

EXECUTIVE SUMMARY: The cell cycle is the series of events that take place in a eukaryotic cell leading to its replication. The activities that occur during that phase of the cycle known as mitosis are crucial in ensuring that chromosomes of the parent cell are distributed faithfully as the cell divides to produce two genetically identical daughter cells. Given their significance, these mitotic events are tightly regulated and errors in their regulation could result in cell malfunctioning, sometimes leading to diseases such as cancer. Polo-like kinase 1 (Plk1) is a key regulator of mitosis and has recently emerged as a promising target for cancer therapy. Although the importance of Plk1 in cell cycle control has been well documented, less is known about how it executes these regulatory functions, largely due to the lack of knowledge about its downstream target proteins. To address this limitation, the PI has previously carried out a cDNA library screening of genetic materials derived from *Xenopus* (frog) oocytes. The *Xenopus* system has unique advantages in cell biology studies because it is relatively easy to manipulate and inexpensive to maintain. In the past, many major breakthroughs in cell cycle studies have come from investigations using this system. The screening has identified a novel substrate of *Xenopus* Plk1 (Plx1), which was later shown to be a **deubiquitinase (DUB)** that belongs to a new group of cell cycle regulators. Misregulation of DUBs has frequently been linked with tumorigenesis. It is therefore very important to study how Plx1/Plk1 regulates the function of this DUB, because of the roles of both Plk1 and DUB in cancer development. In this proposal, we plan to identify the Plx1 phosphorylation site(s) in the DUB, which will pave the way for future studies of the DUB function and its regulation by Plx1. Studies will also be done to examine if Plx1 phosphorylation affects the activity of the DUB. One undergraduate student and one postgraduate student will be involved in this project working closely with the PI, and through this experience will learn various technologies used extensively in modern biotechnology industry .