Name: Student First Name and Last Name
Year of Study: 2
Date of Seminar: September 19, 2022

Seminar Title: "Critical roles of MYST-ING acetyltransferase complexes in genome expression and stability"

Speaker: Dr. Jacques Côté

Factors regulating chromatic accesibility include (1) histone modifying enzymes, (2) ATP-dependent cromatin remodelling, (3) histone variants, and (4) histone chaperone. Dr. Cote focuses on histone modification and how protein domains recognize them – specifically, acetyltransferases. Deacetylation removes positive charge, making DNA more accessible and destabilizes chromatin interaction. NuA4 is a nucleosome acetyltransferase of histone H4 in yeast. It ia big complex and can be seen with EM, and can also be purified as subcomplexes. NuA4 accumulates quickly at double-stranded DNA breaks, and then ATP-dependent remodelers arrive, then remove, and this tells the cell to continue cycling. Recruitment of NuA4 to double stranded breaks occurs preferentially in G2 phase. Cote also studies ING proteins (Inhibitor of growth). They share features with tumor suppressors. ING mutation causes p53 misfunction. INGs stimulates histone acetyltransfersase activity. Acetyl tranferases containing mystING are independent activators of acetylation, and they are possibly involved in the elongation process of RNA/DNA polymerase, acetylation must occur in front of the polymerization reaction.

Conclusion. Dr. Cote sought to discover fundamental aspects of how chromatin gets remodeled, and successfully made important discovers with respect to NuA4 and mystING.

Name: Matthew Solomonson

Year of Study: 2

Date: November 28, 2011

Seminar Title: "Charges in the hydrophobic interior of proteins"

Speaker: Dr. Bertrand Garcia-Moreno

Having charge in a protein comes at a cost, and organization of polar atoms are determined by the dielectric effect. State of matter also influences the dielectric effect – liquid increases the dielectric constant, which would support charge in the core of a protein, where as drying a protein removes dynamics and would support less charge. The question is, does protein behave more like solid or liquid? Dr. Garcia-Moreno started with a stable protein, and mutated amino acids side chains that point inward, such as K, R, etc and then measures destabilization effects. All varients were found to unfold at lower guadinium chloride concentrations. He found pKas of side chains can change considerably – for example, Asp normally has pKa = 4, but in the core of the protein would shift to 6. He determined the cost of putting proteins in the core to be between 8 and 1 kcal/mol. Dr. Garcia-Moreno then went on to study if H2O is prevelent in enzyme centers. He mutated an internal Glu and found that hydration occurs in the molecule and that nanosecond exchange with solvent is occuring. So water can indeed occupy small cavities in a protein. This entropically favorable, because they gain mobiliity in protein. Asp and Glu are the best residues for ordering solvent, followed by Arg. He also studied how internal ionizable groups interact, as well as how conformational changes occur due to charged groups.

Conclusion: Dr. Bertrand ultimately wishes to computre energy paramters from a structure. Toward this goal, he conducted experiments in order to quantify the effect of charge in a protein.

Name: Matthew Solomonson

Year of Study: 2

Date: Dec 5, 2011

Seminar Title: "Movement of Ca2+ within nanodomains"

Speaker: Dr. David Yue,

Dr. Yue studies how calcium is used in signalling. Calcium is a preftect signalling molecule. Voltage gated channels are controlled by calmodulin through a process that is called "calmodulation. Upon binding, Apo-calmodulin binds Ca and binds to the receptor. This controls how long channels are open for. He also discovered that there is functional bipartism, and that different respons depending on which domain calcium binds to – nanodomains. He determined that Ca signalling can be both local signal and a global signal.