

This is the **Foundation Combined** version — Higher Tier and Separate-only content removed.

Mitosis produces genetically identical cells for growth and repair. It is tightly controlled to prevent cancer.

- Cell cycle: G1 (growth) → S (DNA replication) → G2 (preparation) → M (mitosis) → cytokinesis
- Mitosis: chromosomes condense, line up at equator, pulled to poles, cell divides → 2 identical diploid cells
- Cell cycle checkpoints prevent damaged DNA from being copied. Cancer = checkpoints fail
- Stem cells: embryonic (any cell type — totipotent), adult (limited types, e.g. blood cells in bone marrow)
- Stem cell therapy: potential treatment for Parkinson's, diabetes, spinal cord injuries

### Key Terms

<b>Mitosis</b>	Cell division producing 2 identical diploid cells
<b>Stem cell</b>	Undifferentiated cell that can divide and specialise
<b>Totipotent</b>	Can differentiate into any cell type (embryonic stem cells)

■ **Exam Tip:** Cancer results from mutations in CHECKPOINT genes — cells divide without proper DNA checks. Benign = stays localised. Malignant = spreads (metastasises).