

New Material

DNA Replication; Cell Cycle; Cancer

Cell Cycle II

Overview

- multiple **CDKs** & **cyclins**
- **S phase** entry:
 - **SCF ubiquitin ligase** = controls **S phase** entry
 - sort of like **S phase** equivalent of **APC** (which is used in **M phase** entry)
 - **CKIs** = inhibitors
 - cannot enter S phase if **CKI** is bound to **SCF**
 - **pRB** & **E2F**
 - **RB** = inhibitor of **E2F**
 - **RTKs, Ras, Myc, & G1 & S CDKs**
- checkpoints:
 - unreplicated DNA: **G2**
 - **ATR / Chk1** / inhibition of **CDC25 phosphatase** (takes inhibitory phosphate off **CDK**)
 - DNA damage: **G1, S phase, G2**
 - **p53 tumor suppressor protein** = promotes transcription of a **CKI** → stops transcription; can also signal programmed cell death if unsuccessful in stopping transcription
 - **p21** = blocks **CDKs**
 - **CDC25** pathway blocks @ **G1/S, S phase, & G2**
 - mitotic spindle: **M phase**
 - **MAD2** = blocks **APC**
 - sequesters **CDC20**