

# 1 | The Cell Cycle

The cell cycle is roughly three parts which is really 5 parts which is really 9 parts.

The three main parts are:

- **Interphase** — G1, S, G2: systems preparation for mitosis
- **Mitosis** — Separation of the duplicated chromosomes
- **Cytokinesis** — the splitting of the cell itself. Really part of mitosis

## 1.1 | Features of the Cell Cycle

**Most cell division results in genetically identical daughter cell**

Each cell, once specialised, chooses what parts of their chromosome to unwrap + permanently wrap.

Difference in transcription results in different phenotypes.

Sperm + Egg (incomplete cells) combine together to form a "zygote" => a single cell. Each person is from a zygote.

Paul's Cell Cycle Primer

## 1.2 | The Phases

### 1.2.1 | G1 => Rest Phase, Gap 1

This is the phase which is the "daily life of a cell". There are two major checkpoints in this phase which, upon it is reached, sets the rest of the cell cycle into motion.

- May hit s.a. to volume checkpoint => if ratio too big, the cell is too big
- May hit diffusion checkpoint => larger cells would need to work harder to transport things to the centre

At this phase, the organelles in the cytoplasm also replicate in preparation for the S phase.

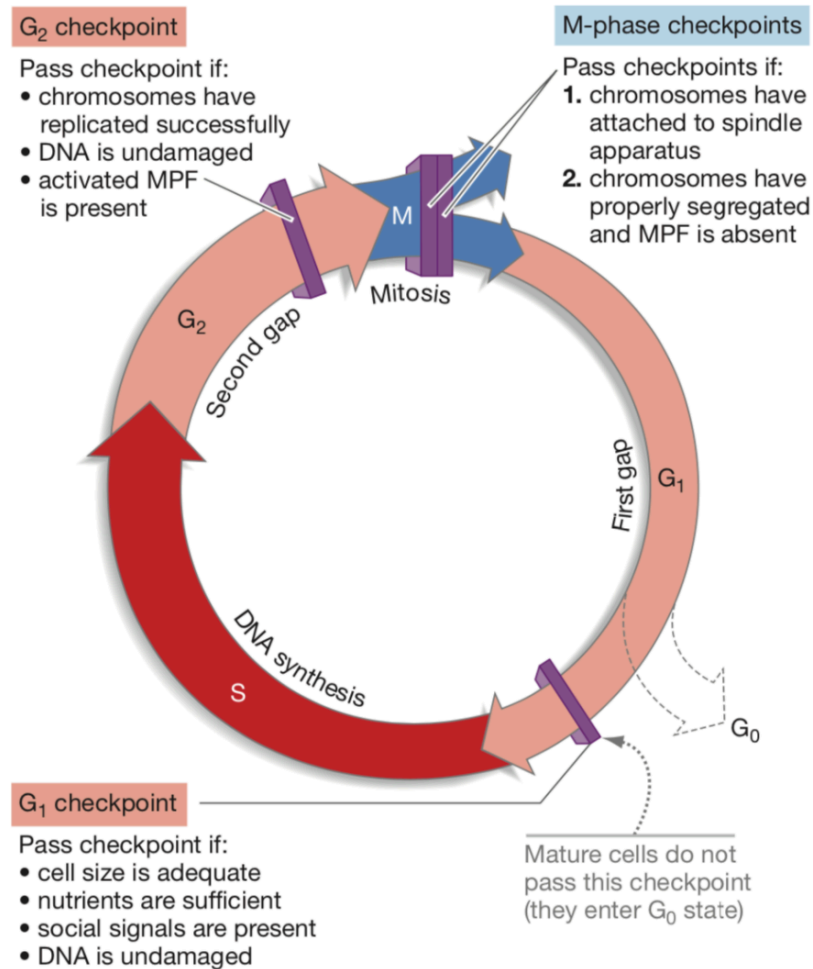
### 1.2.2 | S => S Phase, duplicate DNA. 150 mins

In this process, all of the DNA that is in the nucleus will be KBhBIO101DNARepllicated in order to actually split the cell in half.

### 1.2.3 | G2 => Rest Phase, Gap 2.

The pairs of DNA begins bundling and condensing; the DNA is also checked upon and verified for consistency and dumped based the needs of the cell.

At this point, the enzymes needed to assist Mitosis is also synthesized.



**Figure 12.12 The Four Cell-Cycle Checkpoints.**

Figure 1: Screen Shot 2020-11-09 at 3.16.12 PM.png

### 1.2.4 | **M => Mitosis!**

Mitosis is the process by which non-sex (somatic) cells actually divide. It consists of four parts — prophase, metaphase, anaphase, telophase — and a final separation called cytokinesis. See KBhBIO101Mitosis.

or...

### 1.2.5 | **M => Meiosis!**

Mitosis is the process by which sex cells (gametes) divide. It consists of four parts — prophase, metaphase, anaphase, telophase — and cytokinesis but TWICE! This process also has clever mechanisms to ensure genetic diversity. See yourself: KBhBIO101Meiosis

## 1.3 | **Cell cycle regulation**

Purpose of regulation: **Cells must meet certain conditions before moving onto the next phase.**

Cell regulators are proteins that manage and shepherd the process of cell division. They respond to molecular signals throughout the cell and check for internal signals like DNA damage to control the rate and progress of cell division.

See KBhBIO101CellCycleRegulation

## 1.4 | **How about Meiosis?**

KBhBIO101Meiosis