Abstract:

In Drosophila Melanogaster, the embryonic gonad is composed of somatic gonadal precursors (SGPs) and germ cells (GCs). The coalescence and compaction of SGPs is important for the proper embryonic gonad formation. Previous work has shown that ALK (Anaplastic Lymphoma Kinase) has been shown to play a role in embryonic gonad development. ALK is a tyrosine kinase receptor that is part of the insulin receptor family. It has been found that ALK expression could be responsible for enhancing apoptosis in neuronal and lymphoid cells. In Drosophila, mutations in the Alk gene results in a failure of SGPs to undergo cluster fusion and compaction during gonad formation. Immunostaining reveals that Alk is enriched in spermatids at the time of individualization and localizes to distinct punctate in the germ cells and follicle cells of the ovary. In order to further explore the role of ALK role in gametogenesis in Drosophila the GAL4/UAS system was used to manipulate gene expression in specific cell types in the gonad. Knockdown experiments have been conducted using the germ-cell specific nanos-Gal4, and result in defects in spermatogenesis in males. Phalloidin staining reveals a reduction in the number of spermatid clusters in the SGPs in the gonads. 68-77 shows the normal phenotype, while mutants exhibit embryonic gonad defects.

In Drosophila, the germ cells (GCs) are the somatic cells of the ovary and testis. Phalloidin staining only. (F-G) Images at an increased magnitude to display the differences in phalloidin staining more clearly.

Stages of gonad development

Figure 4. A) Explanation of oogenesis in Drosophila Melanogaster. B) Spermatogenesis depiction. Images from Ryan J. Gleason, Amit Anand, Toshie Kai and Xin Chen GENETICS February 1, 2018 vol. 208 no. 2 435-471; https://doi.org/10.1534/genetics.117.300208.

Figure 6. A-B) Control and experimental genotypes with differences in phalloidin staining. C-D) Phalloidin staining only. (E-F) Images at an increased magnitude to display the differences in phalloidin staining more clearly.

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