

Cell Growth Regulation

Not all cells divide at the same rate. The length of the cell cycle is different for each type of cell.

table available on p. 249

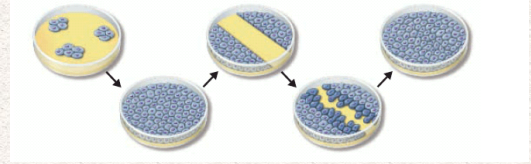
Cell Type	Life Span	Cell division
Esophagus lining	2 - 3 days	divides
Small intestine	1 - 2 days	divides
large intestine	6 days	divides
Red blood cells	120 days	cannot divide
White blood cells	10 hours ++	can divide, not all
Cardiac muscle	long-lived	cannot divide
Neuron	long-lived	cannot divide

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Scientists have observed controls on cell growth in the lab.

Cells can grow on nutrient agar, but stop growing when they come in contact with other cells. Controls can then be turned on and off. (Similar to skin cells healing after an injury)

see figure 10-7, page 250



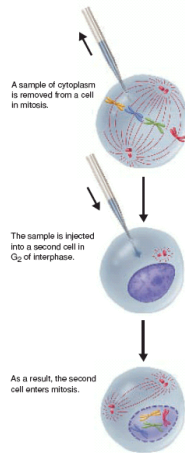
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So how do cells decide that its time to divide??

In the 1980's, scientists found a protein that, when present, promoted the creation of a mitotic spindle in cells. It was named **cyclin** (because the levels rise and fall in tune with cell division).

There are dozens of other proteins that play a role in cell division.

Figure 10-8 (p. 251)



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Internal Regulators

Internal regulators respond to activities going on inside the cell. They allow cell division to proceed only after certain processes have taken place.

ex: making sure all chromosomes have been replicated

External Regulators

External stimulus, such a cut that needs healing or growth hormones, are detected by these regulators outside the cell.

(these are the ones that prevent cells from growing when they detect the presence of another cell nearby)

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Uncontrolled cell growth: Cancer

Cancer cells do not possess, or do not respond to, their cell cycle regulating proteins.

Problems:

- By dividing uncontrollably, they form a mass of cells called a tumor.
- Tumors can prevent necessary processes from taking place in the body
- Cells can break free from a tumor and travel throughout the establishing other tumors along the way.

body

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Many cancer cells have a defect in a gene called p53. External factors, such as smoking, viruses and radiation exposure could be the cause of the damage, or it may be inherited from a parent.

Issue Question:

Scientists have the ability to run a genetic test to determine the likelihood that you will develop cancer.

Should parents be allowed to take this test before deciding whether or not they want to have a child?

Should this test be made mandatory, and if so, at what age? Come up with a list of pros and cons for this practice.

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Cancer test:

Pros	Cons

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Assignment:
Read "Stem Cell: Promises and Problems", page 253.
Essay - Requirements and Rubric
Quiz - material so far
Review: TB p. 257
1- 8, 14, 16, 17, 19, 24
28, 29, 30, 32,

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