

## Organelles within the cytoplasm:

1. Endoplasmic Reticulum (ER) – complex organelle composed of membrane-bound flattened sacs, elongated canals, and fluid-filled vesicles. The membranous parts are interconnected and communicate with the cell membrane, nuclear envelope and some cytoplasmic organelles. ER is widely distributed through the cytoplasm, providing a tubular transport system for molecules throughout the cell. **ER participates in the synthesis of protein and lipid molecules.** Rough (RER) studded with ribosomes to provide the textured surface. Smooth (SER) no ribosomes.
2. Ribosomes – found on the endoplasmic reticulum and scattered throughout the cytoplasm. All ribosomes are composed of protein and RNA and provide structural support and enzymatic activity to link aa to form proteins. **Ribosomes are the sites of protein synthesis.**
3. Golgi apparatus – composed of a stack of flattened, membranous sacs called cisternae. **Refines, packages, and delivers proteins synthesized by the ribosomes associated with the ER, “delivery truck.”**
4. Mitochondria – elongated, fluid-filled sacs that move through the cytoplasm and can divide. **Organelle housing enzymes that catalyze aerobic reactions of cellular respirations, “powerhouse”.**
5. Lysosomes – “garbage disposals” of the cell whose function is to dismantle debris.
6. Peroxisomes – membranous sacs that resemble lysosomes in size and shape. Most abundant in the liver and kidneys. **Contain enzymes called peroxidases that catalyze metabolic reactions release hydrogen peroxide, which is toxic to cells. Also contain an enzyme called catalase which decomposes hydrogen peroxide.**
7. Centrosome – structure located in the cytoplasm near the nucleus. **Cellular organelle consisting of two centrioles.** Centriole is a cellular structure built of microtubules that organizes the mitotic spindle.
8. Cilia and Flagella – **motile extensions of certain cells.** **Cilia / Microscopic**, hairlike processes on the exposed surfaces of certain epithelial cells. **Flagellum / Relatively long**, motile process that extends from the surface of a cell.
9. Vesicles – membranous, cytoplasmic sac formed by an infolding of the cell membrane. **Transport many substances into and out of cells.**
10. Microfilaments and Microtubules – Microfilaments/rod of the protein actin or myosin that **provides structural support or movement in the cytoplasm.** Microtubules/long, slender, hollow rod of the protein tubulin in the cytoplasm. Usually somewhat rigid and form the cytoskeleton (**maintain the structure of the cell**). In cilia and flagella, **microtubules interact to provide movement.**
11. Other structures – cytoplasm contains chemicals called inclusions. Usually are in a cell temporarily. Inclusions include stored nutrients (glycogen, lipids and pigments).