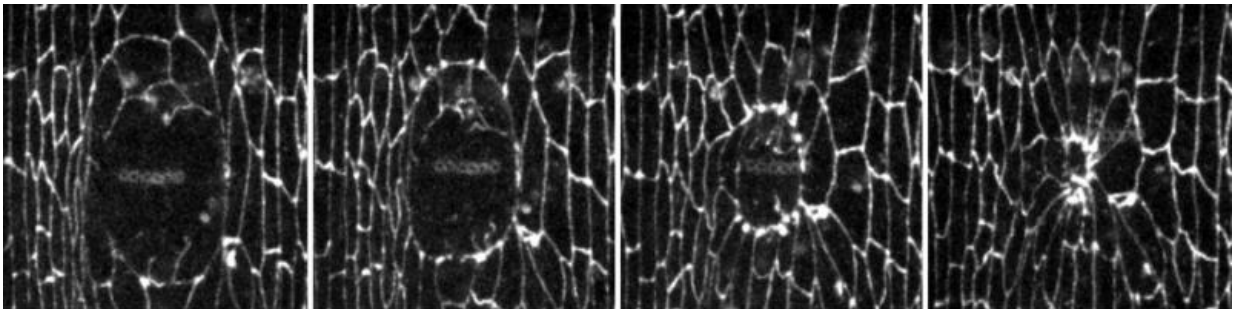


Biologists identify mechanisms of embryonic wound repair

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Time-lapse images show the process of wound closure in the fruit fly embryonic epidermis. The process of endocytosis removes the junctions between wounded and non-wounded cells, allowing the non-wounded cells to move and stretch over the wounded area to close the wound. Credit: Miranda Hunter/University of Toronto

It's like something out of a science-fiction movie - time-lapse photography showing how wounds in embryos of fruit flies heal themselves. The images are not only real; they shed light on ways to improve wound recovery in humans.

Researchers at the University of Toronto (U of T) and the Hospital for Sick Children have found that the process of endocytosis - how cells "eat" by absorbing [molecules](#) - drives rapid embryonic healing.

"Endocytosis removes the junctions between wounded and non-wounded cells, to allow the non-wounded cells to move and stretch over the wounded area to close the wound," said Miranda Hunter, a PhD candidate in the Department of Cell & Systems Biology and lead author of a research study published in the August 31 issue of the *Journal of Cell Biology*.

The researchers further found that [endocytosis](#) coordinates the movement of the non-wounded cells as they close the wound, by directing the formation of a structure known as a "purse string". The structure assembles around the wound and rapidly contracts to draw the surrounding cells together and close the wound.

"Wounds in embryos heal very quickly and with very little inflammation or scarring," said Hunter. "Our hope is that by understanding how embryos repair [wounds](#), we can translate our understanding into more efficient treatments to induce adult cells to move into the wound area in a coordinated way as embryonic cells do."

The researchers used embryos of [fruit flies](#) as a model system for human [embryos](#). Fruit flies are commonly used in genetic studies because they share a surprising number of qualities with humans. Further, they are inexpensive to care for and reproduce rapidly, allowing for several generations to be studied in just a few months.

Hunter's PhD supervisor Rodrigo Fernandez-Gonzalez, a bioengineering specialist in U of T's Department of Cell & Systems Biology and Institute of Biomaterials and Biomedical Engineering, as well as the Developmental and Stem Cell Biology program at the Hospital for Sick Children, said the study offers a range of important new information.

"It shows how cells move in a coordinated manner, which helps us to understand more about processes such as cancer metastasis and

embryonic development."

More information: The study entitled "Polarized E-cadherin endocytosis directs actomyosin remodeling during embryonic wound repair" was published in today's issue of the *Journal of Cell Biology*.

Provided by University of Toronto

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