

## Cell Junctions

### ● Definition

“Cell junctions are protein structures that act as glue to stick the plasma membranes of adjacent cells together”

### ● Characteristics

- i) Prevent flow of materials
- ii) Adhesion
- iii) Communication

### ● Cell Cytoskeleton

“Organized network of protein filaments and hollow tubules including microtubules, micro filaments and intermediate filaments”

- Provides support
- Facilitates cell division
- Facilitates movements



## ● Types

### i) Tight Junctions / Zona Occludens

#### » Definition

“Localized sealing of cell membranes at the apical point”

#### » Link Proteins

→ Occludens

→ Claudins

→ ZO proteins

#### » Cytoskeleton involved

→ Actin Filaments

#### » Major function

→ “Seals” passage of molecules from lumen to connective tissue compartment



## » Medical Significance

- Regulates fetal blood brain barrier
- Prevents neurologic disorders

## » Location

- Proximal Convoluted Tubule (PCT)
- Urinary bladder

## ii) Zonula Adherens (An adhering junction)

## » Definition

“ Provide lateral adhesions between cells by linking the two cytoskeletons ”

## » Cytoskeleton involved

- Actin filaments



## » Link Proteins

- E- Cadherin
- Catenin Complexes

## » Major Function

Strengthens nearby tight junctions

## » Medical Significance

- In epithelial epithelial tumor cells → tumor spread + invasion increases → malignancy increases

## » Location

- Epithelium
- Endothelium



iii) Macula Adherens / Desmosomes (an adhering junction)

» Definition

“Spot like junctions that link intermediate filaments”

» Link Proteins

→ Cadherin family proteins (Desmogleins, Desmocollins)

» Cytoskeleton involved

→ Intermediate filaments (keratins)

» Major Function

→ Strong intermediate filament coupling



## » Medical Significance

- Desmoglein-I decreases (auto immunity) → dyshesive skin disorders occur → decrease cohesion of epidermal cells

## » Location

→ Skin

### iv) Hemidesmosomes

## » Definition

“Facilitate the stable adhesion of basal epithelial cells to the underlying basement membrane”

## » Link Proteins

→ Integrins

## » Cytoskeleton involved



→ Intermediate filaments

» Major function

→ Anchoring

» Medical Significance

- Mutuations in Integerin  $\beta$ -4 gene can lead to skin blisters

» Location

→ Basal plasma membrane

v) Gap junctions / Communicating Junctions / Low Resistance Channels / Nexus

» Definition

“Are channels that allow the passage of small molecules and ions between two cells”



» Link Proteins

→ Connexin

» Cytoskeleton involved

→ None

» Major function

→ Allows direct transfer of small molecules and ions

» Medical Significance

- Mutations in connexin → causes deafness + neuropathy

» Location

→ Epithelium

→ Nerves

→ Cardiac + smooth muscles