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## BMP Regulation of Cyst Stem Cell Division in the *Drosophila* Testis Stem Cell Niche

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## Natural Science Poster

Title: BMP Regulation of Cyst Stem Cell Division in the Drosophila Testis Stem Cell Niche

Presenter: Ahmed, Mohamoud

Faculty Sponsor: Leatherman, Judith

### **Abstract:**

Adult stem cells are found throughout the body and divide to replace dead cells or regenerate damaged tissues. We study the *Drosophila melanogaster* (fruit fly) testis as a model to investigate how adult stem cells are maintained by the intricate microenvironments in which they live, called stem cell niches. Many basic characteristics of adult stem cells in higher organisms were first discovered in the simple stem cell niches found in *Drosophila*. The testis niche is comprised of two distinct stem cells called germline stem cells (GSCs) and cyst stem cells (CySCs). This niche also contains a structure called the hub that communicates with the stem cells to keep them undifferentiated. The stem cells must remain in contact with the hub to remain a stem cell. The hub regulates GSCs by a pathway called bone morphogenetic proteins (BMP). The hub releases a BMP dimer (Gbb and Dpp) that binds to the receptor (TKV) located on the GSC, which stimulates a cell transduction that results in it retaining its stemness. Our lab found that BMP is also needed in CySCs to maintain the stem cell population. We hypothesize that BMP signaling regulates the mitotic division rate in CySCs. To test this hypothesis, we constitutively activated the TKV receptor in the cyst lineage cells. We found that excess CySCs accumulated in response and formed a tumor, supporting our hypothesis that BMP signaling may play a role in stem cell division in this niche. In conclusion, the highly conserved BMP signaling pathway influences the cell division rate of stem cells in the testis niche, and these findings may indicate a conserved role for this pathway in other stem cell populations.