Cell Surface
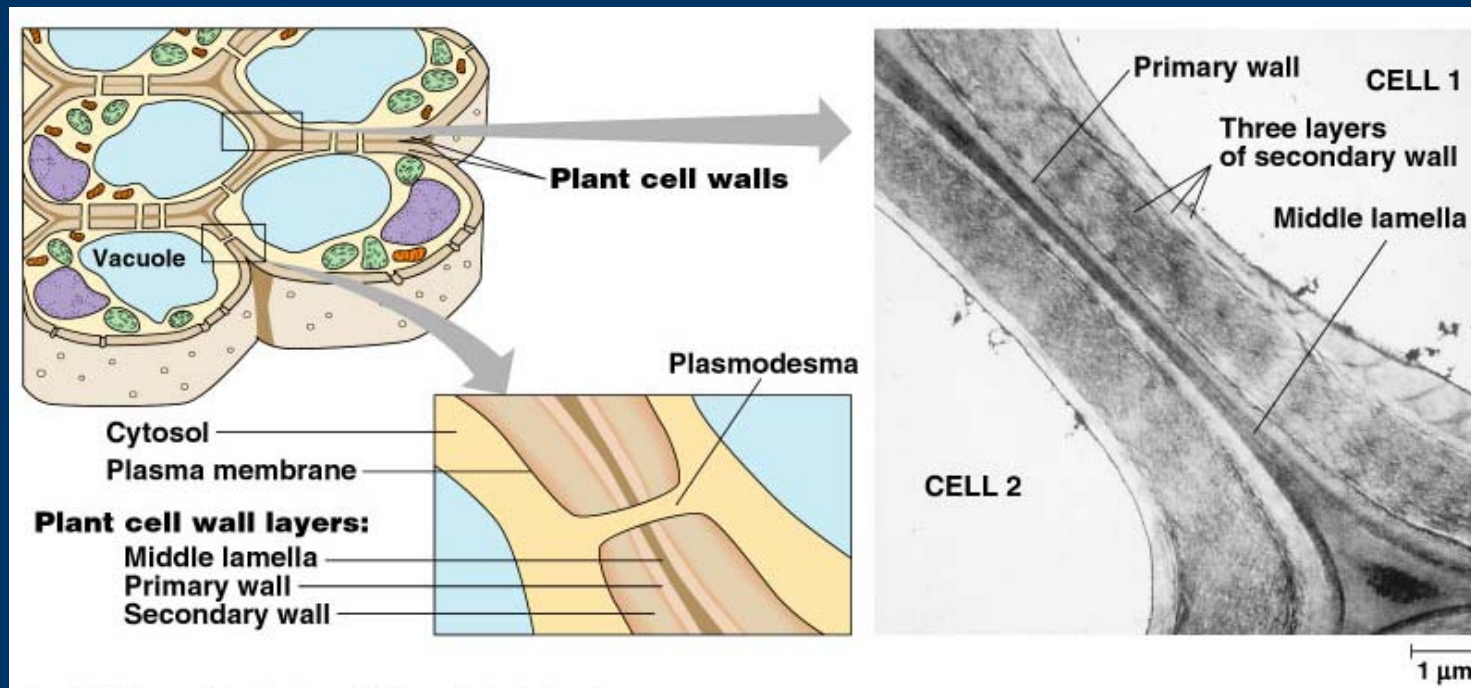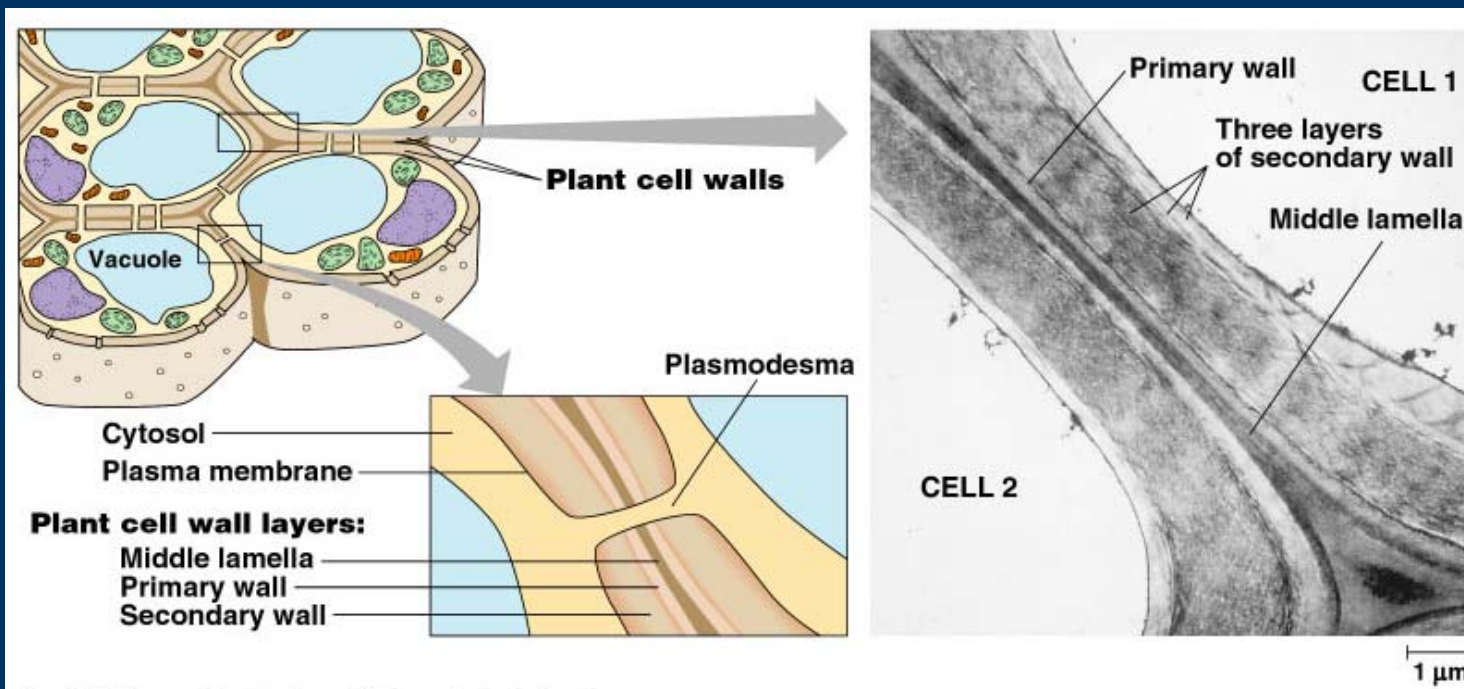
1.Cell wall: of the plant cells

-protect plant cells   -maintain its shape

-prevent excessive uptake of water

-hold the plant up against the gravity force

-prokaryotes, fungi and some protists also have cell wall but different compositions.

Plant cell walls

Vacuole

Cytosol

Plasma membrane

Plant cell wall layers:
Middle lamella
Primary wall
Secondary wall

Plasmodesma

Primary wall   CELL 1

Three layers of secondary wall

Middle lamella

CELL 2

1 μm

-plant cell walls are thicker than plasma membrane

-exact chemical composition varies among species
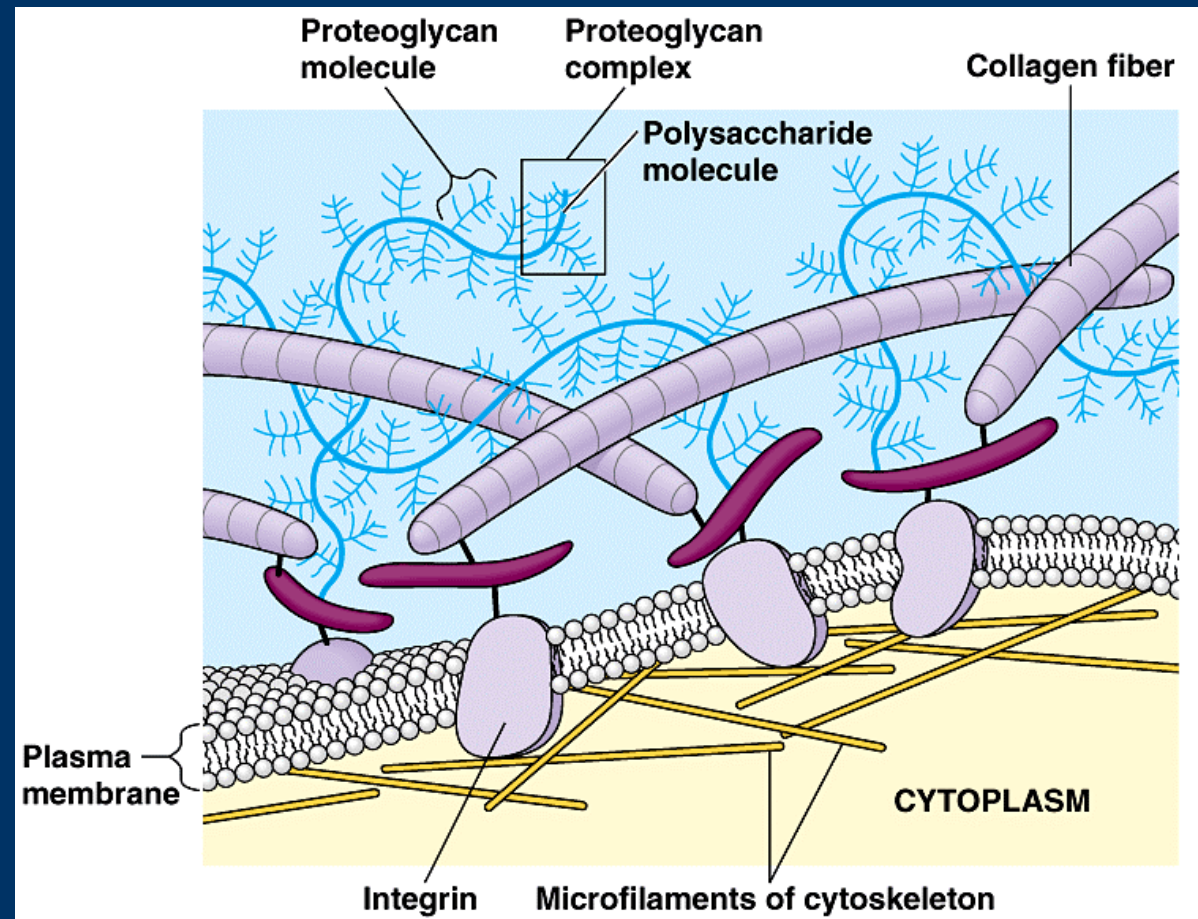
-made of cellulose, other polysaccharides and protein

middle lamella = sticky polysaccharide called pectin
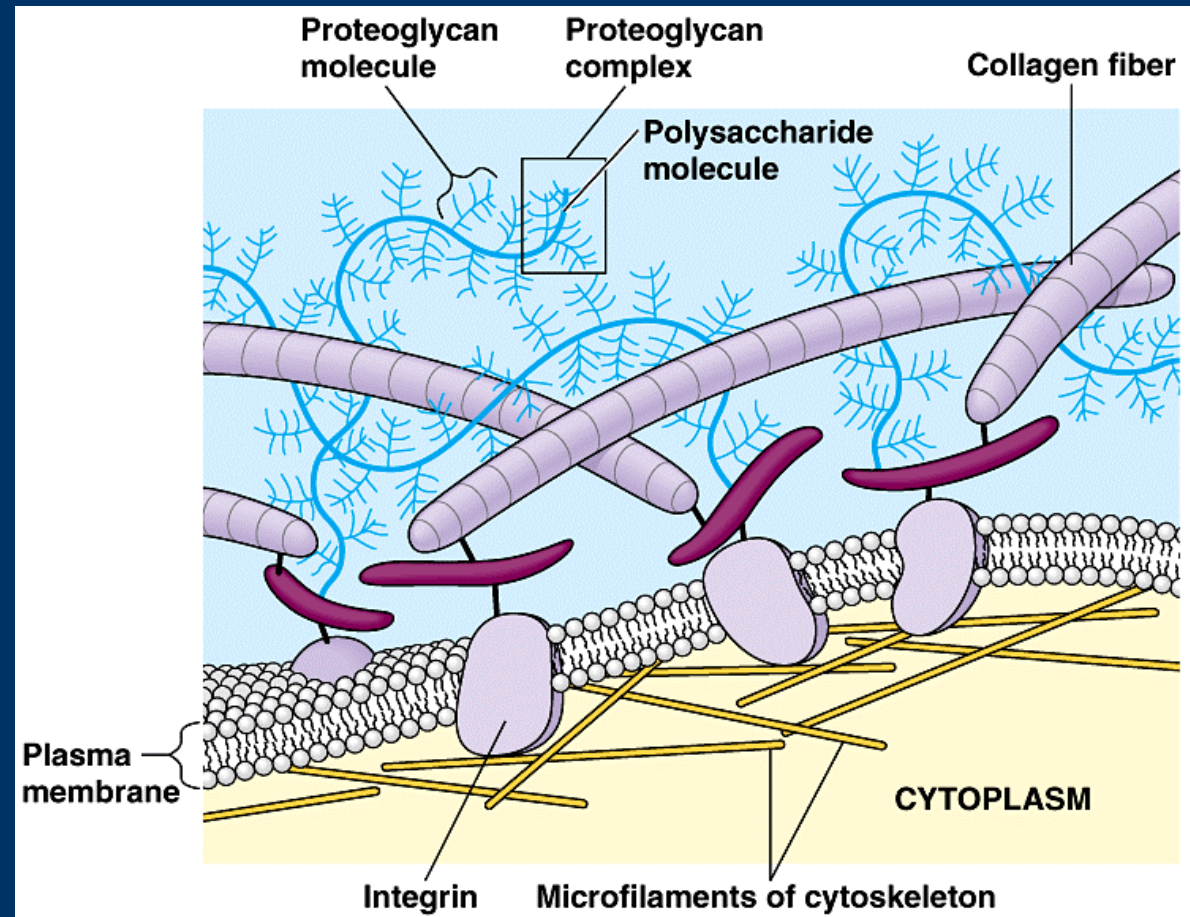
2.Extra Cellular Matrix of Animal cells

-function = support, adhesion, movement and regulation

-consist of
1.network of
proteoglycan. (rich
in carbohydrates -up
to 50%)

Extra Cellular Matrix of Animal cells

2. glycoprotein secreted by the cells: collagen, fibronectin which bind to integrins receptor protein.

Integrins bind to microfilaments on the cytoplasmic side. Thus integrins transmit changes in the ECM to cytoskeleton and vice versa.
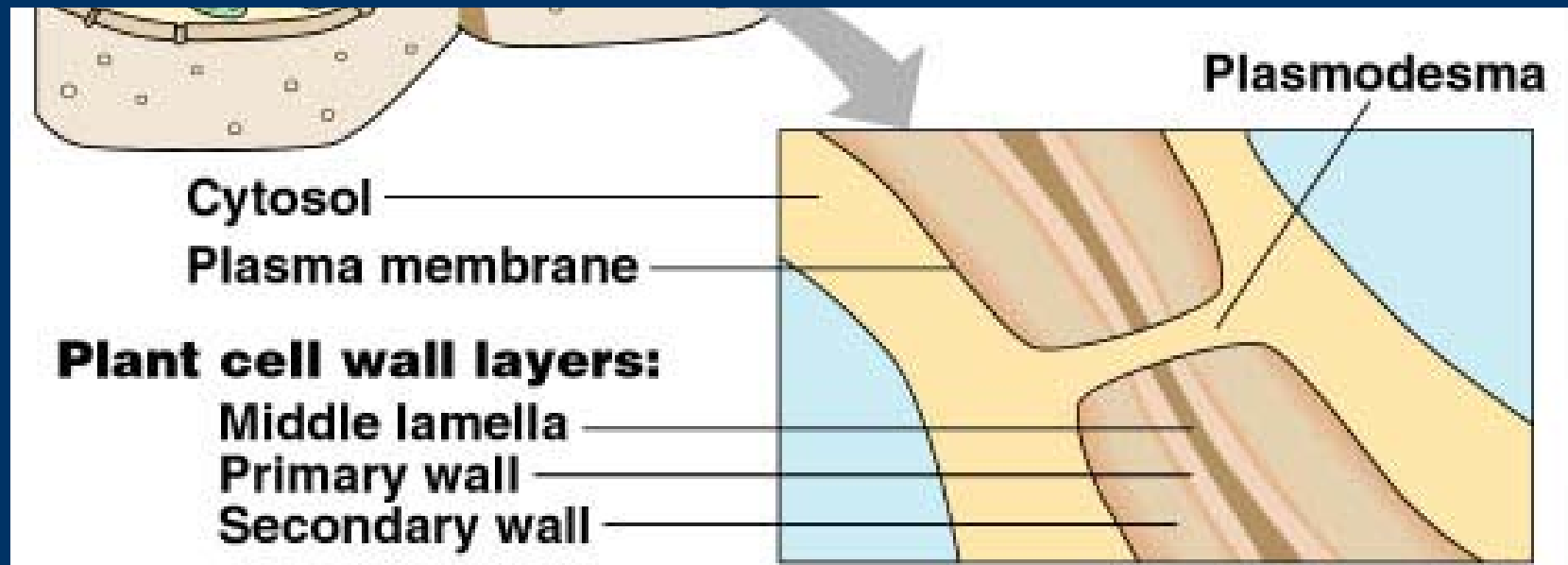
Intercellular Junctions

Animal and plants cells are organized into tissues, organs and organ systems. Neighboring cells in tissues, organs, or organ systems often adhere, interact, and communicate through direct physical contact.
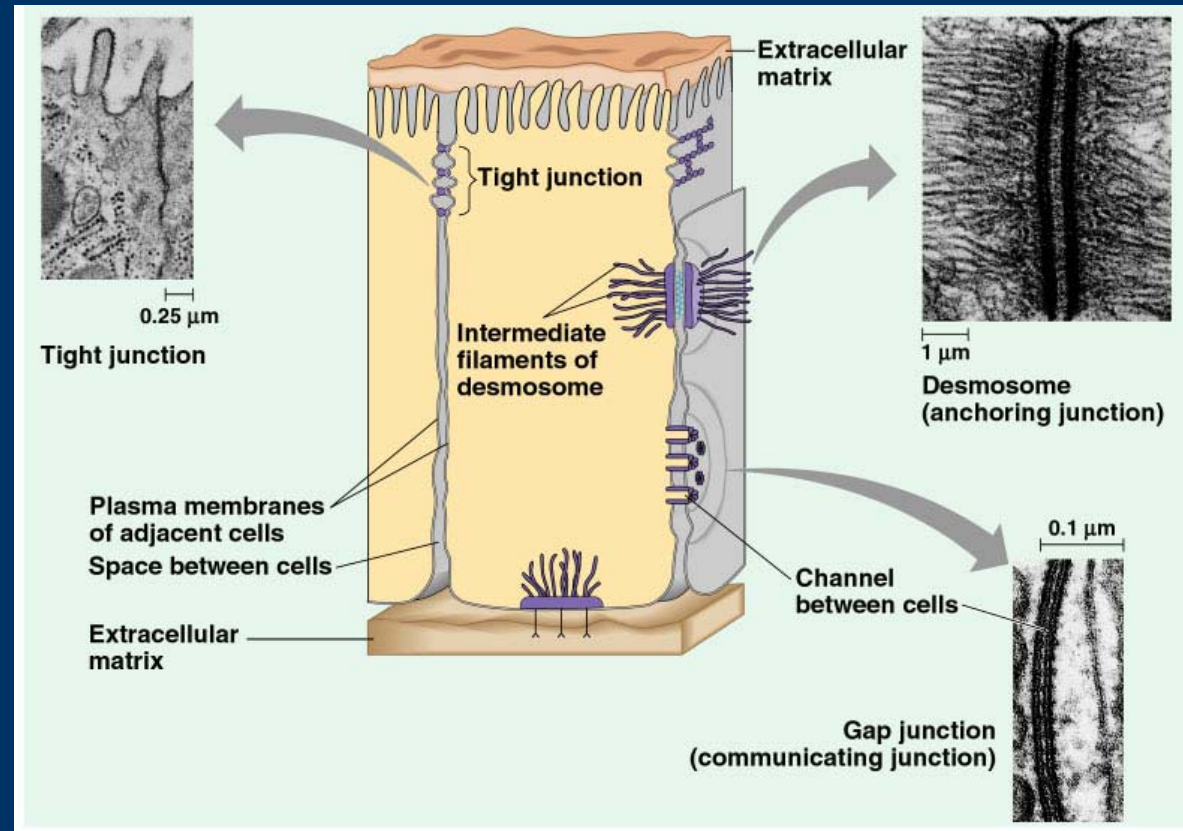
Plant cells

    Plant cell walls are perforated with channels called plasmodesmata.
    Cytosols and its contents pass through the plasmodesmata channel between cells.

Plasmodesma

Cytosol

Plasma membrane

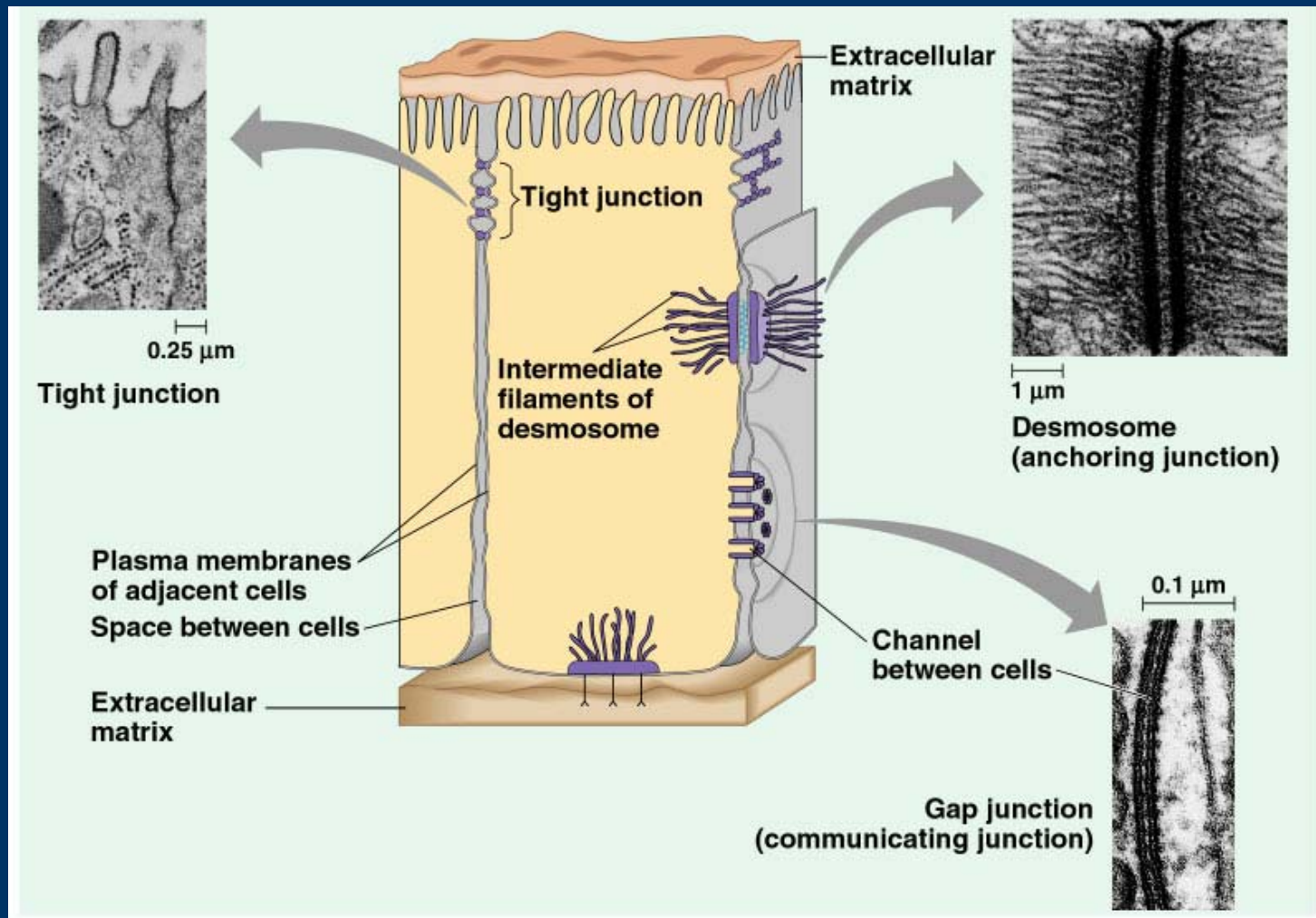Plant cell wall layers:
Middle lamella
Primary wall
Secondary wall

3 main types of animal intercellular junction

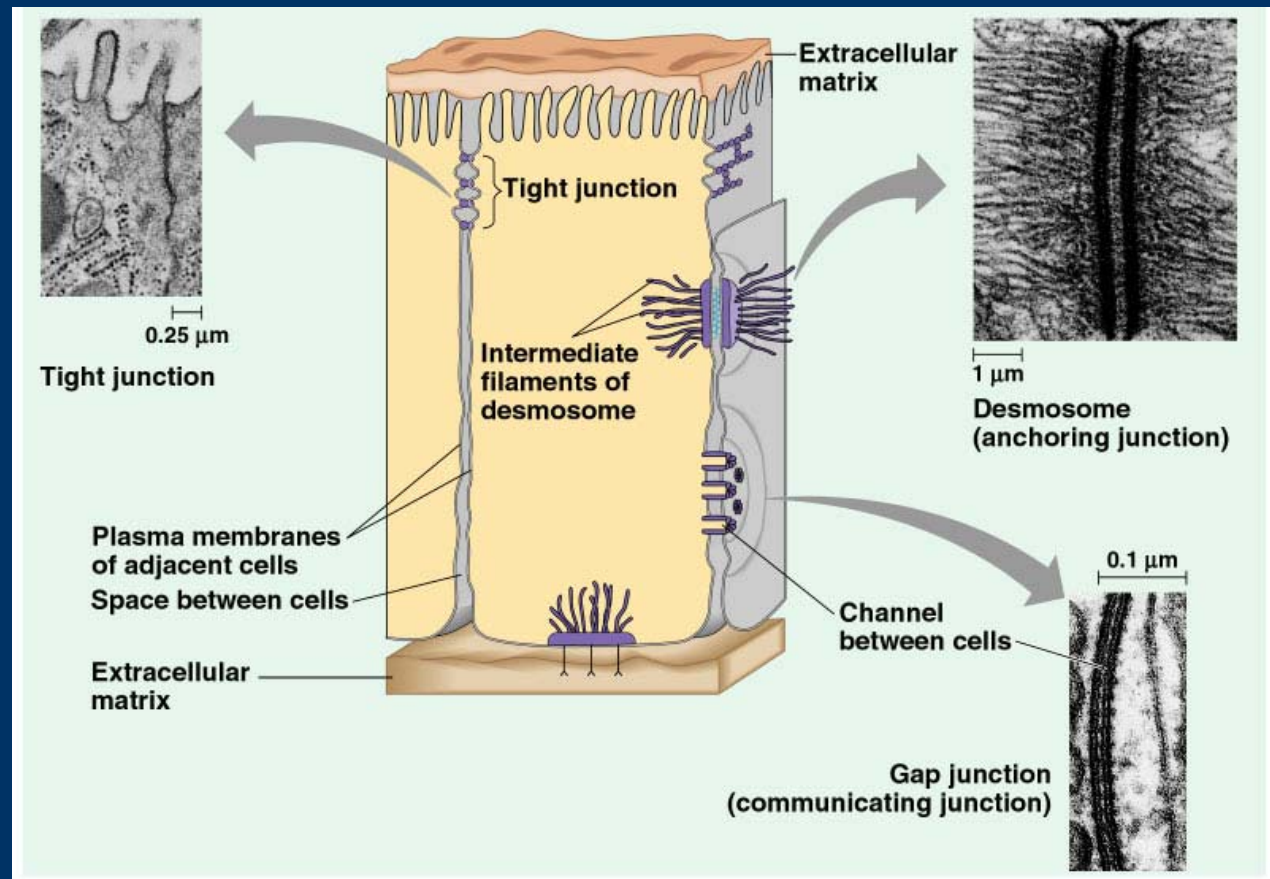-tight junction
-desmosomes
-gap junction

Tight junction
-fused membranes of adjacent cells
-form a continuous belt around cells
-seal intercellular spaces between cells

Desmosomes or Anchoring junction

-fastening adjacent cells together by connecting cell membrane to cytoskeleton proteins

-desmosomes are abundant in cells tha are exposed to shearing force: skin epidermis and cardiac muscle

Extracellular matrix

Tight junction

Intermediate filaments of desmosome

Plasma membranes of adjacent cells

Space between cells

Extracellular matrix

0.25 µm

Tight junction

1 µm

Desmosome (anchoring junction)

Channel between cells

0.1 µm

Gap junction (communicating junction)

Gap junction or Communicating junction

-provide cytoplasmic channel between cells
-salt ions, sugar, amino acids and other small molecules can pass

-in heart muscle, the flow of ions through gap junctions coordinates the contraction
-chemical communication between animal embryos is essential for developement

Tight junction

0.25 µm

Tight junction

Extracellular matrix

Intermediate filaments of desmosome

Plasma membranes of adjacent cells

Space between cells

Extracellular matrix

1 µm

Desmosome (anchoring junction)

0.1 µm

Channel between cells

Gap junction (communicating junction)