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Drosophila ovarian stem cell niche ageing involves coordinated changes in transcription and alternative splicing

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Dilann Even-Ros , Judit Huertas-Romero , Miriam Marin-Mengualo , Gretel Nussbaum , Miguel Borge , Manuel Irmler , Federico Zurita , & Acáimo González-Reyes

Gene expression (GE) and alternative splicing (AS) contribute to the formation of new interaction networks with potentially significant cellular functions. Here, we investigate ageing in the *Drosophila* female germline stem cell (GSC) niche and describe functional changes in both GE and AS. The GSC niche comprises two types of support cells, whose transcriptomes reveal differential GE and AS variations related to cell adhesion, cytoskeleton and neural signalling. Because each population shows distinctive GE and AS changes, niche cell types possess unique ageing signatures. Depending on the cell population, groups of genes display changes in both GE and AS, revealing a coordinated regulation of transcription and splicing during niche ageing. One such gene is *Fasciclin2*, a neural adhesion molecule that we find is essential for niche ageing. Furthermore, genetic analysis in AS underlines changes in GE and/or AS themselves, providing a mechanistic explanation for the coordination of these two processes during niche ageing. This is the case of the splicing factor *Smid*, described here as a key element necessary for ovarian niche homeostasis.

The healthy function of adult organs in animals requires controlled homeostasis during tissue maintenance or in response to pathophysiological situations. As a general principle, tissue function relies on populations of adult stem cells capable of maintaining most of the cell types found in the organ (tissue homeostasis) and by controlling proliferation and genomic integrity, cell adhesion, responsiveness to signalling, cell

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The healthy function of adult organs in animals requires controlled homeostasis during tissue maintenance or in response to pathophysiological situations. As a general principle, tissue function relies on populations of adult stem cells capable of maintaining most of the cell types found in the organ (tissue homeostasis). Precise in most tissues studied to date, stem cells often reside in specialized microenvironments (niches) known to

control expansion of stem cells, as shown for the hematopoietic system. It can also induce a decrease in their proliferative capacity and stem cell loss. At the cellular level, ageing is accompanied in stem cells by an increase in genomic stress (including higher concentrations of reactive oxygen species) and by changes in epigenetic regulation and genomic integrity, cell adhesion, responsiveness to signalling, cell

Martínez, profesor del departamento de Genética
y su equipo han publicado el siguiente artículo.

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