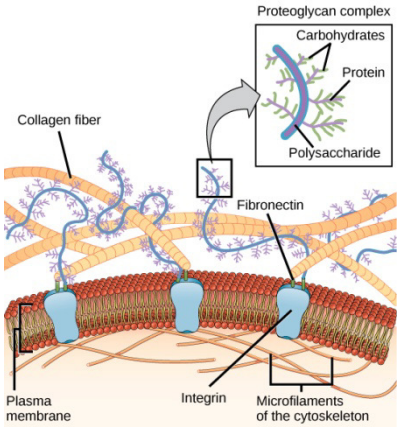
Cell Junctions

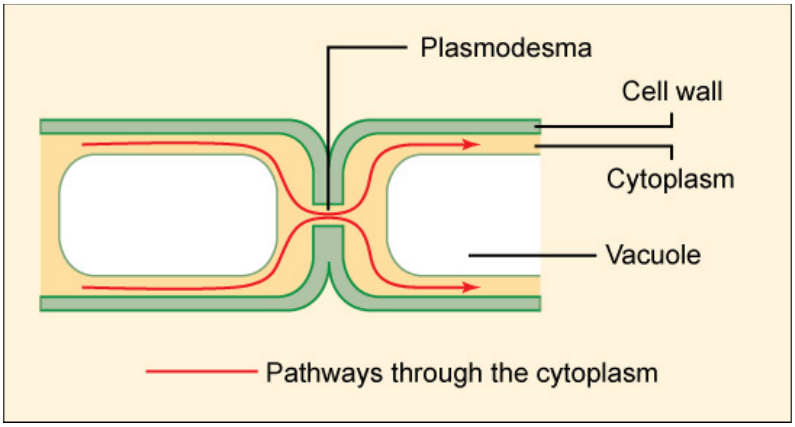
Most animal cells release materials into the extracellular space. The primary components of these materials are proteins, and the most abundant protein is collagen. Collagen fibers are interwoven with carbohydrate-containing protein molecules called proteoglycans. These materials are called the extracellular matrix. Not only does the extracellular matrix hold the cells together to form a tissue, but it also allows the cells within the tissue to communicate with each other.



Cells can communicate with each other via direct contact, referred to as intercellular junctions. There are some differences in the ways that plant and animal cells do this. Plasmodesmata are junctions between plant cells, whereas animal cells have tight junctions, gap junctions, and desmosomes.

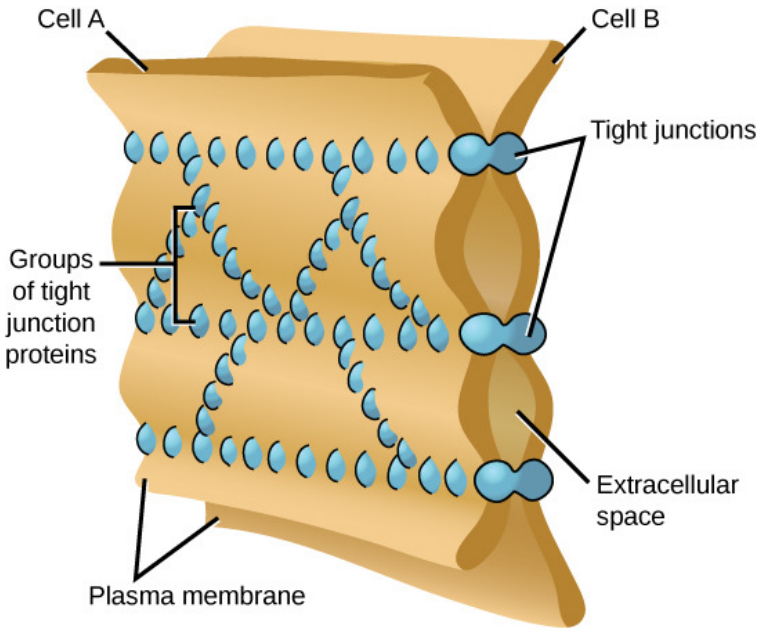
Plasmodesmata:

Long stretches of the plasma membranes of neighboring plant cells cannot touch one another because they are separated by the cell wall that surrounds each cell. There exist structural modifications called plasmodesmata (singular = plasmodesma), numerous channels that pass between cell walls of adjacent plant cells, connect their cytoplasm, and enable materials to be transported from cell to cell, and thus throughout the plant.



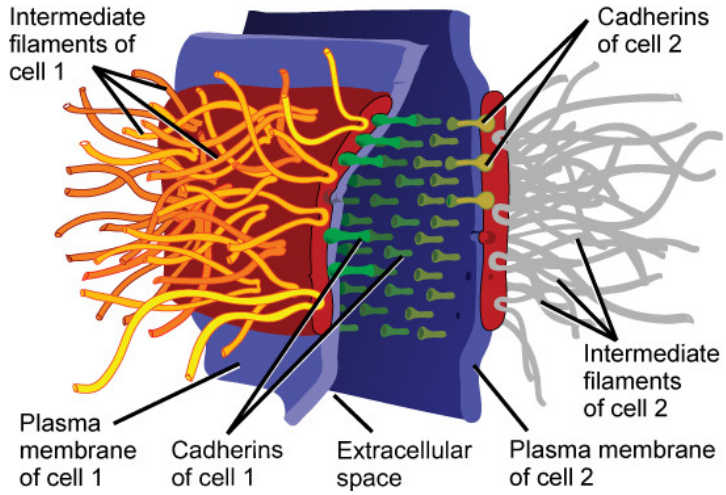
Tight Junctions:

It is a watertight seal between two adjacent animal cells. The cells are held tightly against each other by proteins (mainly two proteins; claudins and occludins). This tight adherence prevents materials from leaking between the cells; tight junctions are typically found in epithelial tissues that line internal organs and cavities, and comprise most of the skin. For example, tight junctions of epithelial cells lining urinary bladder prevent urine from leaking out into extracellular space.



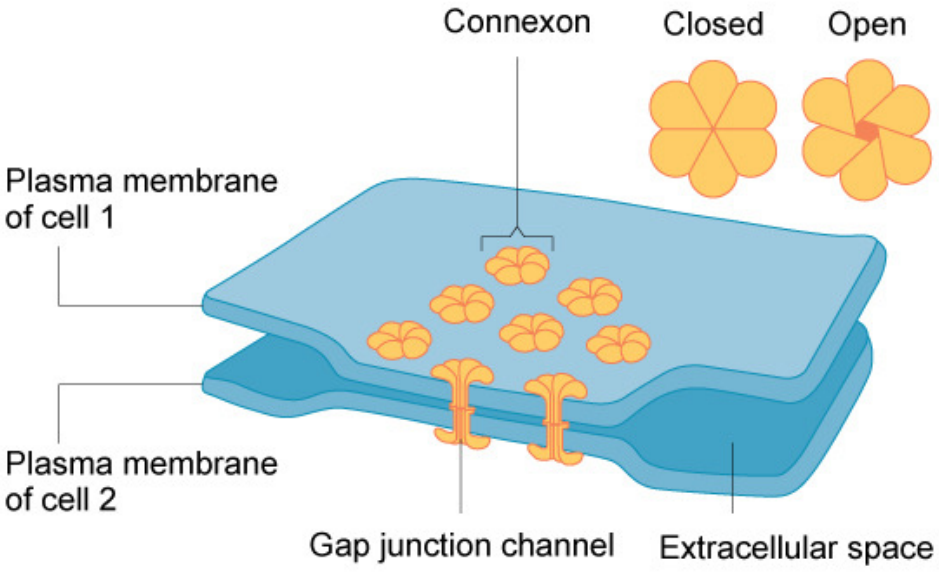
Desmosomes:

It act like spot welds between adjacent epithelial cells. Short proteins called cadherins in the plasma membrane connect to intermediate filaments to create desmosomes. The cadherins join two adjacent cells together and maintain the cells in a sheet-like formation in organs and tissues that stretch, like the skin, heart, and muscles.



Gap Junctions:

In animal cells, gap junctions are like plasmodesmata in plant cells in that they are channels between adjacent cells that allow for the transport of ions, nutrients, and other substances that enable cells to communicate. Structurally, however, gap junctions and plasmodesmata differ. Gap junctions develop when a set of six proteins (called connexins) in the plasma membrane arrange themselves in an elongated donut-like configuration called a connexon. Alignment of the pores (doughnut holes) of connexons in adjacent animal cells leads to the formation of a channel between the two cells forms. Gap junctions are particularly important in cardiac muscle: signal for the muscle to contract is passed efficiently through gap junctions, allowing the heart muscle cells to contract in tandem.



Source: https://courses.lumenlearning.com/wm-biology1/chapter/reading-cell-junctions-in-plant-cells/