Group name: Mechanisms of growth control and cancer
IP name: María Domínguez Castellano
Group web: https://in.umh-csic.es/en/grupos/mechanisms-of-growth-control-and-cancer/

Title of the MRP/TFM:

Generation of a *D. melanogaster* cancer model for tracking preneoplastic cells.

Summary of the Project:

Unlike adaptive immunity, the innate immune system can detect abnormal self-cells by sensing danger signals released from the affected cells to prevent or curb cancer initiation. Hence, a key first obstacle of preneoplastic cells is to evade the detection or killing by the innate immune cells. *PTEN* is a well-established tumour-suppressor gene, one of the most frequently mutated genes in human cancer and cancer-predisposition syndromes. This project will generate an *in vivo* model to study the signals produced by precancer cells to alert the innate immune cells, the cancer cell-host communication, apoptosis, and cell proliferation. The generation of a fly strain where the fate of preneoplastic cells can be tracked could help to screen for drugs and conditions that promote pre- and neoplastic cell death.

Objectives:

1. Generation of a preneoplastic *D. melanogaster* cancer model.
2. Generation of tumour sensor systems (Dilp8-GFP and ReDDM GFP-RFP).
3. Validation of the model by confocal imaging.

Methods and technology involved in the MRP/TFM Project:

Generation of fly strains:

The manipulation of PTEN activity will be made by the QF/QUAS binary expression system using well-established *D. melanogaster* strains that carry the specific RNAi . This approach will allow the co-use of Gal4/UAS temporal and spatial systems to control other genes in different host tissues. The suppression of complementary genes for blocking incipient cancer cell killing will be done by inserting vectors using standard protocols in *Drosophila* (http://flybase.org).

ReDDM biosensor:

The Ilp8-GFP marker will be combined with a stable RFP-tagged histone 2B protein. These constructs will be introduced into the PTEN^{-} model by fly crosses.

Immunofluorescence and microscopy:

Larval tissue will be dissected and stained using well-established protocols at M. Dominguez´s lab. Images will be obtained on a super-resolution microscope. Cell death will be monitored using activated caspase antibodies and TUNEL assay.

Member/s of the lab who will act as tutor/co-tutor of the project (if different from the group IP): Mary Luz Uribe Rios

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