

Lesson 10: Lymphatic System and Cancer

Glossary

1. **Antibodies:** germ-fighters the body makes when antigens are found in the body
2. **Antigens:** unknown things like germs in the body that cause the body to produce antibodies to protect itself
3. **Benign tumors:** tumors that are not cancerous and cannot spread to other parts of the body
4. **Biopsy:** a sample of tissue from the body
5. **Cancer:** a disease where cells grow too fast and create a tumor, causing problems in the body
6. **Cell:** "the building blocks of life" that form all the structures in your body and can only be seen through a microscope
7. **Germs:** the tiny living things that can make you sick, including viruses, bacteria, fungi, and parasites
8. **Imaging tests:** when a doctor takes pictures of the inside of your body using a special machine (for example, x-ray or MRI)
9. **Immunity:** the body's ability to remember a specific germ and how to fight it off
10. **Leukemia:** cancer of the blood
11. **Lymph:** clear fluid that carries antibodies and white blood cells to different parts of the body
12. **Lymph nodes:** small organs in the body that look for and remove unknown cells
13. **Lymphatic system:** the system in the body that helps with infection and keeps body fluid balanced
14. **Malignant (cancerous) tumors:** cancerous tumors that can spread to other parts of the body and can be life-threatening
15. **Metastasize:** to spread to other parts of the body
16. **Phagocytes:** white blood cells that destroy cells that do not belong to the body
17. **Tumor:** a lump of cells that is created when cells grow too quickly; they may be malignant (cancerous) or benign (not cancerous)
18. **White blood cells:** cells that destroy unknown substances in the body

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Reading and True and False

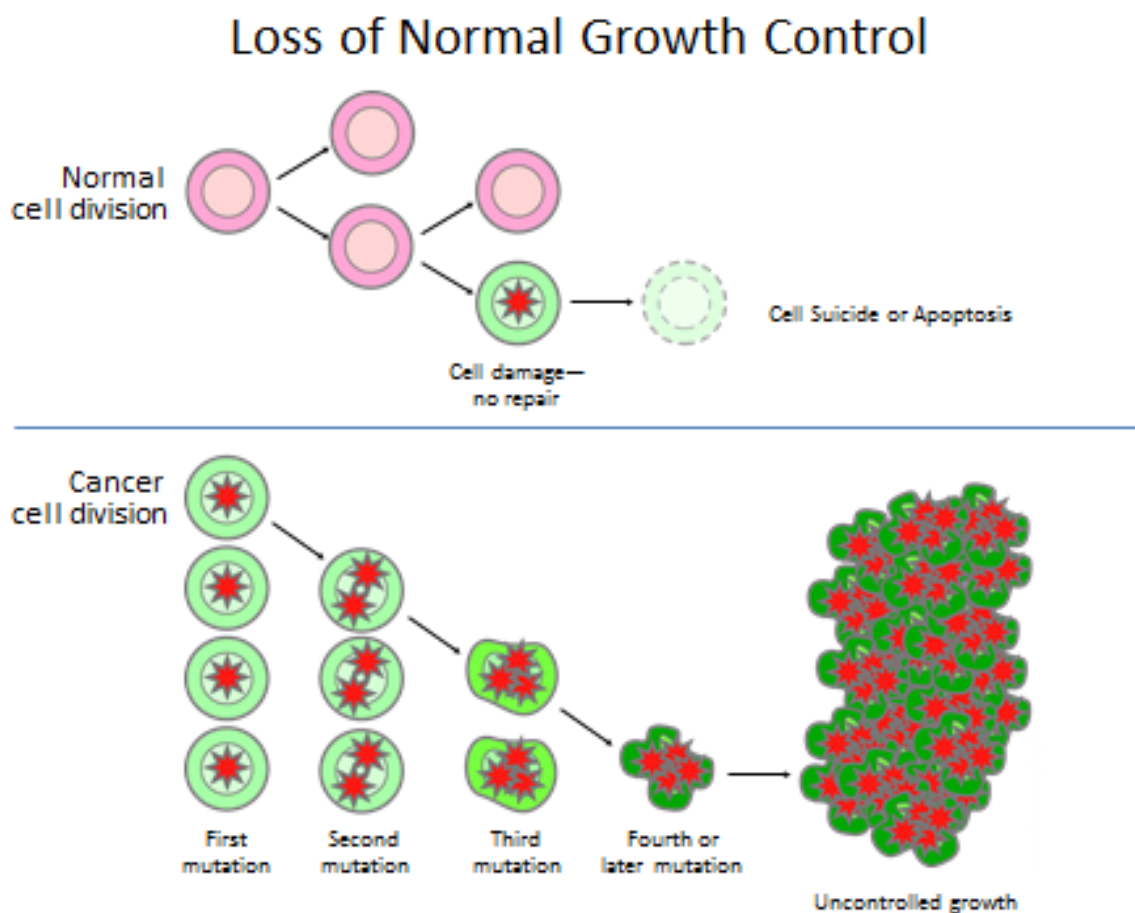
Cancer

Biological Background

The **cells** ("building blocks") in your body go through a normal life cycle. Cells die and new cells are created to replace the old and damaged cells. New cells are created when a single cell divides into more cells. Cell division is important to keeping the body healthy. Sometimes there are problems with the process of cell division.

What is cancer?

Sometimes during cell division, cells mutate (change) and grow faster than the body can manage. The body ends up with cells that do not die when they should and extra cells that the body does not need.¹ The mutated cells can cause problems with normal cells. For example, the mutated cells might take food and oxygen away from normal cells.



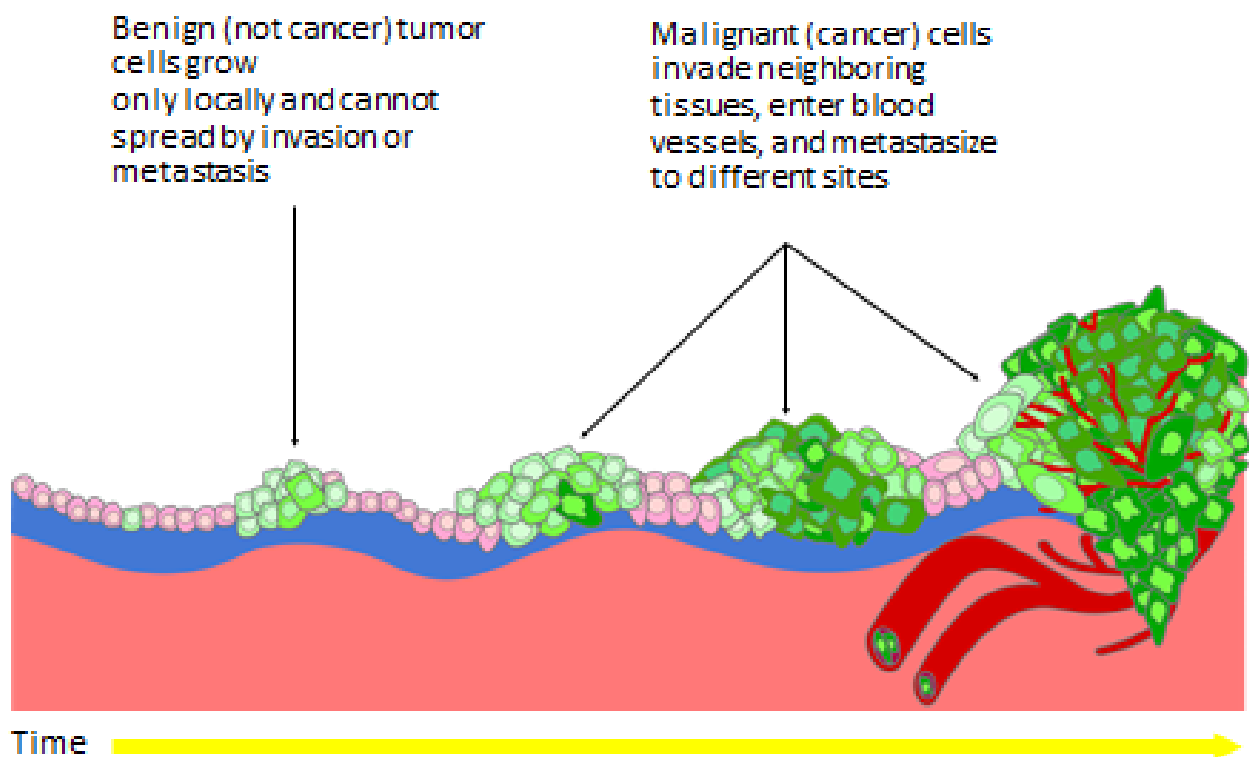
Abnormal cell growth can lead to a lump of cells, called a **tumor**. Some tumors are **cancerous (malignant)**. Others are **not cancerous (benign)**.

¹ <http://www.cancer.gov/cancertopics/cancerlibrary/what-is-cancer>

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Reading and True and False

Malignant versus Benign Tumors



Benign tumors: Benign tumors are NOT cancerous. They are “local” tumors that grow slowly and do not spread, or **metastasize**, to other parts of the body. Once removed, they usually do not come back. They can still cause problems. If a benign tumor is in the brain, it can be difficult to remove and can cause damage. If benign tumors are causing problems, they may be removed.

Malignant (cancerous) tumors: Cancerous tumors have the ability to spread to other parts of the body. Cancerous tumors can be life threatening and usually need strong treatment to be cured.

There are over 200 different types of cancer. Not all cancers cause tumors. For example, **leukemia** is cancer of the blood. Leukemia is abnormal production of white blood cells. The cells do not usually form but may make it hard for other blood cells to work.

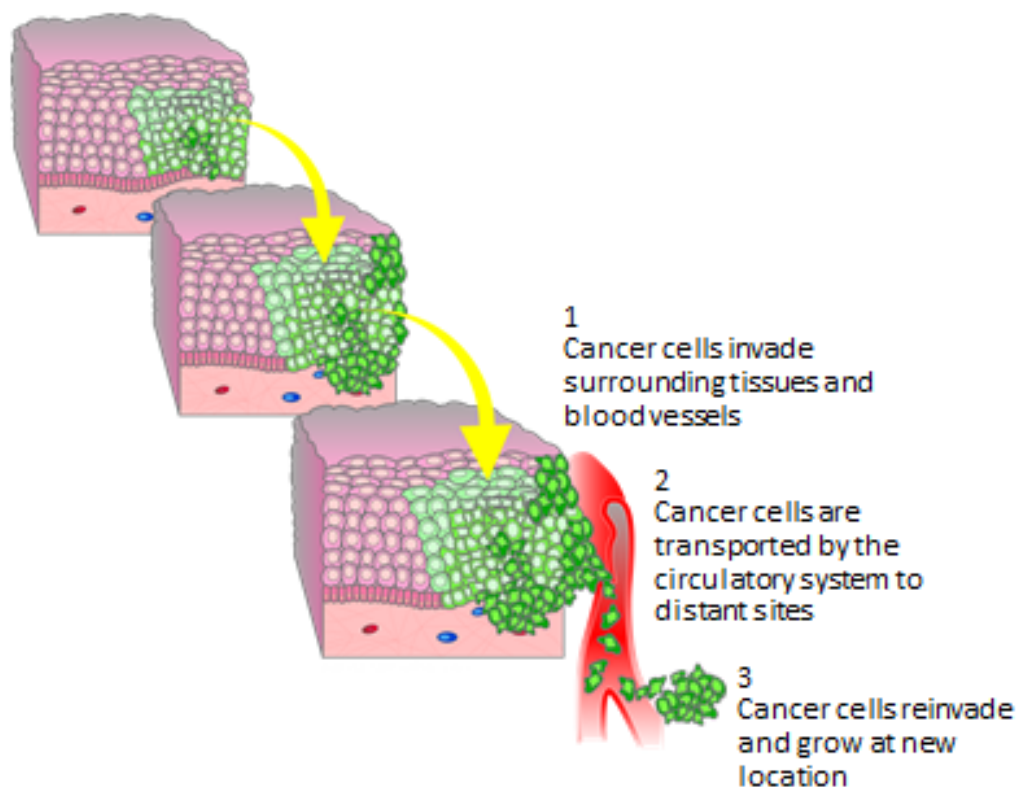
Why is cancer prevention so important?

Cancer can affect anyone. It can be life-threatening depending on the type of cancer, where it is in the body, and when it is found. It is usually easier to treat if doctors find the cancer early. People whose cancer is found early can often recover and live for many years. Cancer that is found late may not be treatable, and may cause death.

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Reading and True and False

Invasion and Metastasis



You can be tested or screened for many types of cancer, such as skin cancer, colorectal cancer, breast cancer and cervical cancer. Screening helps doctors find the cancer early when it is easier to treat.

- Ask your doctor for recommended screenings.
- See the doctor for an annual check-up.
- Ask your doctor about vaccinations for viruses that may lead to cancer: HPV and Hepatitis B
- Talk to your doctor if you are concerned about cancer.

What are some common types of cancer?

Among women, the most commonly diagnosed cancers are the following²:

1. Breast Cancer
2. Lung Cancer
3. Colorectal Cancer

Among men, the most commonly diagnosed cancers are the following:

1. Prostate Cancer
2. Lung Cancer
3. Colorectal Cancer

² <https://www.cdc.gov/cancer/data/index.html>

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Reading and True and False

How do I learn more about cancer?

- *Talk to your doctor*
- Additional websites:
 - o <https://www.cancer.org/>
 - o <https://www.health.state.mn.us/about/org/hpcd/index.html>
 - o <https://www.cdc.gov/cancer/>
 - o <https://mncanceralliance.org/>

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Reading and True and False

Lymphatic System & Immunity

What is the importance of the lymphatic system and immunity?

The **lymphatic system** helps move cells that fight **germs** throughout the body. These **germ-fighting cells** are made by different body systems like the lymphatic and circulatory systems. Some of these cells help the body build **immunity**, which is the body's ability to remember a specific germ and how to fight it. When a body with immunity finds a germ a second time, it can fight it more quickly using the germ-fighting cells that work best against that germ.

How do the lymphatic system and immunity work?¹

The body has a general defense system that protects it from germs and other unknown substances. This includes cells like **phagocytes**, which are white blood cells that eat cells that do not belong to the body. Sometimes, unknown substances can hide or disguise themselves to escape this defense. When this happens, the body uses a more specific defense called the **immune system**. The immune system helps the body recognize, remember, and fight germs. It works closely with the lymphatic system in this process.

Here are some important parts of the lymphatic and immunity system:

- **Antibodies:** The body makes these germ-fighters in response to the presence of antigens (unknown substances) in the body.
- **Antigens:** Antigens are unknown substances in the body. When the body finds antigens, it responds by telling the body to make antibodies to fight them. The body makes specific antibodies that match specific antigens, like a lock and key.

- **White blood cells:** White blood cells destroy unknown substances.
- **Lymph:** Lymph, a clear fluid, moves throughout the body.² It carries antibodies and white blood cells to different parts of the body to destroy germs.
- **Lymph nodes:** Lymph nodes are small organs located throughout the body (in the armpits, stomach, neck, etc.). Lymph nodes find and take out unknown substances. Lymph nodes also store white blood cells. Lymph nodes grow when the body is sick because they are fighting the disease. This is one reason why the doctor will feel your neck or stomach when you are sick.³

Overview of the lymphatic system and immunity

- Antibodies (germ-fighters) are made when the body finds antigens (germs).
- Antibodies stop antigens from hurting the body. Antibodies tell other cells that unknown invaders are in the body, and these other cells then come to help destroy the germs.
- After the body fights off an infection, it makes memory cells that help the body remember the antigen. This memory helps the body to fight the same disease faster the next time the body gets this germ. These memory cells can last for many years, even forever, giving the body immunity against the specific disease.

Talk with a partner. How do the lymphatic system and immunity work?

¹ <https://www.rwjbh.org/rwj-university-hospital-hamilton/>

² www.nlm.nih.gov/medlineplus/ency/article/002247.htm

³ www.nlm.nih.gov/medlineplus/ency/article/002247.htm

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Definitions Match and Complete the Sentence

Lymphatic System

Read each item. As a class, write the letter from the column on the right that provides the correct definition for the word on the left.

- | | |
|----------------------------|--|
| 1. _____ antibodies | a. cells that destroy unknown substances in the body |
| 2. _____ lymph | b. unknown substances in the body, like germs, that cause the body to produce antibodies to protect itself |
| 3. _____ white blood cells | c. the body's ability to remember a specific germ and how to fight it off effectively |
| 4. _____ antigens | d. germ-fighters the body makes when antigens are found in the body |
| 5. _____ lymph nodes | e. small organs in the body that look for and remove unknown cells |
| 6. _____ immunity | f. clear fluid that carries antibodies and white blood cells to different parts of the body |

Use the words in the box to complete each sentence in the following passage about the lymphatic system and immunity.

infection	unknown	antigens	immunity
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The body makes antibodies when it finds _____. Antibodies tell other cells that _____ invaders are in the body.

After the body fights off a new _____ it makes memory cells that help the body remember the antigen. These long-lasting memory cells give _____ against the specific disease.

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Partner Dictation

Partner A

Read these sentences to your partner.

1. 1 in 3 people in the United States will have cancer during their life.
2. Smoking and chewing tobacco causes cancer. Quit smoking or chewing tobacco to decrease your chance of getting cancer.
3. An unhealthy diet and obesity can also cause cancer. Stay a healthy weight by eating a nutritious, healthy diet. This can help reduce your risk of cancer.
4. Be active! Health experts suggest exercising 30 minutes a day, 5 days a week. You could go for a 15-minute walk in the morning and a 15-minute bike ride in the evening, for example.

Now listen to your partner read. You write the sentences.

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Partner Dictation

Partner B

Listen to your partner read. You write the sentences.

Now read these sentences to your partner.

1. Some jobs expose people to chemicals that increase risk of cancers. It is important to wear safety equipment like masks and gloves to protect your health.
2. Ask your doctor about vaccination against HPV and hepatitis B, two viruses that can lead to cancer.
3. Drinking any amount of alcohol (even less than 1 drink a day) can increase the risk of cancer.
4. Ask your doctor about cancer screening. Cancer is usually easier to treat if it is found early.

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Quiz

Read the questions. Then circle A, B, C or D.

- | | |
|---|---|
| <p>1. What is immunity?</p> <ul style="list-style-type: none">A. feeling sickB. the body's ability to remember a specific germ and how to fight it offC. part of the circulatory systemD. none of the above <p>2. What are lymph nodes?</p> <ul style="list-style-type: none">A. part of the digestive systemB. part of the skeletal systemC. stops along the nervous systemD. stops along the lymphatic system that find and take out unknown substances <p>3. Why is cancer prevention so important?</p> <ul style="list-style-type: none">A. because anyone can get cancerB. it is life-threateningC. it is usually easier to treat if it is caught earlyD. all of the above <p>4. What is not considered a symptom of cancer?</p> <ul style="list-style-type: none">A. painB. weight gainC. fatigueD. skin changes | <p>5. What is an antigen?</p> <ul style="list-style-type: none">A. lymphB. antibodiesC. an unknown substance in the bodyD. germ-fighting cells <p>6. How many different types of cancer exist?</p> <ul style="list-style-type: none">A. less than 10B. 20C. 50D. more than 100 <p>7. What is not a cause of cancer?</p> <ul style="list-style-type: none">A. exerciseB. tobacco useC. diet and obesityD. contact with certain chemicals <p>8. How can you find more information about cancer?</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p> |
|---|---|

Student Survey: Lymphatic System / Cancer Unit

1. Did you learn more information about cancer and the lymphatic system from studying this lesson?

1	2	3	4	5
no		some		yes

2. Would you share this information with family and friends?

1	2	3	4	5
no		maybe		yes

3. After studying this lesson, are you more likely to ask your health care provider about cancer?

1	2	3	4	5
no		somewhat		yes

4. Do you know where to find more information about cancer and the lymphatic system if you have more questions?

1	2	3	4	5
no		somewhat		yes

5. Did you like the class activities?

1	2	3	4	5
no		somewhat		yes

We value your opinions! Could you tell us what you liked or give us some suggestions on how to improve this lesson?

Thank you!