (1)

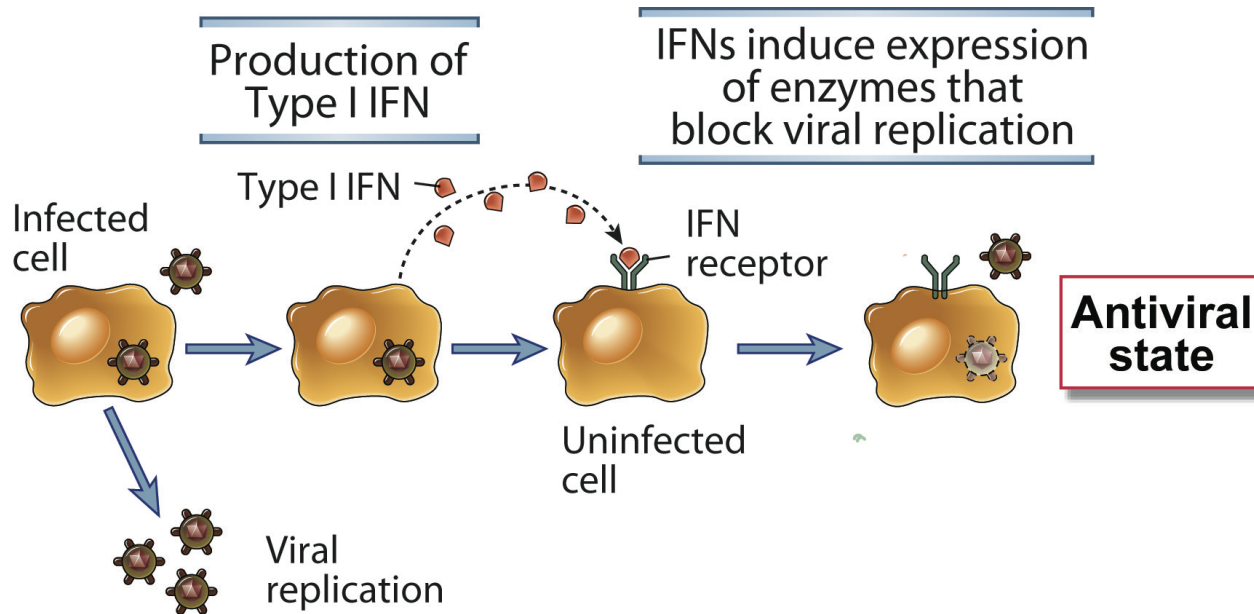
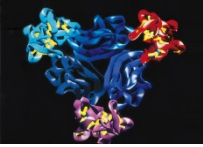
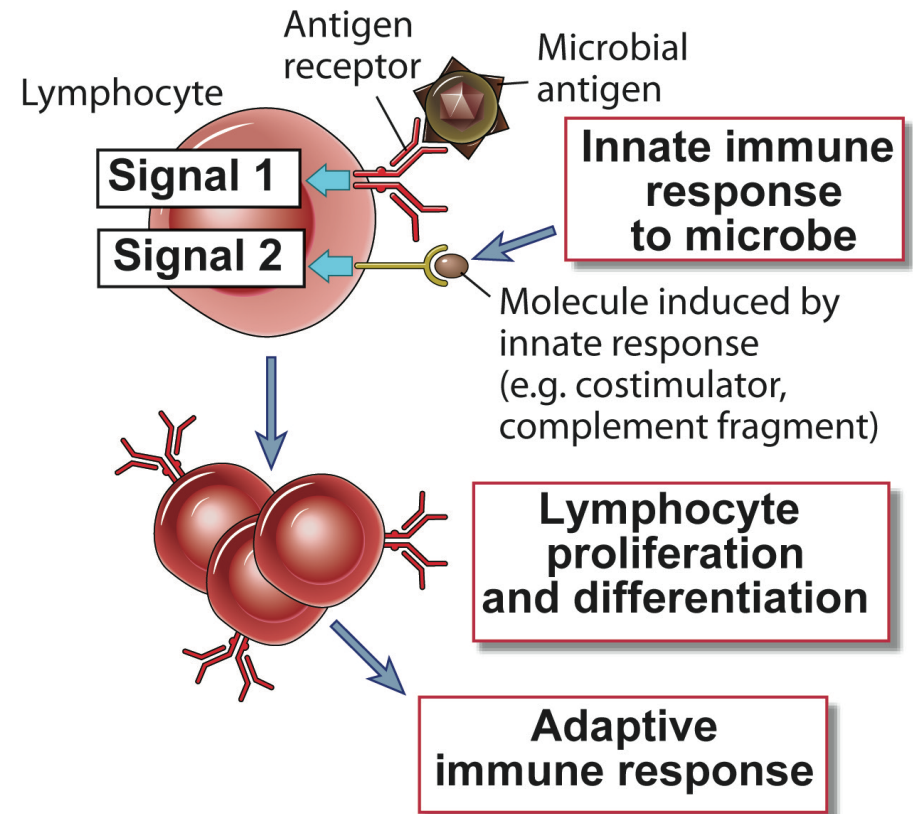


Fig. 4-15

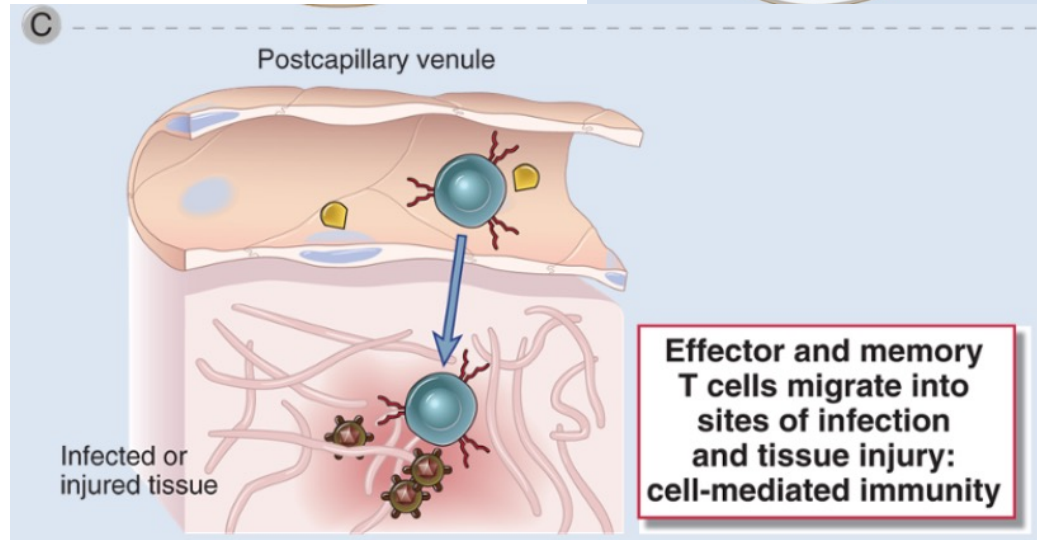
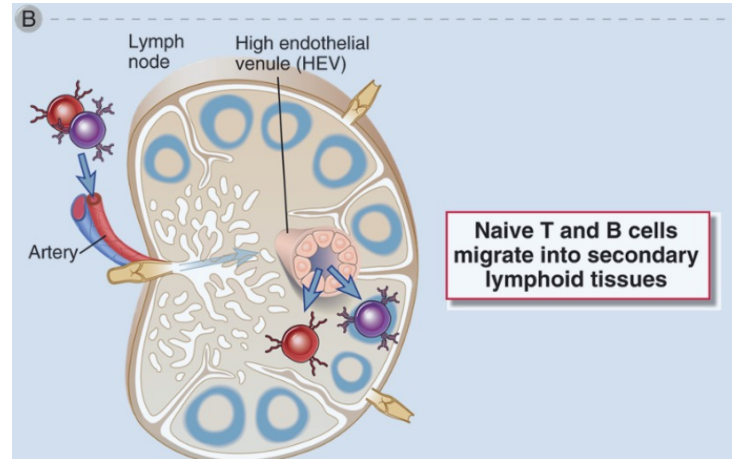
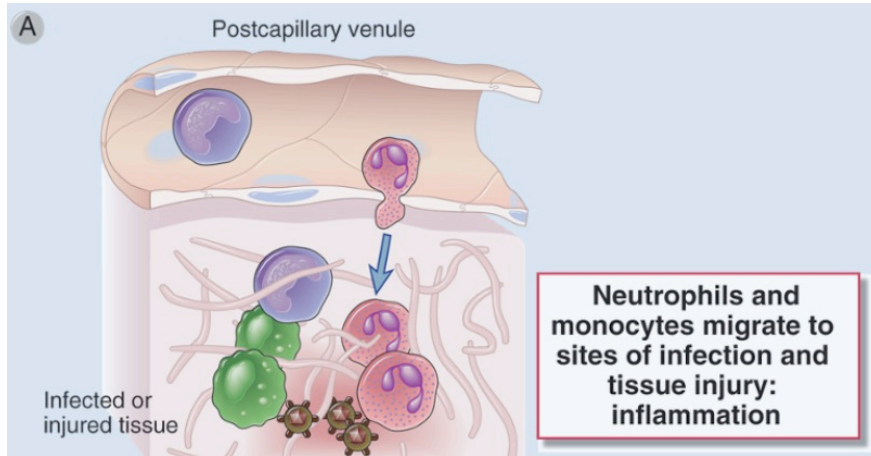


# Innate Immunity Stimulates Lymphocytes

- The requirement for antigen (so-called **signal 1**) ensures that the ensuing immune response is specific.
- The requirement for additional stimuli triggered by innate immune reactions to microbes (**signal 2**) ensures that adaptive immune responses are induced when there is a dangerous infection and not when lymphocytes recognize harmless antigens, including self antigens.



# Leucocytes migration from blood to tissues



# MIGRATION AND RECIRCULATION OF T LYMPHOCYTES

- *Lymphocytes are continuously moving through the blood stream, lymphatics, secondary lymphoid tissues, and peripheral nonlymphoid tissues, and functionally distinct populations of lymphocytes show different trafficking patterns through these sites*

1

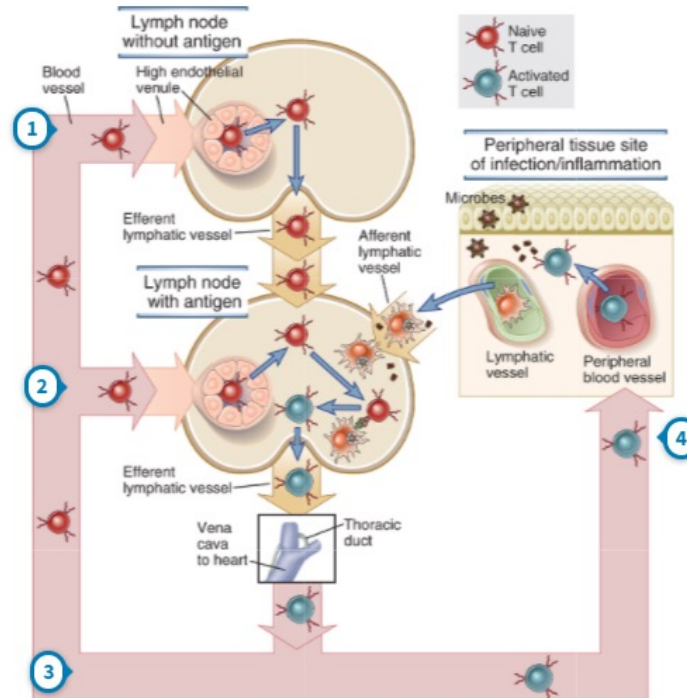
Naïve T cells preferentially leave the blood and enter lymph nodes by crossing high endothelial venules.

2

Dendritic cells bearing antigen enter the lymph node through afferent lymphatic vessels. If T cells recognize antigen, they are activated.

3

Activated T cells return to the circulation through the efferent lymphatics and the thoracic duct; the latter empties into the superior vena cava, and then is pumped by the heart into the arterial circulation.



4

Effector and memory T cells preferentially leave the blood and enter peripheral tissues through venules at sites of inflammation.



# FEEDBACK MECHANISMS THAT REGULATE INNATE IMMUNITY

- ❑ *The magnitude and duration of innate immune responses are regulated by a variety of feedback inhibition mechanisms that limit potential damage to tissues.*
- *IL-10 is a cytokine that is produced by and inhibits activation of macrophages and dendritic cells.*
- *Secretion of inflammatory cytokines from a variety of cell types appears to be regulated by the products of autophagy genes*
- *There are numerous negative regulatory signaling pathways that block the activating signals generated by pattern recognition receptors and inflammatory cytokines.*