

4.1.6

The Cytoskeleton

The cytoskeleton, as the name implies, is the structural component of the cell and is composed of a network of proteins that are constantly destroyed, renewed, and newly built. The cytoskeleton functions in maintaining the cell shape, resisting deformation, movement both inside (transport of vesicles within) and migratory movement, cell signaling, endocytosis and exocytosis, and cell division. The cytoskeleton is composed of three major filaments: microfilaments, intermediate filaments, and microtubules filaments. You can explore these components visually at this link:

Cytoskeletal Networks: <https://books.byui.edu/-pBri>

Video: Cytoskeleton Microtubules: <https://youtu.be/5rqbmLiSkpk>

Microfilaments are the thinnest of the cellular filaments and are composed of long chains of protein monomers called G-actin. They can generate force by adding monomers that cause the growing strand to push against barriers like the cell membrane. Other proteins, like myosin, can move along the track and pull against it, generating contractile forces in all cells, which is especially important in muscle cells. Intermediate filaments are stronger than micro filaments and thus help maintain the cell shape. The filaments serve as anchors for other organelles; they also serve as cell-to-cell junctions. Intermediate filaments are also used in helping to maintain the shape of the nucleus. Microtubules are the largest of all filaments, with a hollow structure made up of protein monomers called *tubulin*, which wind like a spiraling staircase. Microtubules are closely associated with an organizing center called the **centrosome**. Microtubule networks serve as "highways" for the transport of vesicles and are important for specialized movements like the swirling tail of sperm cells or the flagellum of bacteria. They also play a crucial role during cell division where they function to pull apart and segregate individual chromosomes.

Now that you have learned about the basic structures of each of the cell organelles, you can see how each of these organelles interact with one another by watching this video:

Overview of Cell Structure: <https://youtu.be/URUJD5NEXC8>



This content is provided to you freely by BYU-I Books.

Access it online or download it at

https://books.byui.edu/bio_264_anatomy_phy_l/416_the_cytoskeleton.