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## Some brain tumors mimic the genetic program of germline cells

### ***The silencing of specific genes of the germinal cell lines reduces brain tumors in flies***

Scientists at IRB Barcelona have discovered that some brain tumours in larvae of the fruit fly *Drosophila melanogaster* use the genetic programme of germline cells to grow. The removal of some of these genes leads to healthy brains. This finding demonstrates that these genes are crucial for tumour development. The study, headed by ICREA researcher Cayetano González, is published today in the prestigious journal *Science*.

One of the characteristics of tumour cells is their immortality, a property that allows them to divide without obeying external signals. As a result, tissue masses form, which, in most cases, interfere with organ functions. Data collected in recent years reveal that many human tumours activate specific genes of the germinal cell line – those specialized in spermatozooids or ovules –, which is thought to allow them greater and longer viability. However, the role of these genes in tumour development remains to be established. In this study, the scientists showed for the first time that silencing some of these genes leads to the disappearance of tumours in the brain of the fruit fly.

### **Global analysis of gene expression in tumours**

Not all cells use the same genes, but they make use of them depending on the function to be performed. This gene activation profile is what determines how cells divide and what they become specialized in, in the case they have not already done so. In this study the researchers have used DNA chip technology to monitor this gene activity in tumour cells and have compared it with healthy cells. For this purpose, they have analysed brain tumours induced by an alteration in the gene *l[3]mbt* in fruit fly larvae.

Analysis of the gene expression profiles indicates that these tumour cells activate a total of 102 genes that are not activated in healthy cells. When the researchers examined the functions of these genes they observed that, in many cases, they were unknown, although 25% of them were responsible for functions related to germline cells. "These results show that these tumours mimic the gene expression profiles of germline cells", explains Ana Janic, first author of the study and PhD student in González's lab.

### **Germline genes contribute to tumour growth**

When the scientists studied the possible role of these specific genes of the germinal cell line in tumour expansion, they observed that by the silencing four lead to the development of healthy brains. "These experiments demonstrate that these genes are crucial for the development of this kind of tumour", states Janic.

Data collected over the last ten years indicate that the cancer cells of some tumours, such as melanomas and some kinds of carcinoma, activate genes of the germinal cell line. One possible diagnostic approach derived from these studies would be to use some of the proteins produced by these genes as tumour cell markers. In this context, the use of these proteins to make cancer vaccines is of particular relevance. This study sheds new light on the role of these proteins in the pathogenesis of cancer and opens up the way for new lines of research for the development of treatment against this disease in humans.

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Reference article: Ectopic expression of germline genes drives malignant brain tumor growth in *Drosophila*. Janic A, Mendizabal L, Llamazares S, Rossell D, Gonzalez C. *Science* (2010) [doi: 10.1126/science.1195481]

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