Identifying Regulators of Rho Family GTPases Required for Collective Cell Migration in Drosophila Testis Nascent Myotubes

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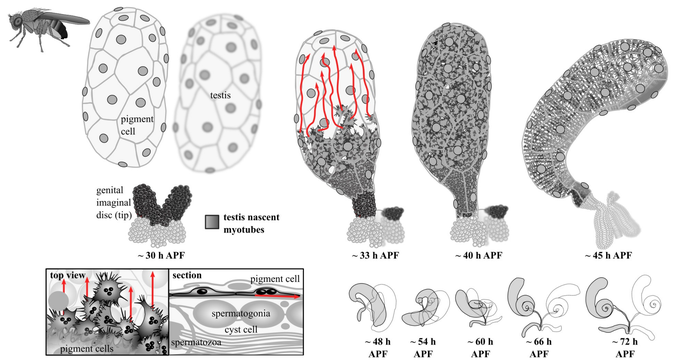
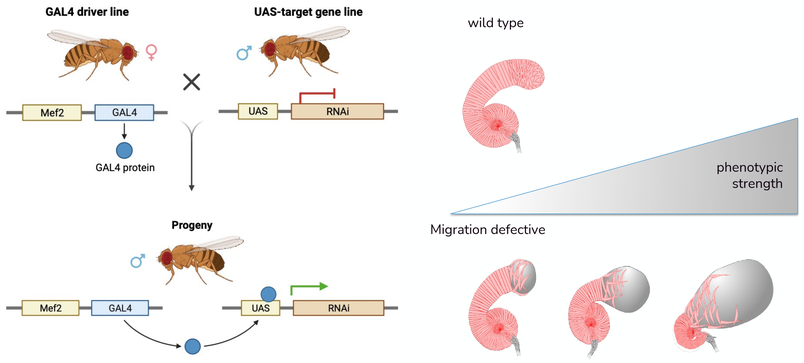
A New System to Study In Vivo Cell Migration in *Drosophila*

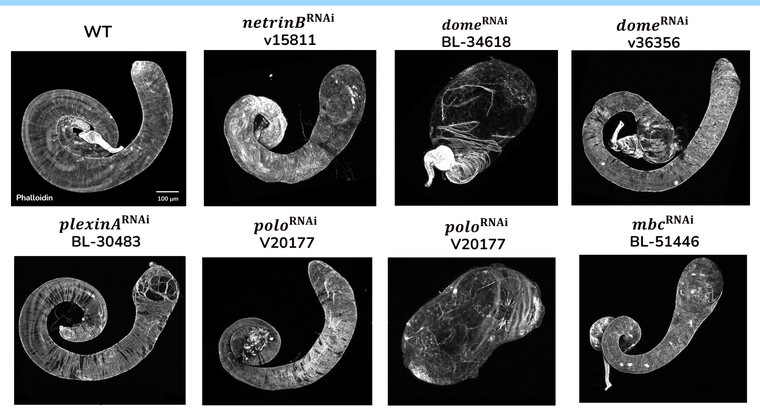
Testis myotubes use an interesting mechanism known as 'contact stimulation of migration,' migrating toward the free edge of the cell sheet



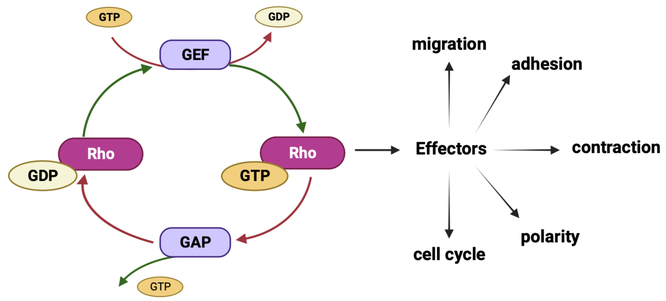
Our goal is to assess which receptors and ligands are important for cell migration and what proteins act downstream. To understand the 'social behavior' of these cells, we have knocked-down expression of genes in the migrating myotubes using the Gal4-UAS System and assessed adult testis



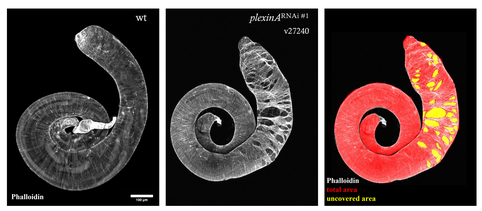
We performed two independent screens. In the first screen, myotube specific RNA-seq was used to identify potential ligands, receptors and regulators

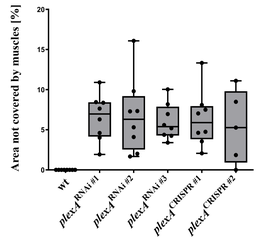


In the second screen, we knocked-down all Rho Family GAP and GEF regulators. Rho-family GTPases appear to act in different places during collective cell migration, and we identified several possible regulators

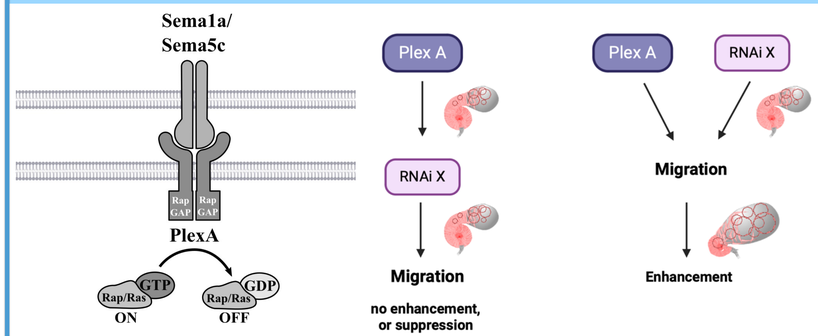


We're currently focusing on PlexA, a receptor known to regulate the migration of axons in the nervous system We can quantify the strength of its phenotype by quantifying gaps in muscles

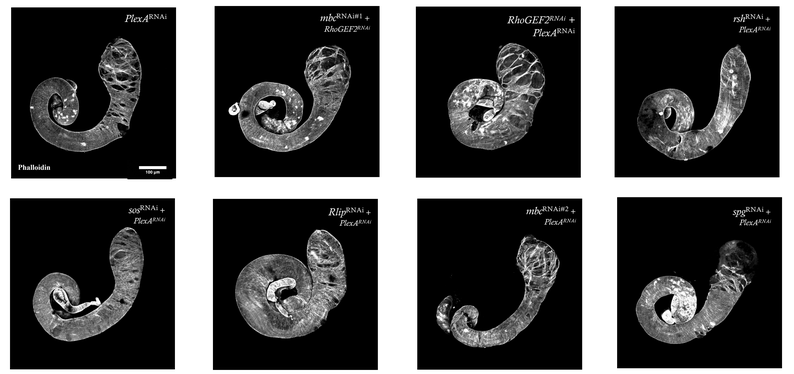




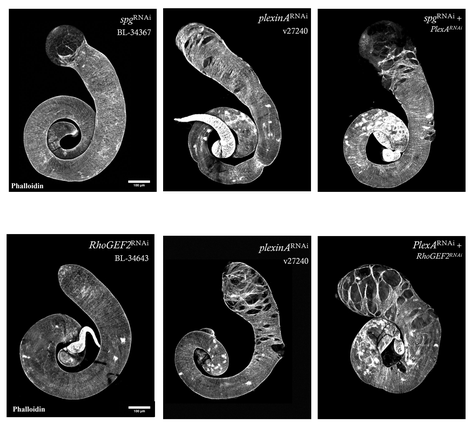
My project seeks to identify regulators acting downstream of PlexA, or in parallel pathways. If a regulator acts in the same pathway, double knockdown pf PlexA and the regulator should NOT enhance the phenotype. However, if they act in different pathways, it might

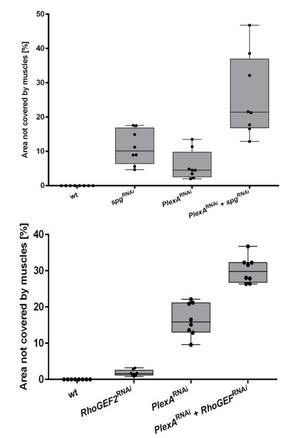


I carried out double knockdown of PlexA and selected Rho-family regulators



Double knockdown of Plex A and two GEFs, Sponge and RhoGEF2, led to enhanced phenotype. This suggests both Sponge and RhoGEF2 are GEFs that act in parallel to the PlexA pathway





Moving Forward

- ❑ Complete single RNAi experiments for additional regulators Sos^{RNAi}, $mbc^{RNAi\#1}$, $rlip^{RNAi}$, rsh^{RNAi}, $mbc^{RNAi\#2}$
- ❑ Test more Rho Family Regulators
- ❑ Compare migration using live imaging after single and double knockdowns

Acknowledgements and Citations

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