GENERATION OF MECHANOSENSORY NEURONS IN ADULT *Drosophila*

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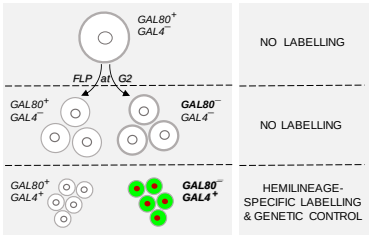
1 SUMMARY

- Hearing loss affects 5% of the world population, due to death of mechanosensory Hair Cells (HC) in the inner ear.
- Regenerative interventions are urgently needed to promote hearing recovery for millions of people worldwide.
- *Drosophila* Johnston's Organ (JO) neurons in the antennae are mechanosensory cells functionally and genetically conserved to HC.
- By refining lineage tracing methods, we captured low-level generation of JO neurons in adult *Drosophila,* which partially occurs by neuronal self-replication, and is promoted by drug administration.
- Our results unveil an unexpected mechanism for nervous system regeneration and establish a new *in vivo* platform to screen for modulators of self-renewal in adult sensory neurons.

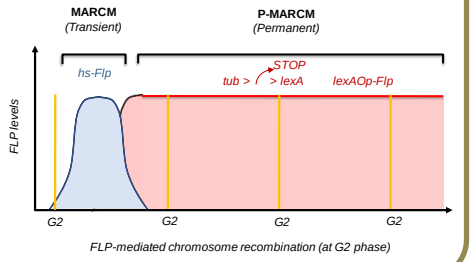
2 PERMANENT-MARCM (P-MARCM) TO CAPTURE ADULT-BORN CELLS

hs-Flp , tub-GAL80 , FRT19A ; 20UAS-6xGFP , UAS-RedStinger ; ***Cell type-GAL4***
tub > STOP > lexA , *FRT19A* ***UAS – X*** ***lexAOp-Flp***

CELL TYPE-SPECIFIC LABELLING

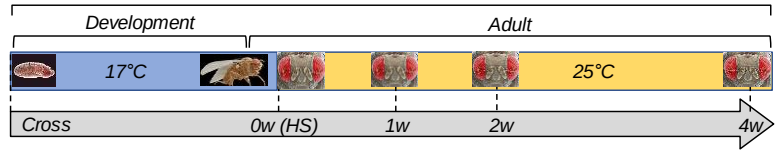


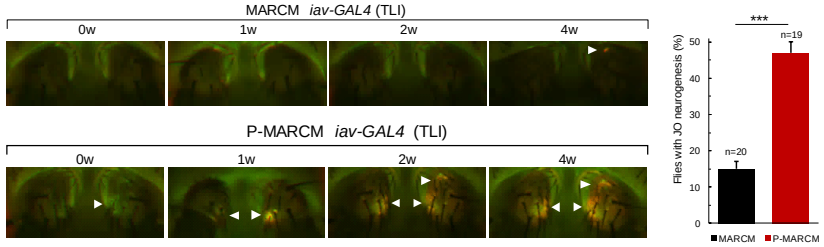
PERMANENTLY ACTIVE UPON HEAT-SCHOCK



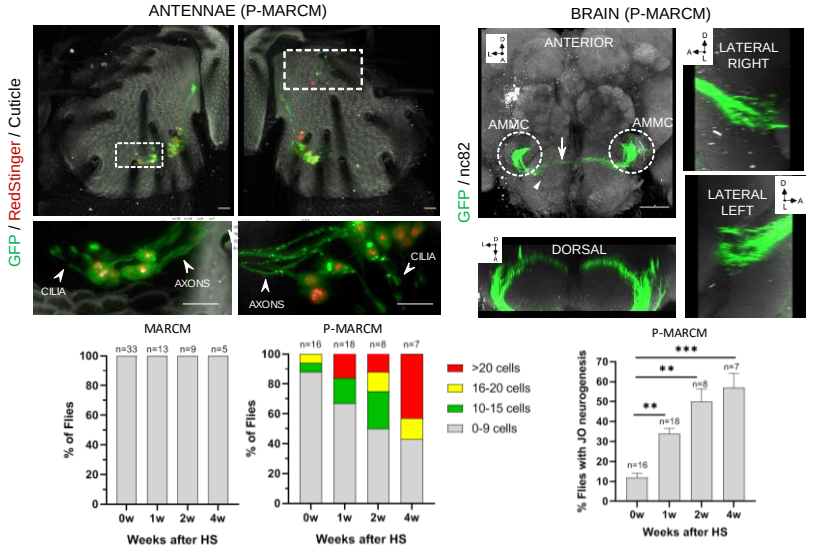
3 P-MARCM CAPTURES ADULT JO NEUROGENESIS *IN VIVO*

MARCM or P-MARCM *iav-GAL4* single-fly Time Lapse Imaging (TLI)





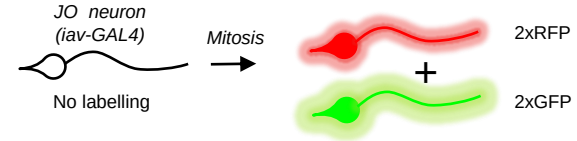
ANALYSIS OF ADULT JO NEUROGENESIS BY CONFOCAL IMAGING



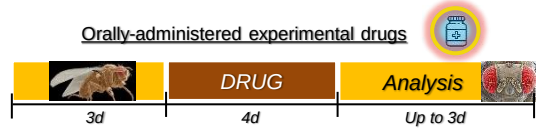
4 PERMA TWIN *IAV* CAPTURES SELF-DIVISION IN JO NEURONS, FURTHER PROMOTED BY DRUGS

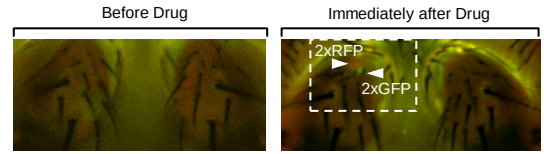
Perma Twin - iav

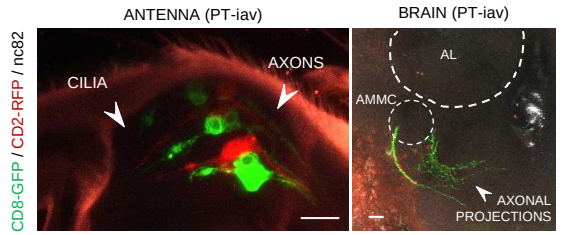
UAS-CD8-GFP,UAS-CD2mir,FRT40A ; iav-GAL4
UAS-CD2-RFP,UAS-GFPmir,FRT40A UAS-Flp

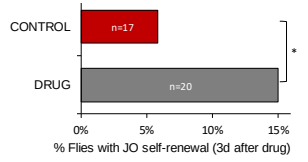


Orally-administered experimental drugs









Questions?

Happy to discuss!

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