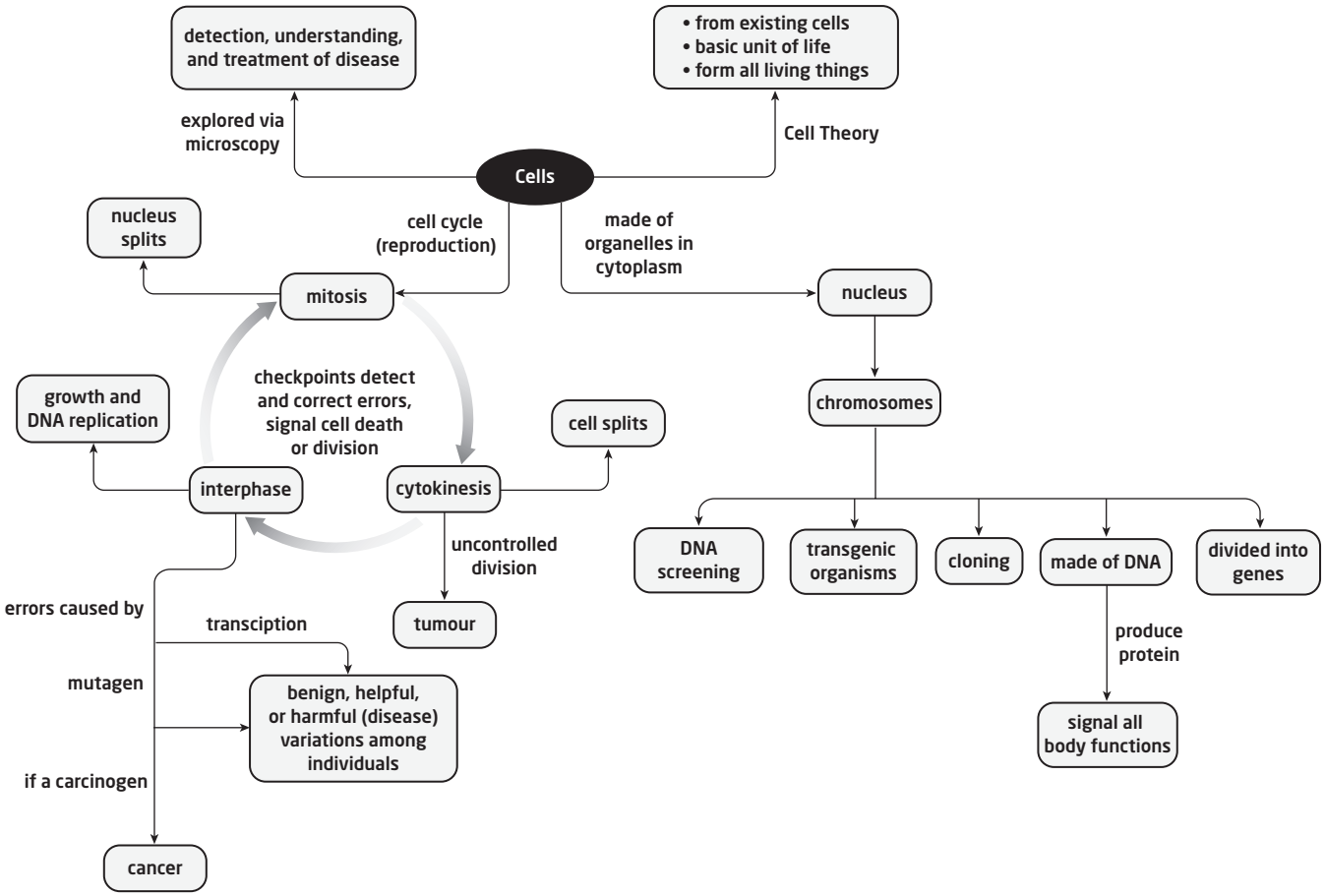
Chapter 1 Review Answers (Student textbook pages 52 and 53)

Please also see **BLM 1-15 Chapter 1 Review (Alternative Format).**

Make Your Own Summary



Reviewing Key Terms

1. organelles
2. micrograph
3. DNA
4. a mutation
5. mitosis, cytokinesis
6. cell cycle

Knowledge and Understanding

7. Both allow us to see objects too small to see with our eyes alone. Both magnify specimens. They are different in that one uses light to illuminate specimens while the other uses electrons. The electron microscope can see inside cells, but the light microscope can show only reflected light.
8. It allowed people to see microscopic organisms and begin to understand that these "germs" cause many diseases, which in turn led to improved hygiene.
9. The nucleolus is where ribosomes are made, and ribosomes help put proteins together.
10. Similarities: organelles; where glucose is produced
    Differences: Chloroplasts-found only in plants; site of photosynthesis; Mitochondria-found in both plant and animal cells, breaks down glucose to release energy for all of the other activities of the cell
11. to reproduce, or replace, damaged cells
12. The diagram should show the chromosomes lined up on the equator of the cell, with the centromere as the point at which sister chromatids are joined; the centrosome attached to the spindle fibres from opposite ends of the cell.
13. Cells do the activities they are designed to do, in both unicellular and multi-cellular organisms. They are performing metabolic activities, chemical reactions, producing and spending energy and making the proteins that are required for all of these processes and more. If conditions are right or the cell is required to do so, they can also proceed to the next stage of interphase and replicate the DNA and begin the journey towards nuclear and cell division.

14. Spindle fibres pull the separated chromatids to opposite ends of the cell.

15. **a.** B **b.** A
c. D **d.** A
e. C, B, A, D

16. Example:

Benefits	Drawbacks
• insect resistant plants might require fewer pesticides: better for the environment • better nutritional value: could help consumers • drought- or cold-resistant plants: could improve yields for farmers	• unknown long-term effects of the plant in ecosystems • unknown side effects on animals that eat GMO plants • potential for agriculture to be over-controlled by corporations • potential for GMO plants to reproduce with other plants, potentially harming ecosystems

17. to help maintain control over cell division so cells only divide when necessary; to determine if a cell is ready to divide (i.e., if its DNA has been copied, it has enough organelles, etc.), which acts as a kind of "quality control"

18. Tumours are cells that are dividing without control and cancer is abnormally dividing cells that have broken away from a tumour and begin to divide uncontrollably in another part of the body.

19. All living organisms are made of cells. The major functions of an organism's body (e.g., breathing, eating, and excreting wastes) are designed to meet the needs of these cells.

20. Each has identical genes in their nuclei and all are the result of mitosis.

Thinking and Investigation

21. Farmers who purchase the seed would want to use the herbicide to take advantage of the genetic modification. The company would increase its sales in both seeds and herbicide. If the company developed a seed that resisted all herbicides, farmers might buy herbicides from other companies.

22. Banana trees are all cloned; cuttings from the original trees.

23. **a.** Interphase 631 min; Prophase 100 min; Metaphase 15 min; Anaphase 15 min; Telophase 39 min
b. to prepare for cell division
c. Example: Longer in a leaf, because it is not actively dividing as much as cells in a root that are causing it to grow.

Communication

24. Example: In democratic societies, it may prove increasingly difficult to restrict capitalism and growth of "personal genotyping." It may help prevent disease by catching it early and treating it. Or, by selecting only those embryos which do not carry the gene. It may direct attention and money away from researching cures, or from unrelated research.

At this point, the possibility raises more questions than it answers. Who owns the information and controls how it is used? If they are available, will service providers such as insurance companies require a person's genotype? Will employers use it to decide on new hires? Will people use it when deciding whether to have children, or carry out a pregnancy? Should the service be available to anyone? Who will get priority in the inevitable backlog? Who will interpret the information? How do you deal with errors and malpractice?

Even though we can identify the code, we don't know how cells interpret the code, change the code, and decide when or whether to express the code. Cells decide what to do with the code, not companies.

25. Example: Mutagens are chemicals or other forces that cause mutations in the DNA. Some of these mutations cause cancer (i.e., they are carcinogens). Conversely, cancer is a type of mutation, so anything carcinogenic must be a mutagen.

26. Crossword puzzles will vary.

Application

27. Example: Any situation in which the population of microscopic organisms as a whole becomes visible, such as mould on food or murky pond water.

28. Similarities—separate each part from the whole; contain and exclude; allow internal environment to be tailored to purpose/contents; Differences—rooms have doors but organelles may be penetrated everywhere; rooms cannot grow and shrink to fit contents

29. Cells can only get so large that their surface area is enough to service the needs of their volume (i.e., taking in nutrients and excreting wastes).

30. **a.** cell cannot divide if its DNA has not replicated
b. cell cannot divide if mitosis is not completed (which requires spindle fibres)