David Boyer  
*Eisenberg Group*

**Structural studies of Amyloid Proteins**

The conversion of the microtubule associated protein tau to amyloid fibers is known to be involved in 26 related neurodegenerative diseases, collectively termed tauopathies (e.g., Alzheimer’s Disease, Pick’s Disease). These diseases currently have no preventative or curative therapeutics; in particular, Alzheimer’s Disease, which mainly affects the elderly, will increase in prevalence as the world population continues to age, placing an enormous burden on both the economy and care providers. My project aims to advance understanding of tau by using cryo-electron microscopy and X-ray crystallography. These techniques allow the visualization of tau in its pathological, aggregated state and facilitate the design of structure-based inhibitors to probe the mechanism of tau aggregation. The design of successful inhibitors of tau aggregation would greatly facilitate the design of therapeutics, thereby moving closer to a cure for numerous debilitating neurodegenerative diseases.

Kevin Clutario  
*Torres Group*

**Analysis of STARD9’s Role in Cancer Division**

Mitotic spindle assembly is a required step in all dividing cells that happens once per cell cycle. The centrosome is a structural organelle that is highly important in spindle assembly as centrosomes act as the microtubule organizing centers at the spindle poles during mitosis. Deviation from normal spindle assembly can lead to activation of the spindle assembly checkpoint (SAC) and a few of the most successful antimitotic drugs target activation of the SAC in order to arrest cancer cells in mitosis to induce subsequent apoptosis. One of these drugs, paclitaxel (taxol) remains a gold standard in chemotherapeutic treatment, but carries with it unwanted side effects and dose-limiting toxicities, highlighting a need to identify novel targets for inhibition. Recently, kinesins and kinases implicated in spindle assembly have gained attention as possible targets, as their functions rely on their ability to hydrolyze ATP. Previous proteomic studies have identified steroidogenic acute regulatory protein-related lipid transfer domain containing 9 (STARD9) as a regulatory kinesin involved in spindle assembly. Its depletion invokes multipolar spindles in dividing cancer cells and most surprisingly, STARD9-depleted cancer cells display increased taxol sensitivity. STARD9 plays a functional role in the stabilization of pericentriolar material during centriole maturation, but the underlying mechanisms are not yet understood. To elucidate these mechanisms we have been using proteomic approaches to dissect the putative interacting proteins with several domains of STARD9 and we look to crystallize its motor domain. Our work looks to further the knowledge of STARD9’s function within cancer cell division and hopefully we can develop inhibitors of STARD9 to test as cancer therapeutics.

**Friday, May 11, 2018**

3440 Molecular Sciences  
3:30 p.m.