

Poster

Influence of the 3D environment in collective cell migration



Esther Molina López, Andrea Valencia Expósito, María Dolores Martín Bermudo

Centro Andaluz de Biología del Desarrollo (CABD-CSIC), Sevilla, España

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ABSTRACT

Motivation: Cell migration plays a key role in several biological processes, such as embryo development or immune system maintenance, and its alteration is involved in pathological conditions like cancer and metastasis. Cells can migrate individually or as a group, but in both cases, they migrate *in vivo* through a complex 3D environment, although the contribution of that environment to cell migration is still poorly understood. The migration of the border cells in the *Drosophila melanogaster* ovaries constitutes an ideal system to study collective cell migration *in vivo*. Border cells are a group of cells that detach from the follicular epithelium that surrounds the egg chamber and migrate through 15 germ cells, called nurse cells, until they reach the oocyte. In this project we use the border cell migration to study the influence of the 3D-environment over the collective migration of a group of cells.

Methods: we analysed the border cell migration in both fixed and live samples in wild type and mutant conditions, which were generated either using mutants or expressing RNAs using the UAS-GAL4 system. Fixed samples were stained with some dyes and antibodies to visualize actin, DNA and the border cells, and *in vivo* analysis was performed using fly strains carrying fluorescently labelled proteins. In all cases, samples were analysed by confocal microscopy and images and movies were processed with ImageJ and Imaris software.

Results: the aim of this project was to analyse the influence of the 3D environment (organization of the nurse cells) in border cell migration. For this purpose, the first step was the identification of two mutant alleles of a gene that, when combined, cause an abnormal organization of the nurse cells. Then, we found that in this mutant background border cell migration was affected. Furthermore, there was a correlation between border cell migration defects and aberrant distribution of nurse cells (especially in the most anterior part of the egg chamber).

Conclusions: according to our findings, we can say that the organization of the 3D environment is a key factor in collective cell migration, since it is necessary to maintain the forces balance required by cells to migrate.

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