Talk

Identification of new genes that regulate cellular migration and invasion

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ABSTRACT

Collective cellular migration is an evolutionarily conserved mechanism which plays a crucial role in several biological processes such as embryo development or immune system maintenance. However, this mechanism is also prominent in pathological conditions, such as cancer and metastasis. The amount of genetic strategies available in Drosophila makes it an ideal model system to study the process of cell migration.

In this study, we have used Drosophila and in particular two tissues with proliferative capacities, the wing disc and the adult fly intestine, to identify new genes regulating the acquistion of metastatic properties by tumor cells. To do this, we have used the UAS:Gal4 system to knock down a collection of random genes via RNAi in tumor cells that express an activated form of Ras, RasV12. By analysing cell morphology, proliferation and survival in fixed tissue, using confocal microscopy, we have seen that RNAis expression against 3 of these genes CG31393, CG16857 and CG33993, results in loss of tissue architecture and over-proliferation in both the wing disc and the larval intestine. Interestingly in this last case, over-proliferation is more prominent in the base of the Malpighian tubules, which is populated by cells with similar characteristics to stem cells. In addition, restrictive expression of the RNAis in groups of cells in the wing disc, either by clonal analysis or specific Gal4 expression, have shown that these cells are able to migrate outside of the tumor area, suggesting the acquisition of a metastatic behaviour. Ultimately, CRISPR was used for the generation of mutants in these genes to support data obtained by RNAi expression.

Our results strongly suggest that these three genes regulate the tumurogenetic properties, proliferation and migration, of RasV12 tumor cells. In the future, we propose to analyse whether mutations in these genes phenocopy expression of the RNAis and try to identify the molecular and cellular mechanisms by which these genes regulate tumurogenesis.

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