

Department of Molecular and Cellular Biology  
**Graduate Seminar MCB\*6500**

Friday, June 9, 2023 @1:30 p.m.

*presented by:*

**Brandon Ulch**

*(Advisor: Dr. Yang Xu)*

**“The role of phosphatidylcholine:diacylglycerol  
cholinephosphotransferase (PDCT) in enhancing unsaturated  
oil production in soybean seeds”**

Soybean is a widely cultivated crop known for its abundant production of valuable oils and proteins. However, the mechanisms responsible for soybean oil production, particularly the synthesis of high levels of unsaturated fatty acids, require further research. To address this knowledge gap, this study aims to investigate the role of an understudied enzyme called phosphatidylcholine:diacylglycerol cholinephosphotransferase (PDCT) in soybean seed oil biosynthesis.

PDCT catalyzes the interconversion of phosphatidylcholine and diacylglycerol, facilitating the movement of fatty acids between intermediate compounds involved in triacylglycerol biosynthesis. This process is crucial for various fatty acid modifications such as desaturation or hydroxylation. Therefore, PDCT likely plays an important role in controlling the accumulation of unsaturated oils. This study will identify the expression pattern of PDCT in developing soybeans and further characterize its enzymatic activity and critical structural features by performing mutagenesis and assessing the enzymes *in vitro* activity in transgenic yeast microsomes.

The aim of this project is to uncover the molecular mechanisms by which PDCT contributes to the accumulation of unsaturated fatty acids in soybeans. These findings have the potential to facilitate the development of customized soybean varieties with enhanced nutritional characteristics for human consumption and specific functional properties for various industries, which will be essential for meeting the demands of a growing global population.