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Cell Antennas Tune In To Chemical Signals

Thin, fingerlike protrusions are essential in aiding cells to trace molecular messages they need for development.

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When cells in a developing animal grow to form tissues and organs, they often are responding to gradients of chemical signals, yet the precise mechanisms by which these molecular messages are received and transduced remain unknown. Research led by Thomas B. Kornberg of the University of California, San Francisco, suggests that thin, fingerlike protrusions from the cell known as filopodia or cytonemes play a part in this process (Science, DOI: 10.1126/science.1198949). Kornberg’s team, which discovered the existence of the mysterious protrusions in 1999, took a closer look at filopodia function in cells that develop into the eyes, airways, and wings of fruit flies. The researchers found that developing cells extend filopodia when they sense particular protein signals made by different sets of cells. Signaling protein receptors aggregate in the filopodia and orient toward the cells that are producing the recognized molecular signal. In this way, the developing cell can tune its reception for chemical signals in different directions as needed.

Cells receive chemical signals through wispy filopodia extensions.

Credit: Science

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