

# Cell to cell interactions

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the slide, creating a modern, layered effect. The rest of the slide is a plain white background.

# Cell to cell interactions

- ▶ Cell–cell interaction refers to the direct interactions between cell surfaces that play a crucial role in the development and function of multicellular organisms.
- ▶ These interactions allow cells to communicate with each other in response to changes in their microenvironment

# Cell Junctions

- ▶ Many cells in tissues are linked one to another and to the extracellular matrix at specialized contact sites called cell junctions.
- ▶ Cell junctions can be classified into three functional groups:
  1. Occluding junctions,
  2. Anchoring junctions and
  3. Communicating junctions.

# Occluding junctions

- ▶ Occluding junction Seal cells together in an epithelium in a way that prevents even small molecules from leaking from one side of the sheet to the other (i.e. forms permeability barrier across epithelial cell sheets).
- ▶ These junctions are of types-
  1. Tight junction and
  2. Septate junction

# Tight junctions (or zonula occludens)

- ▶ They are formed by two major transmembrane proteins-claudins and occludin.
- ▶ Claudins and occludins associate with intracellular peripheral membrane proteins called ZO proteins.
- ▶ Tight junctions make the closest contact between adjacent cells.

## Tight junctions (or zonula occludens)

- ▶ Prevent the free passage of molecules (including ions) across an epithelial sheet in the spaces between cells.

## Septate junctions

- ▶ Septate junctions are the main occluding junctions in invertebrates.

# Anchoring junctions

- ▶ Anchoring junctions mechanically attach cells (and their cytoskeletons) to their neighbours or to the extracellular matrix
- ▶ It perform the key task of holding cells together into tissues.
- ▶ It includes two main types of junctions -
  1. Adherens junction and
  2. Desmosome.

# Adherens junctions (Zonula adherens)

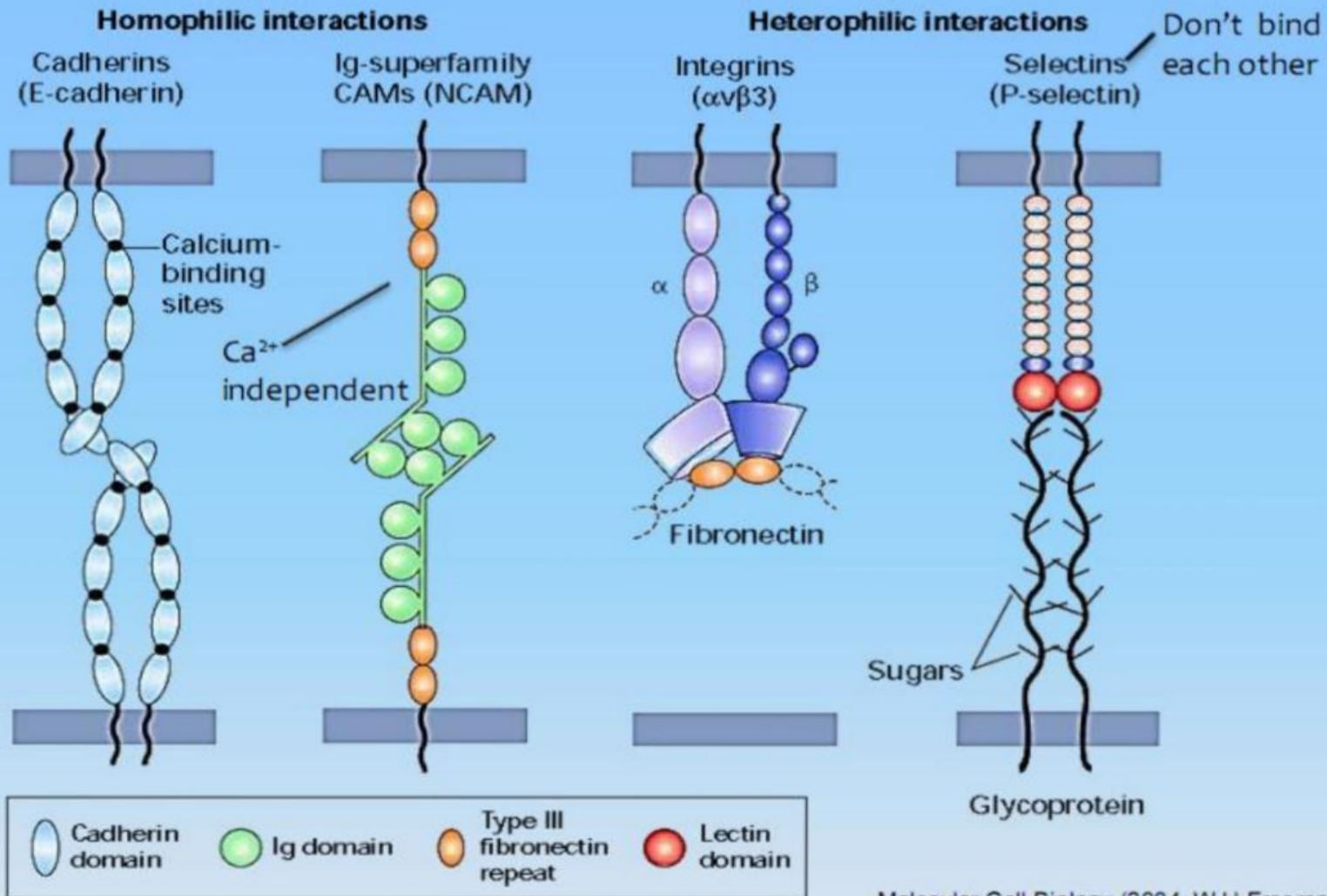
- ▶ Adherens junctions connect bundles of actin filaments from cell to cell or from cell to the extracellular matrix.
- ▶ It is a cell to cell junction, mediated by actin filaments and proteins belonging to the cadherin family.

**Hemophilic interactions** are the interaction between identical molecules.

**Hydrophilic interactions** are the interaction between different molecules.



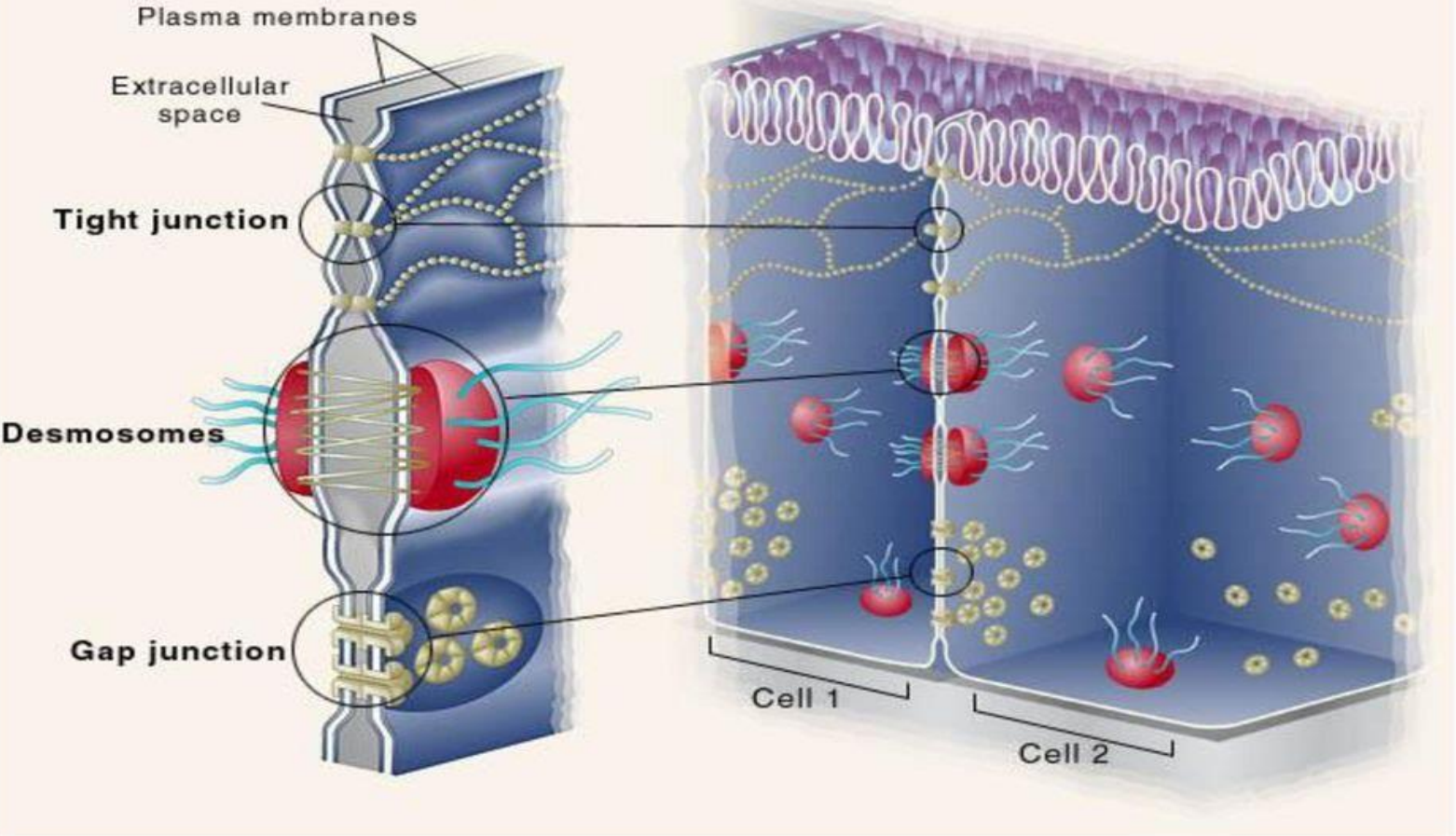
# Cell Adhesion Molecules (CAMs)



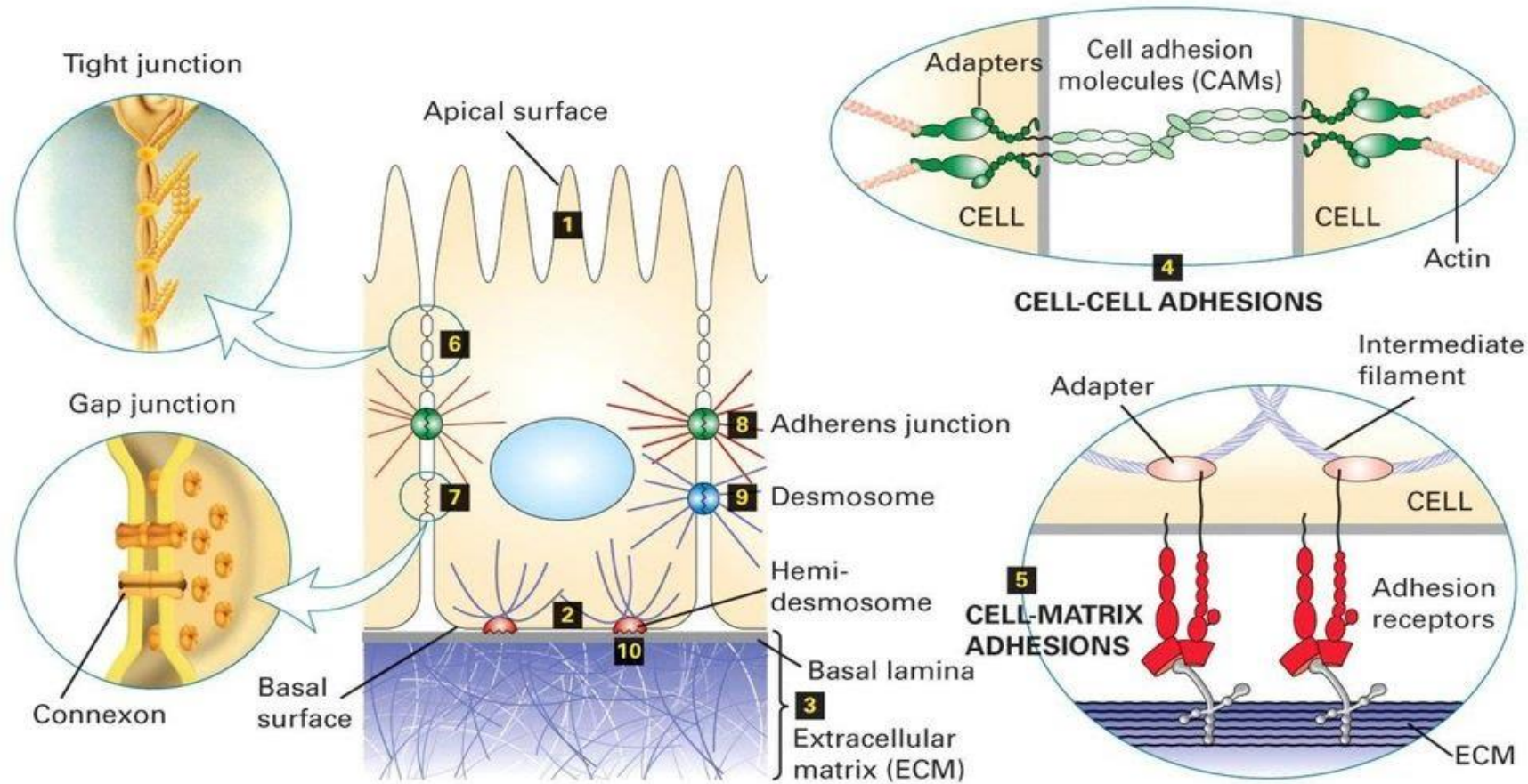
## Desmosomes (Maculae adherens)

- ▶ Desmosomes are buttonlike points of intercellular contacts which bond neighbouring cells together.
- ▶ It contain two specialized cadherin protein, desmoglein and desmocollin.
- ▶ It form dense cytoplasmic plaque

### Specialized cell junctions



# Classification of cell junctions



# Communicating junctions

- ▶ Communicating junctions mediate the passage of chemical or electrical. It is two types
  1. Gap junctions
  2. Plasmodesmata

# Gap junctions

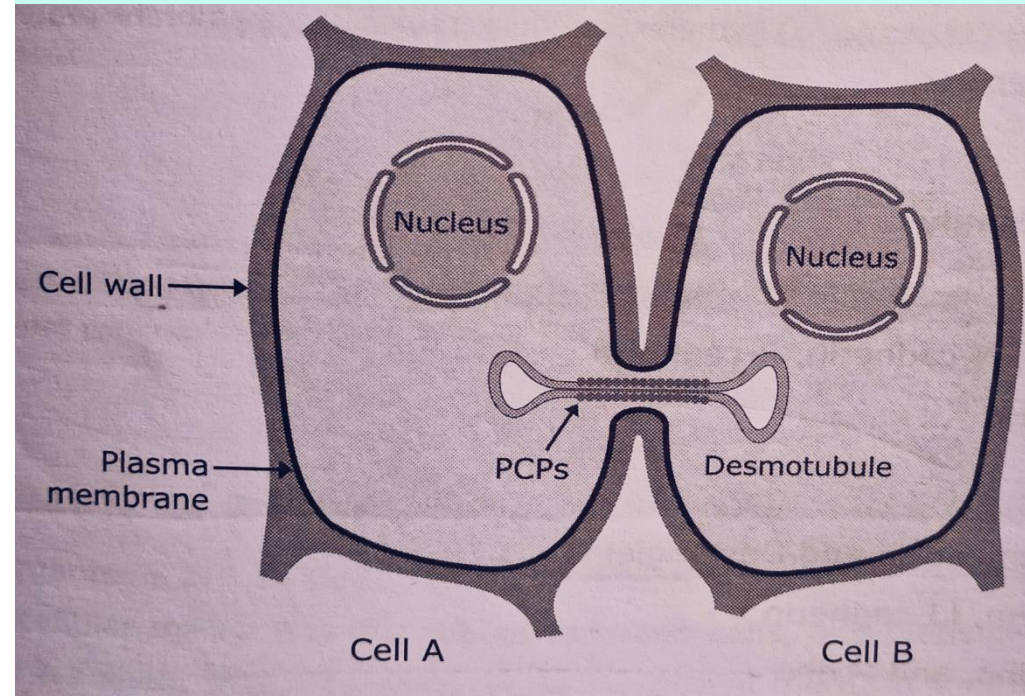
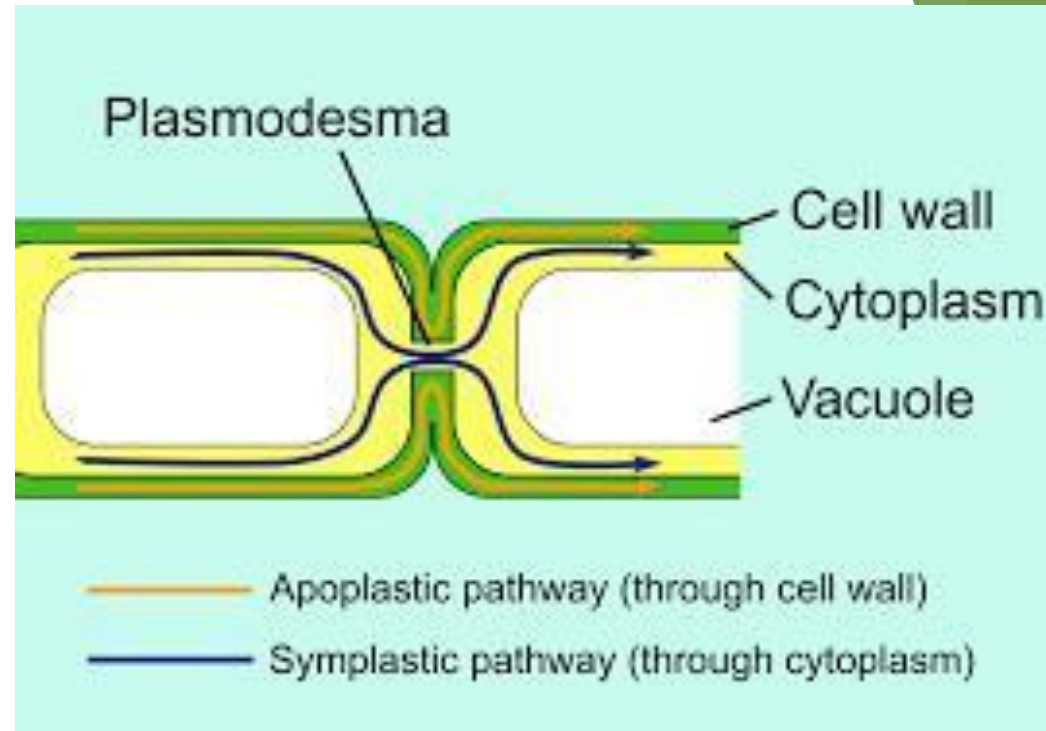
- ▶ Direct connection between cytoplasm of adjacent cells.
- ▶ They act as a channels for inorganic ions and small water soluble molecule up to 1000 Da.
- ▶ It also provide passage for intracellular signalling molecules, such as cAMP and calcium.
- ▶ It consists of transmembrane protein called connexins.
- ▶ Six connexins assemble to form open aqueous pore called connexon.

# Plasmodesmata

- ▶ It is cytoplasmic connection one cell to other cell in the plant.
- ▶ Functionally analogous to gap junctions but structurally unrelated.
- ▶ An extension of the smooth endoplasmic reticulum called desmotubule pass through the pore and for connection between cells.

# Plasmodesmata

- ▶ Plasmodesmata enable direct, regulated, Symplastic intercellular transport of substances between the cells.





# Cellular communication

- ▶ Once a receptor protein receives a signal, it undergoes a conformational change.
- ▶ Which in turn launches a series of biochemical reactions within the cell.
- ▶ These intracellular signaling pathways, also called signal transduction cascades.
- ▶ Activation of receptors can trigger the synthesis of second messengers (cAMP) It involve in signal transduction cascade.
- ▶ Received types of signal cell can regulated its own functions.

# Reference

- ▶ Molecular cell biology by WH Freeman, 2004
- ▶ Cell biology by Gerald Karp
- ▶ Cell biology by C B Powar

**Thanks you**

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