Sylvia Eberhardt Researches Effects of Calcium Current Activity and Voltage Sensitivity in Hypertrophied Hearts

This summer research opportunity program provided me with an excellent experience and exposure to the medical field and some insight into my future endeavors. I had a first-hand interaction with the basic research in heart failure, which remains prevalent in African American communities. Under the mentorship of Dr. Georges Haddad, I have learned the importance of research techniques emphasizing consistency, dexterity, and perhaps most importantly, persistence. We incorporated such methods such as animal surgery to induce aorto-caval shunt leading to cardiac hypertrophy and failure, cardiomyocyte isolation using retrograde perfusion via the Langendorff perfusion system and patch-clamp technique to measure ion channels activities. It was a challenging experience to learn all these skills but it was fantastic once we started getting results and analyzing new data on hypertrophied myocytes. Trial and error led us to the following conclusions:

- Cardiac hypertrophy was manifested by an increased relative heart weight in all 4 chambers (atria and ventricles).
- Cardiac hypertrophy was associated with an increase in the amplitude of the slow calcium current.
- There was a negative shift in the peak amplitude during the development of eccentric cardiac hypertrophy.

The significance of my summer research: This enhanced calcium current activity and voltage sensitivity in hypertrophied hearts may play a major role in sustaining a greater force of contraction and contractility to improve cardiac work efficacy.

Given the chance to do this research again, I would do more readings prior to coming to the research facility. This would have given me an extra edge on my understanding of the whole picture of the project. Many questions remain still unanswered due to the nature of the research conducted, especially pertaining to changes in contractility of the heart during hypertrophy. However, I feel like I made the most of my research experience during this period of time. Given more time to do my research I would continue to sort out the relationship between the intracellular calcium dynamics and cellular contractility profile during cardiac hypertrophy. I would definitely work also on perfecting my research bench skills. Finally, I would like to thank Dr. Haddad for his leadership and guidance throughout the entirety of this research process. His patience and understanding alleviated the pressures of entering a new setting, but also enhanced a positive mind-set to complement the experience. I am sincerely grateful to him and the ASIP/SROPP.