

CELL JUNCTIONS, AND GLYCOCALYX

rvsd 10/19/92, 10/13/93, 10/10/94, 11/1/96, 31 Oct 03, 29 Oct 04, 16 Nov 07, 21Nov08, 23Nov09, 22Nov10
BRP, p. 271-293, BKH 5th: 290-, 6th: 482-, 7th: 186-187, 480-504

DESMOSOMES: p. 487

[band, ligament; body] most prominent in epithelium, rivet cells together.

- glycoprotein fibers** bind cells together between membranes,
- interior tonofilaments** cytoplasmic intermediate filaments (**keratin, etc**)
- plaques** reinforced membrane area.

TIGHT JUNCTIONS: p. 488

Seals epithelial cells lining ducts, especially GI tract.
Consist of repeating ridges of tight junction elements

GAP JUNCTIONS: p. 489

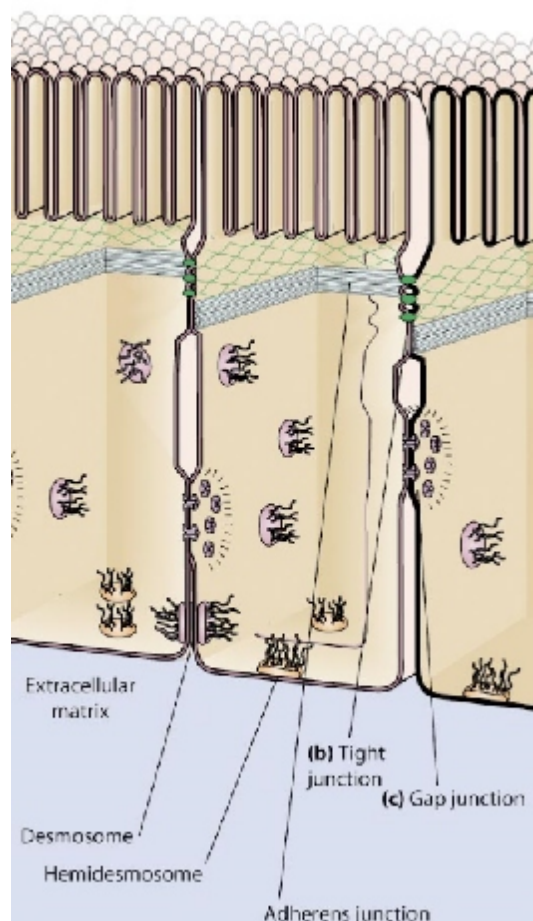
most common junction, allow chemical & electrical communication

Connexons: 6 protein subunits in cylinder, 1.5 nm pore,
allows exchange of small solutes <1200 MW (monosaccharides,
amino acids, nucleotides)

Important in heart, smooth muscle contraction
because of the flow of K⁺ ions.
Alterable by cell according to circumstances.

PLASMODESMATA: P 506 communications through cell walls between
plant cells **annulus** of membrane connects,

desmotubule runs through, allows fusion of adjacent plasma membranes



GLYCOCALYX: Cell coat, if thick outer: fuzzy layer

CELL COAT: part of cell membrane:

oligosaccharides. bind osmium, appear distinct

FUZZY LAYER Extracellular **matrix** of cell coat,
has three components:

- 1) **collagen**, (p 492) (25% of protein in mammals)
Requires vitamin C for hydroxylation of proline
10 kinds of collagen, high tensile strength
3 subunits form helix of tropocollagen
bound together to fibers
- 2) **Elastin** (p 493) also present to give flexibility,
elasticity (not hydroxylated like collagen)
- 3) **Proteoglycans** (p 494)

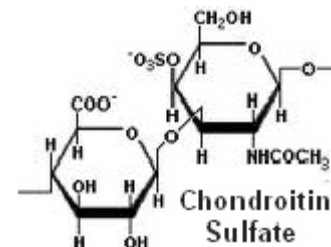
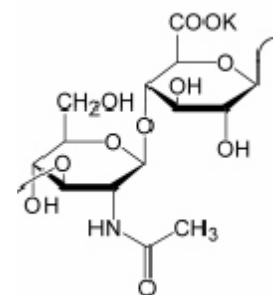
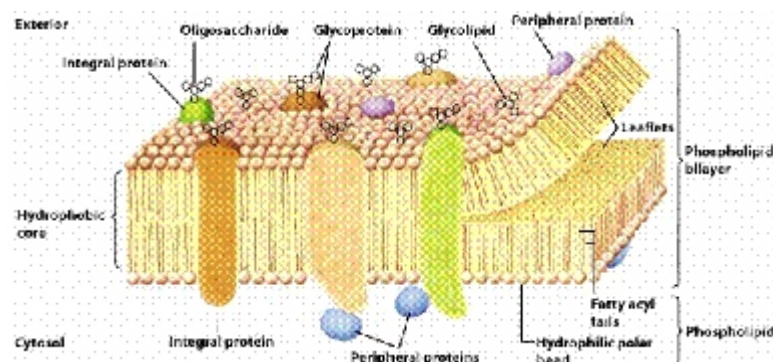
(**Mucopolysaccharides**): 3rd component of fuzzy layer
(= **glycosaminoglycans** = **GAGs**)

repeating disaccharide units of NAG, NAM, glucuronic acids polymerized to form:

hyaluronic acid (backbone) B 1,3 glucuronic acid + NAG
(free hyaluronate: synovial fluid in joints)

Keratin SO₄ B 1,4 galactose + NAG-6-SO₄

chondroitin SO₄ (NAG-6-SO₄) B 1,3 glucuronic acid + N acetyl galactosamine-6-SO₄



CELL WALLS: BACTERIAL of peptidoglycan. Gm + with teichoic acid
gm- with additional lipid layer

Plants with cellulose fibrils embedded in

- hemicellulose polymer of pentose
- pectin polymer of hexuronic acid
- lignin complex organic polymer

Primary cell wall extensible, secondary permanent fixes cell shape