

Golgi Apparatus (complex)

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Definition

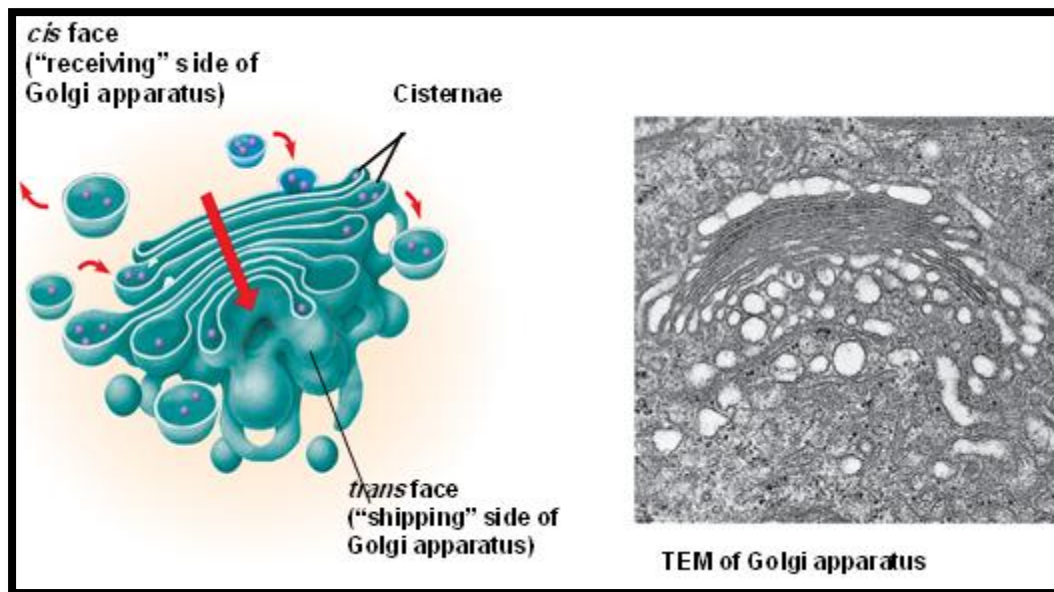
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The name comes from Italian anatomist *Camillo Golgi*, who identified it in 1898. The highly dynamic Golgi apparatus completes posttranslational modifications and then packages and addresses proteins synthesized in the RER. Golgi complex is composed of smooth membranous saccules in which these functions occur.

The characteristics feature

Golgi apparatus varies in sized and form in different cell types, but usually has similar organization for any one kind of cells. It appears as a coarse network under a light microscope and shows a central stack of parallel, flattened, inter communicating sacs or cisternae and many peripheral tubules and vesicles under the EM. The cisternae vary in number from three to seven in most animal cells.

The Golgi apparatus generally shows two distinct sides structurally and functionally, which reflects the complex traffic of vesicles within cells. Near the Golgi, the RER can be seen budding off small transport vesicles that shuttle newly synthesized proteins to the Golgi apparatus for further processing. Proteins, either within the lumen of a coated vesicle or embedded in its membrane, are transported to the Golgi apparatus from ER.

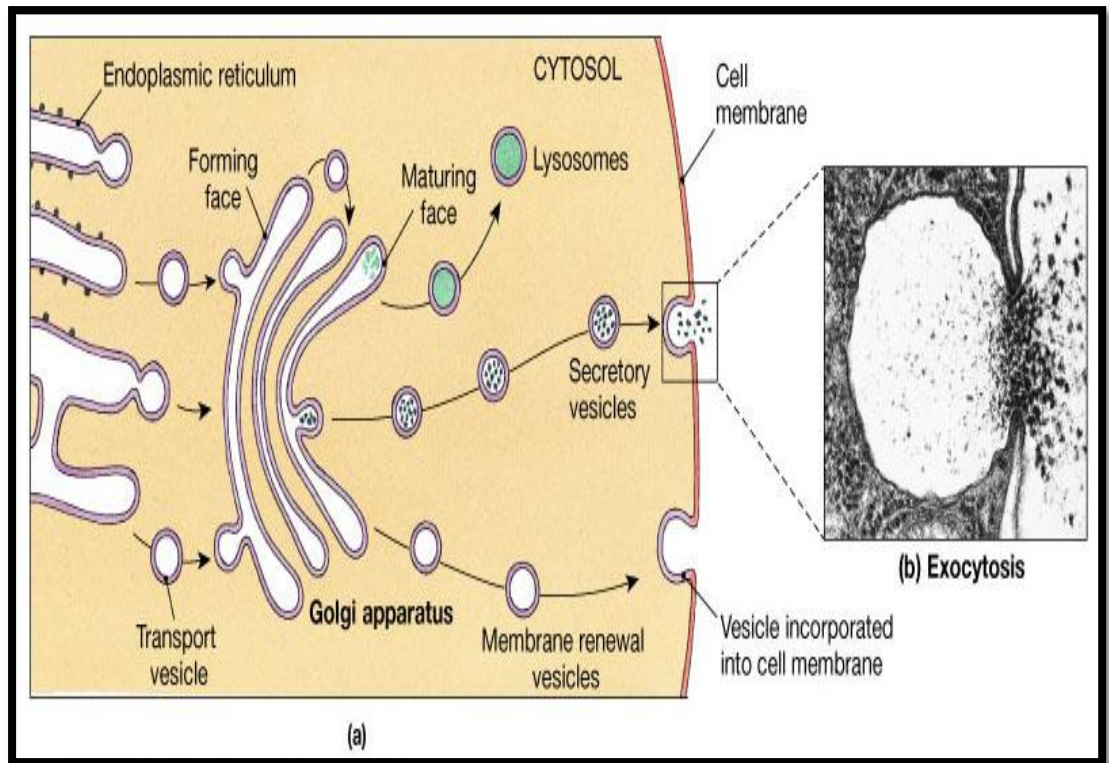


The structure

The convex forming face or **cis face** Golgi network of the Golgi apparatus, the coat proteins disengaged and the vesicles fuse with the membrane of the forming face.

It is thought that each cisterna contains the specific enzyme to add a specific sugar and those proteins are passed from cisterna to cisterna by formation of a series of coated vesicles which then fuse with the next cisterna in the stack.

The concave, (mature) face or **trans face** Golgi network, the proteins are accurately sorted into larger saccules sometime called **condensing vacuoles**. These structures bud from the maturing saccules and generate vesicles that carry completed protein products to organelles away from the Golgi.



The functions

- The TEM and cytochemical methods have shown that Golgi saccules contain different enzymes at different **cis-trans** levels and that the Golgi apparatus is important for glycosylation, sulfation, phosphorylation, and limited proteolysis of proteins.

- The Golgi apparatus initiates packing, concentration, and storage of secretory products.

- Golgi apparatus have roles in Manufactures certain macromolecules, like pectin and sialic acid and certain poly saccharides.

Secretory Vesicles or Granules

Secretory vesicles that produce from Golgi apparatus are found in those cells that store a product until its release by exocytosis is signaled by a metabolic, hormonal, or neuronal message (regulated secretion). These vesicles are surrounded by a membrane and contain a concentrated form of the secretory product. The contents of some secretory vesicles may be up to 200 times more concentrated than those in the cisternae of the RER. Secretory vesicles with dense contents of digestive enzymes are referred to as **zymogen granules**.