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Perspective

# Centriole Function during Cell Division and Centriole Duplication

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## DESCRIPTION

Centrioles are cylindrical organelles that are commonly present in eukaryotic cells. They are typically found together in the centrosome a granular mass that acts as a hub for microtubule organisation. A protein called tubulin makes up the microtubules in centrioles. The centrioles are arranged inside the centrosome at a right angle to one another. Nine microtubule bundles three per bundle are organized into a ring to form each centriole. All animal cells include centrioles but only a few types of lower plant cells do as well. Higher plants lack centrioles altogether in and of themselves, centrioles do not directly carry out any physiological action. Centrioles play a key role in the development of the centrosome and the cilium. Centrioles influence where spindle poles originate but since spindle poles can self-organize the centriole's role in mitosis is not required. Centrioles are essential for the assembly of cilia especially primary cilia that serve as cellular antennas and are in charge of assembling the spindle fibres in the mitotic spindle apparatus. They are also assumed to be involved in the completion of cytokinesis during the process of cell division.

Centriole function during cell division is correlated with centriole duplication. Two centrioles are present in newly formed cells and these centrioles begin replicating DNA. When cell division begins the centrosome splits into two which also causes the centrioles to separate.

### Role of centriole in stages of mitosis

When prophase begins the cell has already made a copy of its DNA. As a result, the cell's nucleus contains two sister chromatids which are connected copies of the chromosomes. A centrosome is built when two centrioles join forces to form a structure and it is then replicated. The nuclear membrane is damaged during the second stage of mitosis when M-CDK kinases phosphorylate the nuclear lamina Cyclin-dependent kinases. As a result, the chromosomes are accessible to the spindle fibres.

The microtubules should firmly tie the chromosomes to the centrosomes located on both sides of the cell when metaphase begins and the mitotic spindle that occurs between centrosomes has bound to the chromosomes and structured them into a linear horizontal arrangement at the centre of the cell. The appropriate division of the chromosomes during division depends on the centrosomes and chromosomes being connected in this manner.

The chromatids arrive at the rest of the metaphase plate during the anaphase of the cell the metaphase plate is merely the area at the cell's centre. By shortening them the chromosomes are drawn to the opposite poles separating them from the pairs.

The final stage of cell division known as Telophase starts after the cell has almost completed splitting itself in half. During this phase the two cell halves divide to form their own distinct cells and they then start re-constructing important regular cell features like the nuclear membrane.

By doing this the centrioles create spindles that aid in dividing the chromosomes into two fresh daughter cells. The transmission of genetic or hereditary information between new cells is another name for this process. Plant cells simply build a new cell wall down the centre but animal cells divide by compressing the cytoplasm in the middle until the cells have divided.

## CONCLUSION

Centriole duplication is associated with centriole function during cell division. In newly created cells, there are two centrioles, and these centrioles start replicating DNA. The centrioles separate as cell division starts because the centrosome divides into two. The centrosome and the cilium both form as a result of centrioles. Centrioles have an impact on the origin of spindle poles, but since spindle poles can self-organize, the centriole is not necessary for mitosis.

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