Increased vascular permeability

- Contraction of vascular endothelium—rounding of cells and widening of intercellular spaces
  - Immediate, transient response (15-30 min)
    - Stimulated by histamine, bradykinin, substance P
      - Venules of 20 – 60 um diameter respond
  - Delayed prolonged leakage (radiation burns)
    - Begins after 2 – 12 h delay, lasts hours – days
    - Stimulated by cytokines and apoptosis of injured skin cells
      - Venules and capillaries respond
  - Immediate, sustained response (days)
    - Caused by direct damage to vascular endothelium
      - Venules, capillaries, arterioles respond
    - Ended by hemostasis, thrombosis, regeneration
- Neutrophil-induced damage (days)
  - Caused when neutrophils adhere and emigrate
Phagocytosis—Engulfment

- Extensions of the cytoplasm (pseudopods) flow around bound receptors.
- Plasma membrane pinches off creating phagosome.
- Phagosome then fuses with a lysosomal granule.
- During this process the phagocyte may also release granule contents into the extracellular space.
- Engulfment is dependent on polymerization of actin filaments.
Morphologic Patterns of Acute Inflammation

- serous inflammation
- fibrinous inflammation
- suppurative or purulent inflammation
- ulcers
Purulent inflammation
An ulcer is a local defect of the surface of an organ or tissue that is produced by the sloughing (shedding) of inflammatory necrotic tissue.
1) inflammatory necrosis of the mucosa of the mouth, stomach, intestines, or genitourinary tract

2) subcutaneous inflammation of the lower extremities in older persons who have circulatory disturbances
Outcomes of Acute Inflammation

Complete resolution

Mechanism:

- Neutralization and removal of chemical mediators
- Normalization of vascular permeability
- Halting of leukocyte emigration
- Clearance of edema (lymphatic drainage), inflammatory cells and necrotic debris (macrophages).
Outcomes of Acute Inflammation

• Healing by connective tissue replacement (fibrosis):
  • This occurs after substantial tissue destruction
    ▪ the inflammatory injury involves tissues that are incapable of regeneration
    ▪ there is abundant fibrin exudation.
  
  ▶ The destroyed tissue is reabsorbed and eventually replaced by fibrosis.