

Enzyme can steer cells or possibly stop them in their tracks

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Researchers at Albert Einstein College of Medicine of Yeshiva University have discovered that members of an enzyme family found in humans and throughout the plant and animal kingdoms play a crucial role in regulating cell motility. Their findings suggest an entirely new strategy for treating conditions ranging from diabetic ulcers to metastatic cancer.

David Sharp, Ph.D., associate professor of physiology & biophysics, was the senior author of the study, which was published in the March 6 online edition of *Nature Cell Biology*.

"[Cells](#) in our bodies are in constant motion, migrating from their birth sites to distant targets," said Dr. Sharp. "Cellular movement builds our tissues and organs and underlies key functions such as the immune response and wound healing. But uncontrolled cell migration can lead to devastating problems including mental retardation, vascular disease and metastatic cancer."

Dr. Sharp and his colleagues found that certain members of an [enzyme](#) family known as katanin concentrate at the outer edge of non-dividing cells where they break up microtubules – dynamic intracellular polymers that regulate cell movement by controlling the formation of protrusions called lamellipodia. (Polymers are large molecules composed of many repeating units.)

When Dr. Sharp's team treated motile cells of the fruit fly *Drosophila*

with a drug that inhibited katanin production, the treated cells moved significantly faster than control cells and with a striking increase in high-velocity movements, indicating that katanin prevents cells from moving too rapidly or in an uncontrolled manner. The researchers observed similar effects with katanin when they examined human cells.

"Our study opens up a new avenue for developing therapeutic agents for treating wounds – burns and diabetic ulcers, for example – as well as metastatic disease," added Dr. Sharp.

Describing katanin as a "microtubule regulator," Dr. Sharp said that its ability to modulate the speed and direction of cell movement – and not just control whether or not it occurs – could be especially useful from a clinical standpoint. Drugs that inhibit katanin, for example, could encourage cells to migrate in a particular direction to heal wounds. Conversely, he said, katanin itself or drugs that stimulate its production might be useful in treating or preventing [cancer](#) metastasis.

More information: The title of the paper is "Drosophila katanin is a microtubule depolymerase that regulates cortical-microtubule plus-end interactions and cell migration."

Provided by Albert Einstein College of Medicine

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