Chapter 2

Cell junctions and their types.

2.1 Types of cell junctions.

There are four types of cell junctions:

- Occluding junctions. These are also called tectbftight junctions. They help seal cells together into sheets to form an impermeable barrier.
- Communicating junctions. These are also called textbfgap junctions. These allow exchange of chemical/electrical information between cells.
- Anchoring junctions. These are required for attachment. The attachment on the between a cell and the extracellula path of the between a cell and the strategies.
 Signal relaying junctions.
- Signal relaying junctions These allow signals to be relayed from cell to covarross the plasma membrane.



A summary of the various cell junctions found in a vertebrate epithelial cell, classified according to their primary functions. In the most apical portion of the cell, the relative positions of the junctions are the same in nearly all vertebrate epithelia. The tight junction occupies the most apical position, followed by the adherens junction (adhesion belt) and then by a special parallel row of desmosomes; together these form a structure called a junctional complex. Gap junctions and adhitional desmosomes are less regularly organized. Two types of cell-matrix anchoring junctions tether the basal surface of the cell to the basal lamina. The drawing is based on epithelial cells of the small intestine.

Figure 2.1: Types of cells junctions.

2.2 Anchoring junctions.

There are integral membrane proteins that connect a cell to a neighbouring cell or to the extracellular matrix. These junctions are connected to cell's cytosol by their cytosolic domains. The below figure shows cadherin in presence and in absence of calcium ions. You can observe that the presence of calcium provides rigidity to the structure by binding the the hinge regions of the cadherin repeats. Cadherins are not like glue. These interactions are



Figure 2.4: Cadherins in presence and absence of calcium. not non-selectively sticky. Cadherin mediated adhesions are schould Cadherins allow segregation of cells by selectively sticking similar cell cagether and excluding other cells. Thus, Cadherins help in cell serving.

Experiment nstating the 🕡 ability of cadherins. 2.3.0.2 \mathbf{rt} te transfected with E cadherins and some cell some cell ir 01 ransfected with N caderin. It as observed that cells segregated into two groups; one containing cells exclusively expressing N cadherin and the other expressing E cadherin. Secondly, a similar setup was desinged with the exception that the cells were not transfected with different cadherins but with the same cadherin expressed in different concentrations. It was again observed that the cells in culture segregated into two distinct regions. This indicated that cadherins help in cell sorting. The sorting can be based on the type of cadherin expressed or the concentration of a given cadherin.



(a) Cells expressing two different types of cadherin - N-cadherin(red) and E-cadherin(blue).



(b) Cells expressing different concentrations of cadherins - Higher expression of E-cdherin(dark blue) and lower expression of E-cadherin(light blue).

Figure 2.5: Experiment demonstrating the cell sorting capability of cadherins.