**Piwi Matters**

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**Part 4:** **Structure Based Hypothesis Development**

When piRNA binding is disrupted (as seen in the Piwi Y551 and K555 mutant) the ovaries are rudimentary in size. It is ideal to test this hypothesis in multiple ways – such as using multiple mutants. Exploring the structure of the Piwi-piRNA complex can help us identify additional amino acids that are critical for Piwi-piRNA binding.

Using the Piwi-piRNA structure, identify additional amino acids that are critical for Piwi’s function (e.g., piRNA binding) and discuss how to mutate them and test the hypothesis.

Q1. Where would you look for residues critical to Piwi’s self-renewal function in the piwi domain? Explain why.

Q2. Using the rationale described in the above answer, identify any 2 other amino acids that may be critical for Piwi’s function. List the amino acid residue number and type and explain why you think they are important. Support your answers with figures.

*Note: The residue numbers that you read by hovering your mouse over residues in the iCn3D graphics display are the NCBI numbers, you have to find the corresponding the PDB/UniProt numbers from the Sequences and Annotation window.*

Q3. What would you mutate the amino acid residues in the answer 2 to in order to test if they are functionally important? Predict what phenotype you would observe if you could make these mutants in flies. Note: Plan the mutations so that there are minimal substitutions of nucleotides (and in the codons) to introduce these mutations See Codon table attached.

