Internship Proposal

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Project Title:
Developmental regulation of Drosophila Dad, the inhibitory SMAD for the TGF signalling pathway

Level:

Master

Project Summary:

In Drosophila, the TGF signalling pathway plays multiple roles in cell growth and differentiation to establish tissue patterning and organ development. TGFb promotes the phosphorylation and activation of the transcription effectors SMADs, which is counteracted by the functions of the inhibitory SMAD Dad. The student will participate in the characterization of the function and biochemical regulation of Dad in photoreceptor differentiation during retinal development.

Work to be developed by the student:

We have recently developed transgenic lines expressing Dad truncations and mutations that modify its functions, and these reagents and preliminary results will allow the student to progress in the identification of novel mechanisms for negative feedback in the TGFb pathway. In a modifier genetic screen, we have identified a kinase as a novel regulator of Dad, counteracting Dad's ability to inhibit TGFb signaling. We aim to characterise the mechanisms for this regulation.
The student will learn and use Drosophila genetics, in vivo RNAi screening and tissue-specific CRISPR, immunohistochemistry and confocal microscopy.

References:

Tavares L, Grácio P, Ramos R, Traquete R, Relvas JB, Pereira PS. (2021). Developmental Biology 473(1):90-96.

García-Morales D, Navarro T, Iannini A, Pereira PS, Míguez DG, Casares F. (2019). Development 25;146(8):dev176933.

Eusebio N, Tavares L, Pereira PS. (2018). Developmental Biology 442(1):188-198.

Tavares L, Correia A, Santos MA, Relvas JB and Pereira PS. (2017) PLoS Genet. 13(3):e1006647.

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