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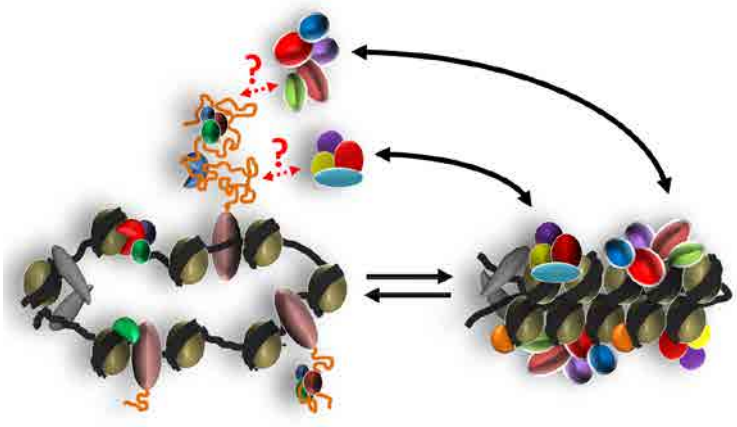
Polycomb repressive complexes 1 and 2 (PRC1 and PRC2) are multi-subunit epigenetic modifier complexes that modify histone proteins during the process of epigenetic repression. During cancer development and progression the balance between polycomb mediated repression and derepression (i.e. transcriptional activation), is altered, leading to repression of tumor suppressor genes and derepression of oncogenes. Yet, the molecular mechanism for these processes is unclear.

Research Projects

1. **Epigenetic repression and derepression of polycomb-target oncogenes and tumor suppressor genes in cancer**
2. **Structural basis for the interaction of epigenetic modifiers with long noncoding RNAs, using high resolution cryo-EM and X-ray crystallography**
3. **RNA-binding specificity by epigenetic modifiers: combining next generation sequencing with classical methods for the detection, quantification and perturbation of binding specificity for the development anti-cancer therapeutics and diagnostic tools**



Various complexes of proteins, RNA and DNA involved in epigenetic regulation during embryonic development, cancer, immune response, regeneration and reprogramming.

Selected significant publications:

1. **Davidovich C**, Wang X, Cifuentes-Rojas C, Goodrich KJ, Gooding AR, Lee JT, Cech TR. 2015. Toward a consensus on the binding specificity and promiscuity of PRC2 for RNA. *Mol Cell*. 57(3),552-8.
2. **Davidovich C**, Goodrich KJ, Gooding AR, Cech TR. 2014. A dimeric state for PRC2. *Nucleic Acids Res.* 42(14), 9236-48.
3. **Davidovich C**, Zheng L, Goodrich KJ, Cech TR. 2013. Promiscuous RNA binding by Polycomb repressive complex 2. *Nat Struct Mol Biol.* 20(11),1250-7.
4. **Davidovich C**, Bashan A, Yonath A. 2008. Structural basis for cross-resistance to ribosomal PTC antibiotics. *Proc Natl Acad Sci USA*.105(52), 20665-70.
5. **Davidovich C**, Bashan A, Auerbach-Nevo T, Yaggie RD, Gontarek RR, Yonath A. 2007. Induced-fit tightens pleuromutilins binding to ribosomes and remote interactions enable their selectivity. *Proc Natl Acad Sci USA.* 104(11),4291-6.