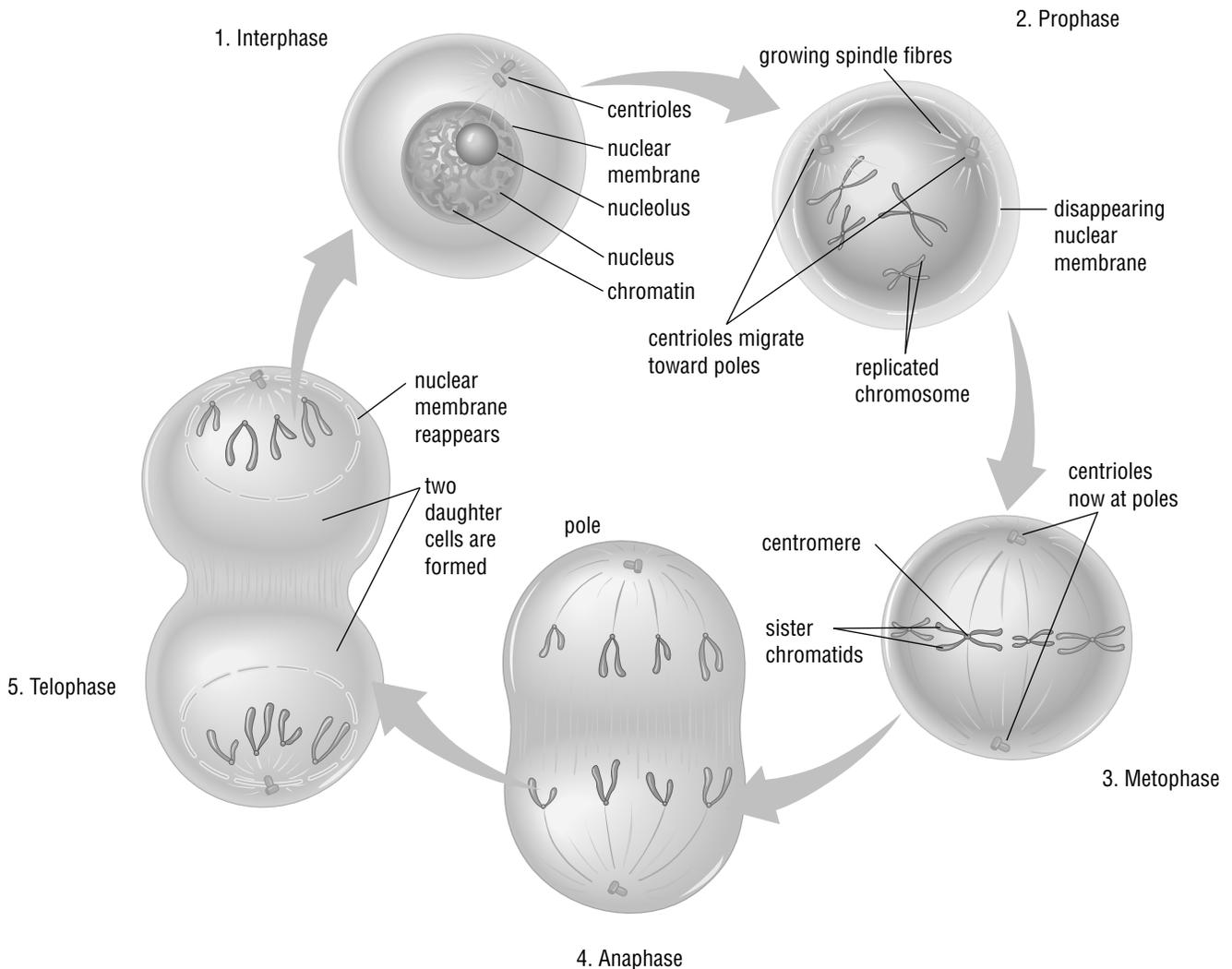


## Section 16.2 Review Answers

### Student Textbook page 561

- Mitosis governs the growth, repair, and maintenance of human tissues.
- Sister chromatids migrate to opposite poles during anaphase.
  - Chromatin condenses to form chromosomes during prophase.
  - The nuclear membrane forms during telophase.
  - The chromosomes align at the cell equator during metaphase.
- Students' sketches should resemble Figure 16.8, (B) through (E), on page 557 of the student textbook."



4. The spindle apparatus guides the chromosomes to the equator of the cell during metaphase, pulls separated sister chromatids to opposite poles of the cell during anaphase, and elongates the cell during anaphase.
5. For any organism to develop properly and to remain healthy its cells must divide only at certain times and they must stop dividing at the correct time. This requires a delicate balance among many different regulatory signals. Within a cell, specific protein interactions serve as “start” or “stop” signals for cell division. External factors, such as the presence of particular hormones, the availability of nutrients, and contact with other cells, also play a role. Anything that interferes with regulatory signals can cause the cell cycle to proceed at an uncontrolled rate. The group of diseases that are associated with uncontrolled, rapid cell division is known as cancer. Rather than spending much of their cell cycle as functioning tissue cells, cancerous cells move quickly from one cell division to the next. The result is a fast growing mass of non-functional cells, called a tumour.
6. Spindle fibres consist of microtubules. Without spindle fibres, the chromosomes would not move to the equator of the cell during metaphase or to the poles of the cell during anaphase. Nor would the cell elongate during anaphase. As a result, the daughter cells would not receive an equal number of chromosomes.
7. An error most likely occurred in anaphase. If the sister chromatids were pulled apart but failed to separate to opposite poles in this phase, following cytokinesis, one cell would have 92 chromosomes (chromosomes would be single, not chromosome pairs; therefore, there would be 92) and the other would have none.