Connective Tissues:

Blood
Repair
Membranes
Components of Blood

- **Cells: Formed Elements**
  - RBC (Erythrocytes; 95%)
  - WBC (Leucocytes)
  - Platelets (Thrombocytes)

- **Matrix: Plasma**
  - Water (91%)
  - Extracellular Proteins (7%)
  - Ions, gases, nutrients (2%) - ground substance
Extracellular proteins

- **Albumin** - contributes to osmotic pressure of blood
- **Globulins** - Antibodies, transport molecules, clotting factors
- **Fibrinogen** - Clotting factor; produces fibrin (threadlike, blood-clot-forming protein)
- **Serum** = Plasma minus clotting factors
Types of Leucocytes

- **Granulocytes:** Leukocytes containing large cytoplasmic granules
  - Neutrophils
  - Basophils
  - Eosinophils

- **Agranulocytes:** Leukocytes lacking cytoplasmic granules
  - Lymphocytes
  - Monocytes
Granulocytes

- **Neutrophils**: Most common
  - spend 10-12 hours in blood
  - **phagocytize** microorganisms & foreign substances in tissues --> pus!!

- **Basophils (mast cells)**: Least common
  - release **histamine** & others promoting inflammation
  - release **heparin** which prevents clotting

- **Eosinophils**
  - release **inflammation suppressing compounds** (antihistamine)
  - Produce chemicals which destroy worm parasites
Agranulocytes

- **Lymphocytes**: Smallest WBC; immune response;
  - produce antibodies & chemicals to destroy foreign cells
  - contribute to allergic reactions
  - reject tissue grafts

- **Monocytes**: Largest WBC; become macrophages in tissues
  - Phagocytize bacteria, dead cells, cell fragments
  - Present phagocytized particles to lymphocytes → **activation**
Tissue Repair

• Inflammation
  - Macrophages, injured cells, mast cells *release inflammatory chemicals*
  - *Capillaries dilate; permeability increases*
  - Proteins, leucocytes, blood *leak into injured area.*
  - clot forms
Tissue Repair

- **Organization**
  - Fragile, capillary-laden tissue grows into wounded area
  - Fibroblasts proliferate; stimulate growth & new collagen fibers
  - Macrophages digest blood clot
Tissue Repair

- **Regeneration**
  - Basal lamina grows *under* the scab & epithelium thickens
  - Connective tissue contracts and thickens = scar tissue
Tissue Origins

16-day-old embryo (dorsal surface view)

Key:
- Blue = Ectoderm
- Red = Mesoderm
- Yellow = Endoderm

Muscle and connective tissue (mostly from mesoderm)

Nervous tissue (from ectoderm)

Epithelium
Membranes
Fascia: CT framework

• **Superficial**
  - Connects skin to organs
  - areolar & adipose CT

• **Deep**
  - Connects organs to body wall; connects to bones & muscles
  - Irregular CT

• **Subserous**
  - Connects deep to serous membranes
  - Areolar CT
Membranes

- **Composition**: All consist of ET supported by CT
- Membranes line body surfaces
  - Mucous
  - Serous
  - Cutaneous
  - Synovial
Mucous Membranes

- Line passageways and chambers that communicate with exterior
  - Digestive, respiratory, reproductive, urinary
  - Kept ET moist
    - reduces friction
    - facilitate absorption or secretion
  - Thin ET over areolar CT
Serous Membranes

- Separate viscera
  - 3 types:
    - Pleura, peritoneum, pericardium
  - Thin
  - Prevent friction between neighboring organs
- Mesothelium supported by areolar CT
Cutaneous Membrane

- Skin!
- Thick!
- Relatively water proof and dry
  - Stratified squamous ET over areolar CT over dense irregular CT
Synovial Membranes

- Joint capsule membranes
  - Lubricates joint cavities surrounding adjacent bones
  - Major layer of areolar CT
    - matrix = collagen fibers & “cement” + incomplete layer of macrophages and fibroblasts (derived from ET)