Tissues

- Groups of cells which are similar in structure and which perform common functions
- Tissues formed by cells and molecules of the ECM – complicated meshwork of proteins and polysaccharides that are secreted by cell and assembled locally
- Epithelial – aggregated polyhedral cells, small amount of ECM, lining of surface and body cavities, glandular secretion
- Connective – fixed and wandering cells, abundant amount of ECM, support and protection
- Muscle – elongated contractile cells, moderate amount of ECM, movement
- Nervous – intertwining elongated process, no ECM, transmission of nerve impulses

Epithelial tissue

- Aggregated polyhedral cells, small amounts of ECM, lining of surface and body cavities, glandular secretion
- Cells have strong adhesion and make cellular sheets
- Functions –
  - Contractility (myoepithelial cells)
  - Absorption of material from lumen (intestinal tract/kidney tubules)
  - Protection of underlying tissues of body from abrasion and injury
  - Secretion of hormones, enzymes and mucus from glands
  - Detection of sensations by taste buds, eye retina, specialised ear hair cells
- Covering epithelium – covers body on its external surface and lines body on its internal surface – protection function
- Glandular epithelium – glands which originate from invaginated epithelial cells – secretion of products
- Origin – depends on organ type – Ectoderm, mesoderm, endoderm
  - Ectoderm – lining of external and internal surface
    - Keratin – aggregated polyhedral cells, show polarity, most epithelia rest on CT, have basal lamina at interface with CT
  - Mesoderm – lining of female urogenital tract
    - Urothelium – lining of urinary bladder
  - Endoderm – lining of respiratory and gastrointestinal tract
  - Ectoderm – skin and mammary glands
- Characteristics – have polyhedral form, show polarity, most epithelia rest on CT, have basal lamina at interface with CT

Covering epithelium

- Cells cover body on its external surface and lines body on its internal surface – protection function
- Simple – unilayer, all cells have contact with basal lamina, facilitates movement of viscera, active transport by pinocytosis, secretion of biologically active molecules (mesothelium)
- Stratified – multilayer, protection, prevents water loss, secretion
- Pseudostratified
- Transitional – can change length
- Keratinised – layers of cells filled with keratin
- Keratinocytes make keratin intermediate filament proteins, give epidermis its toughness

Exocrine glandular epithelium

- Secretes products via ducts onto external or internal epithelial surface from which they originate
- Cells penetrate into CT manufacturing basal lamina
- Classification –
  - Number of cells – unicellular, multicellular
  - Mode of secretion - holocrine, apocrine, merocrine
  - Nature of selection – mucous, serous, mixed
- Multicellular function as secretory organs, simple or compound
- Merocrine secretion –
  - Mucous, secretes mucinogens
  - Serous, secretes enzyme rich, watery fluid

Endocrine glandular epithelium

- Secretes products into the blood or lymphatic vessels for distribution
- Communication modes – paracrine, autocrine, juxacrine
- Endocrine organs – pituitary, thyroid, adrenal
- Hormone secreted – amino acids, steroids
- Function – regulate growth, healing, water balance, blood pressure, calcium, energy metabolism and stress
- Pancreas – islets of Langerhans – alpha glucagon, beta insulin

Connective tissue cells

- Fibroblasts – most common CT cells, differentiate into fibrocyte, synthesise ECM components eg collagen elastin and multidhesive glycoproteins
- Fibroblasts transform into myofibroblast rich in actin and myosin cytoskeleton, used to close wound
- CT Defence cells – mast cells, macrophages, neutrophils, plasma cells
- Mast cells originate from stem cells in bone marrow, promote allergic reactions
- Macrophages ingest foreign particles – bacteria by phagocytosis
- Neutrophils and macrophages digest clot
- Plasma cells – antibody producing cells derived from beta cells
- Adipocytes – rich in lipids in cytoplasm