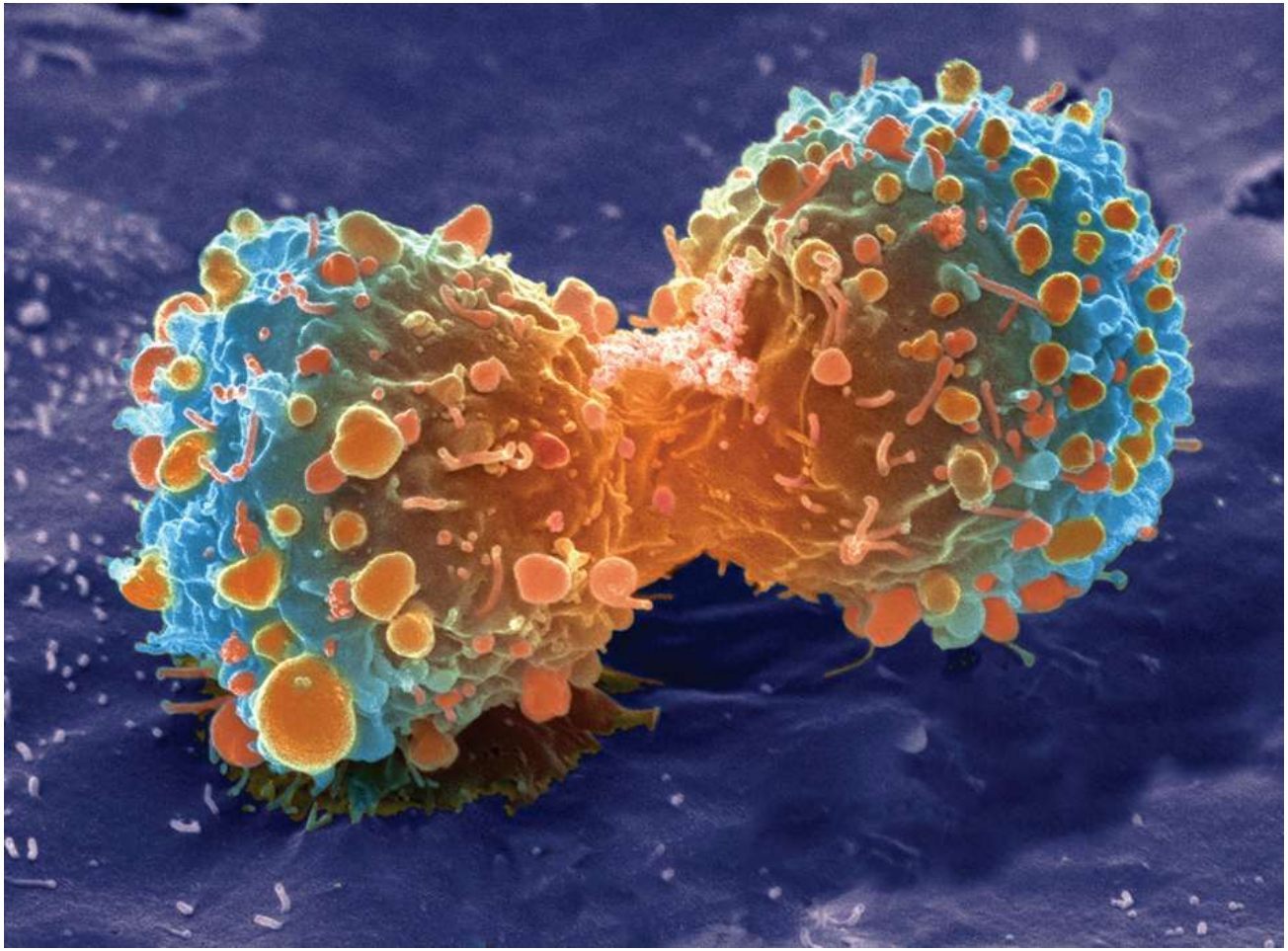
5.3 Regulation of the Cell Cycle

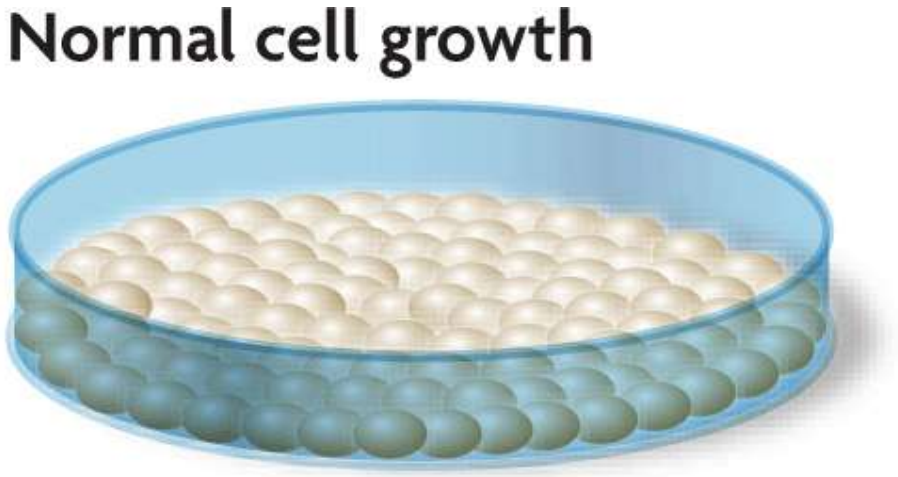
KEY CONCEPT

Cell cycle regulation is necessary for healthy growth.



5.3 Regulation of the Cell Cycle

- **Internal and external factors regulate cell division.**
  - External factors include physical and chemical signals.
  - Growth factors are proteins that stimulate cell division.
    - Most mammal cells form a single layer in a culture dish and stop dividing once they touch other cells.



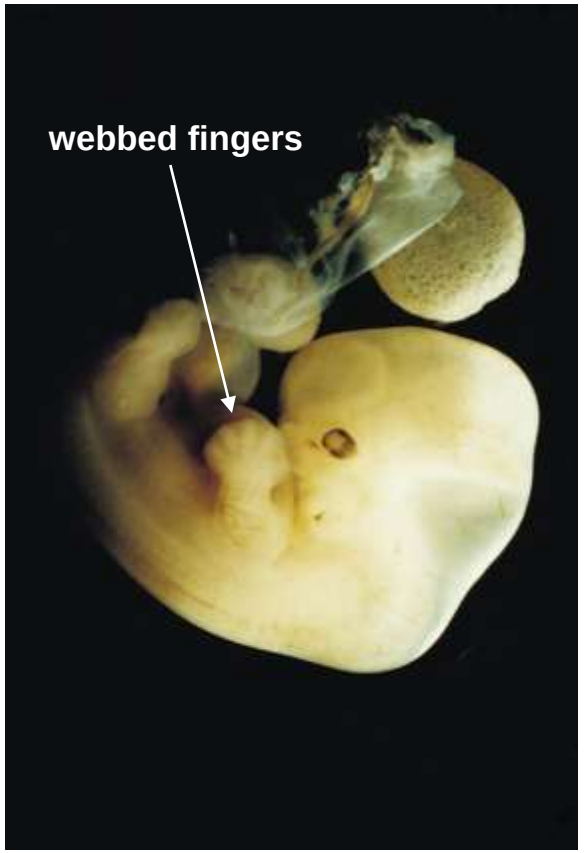
5.3 Regulation of the Cell Cycle

- Two of the most important internal factors are kinases and cyclins.

- External factors trigger internal factors, which affect the cell cycle.

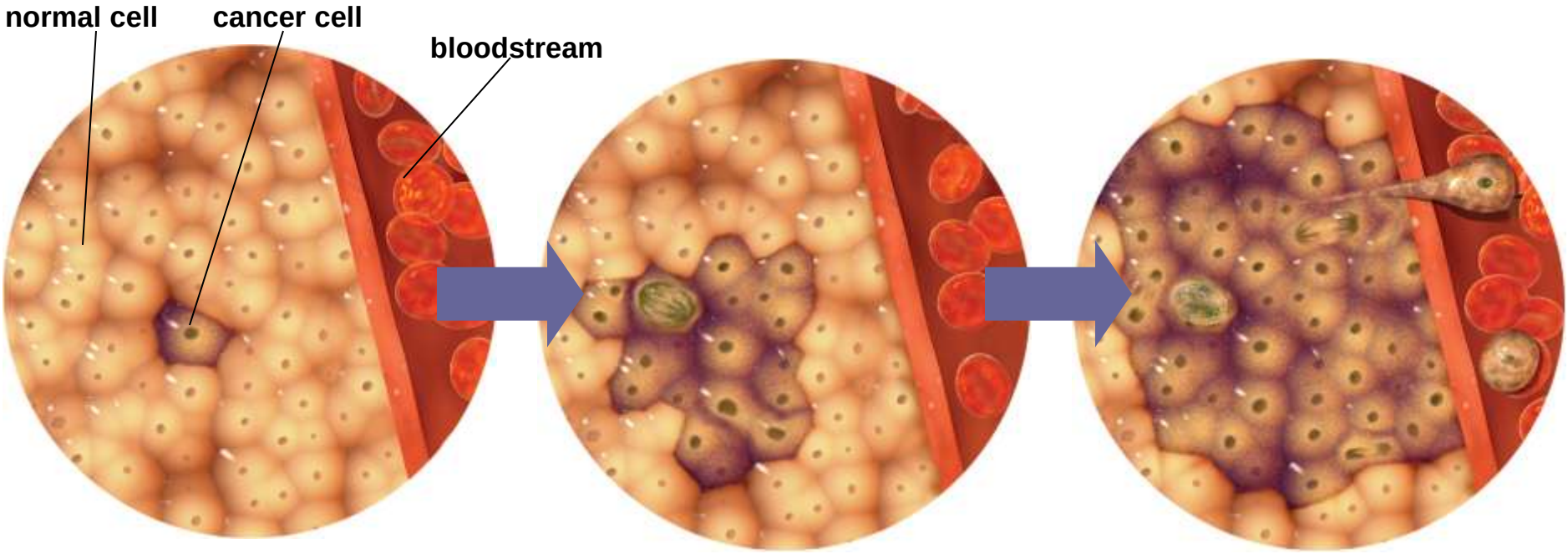
5.3 Regulation of the Cell Cycle

- Apoptosis is programmed cell death.
  - a normal feature of healthy organisms
  - caused by a cell's production of self-destructive enzymes
  - occurs in development of infants



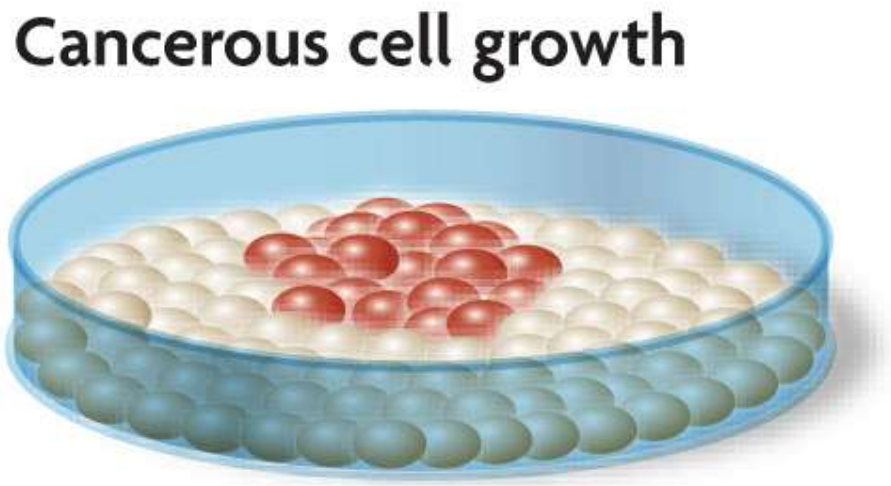
5.3 Regulation of the Cell Cycle

- **Cell division is uncontrolled in cancer.**
  - Cancer cells form disorganized clumps called tumors.
    - Benign tumors remain clustered and can be removed.
    - Malignant tumors metastasize, or break away, and can form more tumors.



5.3 Regulation of the Cell Cycle

- Cancer cells do not carry out necessary functions.
- Cancer cells come from normal cells with damage to genes involved in cell-cycle regulation.



5.3 Regulation of the Cell Cycle

- Carcinogens are substances known to promote cancer.
- Standard cancer treatments typically kill both cancerous and healthy cells.