Public Abstract
First Name:Sarah
Middle Name:Marie
Last Name:Lewis
Adviser's First Name:Kent
Adviser's Last Name:Gates
Co-Adviser's First Name:
Co-Adviser's Last Name:
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Title:INVESTIGATION OF THE KINETICS AND MECHANISM OF INACTIVATION OF PTP-SHP2 BY PEROXYCARBONATE AND PHYTOCHEMICALS

Protein tyrosine phosphatases (PTPs) work in tandem with protein kinases in order to regulate many cellular signaling pathways. These signaling pathways control many cell function and can lead to many diseases such as diabetes, Juvenile Myelodysplastic Leukemia, and cancer. The importance of controlling these pathways leads to the attention that has been given to PTPs. The protein of interest in this work is PTP-Src homology 2 (SHP2), which acts as a positive regulator in the cell cycle.
Phytochemicals are compounds found in fruits and vegetables and have been used to treat many aliments. Investigation into the mechanism of action for these compounds is important to understand how they are utilized within the cell. Isothiocyanates are part of a sub-group of phytochemicals. Due to isothiocyanates (ITCs) ability to react with PTPs, determination of ITCs ability to react with PTPs was elucidated. This reaction between ITCs and PTPs can have both positive and negative effects on the cell depending on what the PTP controls in the cell. For SHP2, this reaction with an ITC would provide negative cell control since the inactivation of PTP-SHP2 could cause cell cycle arrest in the G2/M phase of the cell cycle. Studying the natural buffer system of the cell is important to decipher a PTPs ability to be oxidized at a rate quicker than that previously determined by hydrogen peroxide. The oxidation of a PTP can have either a positive or negative effect to the cell depending on the downstream events that follow the PTP. Examination of the formation of a more reactive oxidant and its ability to inactivate PTPs was performed to attempt to understand how PTPs are controlled within the cell.