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[\[BioMedical\] Academia Sinica Researchers Shed Light on One of the Mysteries of Cell Division, Move Closer to Understanding the Mechanism Governing Brain Size](#)

[BioMedical] Academia Sinica Researchers Shed Light on One of the Mysteries of Cell Division, Move Closer to Understanding the Mechanism Governing Brain Size ([Chinese Version](#))

Academia Sinica Newsletter (2009/07/15) The centriole is an organelle found in most animal cells. Its duplication involves the growth of a procentriole (a daughter centriole). Up until now, the molecular mechanisms controlling the growth of the procentriole were unknown. In a Letter published in the the July issue of the prestigious scientific journal Nature Cell Biology, Dr. Tang K. TANG, a Research Fellow at the Institute of Biomedical Sciences (IBMS), Academia Sinica, reported that procentriole growth is governed by the protein 'centrosomal P4.1-associated protein' (CPAP).

Earlier research has connected CPAP (also named CENPJ) to brain size. In 2005, researchers reported that the genetic disorder autosomal recessive primary microcephaly (MCPH), which is characterized by a substantial reduction in size of the cerebral cortex and a generalized reduction in size of the remainder of the central nervous system, is caused by a mutation in the CPAP gene and one other gene. However, the mechanism by which CPAP operated was unknown.

The research of Dr. TANG and colleagues at IBMS now suggests that the mechanism by which CPAP affects the growth of the brain is possibly by the disruption of centriole replication during neurogenic mitosis.

The cell cycle is the process by which cells divide and multiply. The biologists discovered that CPAP levels fluctuate during the cell cycle and that the protein is degraded at the stage called "late mitosis." They further found that an excess of CPAP induced the formation of elongated centrioles and CPAP depletion inhibited the duplication of the centrosome, a cell organelle that is intimately involved with the cell cycle and in which the centrioles are contained.

The researchers will now go on to investigate the effect of neurogenic mitosis in CPAP gene knockout mice and the significance of CPAP in cells with cilia, such as lung cells and sensory cells, and sperm cells which have flagella, said Dr. TANG, as cilia and flagella are essentially created from elongation of centrioles.

The whole Letter entitled "CPAP is a cell-cycle regulated protein that controls centriole length" can be found in the July issue of Nature Cell Biology at: <http://www.nature.com/ncb/journal/v11/n7/abs/ncb1889.html>

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