Investigating the Function of the shep Gene in Cell Migration
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Abstract
Cell migration is an important process as it is necessary for proper immune function, embryonic development, and injury repair. Border cell migration in Drosophila melanogaster is used as a model to study cell migration due to similarities between fly genes and human genes, the ease of manipulating gene function in flies, and the fact that migrating cells can be observed in their native tissue. During border cell migration, a group of cells travels from one side of a developing egg chamber to the other. Previous investigations into a D. melanogaster gene called shep have indicated it may have a role in this important developmental process. We tested this hypothesis using immunohistochemistry, RNA interference, and a transposase experiment. A GFP reporter insertion in the shep locus showed specific expression of Shep protein in the border cells. Knockdown of shep via RNA interference caused delayed migration in developing eggs. The transposase experiment to generate shep alleles is ongoing but has not yet yielded affected offspring. Thus, another method to generate mutant alleles, CRISPR-Cas9, will be used. This work may reveal that Shep regulates cell migration in D. melanogaster and lead researchers to investigate the functions of similar proteins in humans.

Methods

Results

Background
The ovariole of a Drosophila ovary contains egg chambers in different stages of development. In stage eight, the border cells differentiate from surrounding epithelial cells. They migrate in stage nine and arrive at the oocyte in stage ten. They migrate in stage nine and arrive at the oocyte in stage ten. Previous investigations into a Drosophila melanogaster gene, the ease of manipulating gene expression, and the fact that migrating cells can be observed in their native tissue. During border cell migration, a group of cells travels from one side of a developing egg chamber to the other. Previous investigations into a D. melanogaster gene called shep have indicated it may have a role in this important developmental process. We tested this hypothesis using immunohistochemistry, RNA interference, and a transposase experiment. A GFP reporter insertion in the shep locus showed specific expression of Shep protein in the border cells. Knockdown of shep via RNA interference caused delayed migration in developing eggs. The transposase experiment to generate shep alleles is ongoing but has not yet yielded affected offspring. Thus, another method to generate mutant alleles, CRISPR-Cas9, will be used. This work may reveal that Shep regulates cell migration in D. melanogaster and lead researchers to investigate the functions of similar proteins in humans.

Conclusions and Future Directions

References

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