Identification of possible phosphorylation sites within *S. cerevisiae* derived kinases Mps1 and Ipl1, that are known to phosphorylate the kinetochore

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The proper segregation of chromosomes in the cell during cell division is crucial for the integrity of the genome and health of the cell. The kinetochore, a multisubunit protein, mediates the connection between microtubules and chromosomes during cell division. The attachment of microtubules to sister chromatids is regulated by kinases phosphorylating the kinetochore to ensure proper chromosome segregation. Previous research has suggested that Ipl1, a *S. cerevisiae* kinase, is responsible for not only phosphorylating the kinetochore but other kinases involved in the regulation of the kinetochore, like Cdc28. With this in mind, we hypothesized that Ipl1 phosphorylates other *S. cerevisiae* kinases regulating the kinetochore, specifically Ipl1 itself and Mps1. To identify phosphorylation events occurring between Ipl1, itself, and Mps1, bioinformatics programs, BLASTp and MAFFT, were applied to search for Ipl1 consensus sequences and the conservation of these motifs in homologs across species. Identification of highly conserved motifs is crucial because there is a significant number of phosphorylation sites related to the kinetochore, and it would take too long to understand the role of each individual site through mutagenesis alone. Through this application of bioinformatics, we were able to identify two conserved Ipl1 motifs, one belonging to Mps1 and the other to Ipl1. The high conservation of these two Ipl1 motifs in Mps1 and Ipl1 across multiple species, including mammalian homologs, suggests that these sites may have an important role in the phosphorylation and regulation of the kinetochore. Therefore, identification of these highly conserved phosphorylation sites within Ipl1 and Mps1 can allow for specific mutagenesis of these sites to understand their role in the regulation of the kinetochore and the proper segregation of chromosomes. By furthering our understanding of how the kinetochore regulates and ensures proper connection between microtubules and chromosomes, genetic disorders and diseases can be further understood and possibly treated.