**Piwi and Papi**

After completing the “Structure Based Hypothesis Development” for testing the amino acid residues that are involved in maintaining germline stem cells answer the following questions.

PIWI proteins bind to PIWI-interacting RNAs (piRNAs) and function in epigenetic regulation and transposon control. Another protein PAPI (Partner of PIWIs), interacts with PIWI in its N-terminal domain, mediates repression of transposons for germline integrity.

Here we explore the structure of Papi in complex with an N-terminal peptide from Piwi (PDB ID 5ygd) to understand the nature of the Piwi-Papi interaction.

Q1. Explore the structure summary page of this structure and list the sequence of the Piwi peptide that is present in this structure.

Q2. Visualize the structure of this complex and describe where in the structure the Piwi peptide binds? Include a figure along with the description.

Q3. List all the Papi protein residues that interact with the methylated Arg in the Piwi peptide.

Q4. Use the molecular structure visualization and analysis to figure out why mutating the Arg at position 10 (R10) abolishes binding to Papi? Explain your rationale in 3-4 sentences and support your answer with a suitable molecular structural image.

Q5. A research publication in 2018 showed that Y328 → A mutation in Papi shows significant decrease in binding to unmethylated piwi. Using the structure can you explain why this would happen? Support your answer with a suitable molecular structural image.