

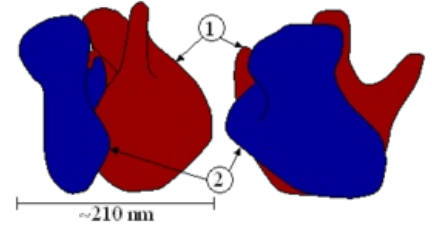
Non-membranous cell organelles

Non-membrane cell organelles include ribosomes, centriole, cytoskeleton and nucleolus.

Ribosomes

Ribosomes are electron-dense particles that are 15–30 nm in size. They are composed of 4 types of RNA and 80 proteins. Their function is mainly translation from mRNA and proteosynthesis. Ribosomes are composed of small and large subunits stored loosely in the cytoplasm. Proteosynthesis takes place at:

- on **free polyribosomes** (polysomes), they produce proteins that remain in the cytoplasm - hemoglobin, contractile proteins (actin, myosin), proteins of intermediate filaments and most mitochondrial enzymes,
- on **ribosomes bound to the granular endoplasmic reticulum**, where proteins intended for export (secretions, lysosomal enzymes, biomembrane proteins) are synthesized.



Ribosome structure: (1) – large subunit, (2) – small subunit

 For more information see *Ribosome*.

Centriole

A centriole is a paired, cylindrical organelle capable of self-division. Microtubules of the cytoskeleton emerge from it. Coupled with the surrounding dense mass (pericentriolar matrix, abbreviated PCM), a centrosome is formed, from which the dividing spindle grows in most animal cells. The wall is made up of nine triplets of microtubules (however, in some animal cells, 9 doublets or even 9 singlets).

Cytoskeleton

The cytoskeleton is a three-dimensional network in the cytoplasm of eukaryotic cell. It mechanically stabilizes the cell, enables its movement and participates in intracellular transport.

The main structural component is the **protein filament** – a polymeric dynamic structure. We distinguish **three types of filaments**:

- actin filaments' (diameter about 7 nm),
- intermediate filaments' (diameter about 10 nm),
- microtubules (about 25 nm in diameter).

Another part of the cytoskeleton are **accompanying proteins**. They regulate the construction and dismantling of filaments, connect them to each other and connect them to other, e.g., membrane proteins.

 For more information see *Cytoskeleton*.

Nucleolus

The nucleolus is the largest structure in the nucleus of eukaryotic cells. It is best known as the site of ribosome biogenesis, which is the synthesis of ribosomes. The nucleolus also participates in the formation of signal recognition particles and plays a role in the cell's response to stress. Nucleoli are made of proteins, DNA and RNA, and form around specific chromosomal regions called nucleolar organizing regions.

 For more information see *Nucleolus*.

Links

Related articles

- Organelle

Sources

- KONRÁDOVÁ, Václava – UHLÍK, ET AL, Jiří. *Funkční histologie*. 2. edition. H & H, 2000. ISBN 80-86022-80-3.