

# Cellular Growth



■ Interphase

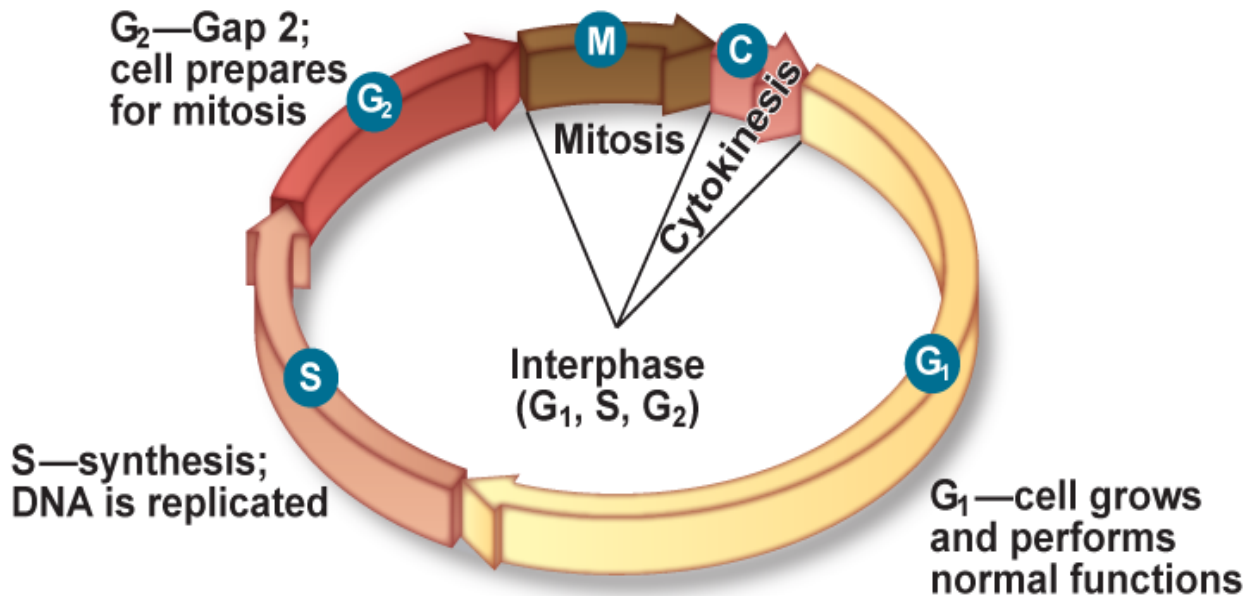
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■ Mitosis

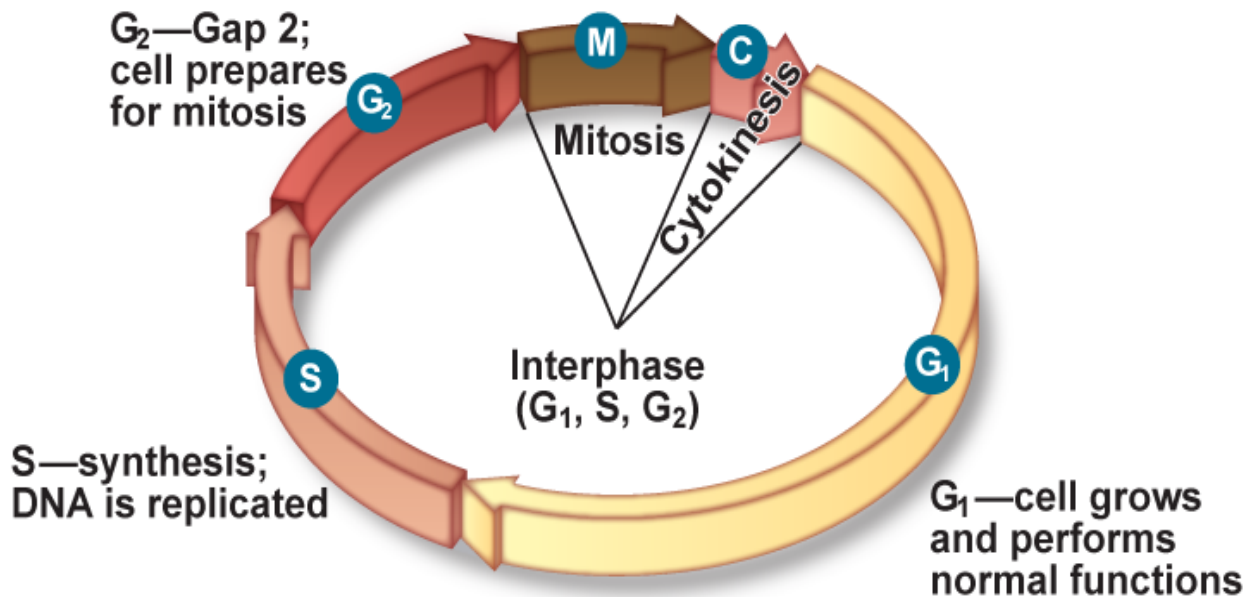
■ Cytokinesis

# The Stages of Interphase

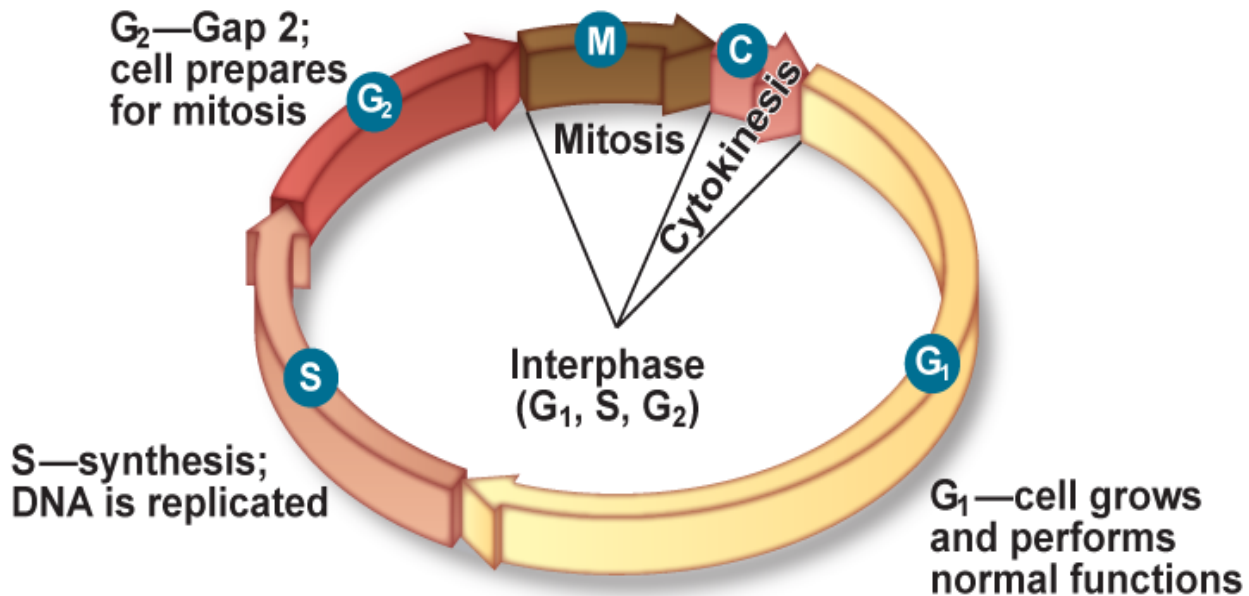
- The first stage of interphase,  $G_1$



# The Second Stage of Interphase, S



# The Third Stage of Interphase, $G_2$



# Mitosis and Cytokinesis

## The Stages of Mitosis

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- Prophase

- \_\_\_\_\_

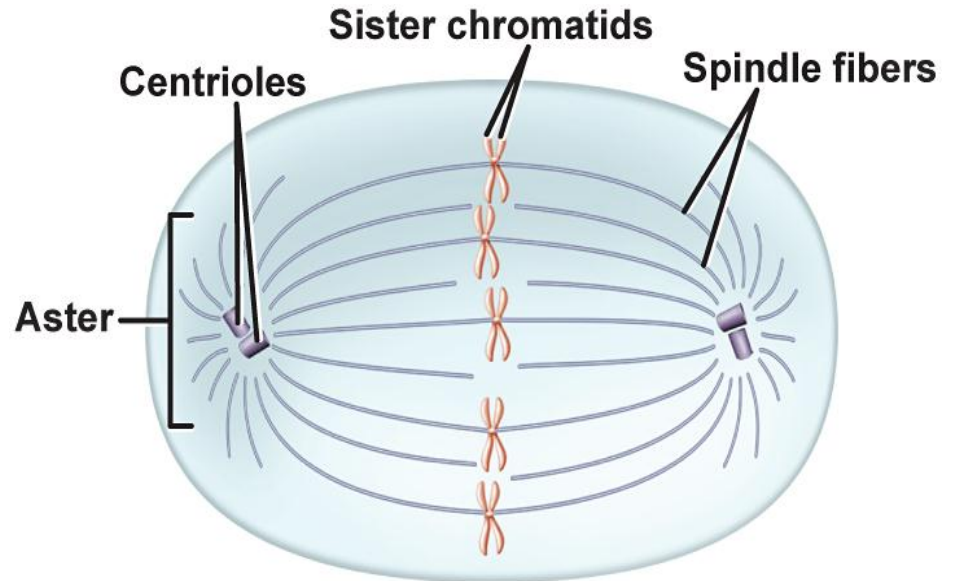
- \_\_\_\_\_ are attached at the  
\_\_\_\_\_.

- \_\_\_\_\_ form in the  
cytoplasm.

# Mitosis and Cytokinesis

■ The \_\_\_\_\_  
\_\_\_\_\_ seems  
to disappear.

■ \_\_\_\_\_ attach  
to the  
\_\_\_\_\_

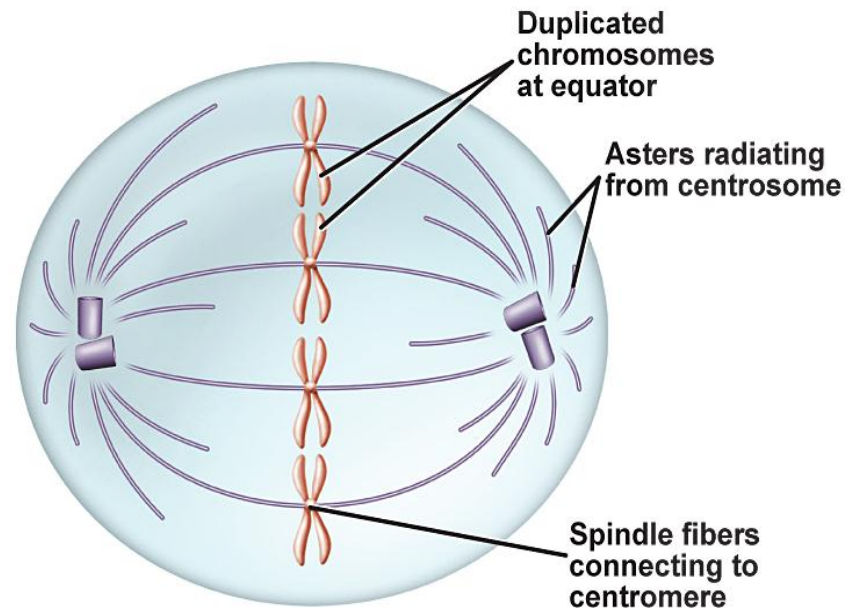


# Mitosis and Cytokinesis

## Metaphase

\_\_\_\_\_ are pulled along the \_\_\_\_\_ toward the center of the cell.

- They line up in the \_\_\_\_\_ of the cell.



# Mitosis and Cytokinesis

## Anaphase

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- The \_\_\_\_\_ of the spindle apparatus begin to shorten.
- The \_\_\_\_\_ separate.
- The \_\_\_\_\_ move toward the \_\_\_\_\_ of the cell.



# Mitosis and Cytokinesis



## Telophase

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- The \_\_\_\_\_ arrive at the poles and begin to relax.
- Two \_\_\_\_\_ begin to form and the \_\_\_\_\_ reappear.
- The \_\_\_\_\_ disassembles.

# Mitosis and Cytokinesis



## Cytokinesis

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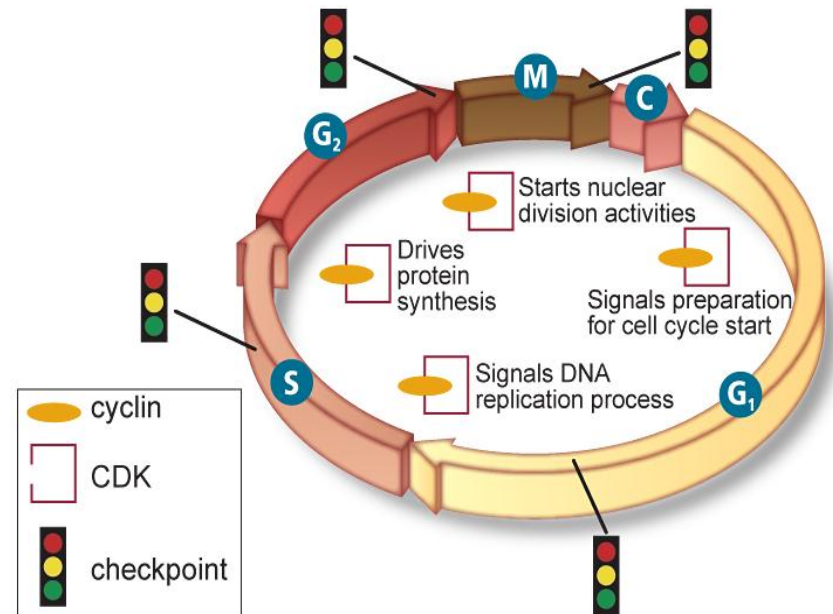
- In \_\_\_\_\_ cells, \_\_\_\_\_ constrict, or pinch, the cytoplasm.
- In \_\_\_\_\_ cells, a new structure, called a \_\_\_\_\_, forms.

# Cell Cycle Regulation

## Normal Cell Cycle

- Different

combinations signal other activities, including DNA replication, protein synthesis, and nuclear division throughout the cell cycle.



# Cell Cycle Regulation

## Quality Control Checkpoints

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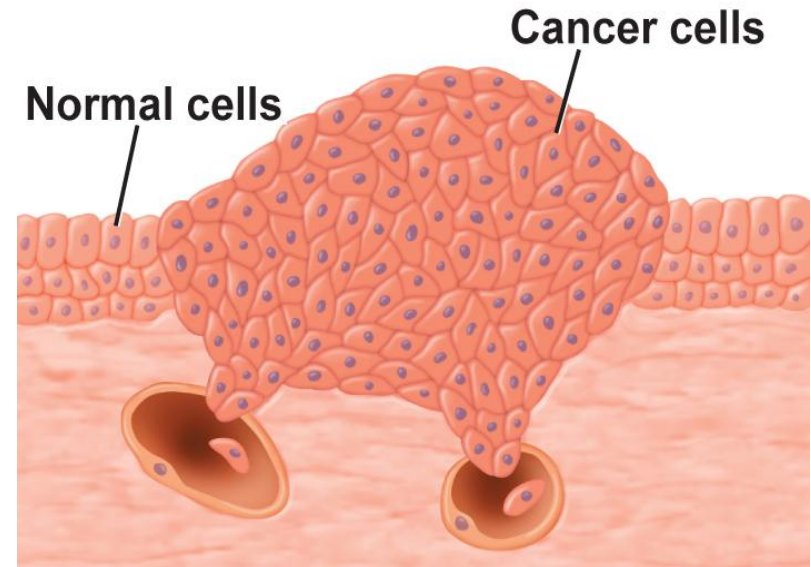
- The cell cycle has built-in \_\_\_\_\_ that monitor the cycle and can stop it if something goes wrong.
- Spindle checkpoints also have been identified in mitosis.

# Cell Cycle Regulation

## Abnormal Cell Cycle: Cancer

- \_\_\_\_\_ is the uncontrolled growth and division of cells.
- Cancer cells can kill an organism by

\_\_\_\_\_, resulting in the loss of tissue function.



# Cell Cycle Regulation

## Causes of Cancer

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- The changes that occur in the regulation of cell growth and division of cancer cells are due to \_\_\_\_\_.
- Various \_\_\_\_\_ can affect the occurrence of cancer cells.

# Cell Cycle Regulation



## Apoptosis

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 Cells going through apoptosis actually shrink and shrivel in a controlled process.