

Grapes(Chk1) prevents nuclear CDK1 activation by delaying cyclin B nuclear accumulation.

Journal: J Cell Biol

Publication Year: 2008

Authors: Anne Royou, Derek McCusker, Douglas R Kellogg, William Sullivan

PubMed link: 18824564

Funding Grants: Training Program in Systems Biology of Stem Cells

Public Summary:

Entry into mitosis is characterized by a dramatic remodeling of nuclear and cytoplasmic compartments. These changes are driven by cyclin-dependent kinase 1 (CDK1) activity, yet how cytoplasmic and nuclear CDK1 activities are coordinated is unclear. We injected cyclin B (CycB) into *Drosophila melanogaster* embryos during interphase of syncytial cycles and monitored effects on cytoplasmic and nuclear mitotic events. In untreated embryos or embryos arrested in interphase with a protein synthesis inhibitor, injection of CycB accelerates nuclear envelope breakdown and mitotic remodeling of the cytoskeleton. Upon activation of the Grapes(checkpoint kinase 1) (Grp(Chk1))-dependent S-phase checkpoint, increased levels of CycB drives cytoplasmic but not nuclear mitotic events. Grp(Chk1) prevents nuclear CDK1 activation by delaying CycB nuclear accumulation through Wee1-dependent and independent mechanisms.

Scientific Abstract:

Entry into mitosis is characterized by a dramatic remodeling of nuclear and cytoplasmic compartments. These changes are driven by cyclin-dependent kinase 1 (CDK1) activity, yet how cytoplasmic and nuclear CDK1 activities are coordinated is unclear. We injected cyclin B (CycB) into *Drosophila melanogaster* embryos during interphase of syncytial cycles and monitored effects on cytoplasmic and nuclear mitotic events. In untreated embryos or embryos arrested in interphase with a protein synthesis inhibitor, injection of CycB accelerates nuclear envelope breakdown and mitotic remodeling of the cytoskeleton. Upon activation of the Grapes(checkpoint kinase 1) (Grp(Chk1))-dependent S-phase checkpoint, increased levels of CycB drives cytoplasmic but not nuclear mitotic events. Grp(Chk1) prevents nuclear CDK1 activation by delaying CycB nuclear accumulation through Wee1-dependent and independent mechanisms.

Source URL: <https://www.cirm.ca.gov/about-cirm/publications/grapeschk1-prevents-nuclear-cdk1-activation-delaying-cyclin-b-nuclear>