GOLGI COMPLEX

INTRODUCTION :-

Golgi body, the most controversial structure of the cytological age, was first of all discovered by C. Golgi (1898) in the nerve cells of barn owl. Golgi named it as "internal reticular apparatus". In the year 1900 HOLMGREN called it 'Trophospongium'. By the claim of HOLMGREN it has fallen into the lap of confusion. Because of the unfortunate coining by Golgi certain doubt existed in the mind of cytologists. First opposition come from PARATE and PAINCEVE in 1924, who elaborated the vacuum theory propounded by ACCOYER in 1924. They stated that Golgi is an artifact. The greatest block to PARATE's view come from CHATENBY and very soon this theory has to be discovered. But again in 1944 JOHN R. BAKER come out with statement that the Golgi produced by deposition of silver or osmium on the periphery of vacuoles.

All thoughts generated in the keenest mind of the eminent cytologist were responsible for the frustability regarding the structure and position of golgi complex. But all these riddles were solved by the discoveries made after by the electron microscope.

MORPHOLOGY :-

a) POSITION :-

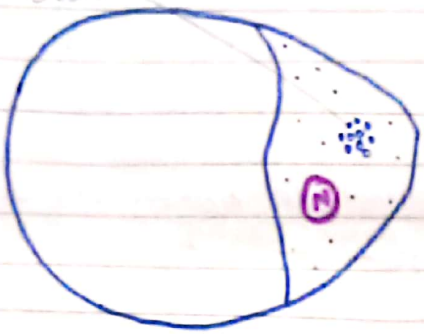
In the epidermal cells golgi is found between the nucleus and the periphery. In the exocrine gland cells it is found in between nucleus and excretory pore. In endocrine gland cells [thyroid] it is found in the centre of follicle.

B) SHAPE :-

In some cells it occurs as a fine reticulum while in others as an irregular ring, hollow spheres in nerve cells. It occurs as a reticulum as wide meshes around the nucleus.

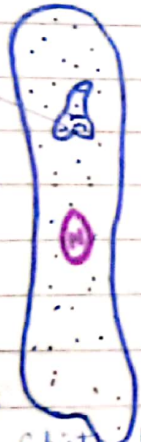
C) SIZE :- It is small in mucous cells but quite large in nerve and gland cells. They appear to be linked to the functional state. Ex. e.g. hypertrophy in hyperfunction.

Erythroblast cell of Guinea pig



Fat cell from Human skin

Cell from pancreas of Cat



Epithelial cell from prostate gland of Dog

Cartilage ce of Cat

ULTRA STRUCTURE :-

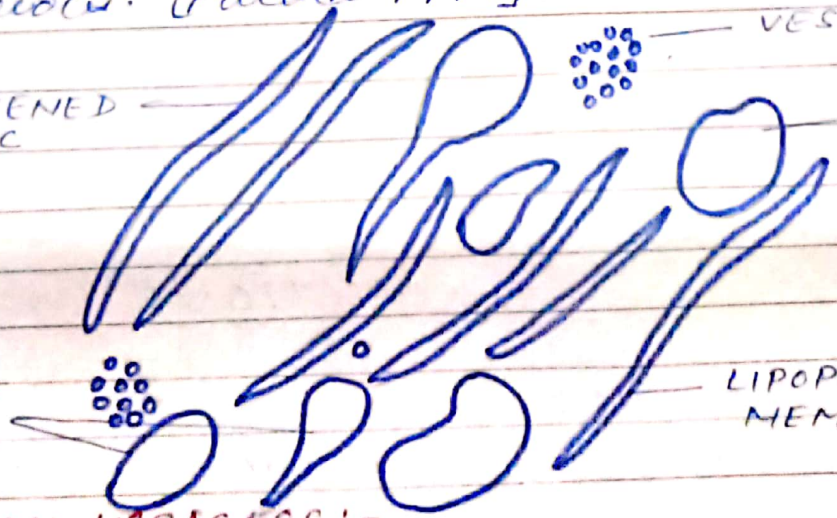
The whole controversy about Golgi complex to have been reconciled now by the studies made with the electron microscope by DALTON and FELIX [1953-57] and by SJOSTERAND. The Golgi contents the following components a) flattened s b) large vacuole & small vesicles & Tubul

a) FLATTENED SACS OR CISTERNAE :-

These are double membrane structure and similar to the smooth surface endoplasmic reticulum. Golgi complex usually consist of four to seven or three to twelve flat tubular or filamentous cisternae which are closely held in parallel bundle one above the other. Each membrane is about 60-70 A° in thickness and the two membranes together with the space in pair are 160-170A°. The space between the two membranes can however vary from 50-200A°. A cisternae is a sac or cavity filled with fluid content.

b) LARGE VACUOLES :-

They represent modified and expanded flattened sacs in which the two membranes of the sacs are more wide and the vacuolar spaces has enlarged. In some cell it may contain dense masses or granules. It is evident in rat liver cell where glycoprotein particles accumulate in the vacuoles. (Palade 1969).



c) SMALL VESICLES :-

These small vesicles of about 600A° are intimately associated with cisternae and may show continuity with

them. They arise from flattened sacs by budding or pinching off the sacs. These are mainly of two type :- smooth and coated.

In 1956 DALTON and FELIX showed that all these three parts of Golgi reduced the osmium tetroxide or silver.

d) TUBULES :-

From the peripheral area of cisternae arise a complex anastomosing flat network of tubules of 300-500 diameter [CLOWES and JUNIPER 1969.]

CHEMICAL COMPOSITION :-

In 1925, NATH believed that Golgi is composed of fatty acids, Lipid and Protein. BOURNE [1942-43] claimed the presence of vitamin C and enzyme such as acid or alkaline phosphatase. BAKER found that it contains lecithin and cephalin BOURNE believed that Golgi contains oxidative enzymes.

Chemical analysis of the Golgi membrane have shown that they have a composition between that of the endoplasmic reticulum and plasma membrane [Kumar and Morre, 1970]