Public Abstract
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Title:Regulation of Pcl6 and Pcl7 in a Glc7 pathway in Saccharomyces cerevisiae

GLC7 is an essential gene in Saccharomyces cerevisiae that encodes the catalytic subunit of protein phosphatase-1. The Glc7 protein regulates diverse cellular processes including mitosis. We have identified a Glc7 pathway that controls cell division; however, the components of this pathway are not fully understood. Glc7 is conditionally activated by phospho-Glc8, which is phosphorylated by the cyclin dependent kinase, Pho85, associated with Pcl6 and Pcl7 (two of its ten cyclins). Our knowledge about these two cyclins is limited. Therefore, our goal was to determine the input(s) that regulate Pcl6 and Pcl7. This will provide us with valuable information about the conditional activation of Glc7 by phospho-Glc8.
We determined Pcl6 to be more stable (t Â½ = 8.4 hr. Â± 1.2) than Pcl7 (t Â½ = 52 min Â± 7). We confirmed and discovered that Elongin C (Elc1) stabilizes both Pcl6 and Pcl7. A null mutation of elc1 compromises the in vivo function of Pcl6 and Pcl7 in cell growth and in DNA damage response to 4-nitroquinoline oxide (4-NQO). Elc1 is found in two nucleotide excision repair complexes (NEF4 and Ela1 containing complex). We hypothesized that, Pcl6 and Pcl7 levels are induced by DNA damage and controlled by the Elc1 containing complexes. We discovered that the NEF4 and a non-Elc1 containing complex, NEF2, control the stability of both cyclins.
Our data reveal that, NEF4 and NEF2 both regulate the stability of Pcl6 and Pcl7 and DNA damage is an input that controls the conditional activation of Glc7 by phospho-Glc8.