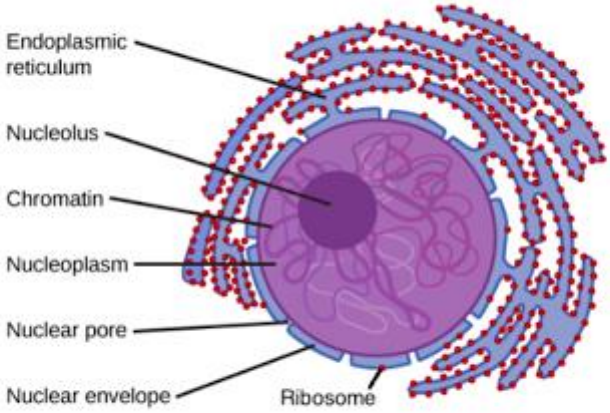
Ribosomes

The ribosomes are protein-synthesizing organelles. Each type of ribosome hat 2 unequal ribosomal subunits. Cytoplasmic ribosomes are composed of ribosomal RMA (RSA) synthesized in the mulches and associated proteins synthesized in the cytoplasm.

They are intensely basophilic. Light Microscopy reveals cytoplasmic accumulations of ribosomes as basophilic patches, formerly termed ergastoplasm in grandular cells and Nissl bodices in neurons, in electron micrographs, ribosomes appear as small, electron-dense cytoplasmic granules.

Cytoplasmic ribosomes occur in 2 forms.

- **Free ribosomes** are individual ribosomes dispersed in cytoplasm.
- **Polysomes** are groups of ribosomes evenly distributed along a single strand of messenger RNA (MENA), an arrangement that permits synthesis of multiple copies of a protein from the same message. Polysomal ribosomes read (translate) the mRAA code and thus play a critical role in assembling amino acids into specific proteins, are found free in the cytoplasm (free polysomes) and attached to membranes of the rER.
- Free polysomes are involved in the synthesis of structural proteins and enzymes for intracellular use.
- Polysomes of the rER are involved Polysome in synthesizing proteins that are secreted or.



Ribosome

Endoplasmic Reticulum

The endoplasmic reticulum (ER) is a complex organelle involved in the synthesis, packaging, and processing of various cell substances. It is a freely anastomosing network (reticulum) of membranes that form vesicles, or cisternae; these may be elongated, fattened, rounded, or tubular.

Transfer vesicles (transitional vesicles) are smell, membrane- limited vesicles that bud from the ER and cross the intervening cytoplasm to reach the Golgi complex for further processing or packaging of their contents.

= ER occurs in 2 forms:

- Rough
- Smooth

Rough endoplasmic reticulum (RER)

The also called granular endoplasmic reticulum. is studded with ribosomes, many of them in Polysomal clusters.

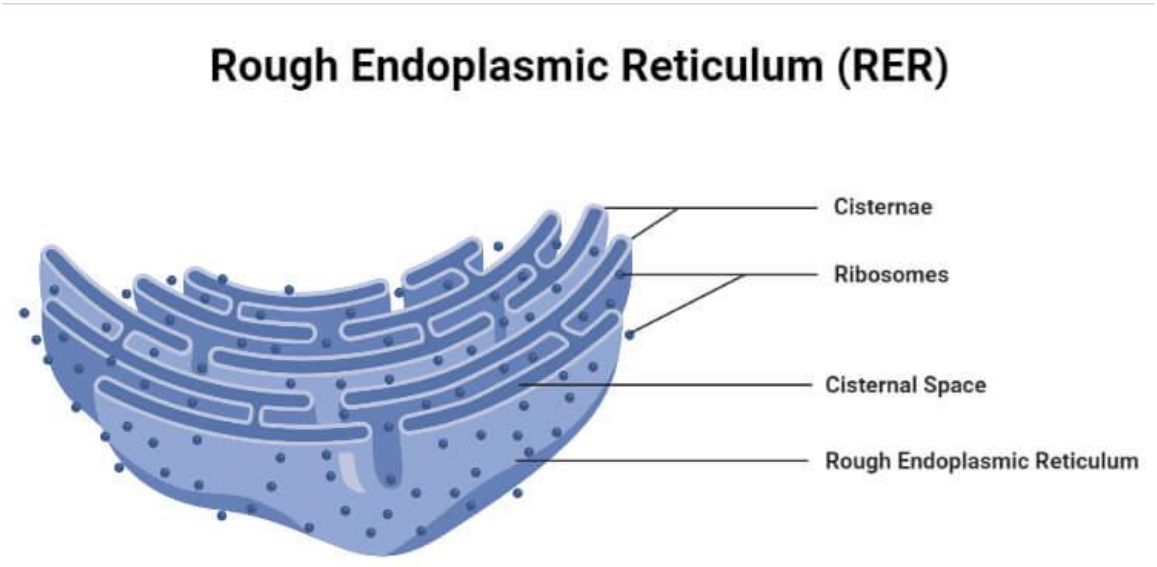
- **RER cisternac** are typically parallel, flattened, and elongated, especially in cells specialized for protein secretion (pancreatic acinar cells, plasma cels).

  The ribosomes give RER basophile staining properties.

  The fine structure of RER (membranes and Individual ribosomes) is visible only with the coercion microscope.

RER is mainly concerned with the synthesis of proteins for sequestration from the rest of the cytoplasm, ie, secretory proteins such as collagen, proteins for incorporation into cell membranes, and lysosomal enzymes (separated from the rest of the cytoplasm to prevent autobuses).

RER in protein-secreting epithelial cells often lies in the basal ectoplasm, between the plasma membrane and the ouches.



Smooth endoplasmic reticulum (SER)

The **smooth endoplasmic reticulum** (SER) lacks ribosomes and thus appears smooth in electron micrographs.

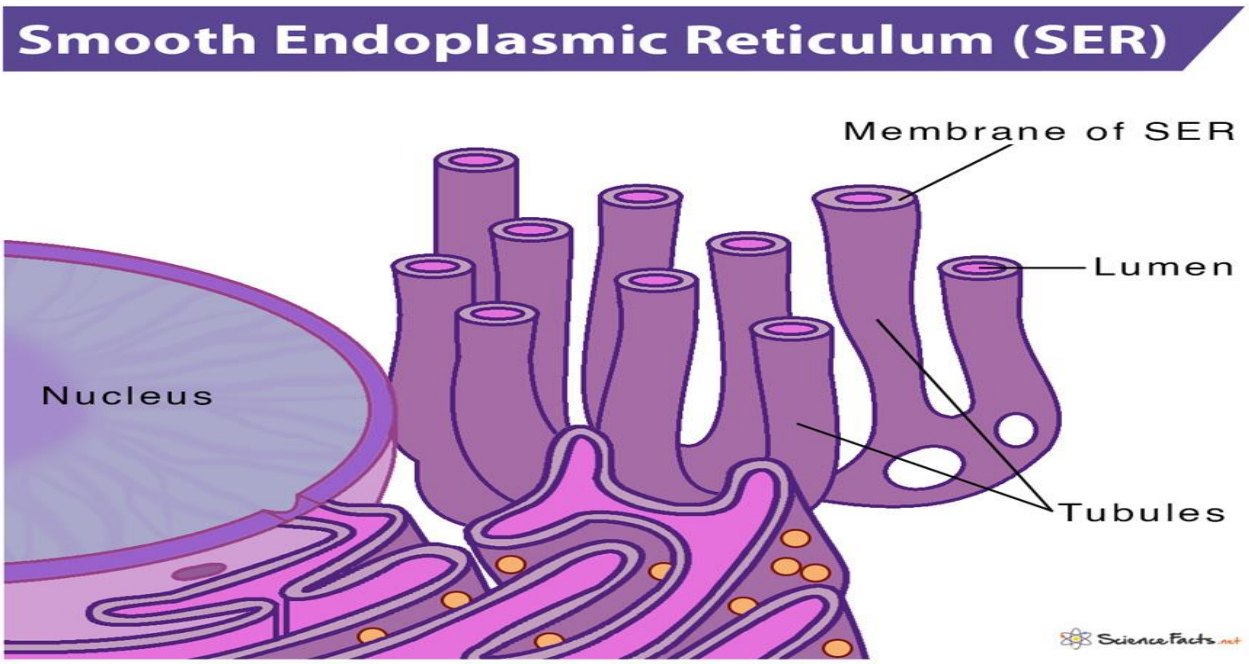
- SER cisternae are more tubular or vesicular than those of RER.
- SER stains poorky, if at all, So with the light microscope it is indistinguishable from the rest of the cytoplasm.

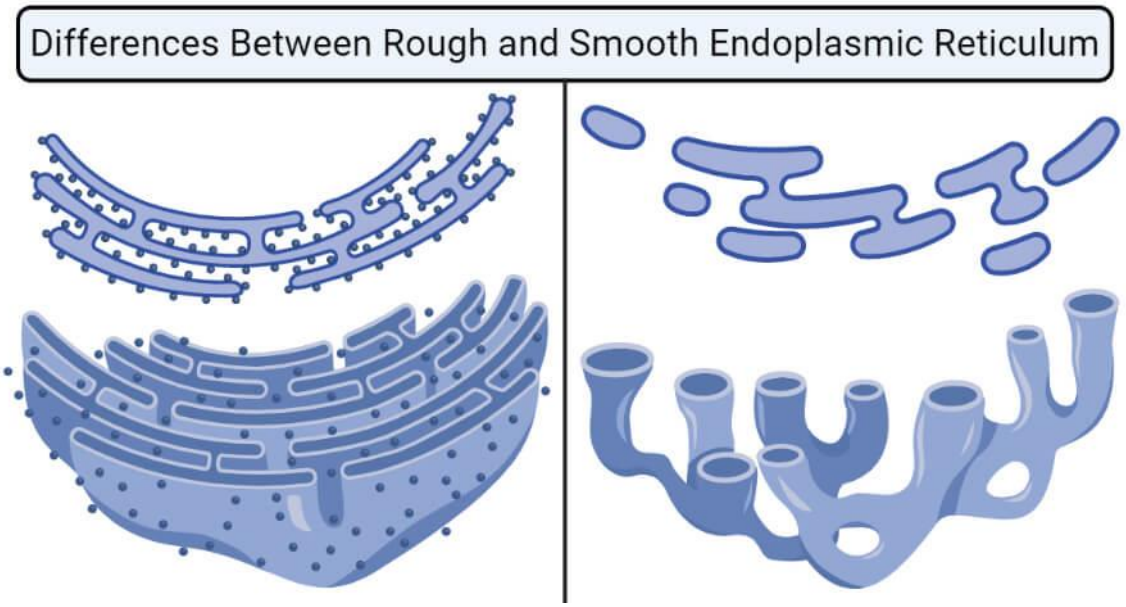
Because it lacks ribosomes, the SER camote synthesize proteins.

It has many enzymes, important in lipal metabolism, steroid hormone syntheses, glycogen Synthesis (glucose-6- phosphatase), and detoxification.

The sER is suspended in the cytoplasm of many cells and is especially abundant in cells that synthesize steroid hormones (cells of the aircoal cortices, gonads in liver cells “hepatocytes”, where it is Involved in glycogen synthesis and drug detoxification).

Specialized SEK termed sarcoplasmic reticulum is found in striated muscle cells, where it helps to regulate mnscle contraction by acupuncturing and releasing calcium ions.





Golgi Complex

The Golgi complex (Golgi apparatus) participates in many activities, particularly those associated with secretion. It has an essential role in coordinating membrane flow and vesicle traffic among organelles. The Golgi apparatus structure is composed of flattened membrane-enclosed sacs called cisternae, and associated vesicles. Here we describe a variety of cell-permeant probes that can be used to distinguish the Golgi morphology in both live and fixed cells. Additionally, these probes have applications in lipid metabolism, trafficking studies, or can be used for measuring rates of lipid synthesis.

The composed of 3 major compartments:

- **Conspicious stack** of 3-10 discrete, slightly curved, flattened cisternae.
- **Numerous small vesicles** peripheral to the stack.
- **A few large vacuoles**, sometimes called condensing vacuoles, at the concave surface of the stack.

- **The cis face** (convex face, forming face) of the stack is usually closest to adjacent dilated ER cisternae and is surrounded by transfer vesicles, Its cisternae stain more darkly with osmium.
- **The trans face** (concave face, maturing face) often harbors several condensing vacuoles and generally faces a away from the nucleus.