**Title**: Piwi Matters

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**Abstract**:

Fruit flies produce a large number of eggs throughout their lifetime. This case discusses how self-renewal of germline stem cells is required for producing these large number of eggs. A protein called Piwi, that is highly conserved in many species, is known to play a key role in self-renewal of germline cells. This RNA binding protein interacts with different biological macromolecules (proteins, and nucleic acids) to mediate its various functions. The case begins with watching a video about egg development in fruit flies and explores the impact of piwi mutation on this process. The case was developed for introductory genetics courses where students are introduced to the molecular structural basis for repression of transposable elements during meiosis. Students learn to identify and access data from various biological databases and integrate information to understand the structure and functions of this protein. The explorations may be expanded to a laboratory exercise where students can develop hypothesis about Piwi's structure-function relationships and design experiments to test them. Depending on the details included in the discussions, it may also be used to teach slightly advanced molecular biology and genetics students. By the end of the case, students should develop some basic understanding of biomolecular structure-function relationships. Basic understanding of primary content is acquired by working through the handout and answering the questions and class time is devoted to discussion and interaction with the instructor. Detailed teaching notes, and discussion prompts are available for download to guide the in-class activity.

**Subject Headings**: Biology (Introductory), Chemistry (Introductory), Biochemistry, Genetics, and Molecular Biology

**Objectives**: Learning objectives span the following fields

*A. Biology*

*B Genetics*

*C. Molecular Biology*

*D. Modeling and Presentation Learning Objectives*

**Keywords**: Piwi; Papi; Siwi; post-transcriptional; germline; self-renewal; conserved.

**Topical Area**: Scientific method; Molecular structure representation; Visualization

**Educational Level**: Undergraduate lower division

**Formats**: PDF and Website

**Type/Method**: Flipped, Interrupted

**Language**: English

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