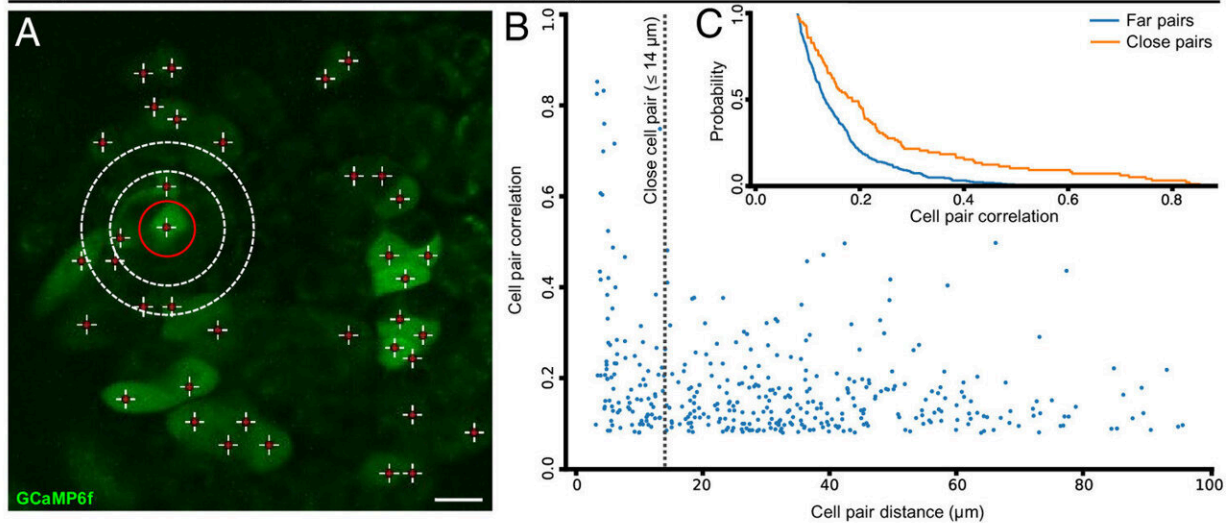


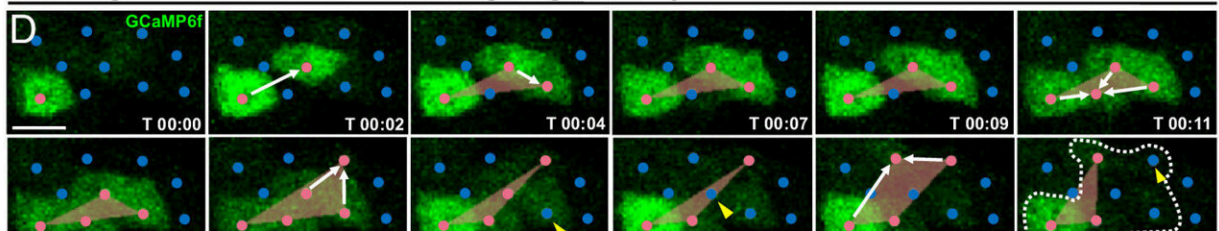
How do cells coordinate their behavior with other cells to create tissue-scale behaviors?

July 29 2024

Analysis of Ca²⁺ cell pair synchronization in blood progenitors



Visualizing the evolution of a local transient signaling community



Blood progenitor cell–cell communication forms communities of propagative Ca²⁺ signaling. Credit: *Proceedings of the National Academy of Sciences* (2024). DOI: 10.1073/pnas.2318155121

Cells communicate with one another during development, but what are the steps that enable them to transition from local cell-cell

communication to a globally synchronized tissue-scale behavior?

Ben-Gurion University of the Negev's Prof. Assaf Zaritsky and his international colleagues have identified a new mode of communication that involves recurring "communities" of cells that are associated with the fruit fly (*Drosophila*) lymph gland developmental process. These findings may begin to explain how collective tissue behavior emerges from single cell interactions.

Their findings were [published](#) in the *Proceedings of the National Academy of Sciences*.

The team found communities of three to ten cells each which both communicated extensively among themselves and received and transmitted information to the surrounding cells. Cells that participated in multiple communities merged to form larger communication hubs, called "hotspots" that repeatedly spread and retrieve information throughout the lymph gland to synchronize the tissue.

These "hotspots" resemble beating pacemaker heart cells that coordinate other individual cells to guide collective decisions in the heart. These communities and "hotspots" emerged in advanced stages of lymph gland [development](#), and required the existence of tiny channels, called "[gap junctions](#)," that connect adjacent cells and allow them to communicate with each other by direct passing of molecules and ions between them.

"We pinpointed an intermediate spatial scale between single-cell and tissue function involving cell [communities](#) working together to coordinate the collective. These results highlight how diversity in local cell-cell [communication](#) can contribute to collective decision making," explains Prof. Zaritsky.

Prof. Zaritsky is a member of the Department of Software and

Information Systems Engineering.

Additional researchers included: Saar Ben David from the same department at Ben-Gurion University and Kevin Ho and Guy Tanentzapf from the Department of Cellular and Physiological Sciences at the University of British Columbia.

More information: Saar Ben David et al, Formation of recurring transient Ca²⁺-based intercellular communities during *Drosophila* hematopoiesis, *Proceedings of the National Academy of Sciences* (2024). [DOI: 10.1073/pnas.2318155121](https://doi.org/10.1073/pnas.2318155121)

Provided by Ben-Gurion University of the Negev

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