Delayed Sleep Phase Syndrome (DSPS) is a circadian rhythm sleep disorder characterized by later sleeping and waking times than standard [1]. In addition to the lag in sleeping and waking schedule, individuals with DSPS often report fragmented patterns of sleep: brief periods of sleep during the night and extended naps during the day. Recent studies have identified a candidate allele in the CRY1 gene, a repressor of the transcription factors Clock and Bmal1 in the circadian clocks of mammals. A deletion of exon 11 in Cry1 has been linked to a gain-of-function mutation enhancing the affinity of the Cry1 protein to Clock and Bmal1 [2]. In consequence, the circadian cycle is lengthened. The Cry1 protein is composed of a highly conserved N-terminal photolyase homology region and a more divergent C-terminal tail [3]. The N-terminal’s photolyase region is responsible for Clock/Bmal1 repression [4] and the C-terminal protein tail has been linked to nuclear translocation and lengthening via phosphorylation [5], *yet* *the process by which this protein tail interacts with the Clock/Bmal1 transcription factors in the circadian rhythm cycle are still unknown.*

My **primary goal** is to understand the role of phosphorylation of the Cry1 protein tail in the regulation of circadian cycles via interactions with the Clock and Bmal1 transcription factor domains. I will test the **hypothesis** that phosphorylation events in the Cry1 protein tail increase the length of the circadian cycle by structurally regulating the Cry1 protein’s affinity to transcription factors. My **long-term goal** is to understand the processes by which the Cry1 C-terminal protein tail affects circadian rhythm patterns.

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