

Evolution of Functionality of the Polycomb Repressive Complex 2 (PRC2)

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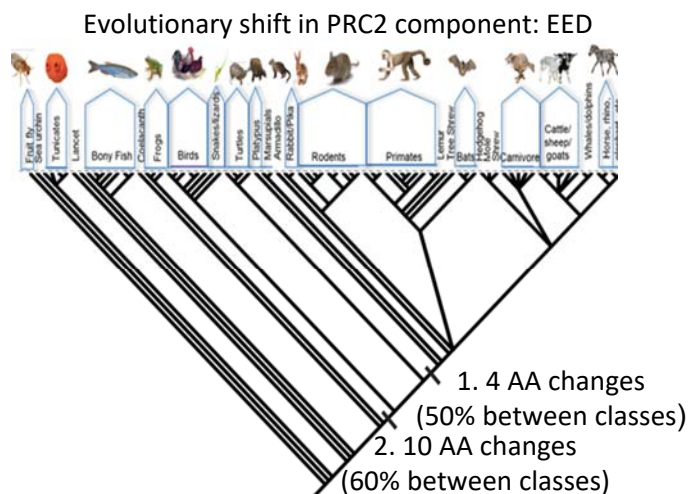
Central Question:

- How does the structure-function relationship of one epigenetic gene expression regulator (PRC2) vary across taxa?
- How does DNA accessibility alter the genotype/phenotype relationship?

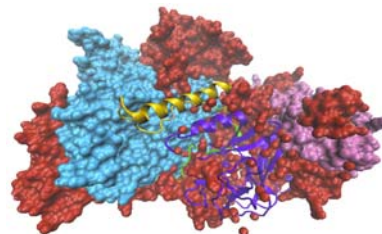
Research Project:

- Search Protein Data Bank (PDB) for the Polycomb Repressive Complex 2 (PRC2) components and identify critical sequences and structural elements that are conserved or divergent for amniote (1.) and mammal (2.) splits across vertebral taxa.
- Analyze the primary structure of PRC2 relationship between amino acid changes.

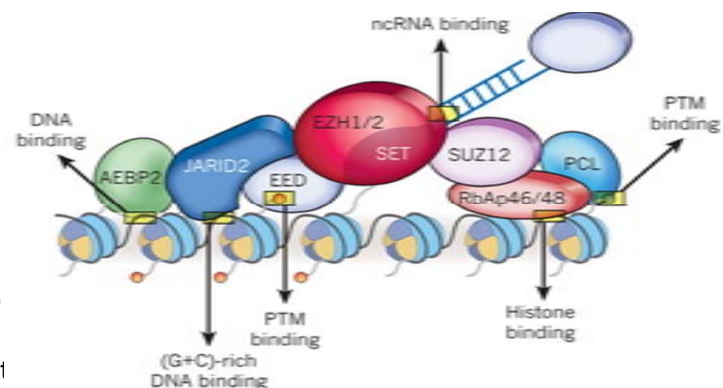
Structure/ Function/ Expression:



Crystal structure of an active polycomb repressive complex 2 in the stimulated state



PDB ID: 5CH1



Source: Raphaël Margueron & Danny Reinberg, 2011

Conclusion:

The evolutionary shifts in the Polycomb Repressive Complex 2 component EED, SUZ12, and EZH2 were identified for both mammal and amniote splits for the evolution of vertebrates. PRC2 component EED is the most evolutionarily conserved with only 10 amino acid changed between the amniote split and 4 between the mammal split.

Using Visual Molecular Dynamics (VMD), the PRC2 complex was recreated with components EED, SUZ12, and EZH2 and its sub-domains using PDB ID: 5CH1, 5CH2, and 5HYN structures.