

Endoplasmic reticulum

Endoplasmic reticulum (hereinafter referred to as ER) is a membrane-bound organelle (or - better - a system of organelles formed by interconnected cisternae and tubules) that is found in eukaryotic cells. In the endoplasmic reticulum, the synthesis of molecules that also make up other organelles (lipids, proteins, polysaccharides) takes place. In principle, two types of endoplasmic reticulum can be distinguished according to functional and morphological differences:

- **ER smooth**, agranular (smooth, SER)
- **ER rough**, granular (GER)

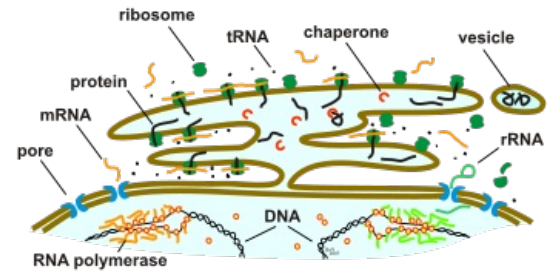
Granular endoplasmic reticulum

Granular ER got its name because of the "granules" of attached ribosomes in the image of electron microscopy. Ribosomes in eukaryotic cells can be either free in the cytoplasm or just bound to the inner membrane of the GER. The GER forms to some extent a continuum with the nuclear membrane, which greatly facilitates the translation of the information encoded in nucleic acids into the structure of proteins. Molecules of mRNA and tRNA can leave the nucleus and reach the site of proteosynthesis in a controlled and well-controlled process.

Agranular endoplasmic reticulum

Smooth ER is the site of synthesis of fats - triacylglycerols - and steroids. It also plays an important role in the "compartmentalization" of the cell, i.e. the separation of individual intracellular spaces. It contains, for example, a many times higher concentration of calcium cations than the rest of the cytoplasm. This fact is important because it is possible to regulate the permeability of the SER membrane and to efflux calcium, as occurs during muscle contraction.

SER can be found in older literature under the term "microsome", because in the cell lysate after ultracentrifugation, SER formed a peculiar fraction, which was further investigated, and the bodies found in it were then also found in intact cells.



Endoplasmic reticulum, diagram of protein synthesis.