

Quadrant II – Transcript and Related Materials

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Notes

What is Golgi apparatus?

- The Golgi Apparatus is a stack of membrane bound flattened sacs, and are responsible for the modification of proteins received from the Endoplasmic Reticulum. These proteins are then transported in vesicles around the cell and hence act as the 'post office' of the cell.

STRUCTURE OF GOLGI APPARATUS

- The Golgi apparatus is composed of stacks of flattened sacs – cisternae that contain numerous vesicles containing secretory granules with two faces: The Cis face and the Trans face.
- The Cis face of the organelle is closest to the Endoplasmic reticulum.
- The Trans face is the side furthest from the nucleus, which secretes vesicles to various parts of the cell.
- There are a number of lumens and cisternae through which products flow.
- It is morphologically very similar in both plant and animal cells.

- It is extremely pleomorphic : in some cells it appears compact and limited, in others spread out and reticular (net-like).
- Typically, it appears as a complex array of interconnecting tubules, vesicles, and cisternae.

A. Flattened Sac or Cisternae :-

- Cisterna is the simplest unit of the Golgi apparatus and is 1 μm in diameter.
- It is central, flattened, plate-like or saucer-like closed compartments that are held in parallel bundles or stacks one above the other.
- In each stack, cisternae are separated by a space of 20 to 30 nm which may contain rod-like elements or fibers.
- Each stack of cisternae forms a dictyosome which contains 5 to 6 Golgi cisternae in animal cells or 20 or more cisternae in plant cells.
- Each cisterna is bounded by a smooth unit membrane (7.5 nm thick), having a lumen varying in width from about 500 to 1000 nm.
- The margins of each cisterna are gently curved so that the entire dictyosome of the Golgi apparatus takes on a bow-like appearance.
- The cisternae at the convex end of the dictyosome comprise proximal, forming or cis-face and cisternae at the concave end of the dictyosome comprise the distal, maturing or trans-face.

B. Tubules

- A complex array of associated vesicles and anastomosing tubules (30 to 50 nm diameter) surround the dictyosome and radiate from it.
- In fact, the peripheral area of the dictyosome is fenestrated (lace-like) in structure.

C. Vesicles

- The vesicles (60 nm in diameter) are of three types:-
1. Transitional vesicles

2. Secretory vesicles
3. Clathrin-coated vesicles

1. Transitional vesicles

- They are a small membrane limited vesicles.
- It forms blebs from transitional ER to migrate.
- It converge to cis face of Golgi, where they coalesce to form new cisternae.

2. Secretory vesicles

- They are varied-sized membrane-limited vesicles.
- It is discharged from margins of cisternae of Golgi.
- It often occur between the maturing face of Golgi and the plasma membrane.

3. Clathrin-coated vesicles

- It is spherical protuberances, about 50 μm in diameter & with a rough surface.
- It is found at the periphery of the organelle, usually at the ends of single tubules.
- Morphologically quite distinct from the secretory vesicles.
- The clathrin-coated vesicles plays a role in intracellular traffic of membranes and of secretory products, i.e., between ER and Golgi, as well as, between the GERL region and the endosomal and lysosomal compartments.

GOLGI APPARATUS FUNCTION

- The Golgi apparatus is responsible for transporting, modifying, and packaging proteins and lipids into vesicles for delivery to targeted destinations.

- As the secretory proteins move through the Golgi apparatus, a number of chemical modifications may transpire.
- The products enter through the Cis face and are modified by the Golgi Apparatus. The modified products exit through the Trans face and are stored in vesicles.
- They also take part in the transport of lipids and the formation of lysosomes.
- Process materials to be removed from the cell.
- Make and Secrete mucus.
- Golgi apparatus is the site for the synthesis of various glycolipids, sphingomyelin, etc.
- In the plant cells, complex polysaccharides of the cell wall are synthesised in the Golgi apparatus.