

# Researchers characterize novel regulator of chromosome function

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The Stowers Institute's Workman Lab has shed new light on a novel histone acetyltransferase protein complex called ATAC.

Acetyltransferases are enzymes that introduce a new acetyl functional group into histone proteins, a process by which all chromosome functions are controlled.

The findings were posted to the Web site of *Nature Structural and Molecular Biology* yesterday and will appear in a future print edition of the journal.

ATAC is unique as the only acetyltransferase protein complex that contains two distinct acetyltransferase enzymes; one that generally activates processes like gene transcription and DNA repair and another that makes a specific modification thought to alter chromosome structure. ATAC can also assist in the movement of chromosome subunits, called nucleosomes, along DNA.

The work was conducted using the *Drosophila*, or fruit fly, model — ATAC is present in multicellular organisms, including fruit flies and humans, but not in lower eukaryotes, like yeast.

“We knew that the ATAC complex existed and that it was only present in multicellular organisms, but we did not know all the proteins it contained or what their functions were,” said Tamaki Suganuma, Ph.D., Postdoctoral Research Associate and first author on the paper. “In this work, we were able to identify the protein components of ATAC to gain

insight into its functions.”

The improved understanding of ATAC may lead to a better understanding of a number of human diseases.

“We were able to show that in *Drosophila*, the ATAC complex is essential for development of the embryo to an adult organism,” said Jerry Workman, Ph.D., Investigator and senior author on the publication. “It is likely that ATAC will also be required for development of mammals, including humans, and that by understanding the functions of ATAC we will be better able to pinpoint its role in developmental defects and cancers.”

Having characterized all of the proteins in ATAC, the Workman Lab will now focus on which chromosomal functions it regulates and how these actions contribute to development.

Source: Stowers Institute for Medical Research

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