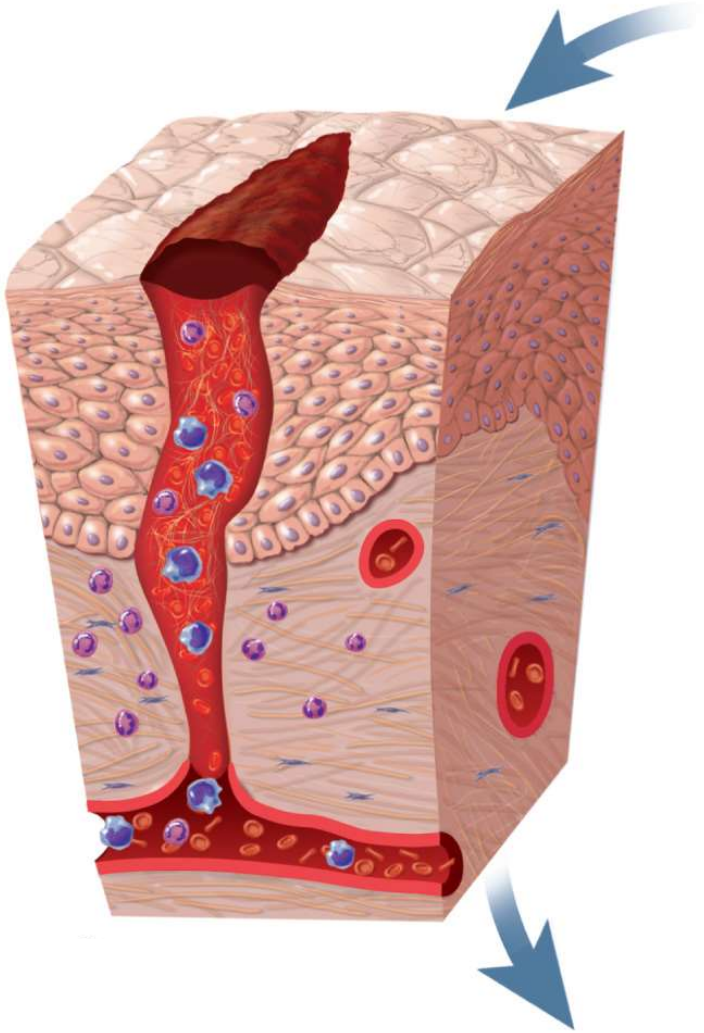
Chapter 5.4

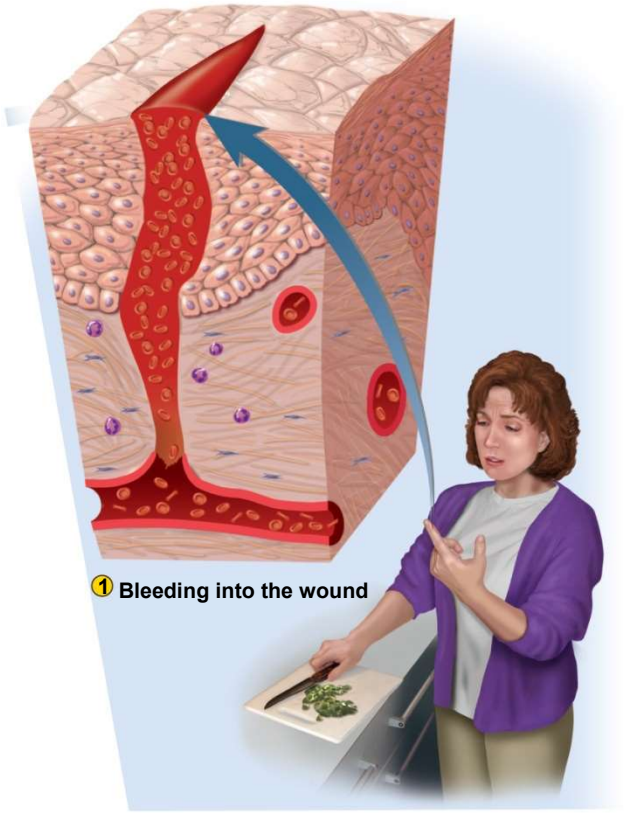
Tissue Repair and Wound Healing



How do we repair damaged tissue? Regeneration VS Fibrosis

- **Regeneration**
  - replace dead or damaged cells with same type of cells (i.e. mitosis)
  - restores normal function (e.g. skin injuries and liver damage)
- **Fibrosis**
  - replace damaged cells with scar tissue (i.e. fibroblast make connective tissue by filling in space with extracellular collagen fibers)
  - this is one of the steps associated with the inflammatory response
  - fibrosis function is to hold other tissues together /// fills in the space
  - does not restore normal function
  - occurs following severe cuts and/or burns on skin, healing of cardiac and skeletal muscle injuries, scarring of lungs in tuberculosis

Key Events in Wound Healing

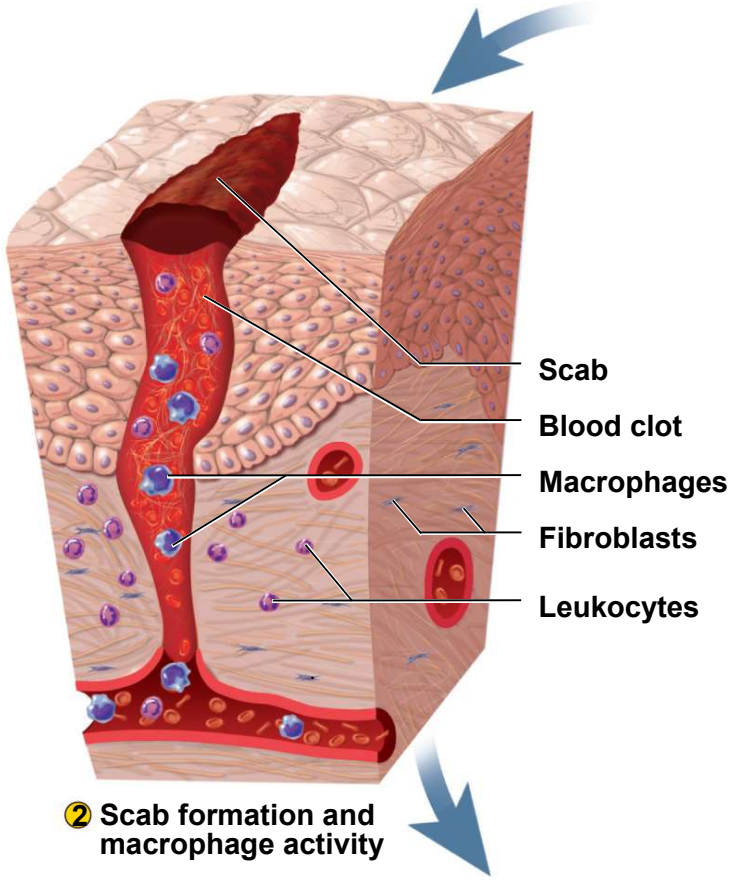


Note: Know Sequence of Events

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

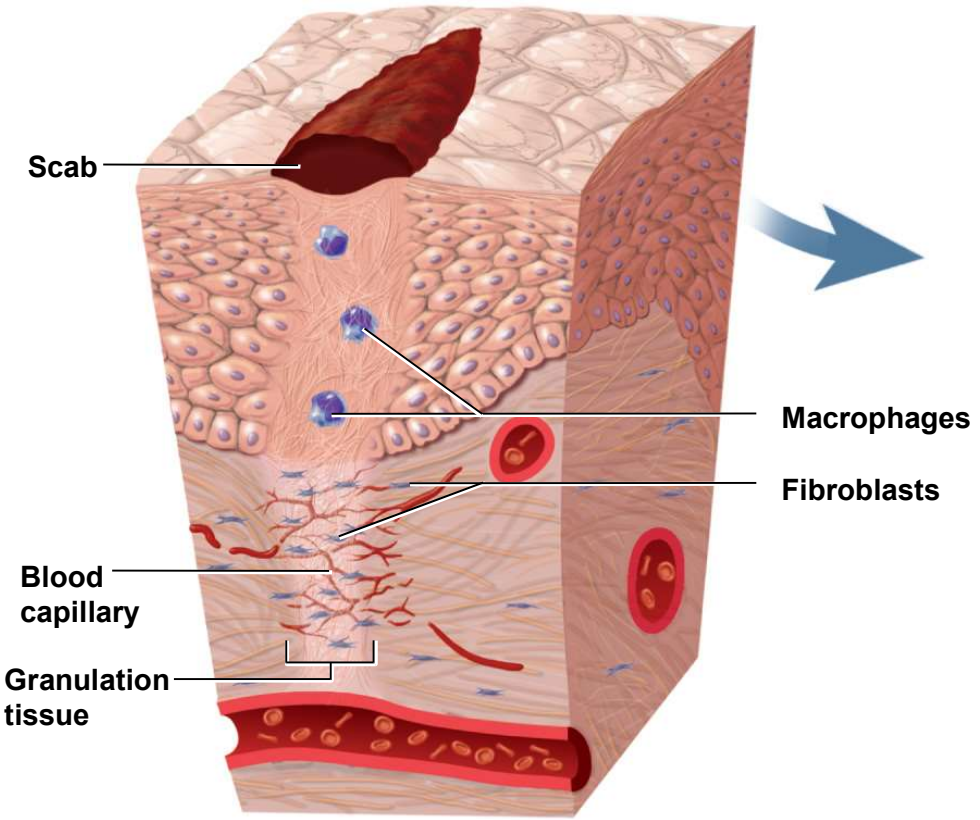
Key Events in Wound Healing

- **blood clot** forms around liquefied tissues at wound
  - Initially, wound area “open” so WBC can enter area // later clot isolates wound area
  - inhibits spread of pathogens from injury site to healthy tissue
- forms **scab** that temporarily seals wound and blocks infection
- **macrophages** phagocytize and then digest tissue debris



Wound Healing

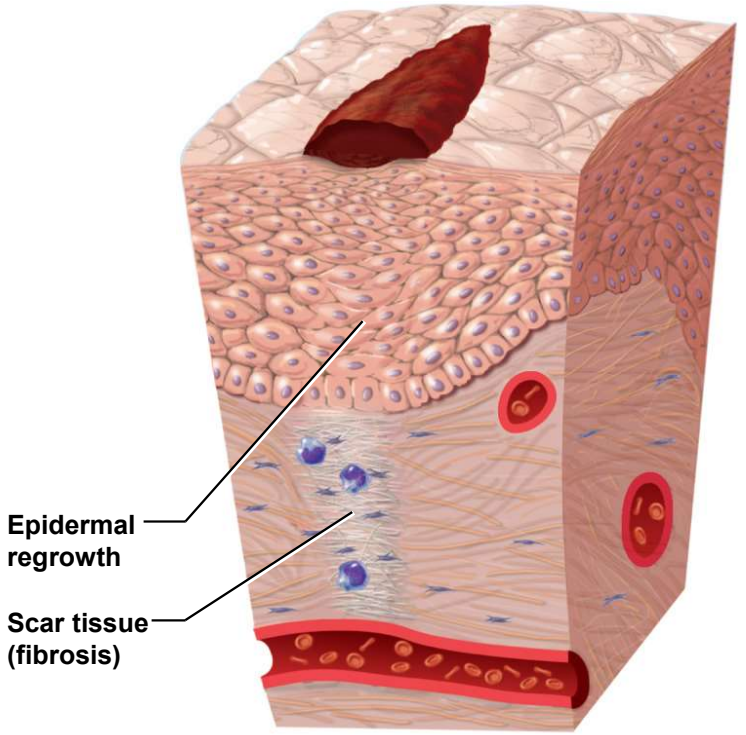
- new capillaries sprout from nearby vessels and grow into wound
- deeper portions become infiltrated by capillaries and fibroblasts
  - transform into soft mass called **granulation tissue**
  - **macrophages** remove the blood clot
  - **fibroblasts** deposit new extracellular collagen
  - begins 3-4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



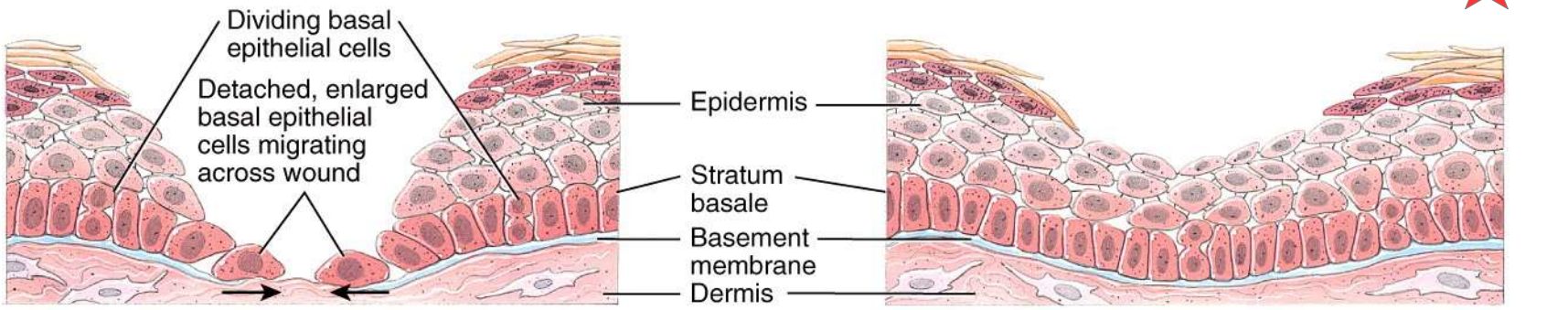
③ Formation of granulation tissue (fibroblastic phase of repair)

Wound Healing

- surface epithelial cells around wound multiply and migrate into wound area beneath scab
- epithelium **regenerates**
- connective tissue deeper 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



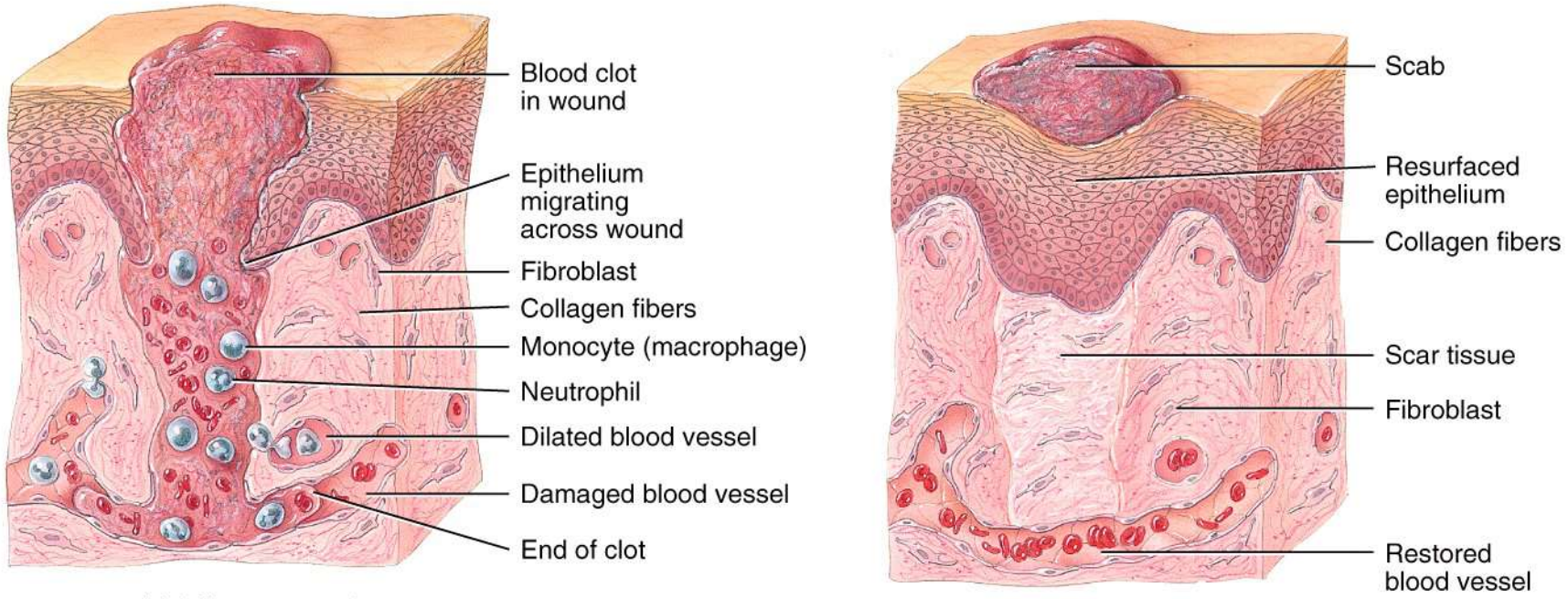
④ Epithelial regeneration and connective tissue fibrosis (remodeling phase of repair)



(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