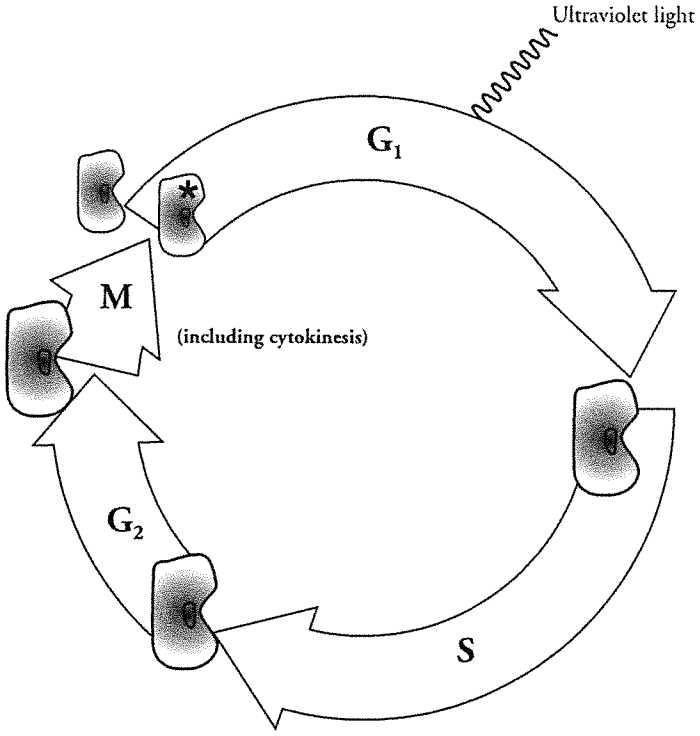
Model 3 – Radiation



23. According to Model 3, ultraviolet light is affecting a cell in which phase of the cell cycle?

24. Ultraviolet light may cause DNA damage, which is known as a mutation. How might such damage affect events taking place during the synthesis phase? *Hint:* Use information from Model 2.

Read This!

The cell cycle has a regular system of checks and balances that prevents damaged or mutated cells from proceeding to the next phase. One way an organism deals with the problems is to kill the damaged cell before it passes on the problem to its daughter cells. This is a normal process called **apoptosis**. (Some normal cells also go through this process.)

25. How might the DNA damage go on to affect the rest of the cell cycle if apoptosis did not occur?

26. Why might it be beneficial to an organism for damaged cells to enter G_0 instead of dividing once they exist?

27. What could happen, after several cell cycles, to an organism whose damaged cells did not go through apoptosis? In other words, what if a damaged cell that is supposed to die does not?

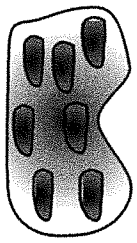
Extension Questions

28. For each phase, describe at least one way mistakes during the cell cycle could result in problems.

G_1	
S	
G_2	
M	
G_0	

29. Some types of cancers are treated with radiation, similar to ultraviolet light. Why might it be beneficial to irradiate cancer cells?

30. Plasmodial slime mold is an example of a multinucleated cell. It can be referred to as "one huge cytoplasmic mass with many nuclei" as seen to the right. What part of Model 1 is skipped in the formation of such a cell? Explain your answer.



31. Chemotherapy utilizes chemicals that disrupt various parts of the cell cycle, targeting rapidly growing cells. Paclitaxel (Taxol®) is one such drug that prevents the mitosis phase from taking place.

    a. Explain how this drug is useful as a cancer treatment.

    b. How might targeting rapidly growing cells explain common chemotherapy side effects such as hair loss and nausea?