Source: KBhBIO101CellCycle

1 | Cell Cycle Regulation

The Problem: **Cells need to know whence to divide itself.**

Drivers tell cells when to divide. The processes that move a cell forward through its life are called “drivers”.

- Drivers consists of two parts: a switch + a cyclin
  - a “switch” turns on a “cyclin” protein
  - this cyclin protein actually drive cell forward
- Checkpoints regulate drivers’ actions
  - Should the cells not meet the requirements of a checkpoint, its driver would be stopped; and/or
  - It will be called to self-destruct

1.0.1 | Common cell-cycle checkpoints

- **G1/S Checkpoint** (After S) — external factors and growth factors (nutrients, raw material, DNA damage) , along with measurements of the volume, shape of the cell and the duplicated DNA, ensure that the pre-G2 cell is intact and healthy before moving onto G2
- **Inter s-checkpoint** (During S) — during S, check for DNA damage.
- **G2/M Checkpoint** (After G2) — before mitosis, check that the cell has correctly duplicated parts and tools needed for replication
- **Spindle Checkpoint** — checking for the attachment of all kineticores to the spindles such that all the chromasomes could be correctly lined up and seperated later

Growth Factors that the cells measure: the 1) Size of the cell 2) the nutritional state of the cell

Positive Regulators push the cell cycle forward, CDK, upon lots of cycling binding to it and the meeting of checkpoint.

Negative Regulators hold the cell cycle back due to a response to a checkpoint or an environmental factor