Mitosis
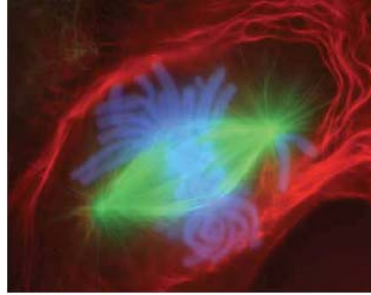## *The Dance of the Chromosomes*
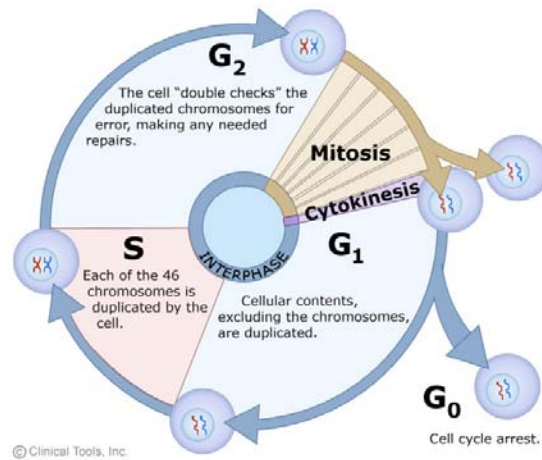

Genes in Motion

Mitosis Presentation

April 30, 2007

Mitosis is part of the Cell Cycle

- The cell cycle encompasses the stages of cell division when one cell becomes two cells, each one identical to the original cell.

- Mitosis is the process in which identical chromosomes are pulled apart, just before the cell divides.

- During mitosis, chromosomes move in rhythmic symmetry.

The Cell Cycle: Interphase, Mitosis & Cytokinesis

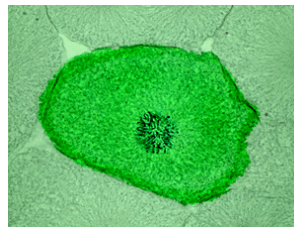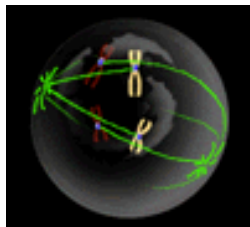## The Cell Cycle: Interphase, Mitosis & Cytokinesis

- Interphase - chromosomes are duplicated

- Mitosis - Identical chromosomes are separated and
  are pulled to opposite ends of the cell

- Cytokinesis - division of the cell

The Fluid Phases of Mitosis

Mitosis is divided into functional phases, yet in reality,
it is a fluid continuum of change.

- Prophase
- Metaphase
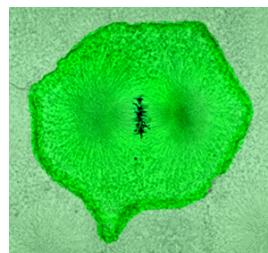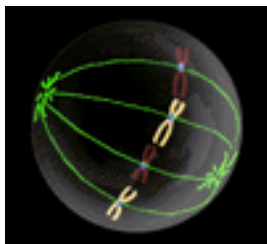- Anaphase
- Telophase

Prophase

Prophase - coil to shape

Prophase is about changing forms and building structures to reorganize.

- chromosomes condense or "coil" into a smaller shape
- identical chromosomes appear as the letter "X" and are held together at the center (the centromere)
- nuclear envelope breaks down
- mitotic spindles begin to form at opposite poles of the cell acting as anchors for the tow ropes (microtubules)
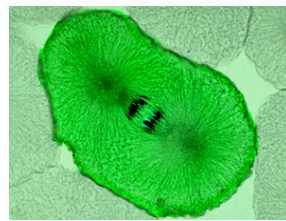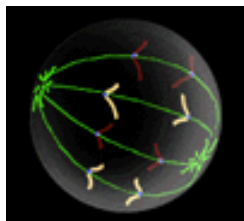
Metaphase

Metaphase - align & attach

During metaphase, identical chromosomes are assembled and prepared for equal distribution.

- Chromosomes line-up at the center of the cell (or equatorial plate)
- Microtubules ("ropes") attach to the mitotic spindles ("anchors") at opposite ends of the cell, and to the centromeres of each chromosome
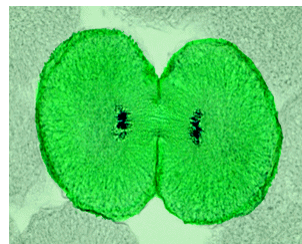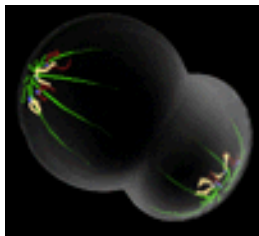
Anaphase

Anaphase - divide & drag

In anaphase, identical chromosomes are pulled far apart to make room for the cell to split in half.

- centromeres divide, one for each duplicate chromosome
- identical chromosomes separate and are dragged by microtubules to opposite poles of the cell
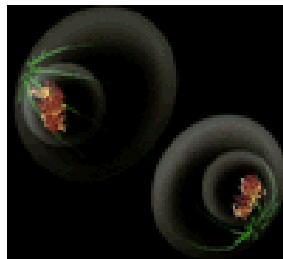- the cell becomes stretched and elongated

Telophase

Telophase - contract & expand

Telophase works as the reverse of prophase. The cell is restructuring itself on either end in preparation for dual independence.

- chromosomes arrive to the poles
- microtubules break down
- nuclear envelopes form around chromosomes
- chromosomes loosen and expand
- cell division (cytokinesis) begins

Cytokinesis

Cytokinesis - separate & go your own way

Cytokinesis is the final split, resulting in independent twin cells.

- follows mitosis as part of the cell cycle
- cell division is completed
- two cells are formed, each genetically identical to the original

Cell Division Gone Awry

When things go wrong in cell division, cells commit suicide or become cancerous.