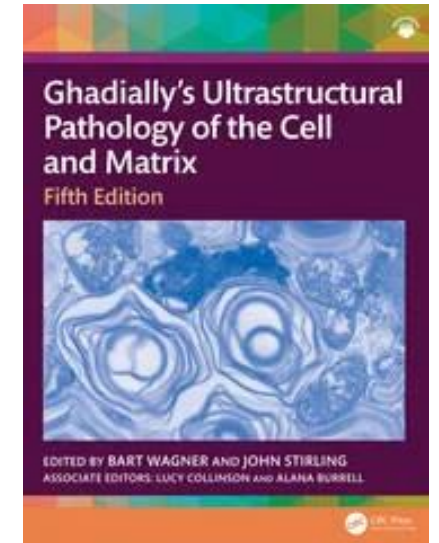


Ghadially's Ultrastructural Pathology of the Cell and Matrix



Editors Wagner and Stirling



Chapter 4

The Golgi Apparatus and Secretory Granules

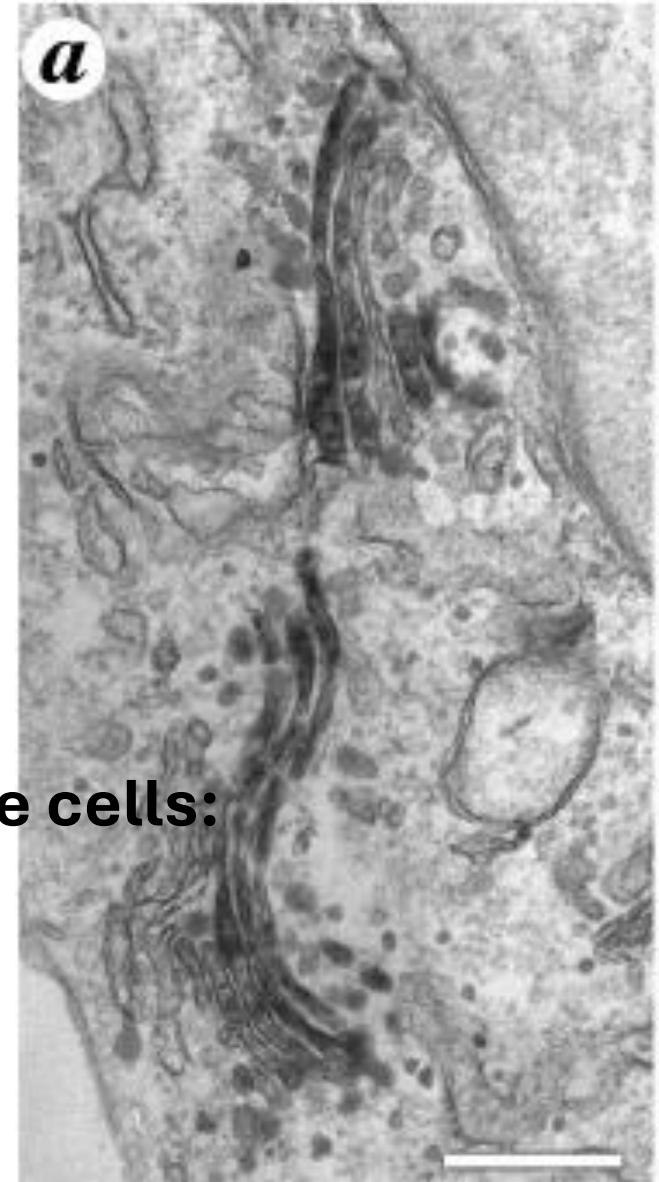
The Golgi apparatus (body)

1898 – Camillo Golgi described a new organelle in nerve cells:

“Apparato reticolare interno”

Stained by the “black reaction”:

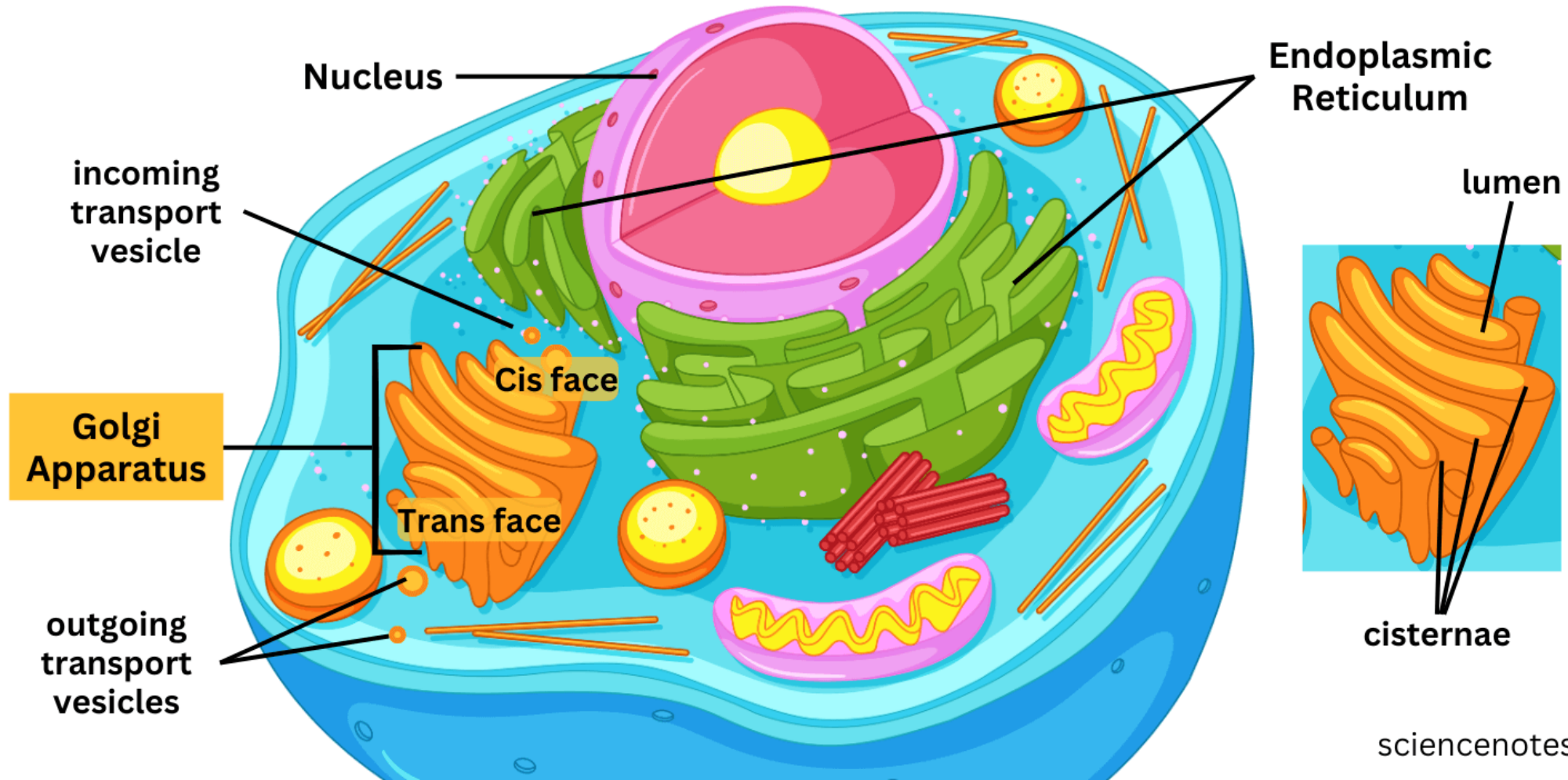
A histochemical stain - caused by the reduction of silver nitrate or osmium in compartments of the Golgi apparatus.



Golgi Apparatus

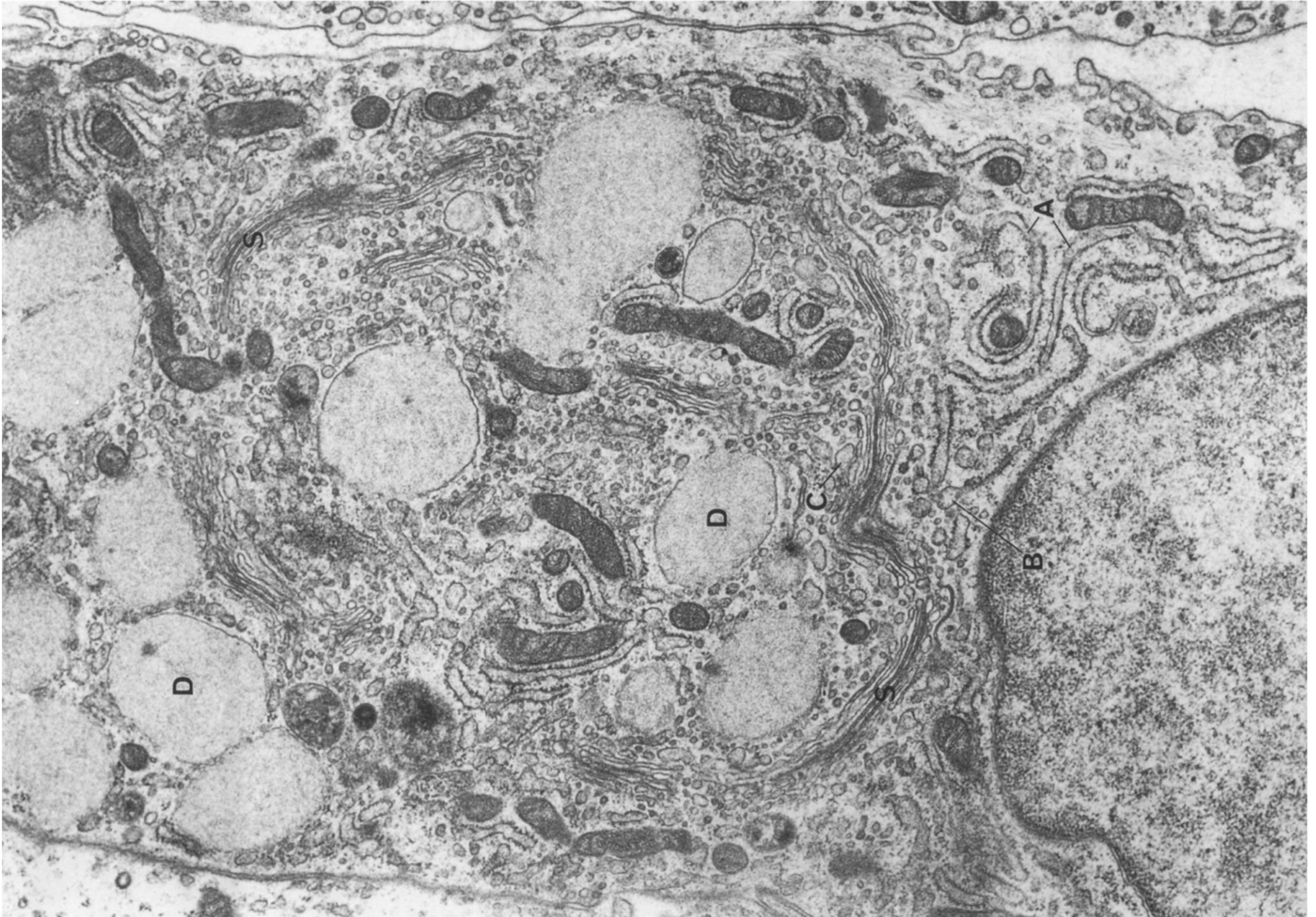
“Cell’s Post Office”

The Golgi apparatus is an organelle that modifies, sorts, and transports lipids, proteins, and other macromolecules.



4.1

Bronchial
mucosal
cell



Golgi apparatus 1997 - 2025

UPDATES!

- Cargo exported to Golgi from the ER via ERES?
- Tubules & vesicles tx cargo from ERES to the ERGIC – a sorting site?
- PLUS > TX via membrane contact sites?
- Tubules and vesicles between cisternae?
- “Wells” in cisternae – specialized areas within cisternae??
- Tubules connect adjacent cisternae in ribbons?
- Cisternae move or are stable?
- Trans Golgi apparatus – final sorting & processing (?) zone. Separate from Golgi?
- Cargo export via endosomal lysosomal transport system
- **How many variants for 4 main models for trans Golgi transport (~2020s)?**

Golgi apparatus

How many variants for 4 main models for trans Golgi transport (~2020s)?

(1) the vesicular transport model

(2) the cisterna maturation-progression model (CMPPM)

(3) the diffusion model

(4) the kiss-and-run model (KARM) - symmetric and asymmetric variants (the latter = carrier-maturation model).

Golgi apparatus



Because of its central role in a range of critical cell activities the Golgi is a major player in health and disease.

????????????????

4.7.2

Arrows???



Lipid

As well as glycoprotein processing and sorting, Golgi bodies and the TGN are also involved in the synthesis and processing of glycolipids and sphingolipids, especially sphingomyelin and chylomicrons.

4.7.2

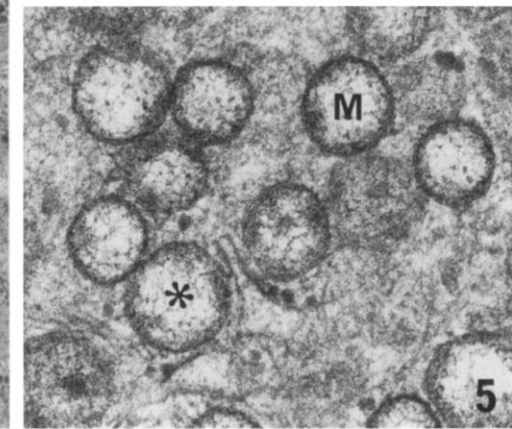
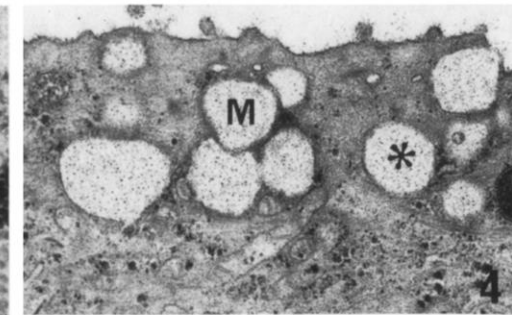
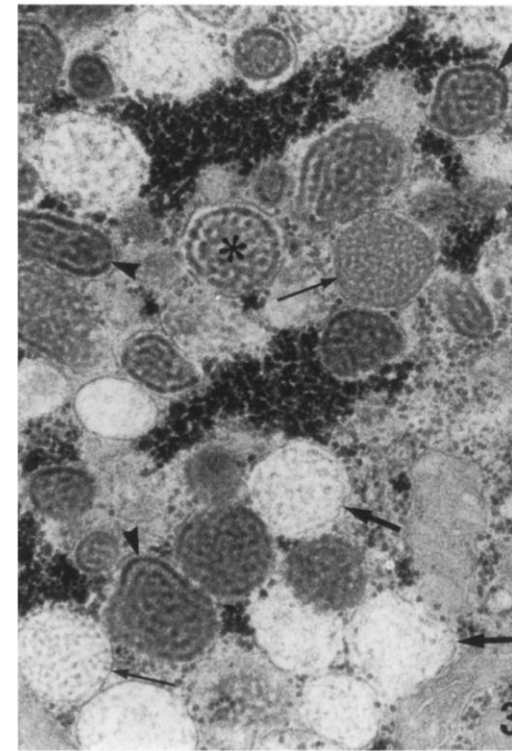
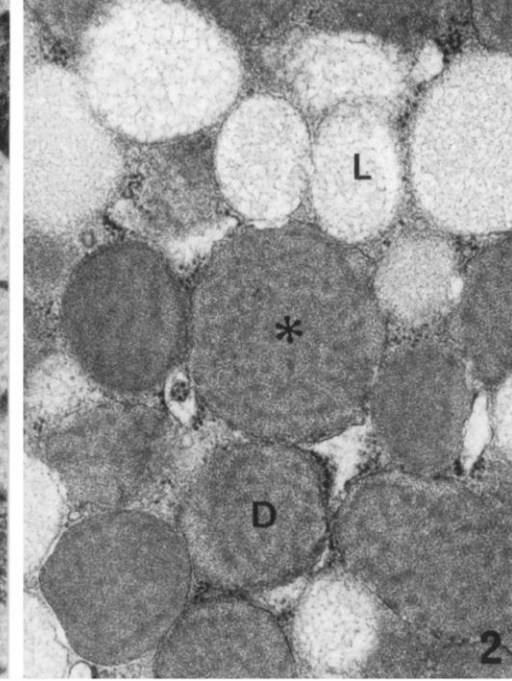
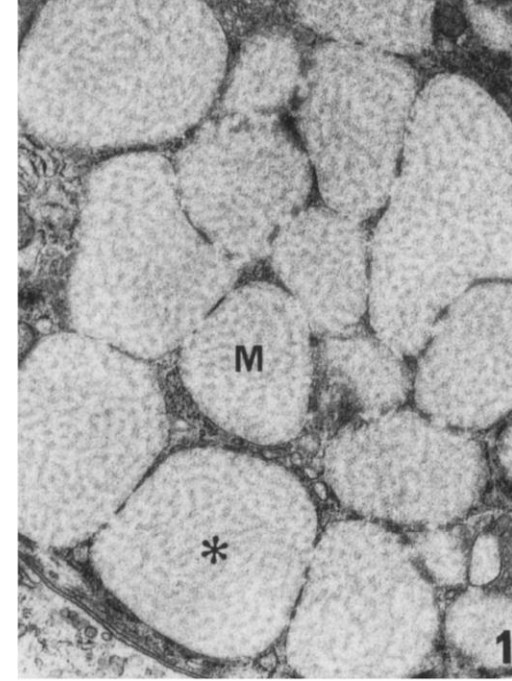
Electron lucent droplets, representing very-low-density lipoproteins, are seen in Golgi vacuoles.



Granule structure: Diagnostics?

4.10

Granules with varying morphology.



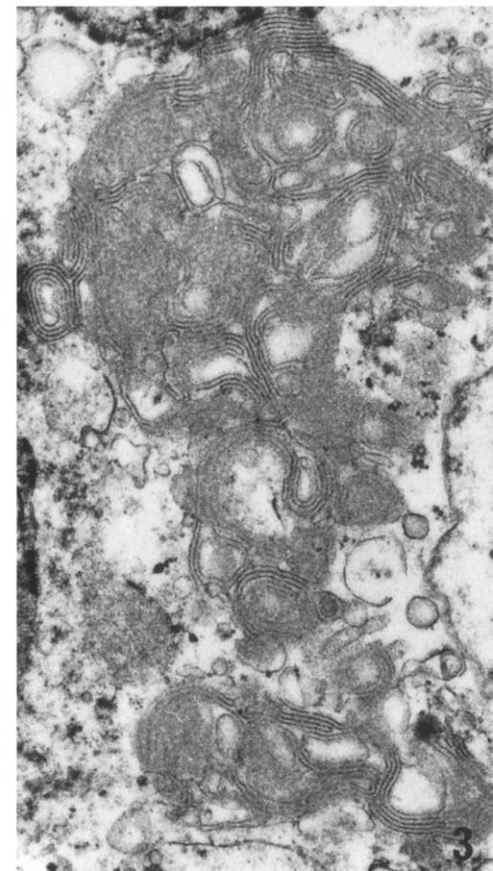
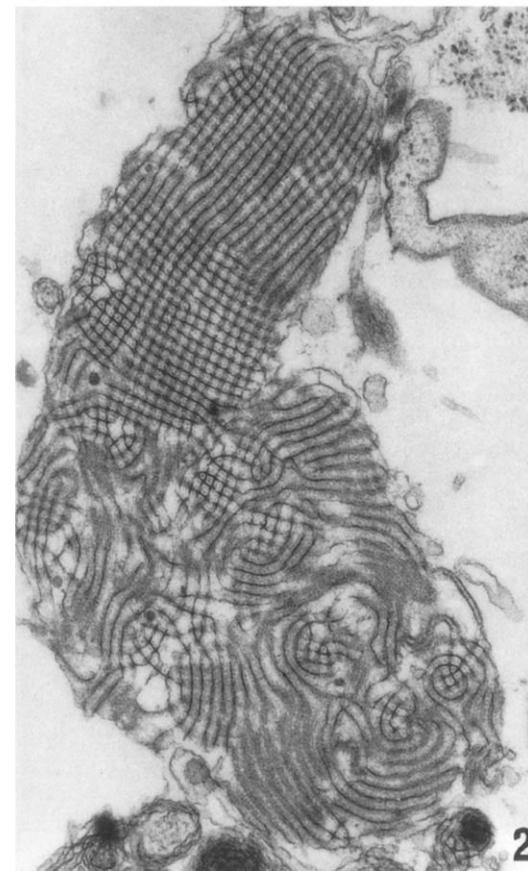
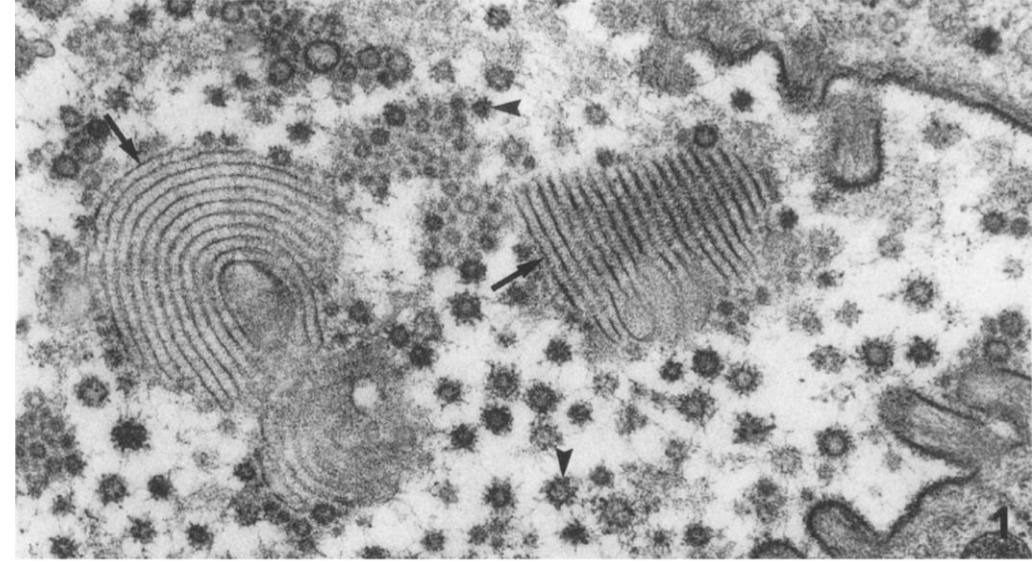
??????????

4.17

Bronchiolo-alveolar carcinoma

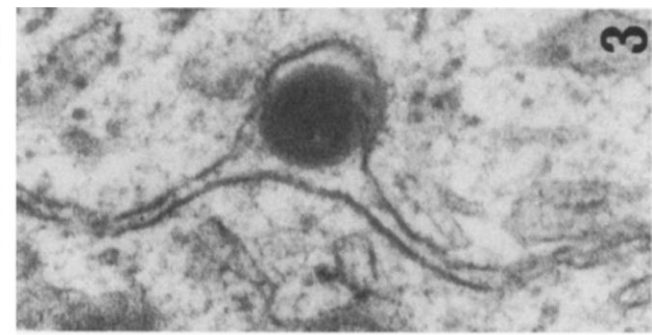
Alveolus surrounded by tumor cells.

Stacks or whorls of highly ordered membranes
(periodicity 39 nm).



What the!??

4.29



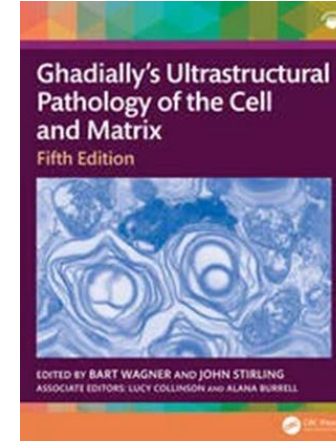
Misplaced exocytosis

4.29

Sparsely granulated prolactin-cell adenoma (Grade IV)

- Secretory granules seen between the lateral cell surfaces in the extracellular space (misplaced exocytosis)
- The cell on the lower left also has multiple well-developed Golgi bodies (G) in these cells, $\times 21,000$.
- **Figures 2 and 3** Higher-power views $>$ exocytosed prolactin granules lying between the cell membranes
- of adjacent cells.

THE END - but there's so much more!



As reviewed by Samuel Pepys:

"The most ingenious book that I ever read in my life".

"So pretty a thing to look on through a microscope"