2023 Annual Research Day Poster Sessions – April 19th, 2023

Session/Poster#	Presenter
B11	Quiana Jones School of Graduate Studies Student

Advisor(s): Dr. Xian Cheng Jiang, Cell Biology

Structural investigation of sphingomyelin synthase related protein via catalytic domain engineering

Sphingomyelin (SM), one important lipid on the cell membrane, is synthesized by SM synthases (SMS). The SMS family has three members: SMS1, SMS2, and SMS synthase-related protein (SMSr). Although all three enzymes share four identically conserved regions (D1-D4) with a catalytic domain (Histidine-Histidine-Aspartate) in D3 and D4, SMS1 and SMS2 but not SMSr have SM synthase activity. Thus, there must be certain amino acids surrounding the catalytic domain or within the D1-D4 regions that determine the specificity of the three enzymes. The aim of my work has been to use site-directed mutagenesis to alter amino acids within the SMSr sequence to match those of the SMS1, resulting in an SMSr-mutant isoform with the ability to synthesize SM. Thus far, I have discovered two amino acids within the D3 region that resulted in the partial ability of the SMSr-mutant to produce SM. I have also identified other amino acids within D2-D4 which could be important determinants in enzyme specificity. This work gives clarity into the specific aspects of the enzymes needed to produce SM, which are involved in many metabolic diseases.