# The Division Decision: The Cdc13 Protein and Cell Size Control

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How cells regulate and maintain their size is fundamentally unknown. Failure to maintain a consistent cell size has been associated with cardiac disease, brain disease, musculoskeletal disease, and cancer. The objective of this research is to understand whether the Cdc13 protein in fission yeast is an indicator of cell size. The concentration of Cdc13 decreases at cell division but rises as cells grow. This project addresses whether Cdc13 accumulates as time passes (time-dependent accumulation) or directly responds to cell size (size-dependent accumulation). Predictions about time- and size-dependent accumulation were made using a computational model and experimentally tested using live cell imaging and western blot procedures. The live cell imaging demonstrated increasing concentrations of Cdc13 with cell size and time. The western blot indicated a short protein half-life which, according to the model, suggests size-dependent rather than time-dependent accumulation. This project concludes that Cdc13 concentration increases dependent on cell size. Because Cdc13 increases in concentration as the cell grows and is known to induce cell division, it has the potential to act as a sensor to measure cell size and trigger division at the correct size. Many fission yeast proteins' functions are conserved in complex organisms, which may suggest similar size control mechanisms in human and animal cells.

**Awards Won:**