

Biologists identify proteins vital to chromosome segregation

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New York University biologists have identified how a vital protein is loaded by others into the centromere, the part of the chromosome that plays a significant role in cell division. Their findings shed new light on genome replication and may offer insights into the factors behind the production of abnormal numbers of chromosomes.

Their findings appear in the latest issue of the journal the [Proceedings of the National Academy of Sciences](#).

The researchers focused on the organization and functioning of the centromere, which is responsible for chromosome segregation—a process that ensures that replicating cells receive a complete copy of the genome. Disruption of this process can lead to the production of an abnormal number of [chromosomes](#)—a condition evident in 90 percent of cancer cases.

To explore the mechanics of the centromere, the researchers examined fission yeast. This species of yeast is a [model organism](#) in [cell biology](#) because its chromosome replication and the regulation of its centromere are similar to that of humans.

In the PNAS study, the researchers focused on a protein, CENP-A, present in both humans and [fission yeast](#). They specifically examined how it is incorporated into the centromere during cell division in order to better understand its role in this process.

Their results identified that a trio of proteins—Dos1, Dos2, and Cdc20—work together to assemble CENP-A at centromeres as they duplicate. They further observed that any disruption of this process subsequently places this vital protein outside of the centromere—thereby preventing it from performing its role of ensuring proper chromosome segregation.

"CENP-A is the engineer of the centromere," explained Fei Li, an assistant professor in NYU's Department of Biology and the study's senior author. "Without this protein, the centromere simply can't function."

Li noted that many forms of cancer have been linked to malfunctioning CENP-A.

"Hopefully, these findings can contribute toward the development of improved strategies for the diagnosis and treatment of cancer," he added.

Provided by New York University

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