

# 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  
BRP, p. 271-293, BKH 5<sup>th</sup>: 290-, 6<sup>th</sup>: 482-, 7<sup>th</sup>: 186-187, 480-504

**DESMOSOMES:** p. 487 (band, ligament body) most prominent in epithelium, rivet cells together. Bound by **glycoprotein fibers** between membranes, cytoplasmic filaments **interior tonofilaments (keratin, etc)**, reinforced membrane area called **plaques**.

**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<sup>+</sup> ions.  
Alterable by cell according to circumstances.

**PLASMODESMATA:** 506 communications through cell walls between plant cells **annulus** of membrane connects, desmotubule runs through, allows fusion of adjacent plasma membranes

**GLYCOCALYX:** **cell coat** part of cell membrane. **part of membrane:** oligosaccharides bind osmium, appear distinct  
**fuzzy layer** Extracellular **matrix** of cell coat and more exterior layer of material

**FUZZY LAYER** 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 bands, fibers
- 2) **Elastin** (p 493) also present to give flexibility, elasticity (not hydroxylated like collagen)
- 3) **Proteoglycans (Mucopolysaccharides)**(p. 494): 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)  
Keratan SO<sub>4</sub> B 1,4 galactose + NAG-6-SO<sub>4</sub>  
chondroitin SO<sub>4</sub> (NAG-6-SO<sub>4</sub>) B 1,3 glucuronic acid + N acetyl galactosamine-6-SO<sub>4</sub>

**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