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Pictures in cell biology

Cytonemes

Earlier this year, Ramírez-Weber and Kornberg published a striking paper characterizing cytoplasmic extensions of cells in *Drosophila* wing imaginal discs¹. They labelled cells of the *Drosophila* wing imaginal disc by constructing a fly line that expressed green-fluorescent protein (GFP) specifically in the lateral flanks of the disc. In imaginal discs dissected from these flies, they saw, as would be expected, green-fluorescent

labelling of the flanks of the disc, but, surprisingly, they also saw long threadlike projections emanating from the cells at the periphery of the disc towards the centre, which they named cytonemes (Fig. 1). To study the induction of cytonemes, the authors cultured wing disc cells and found that cells from the flanks cultured in the presence of the central cells grew cytonemes directed towards the central cells. This suggested that the central cells produce a chemoattractant that induces cytoneme formation. *Drosophila* fibroblast growth factor (FGF) was able to induce cytoneme formation in culture, implying that it might be the factor responsible.

This is a very interesting result because it suggests a novel mechanism by which different groups of cells located some distance from each other could communicate during development. It is possible that cytonemes are a widespread developmental phenomenon, but at this point it is also possible that they are unique to wing imaginal discs or even to the GFP-labelled cells. Ramírez-Weber and Kornberg described preliminary evidence that a similar process can occur in mouse limb-bud cells and chick embryo cells, but it will be important to verify the existence and role of cytonemes in other contexts before concluding that they constitute a major mechanism of cell-cell communication during development.

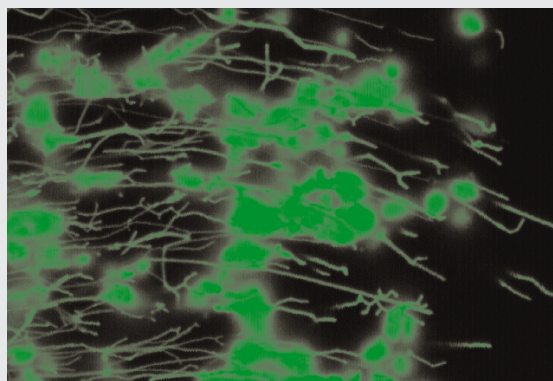


FIGURE 1

Cultured cells from the anterior region of a *Drosophila* wing imaginal disc projecting cytonemes towards unlabelled cells from the centre of the disc. The cytonemes are visualized by the expression of green-fluorescent protein (GFP) in the originator cells.

Reference

- 1 Ramírez-Weber, F. A. and Kornberg, T. B. (1999) *Cell* 97, 599–607

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