

**CHEMISTRY Departmental Seminar**

Spring 2022  
CHEM 285/191 Schedule  
Tuesday at 4:30-5:45PM  
Duncan Hall 250

February 22<sup>nd</sup>, 2022

**Dr. Alexander Payumo**  
San José State University

***Hormonal Regulation of Mammalian Heart Muscle Cell  
Proliferation and Regeneration***

Heart disease remains a leading cause of death in the United States. This is largely due to the inability of adult humans to regenerate lost cardiomyocytes (CM) after a heart attack. In contrast, newborn mice and rats possess a transient but robust capacity for cardiac regeneration, which depends on the proliferation of pre-existing CMs. Rodents lose this ability within the first week after birth when the majority of their CMs permanently exit the cell cycle, become polyploid, and undergo hypertrophic growth. We recently discovered that blocking thyroid hormone signaling during the first two weeks of mouse postnatal development promotes CM proliferation and increases heart regenerative capacity. These effects are further enhanced upon combined inhibition of both thyroid hormone and adrenergic receptor signaling, suggesting interactions between these pathways. Our lab currently focuses on deciphering the molecular and cellular mechanisms downstream of thyroid hormone and adrenergic signaling that control the CM cell cycle. This work may lead to the identification of new molecular targets that could inform future strategies in cardiac regenerative medicine aimed at unlocking the regenerative potential of the adult human heart.