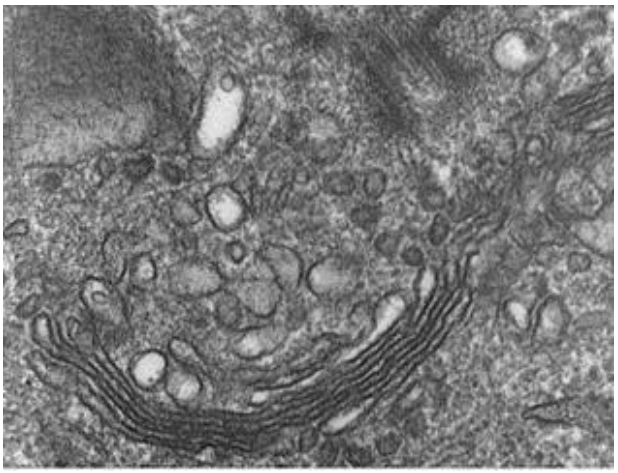
Golgi apparatus

The Golgi apparatus, also known as the Golgi complex, Golgi body, or simply the Golgi, is an organelle found in most eukaryotic cells.
Part of the cellular endomembrane system, the Golgi apparatus packages proteins inside the cell before they are sent to their destination; it is particularly important in the processing of proteins for secretion.



Electron micrograph of Golgi apparatus, visible as a stack of semicircular black rings near the bottom. Numerous circular vesicles can be seen in proximity to the organelle.

Structure::

Golgi is composed of stacks of membrane-bound structures known as cisternae (singular: *cisterna*). A mammalian cell typically contains 40 to 100 stacks. The cisternae stack has four functional regions: the cis-Golgi network, medial-Golgi, endo- Golgi, and trans-Golgi network. Vesicles from the endoplasmic reticulum fuse with the network and subsequently progress through the stack to the trans Golgi network, where they are packaged and sent to their destination. Each region contains different enzymes which selectively modify the contents depending on where they reside. The cisternae also carry structural proteins important for their maintenance as flattened membranes which stack upon each other.

Function::

Cells synthesize a large number of different macromolecules. The Golgi apparatus is integral in modifying, sorting, and packaging these macromolecules for cell secretion· (exocytosis) or use within the cell. It primarily modifies proteins delivered from the rough endoplasmic reticulum but is also involved in the transport of lipids around the cell, and the creation of lysosomes. In this respect it can be thought of as similar to a post office; it packages and labels items which it then sends to different parts of the cell. Enzymes within the cisternae are able to

modify the proteins by addition of carbohydrates (glycosylation) and phosphates (phosphorylation).

Lysosomes:::

Lysosomes are cellular organelles that contain acid hydrolase enzymes that break down waste materials and cellular debris. They can be described as the stomach of the cell. They are found in animal cells, while their existence in yeasts and plants are disputed. Some biologists say the same roles are performed by lytic vacuoles, while others suggest there is strong evidence that lysosomes are indeed in some plant cells. Lysosomes digest excess or worn-out organelles, food particles, and engulf viruses or bacteria. The membrane around a lysosome allows the digestive enzymes to work at the 5 pH they require. Lysosomes fuse with vacuoles and dispense their enzymes into the vacuoles, digesting their contents. They are created by the addition of hydrolytic enzymes to early endosomes from the Golgi apparatus. The name *lysosome* derives from the Greek words lysis, *to separate*, and soma, *body*. They are frequently nicknamed "suicide-bags" or "suicide-sacs" by cell biologists due to their autolysis.

The size of a lysosome varies from 0.1–1.2 μm. At pH 4.8, the interior of the lysosomes is acidic compared to the slightly basic cytosol (pH 7.2). The lysosome maintains this pH differential by pumping protons (H^+ ions) from the cytosol across the membrane via proton pumps and chloride ion channels. The lysosomal membrane protects the cytosol, and therefore the rest of the cell, from the degradative enzymes within the lysosome. The cell is additionally protected from any lysosomal acid hydrolases that drain into the cytosol, as these enzymes are pH-sensitive and do not function well or at all in the alkaline environment of the cytosol.This ensures that cytosolic molecules and organelles are not lysed in case there is leakage of the hydrolytic enzymes from the lysosome.