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Crystallization of human polyamine oxidase

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Human polyamine oxidase (hPAO) is a flavoprotein that catalyzes the oxidation of polyamine metabolites. Polyamines are important for cell growth and proliferation¹. It has been shown that if polyamine synthesis is inhibited, cell growth is limited². Recent studies have found a link between increased polyamine levels and hydrogen peroxide in cancer cells³. The catabolism of polyamines produces peroxides, which in high levels can enhance cancer cell growth^{4,5}. Understanding polyamine metabolism can lead to advancements in cancer therapy. To better understand hPAO and its links as a target for cancer therapy, we need to have a better understanding of the chemical and structural specificities of hPAO.

Sequence alignment has identified a conserved histidine residue in the active site of PAO and it has been found to play a role in polyamine metabolism⁶. Previous studies have shown that mammalian PAO prefers the N1-acetylated substrate over the non-N1-acetylated substrates⁶. Currently there are crystal structures for the maize and yeast PAO, but they are only 20% identical to mammalian PAO⁶. Therefore, in order to better understand the chemical and structural specificities of PAO we have attempted to obtain the first crystal structure of a mammalian PAO.

Here in, we present two different purification methods for the crystallization of hPAO. Samples were submitted for crystallization trials at the X-Ray Core facility at the Department of Biochemistry in the University of Texas Health Science Center at San Antonio.



Figure 1. Crystallization attempt of human PAO

Biography

Jared Selman is currently a Forensic Science – Chemistry major at St. Mary's University. Over summer 2016, he worked with Dr. José Tormos-Mélendez as part of the Summer Undergraduate Research Program supported by a departmental Welch grant awarded to the Department of Chemistry and Biochemistry at St. Mary's University. His summer work consisted in obtaining the first crystal structure of mammalian PAO. He learned essential lab techniques and research methodologies that will prepare him for graduate studies. After graduate school, he hopes to launch a career as a forensic scientist. He also hopes to one-day work as a high school science teacher. Inspired by the teachers who challenged and prepared him for college, he seeks to educate the next generation of upcoming leaders.

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