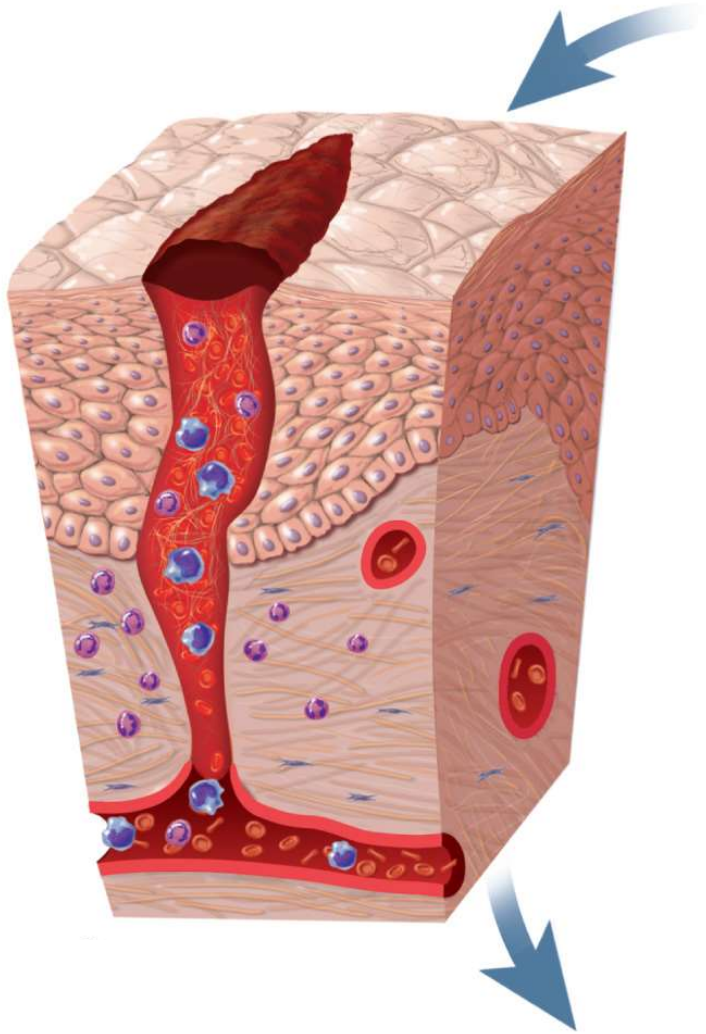
Chapter 4.5

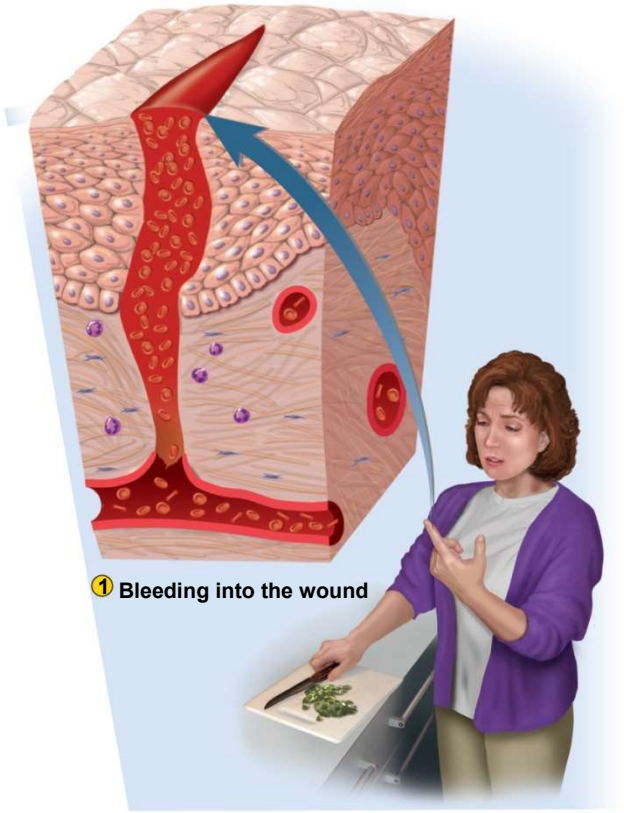
Tissue Repair and Wound Healing



Tissue Repair: Regeneration VS Fibrosis

- **Regeneration**
  - replacement of dead or damaged cells by the same type of cell as before
  - restores normal function
  - skin injuries and liver regenerate
- **Fibrosis**
  - replacement of damaged cells with scar tissue (i.e. collagen fibers) /// part of the inflammatory response
  - Simply holds other tissues together /// fills the space
  - does not restore normal function
  - occurs following severe cuts and burns, healing of muscle injuries, scarring of lungs in tuberculosis

Wound Healing

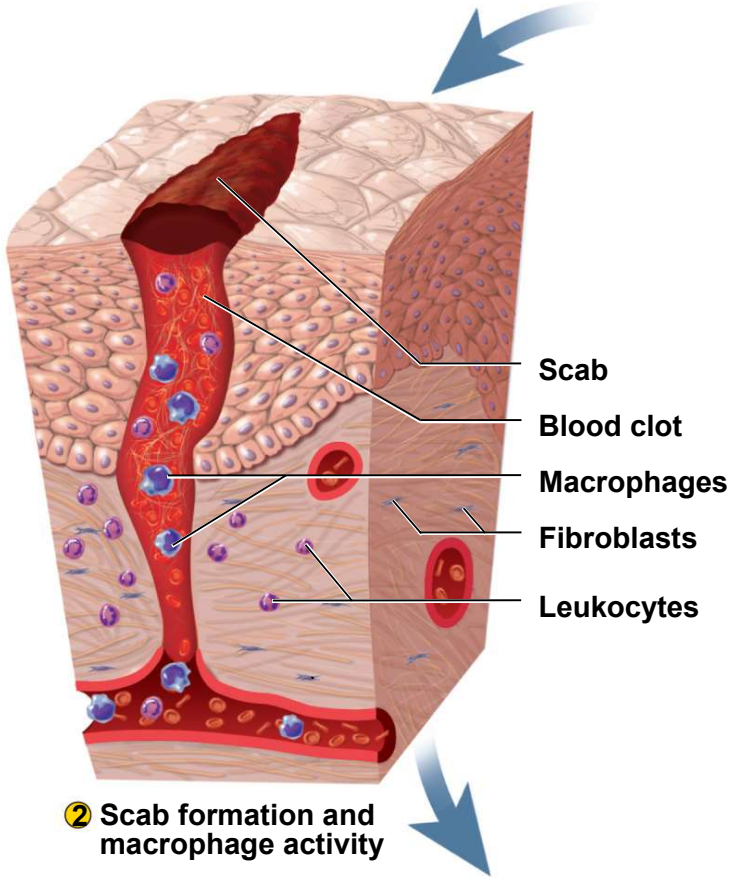


Note: Know Sequence of Events

- **severed blood vessels bleed into cut**
- **mast cells and damaged cells release histamine**
  - dilates blood vessels
  - increases blood flow to area
  - makes capillaries more permeable
- **blood plasma seeps into the wound carrying:**
  - antibodies
  - clotting proteins
  - blood cells /// white blood cells

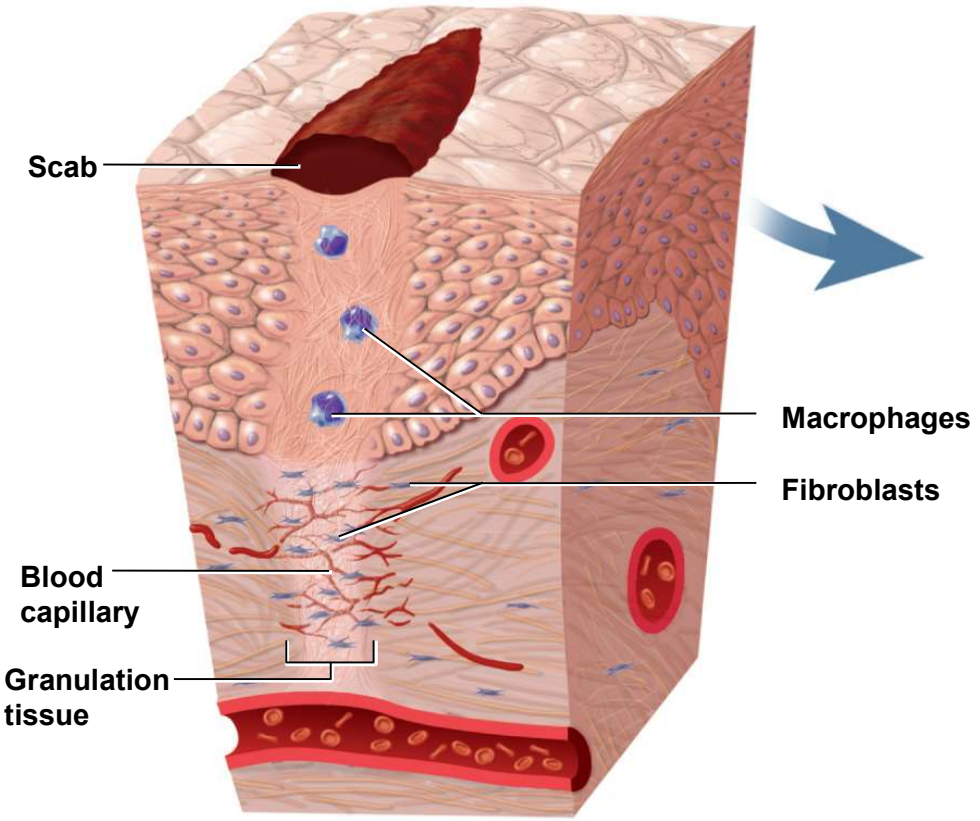
Wound Healing

- **blood clot** forms in the tissue
  - loosely knitting edges of cut together
  - inhibits spread of pathogens from injury site to healthy tissue
- forms **scab** that temporarily seals wound and blocks infection
- **macrophages** phagocytize and digest tissue debris



Wound Healing

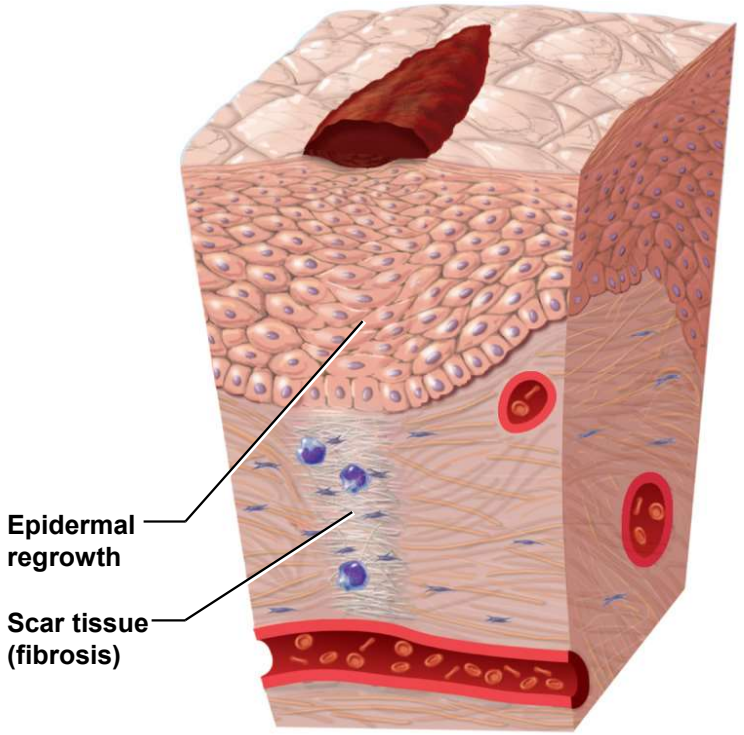
- new capillaries sprout from nearby vessels and grow into wound
- deeper portions become infiltrated by capillaries and fibroblasts
  - transform into soft mass – **granulation tissue**
  - **macrophages** remove the blood clot
  - **fibroblasts** deposit new collagen
  - begins 3-4 days after injury and lasts up to 2 weeks



3 Formation of granulation tissue (fibroblastic phase of repair)

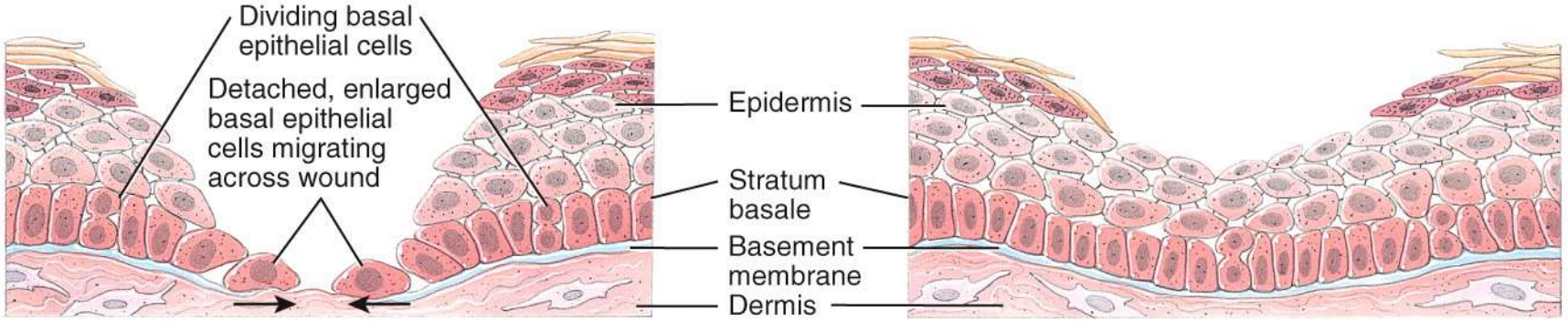
Wound Healing

- surface epithelial cells around wound multiply and migrate into wound area beneath scab
- epithelium **regenerates**
- connective tissue undergoes **fibrosis**
- scar tissue may or may not show through epithelium
- **remodeling (maturation) phase** begins several weeks after injury and may last up to two years



④ Epithelial regeneration and connective tissue fibrosis (remodeling phase of repair)

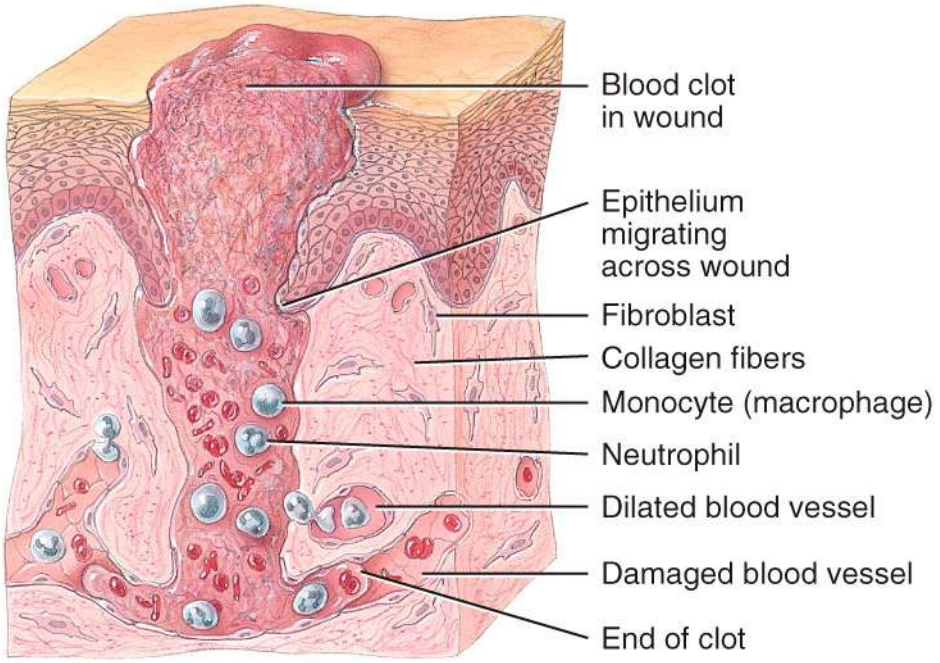
Superficial or Epidermal Wound Healing



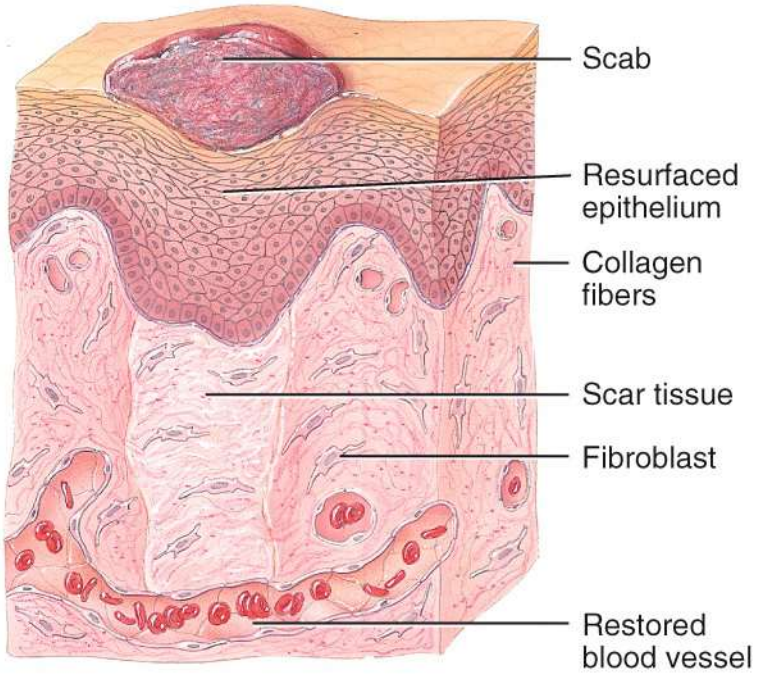
(a) Division of stratum basale cells and migration across wound

(b) Thickening of epidermis

Deep Wound Healing

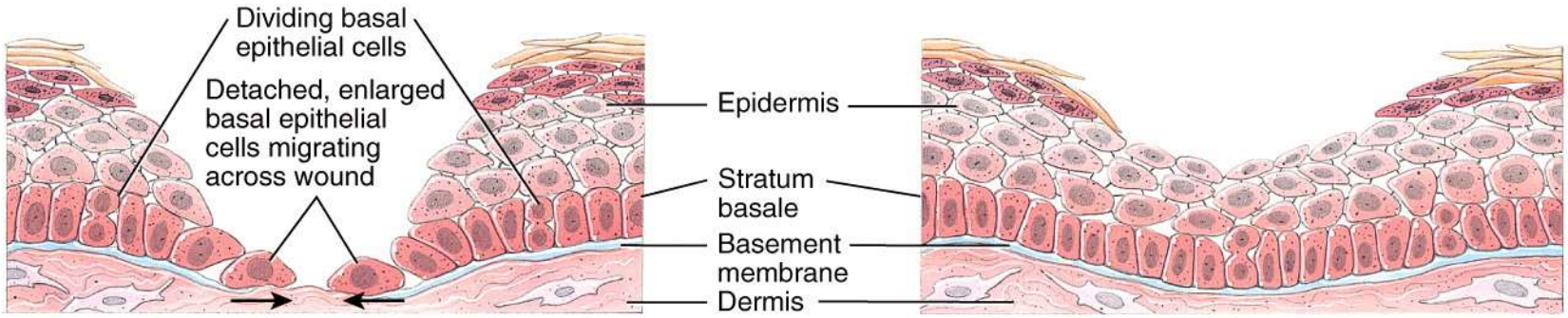


(c) Inflammatory phase



(d) Maturation phase

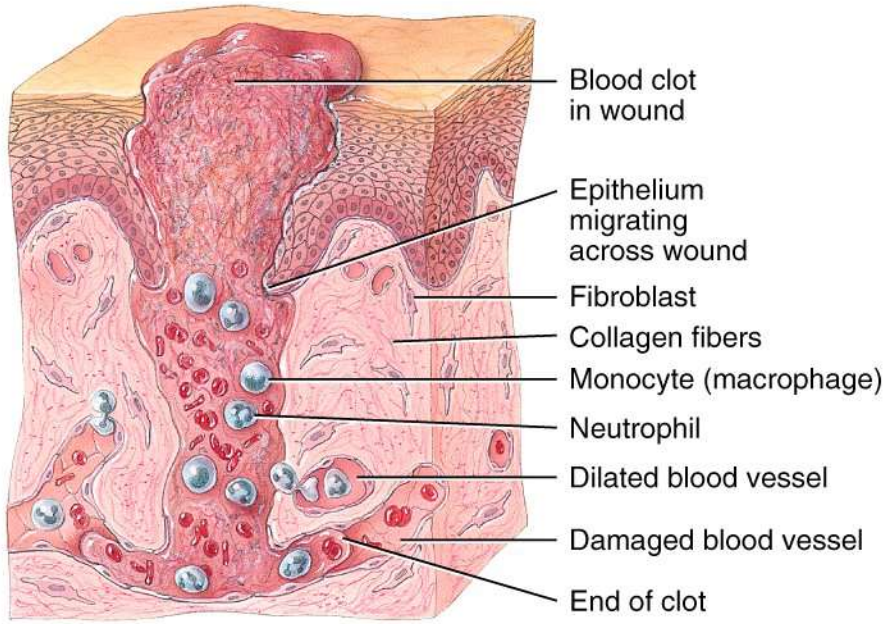
Note: Deep wound healing results in scar tissue within dermis. However, epidermis is restored. If wound penetrates through dermis into the hypodermis or deeper, than it is unlikely that the epidermis will be restored. This then results in scar tissue formation within the superficial epidermis.



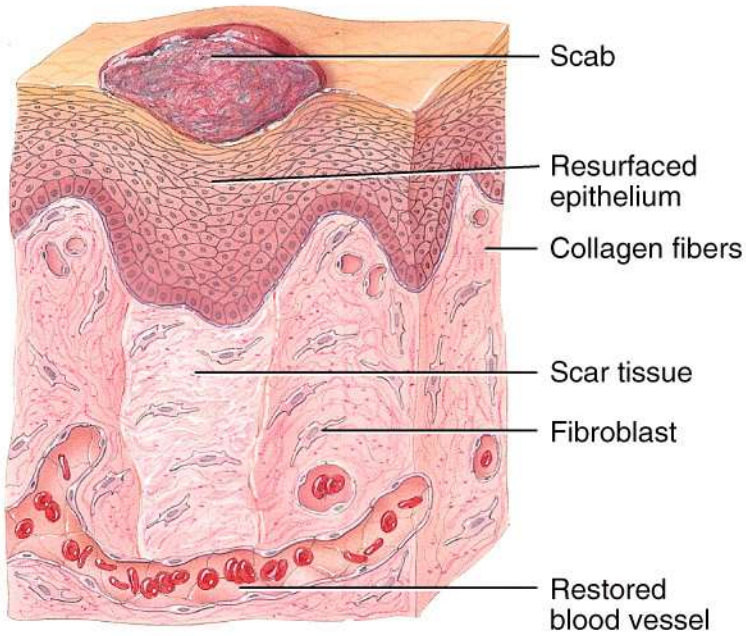
(a) Division of stratum basale cells and migration across wound

(b) Thickening of epidermis

Epidermal wound healing



(c) Inflammatory phase



(d) Maturation phase

Deep wound healing