What Is Cancer?

Cancer is a group of diseases where abnormal cells grow out of control and crowd out normal cells. It affects 1 in 3 people in the United States. Chances are that you or someone you know has been affected by cancer. Here is some information to help you better understand what cancer is.

What makes something cancer?

There are many different kinds of cancer, but they all involve abnormal cells. Cancers often have these features:

- **Gene changes (mutations):** Cancer cells have changes in their genes that make them abnormal. Some of these gene changes may be passed down from a parent (inherited mutations), while others may happen later in life (acquired mutations).
- **Uncontrolled cell growth:** Most abnormal cells die off or are unable to reproduce. But cancer cells can keep growing and dividing to make more abnormal cells. Cancer cells can crowd out normal cells.
- **Tumor formation:** Not all cancer cells form tumors, and not all tumors are cancer. But many types of cancer cells do clump together to form tumors.
- **Cancer spread (metastasis):** Cancer cells can invade nearby tissues, and many can even spread to other parts of the body.

Many types of abnormal cell growths have some of these features, but not all of them are cancer. For example:

- Tumors are lumps or masses of abnormal cells (**neoplasms**) that can be **malignant** (cancer) or **benign** (not cancer).
- Precancers are abnormal cells that are not cancer but could become cancer over time.
- Cysts are abnormal sac-like growths filled with air, fluid, pus, or tissue. Most cysts do not have abnormal cells in them and are not cancer.

What causes cancer?

Cancer starts when something goes wrong in the normal process of cells growing and dividing to make new cells. A cell's genes (pieces of DNA that tell the cell how to function) change and make the cell abnormal. Most cells die if they become abnormal, but some gene changes[1] allow cells to survive, grow, and divide to make more abnormal cells.

Gene changes that lead to cancer can have many possible causes[2]. Lifestyle habits, genes you get from your parents, and being exposed to certain chemicals or radiation can all play a role. Many times, there is no clear cause.

Cancer is more than just one disease

There are many types of cancer. Most types also have subtypes based on features like what the cells look like under a microscope.

Cancer can develop anywhere in the body. It's usually named for the part of the body where it starts, even if it spreads. For example, if cancer starts in the breast and spreads to the lungs, it's still called breast cancer. It's not considered lung cancer, but metastatic breast cancer. **Metastatic** means it has spread to another part of the body.

Some cancers are also named for the type of cell they start in. For example, carcinomas start in the skin or the lining of organs, while sarcomas begin in bone, muscle, or connective tissue.

Two main types of cancer

Cancers are often grouped into two main categories:

- Blood (hematologic) cancers[3] start in blood cells or blood-forming tissues. These include leukemia, lymphoma, and multiple myeloma.
- Solid tumor cancers[4] develop in organs or tissues. The most common solid tumors are breast, prostate, lung, and colorectal cancers.

Why cancer types matter

While all cancers involve uncontrolled cell growth, different types can behave in different ways. For example:

- Some grow and spread fast, while others are slower
- Some depend on hormones to grow
- Some are more likely to stay in one place, while others spread more easily.
- Some are treated with surgery; others respond better to radiation therapy or drugs such as chemotherapy, targeted therapy, or immunotherapy. For many cancers, more than one treatment is often used to get the best treatment outcome.

It's very important to know the type (and subtype) of cancer before starting treatment, if possible. Knowing the exact type helps doctors know which treatment will work best.

What is the cancer stage?

When cancer is found, tests are done to see how big it is and whether it has spread. This is called staging the cancer[5].

A lower stage (like stage 1 or 2) means the cancer has either not spread or has spread to lymph nodes or just outside the **primary site** (the place it started). A higher stage (like stage 3 or 4) means it has spread farther.

The stage of a cancer is very important to know. Along with other testing on the tumor, doctors use the stage to figure out the best treatment options for a person.

How does cancer spread (metastasize)?

Cancer cells have the unique ability to:

- Grow quickly and out of control
- Spread to other parts of the body

- Invade other organs and tissues

When cancer cells break away from the original tumor, they can travel through the bloodstream or the lymphatic (lymph) system[6] to other parts of the body. Most of these cells die. But some might survive, settle in a new area, and form new tumors. Learn more in How Does Cancer Spread?[7]

Hyperlinks

1. www.cancer.org/cancer/understanding-cancer/genes-and-cancer/gene-changes.html
2. www.cancer.org/cancer/risk-prevention.html
3. www.cancer.org/cancer/types/blood-cancer.html
4. www.cancer.org/cancer/types.html
5. www.cancer.org/cancer/diagnosis-staging/staging.html
6. www.cancer.org/cancer/understanding-cancer/anatomy-gallery/lymphatic-system.html
7. www.cancer.org/cancer/managing-cancer/advanced-cancer/how-does-cancer-spread.html

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What Are Neoplasms and Tumors?

A **neoplasm** is an abnormal growth of cells in the body. It happens when the body's normal process of making and replacing cells doesn't work as it should.

When a neoplasm forms into an abnormal growth, mass, or lesion, it's called a **tumor**. Unlike cysts, tumors are usually solid and firm because they are filled with clumps of abnormal cells. Neoplasms don't always form tumors, but many do, and the two terms are often used interchangeably.

Not all tumors or neoplasms are cancer – they can be **benign** (not cancer) or **malignant** (cancer).

Signs of a tumor or neoplasm

Tumors can feel different depending on their size, location, and type. Some can be felt with your hand, while others may be too deep inside the body to find without imaging tests.

A tumor may:

- Feel firm, solid, soft, smooth, or bumpy
- Sometimes cause pain or discomfort
- Often be seen only with x-rays or other imaging tests

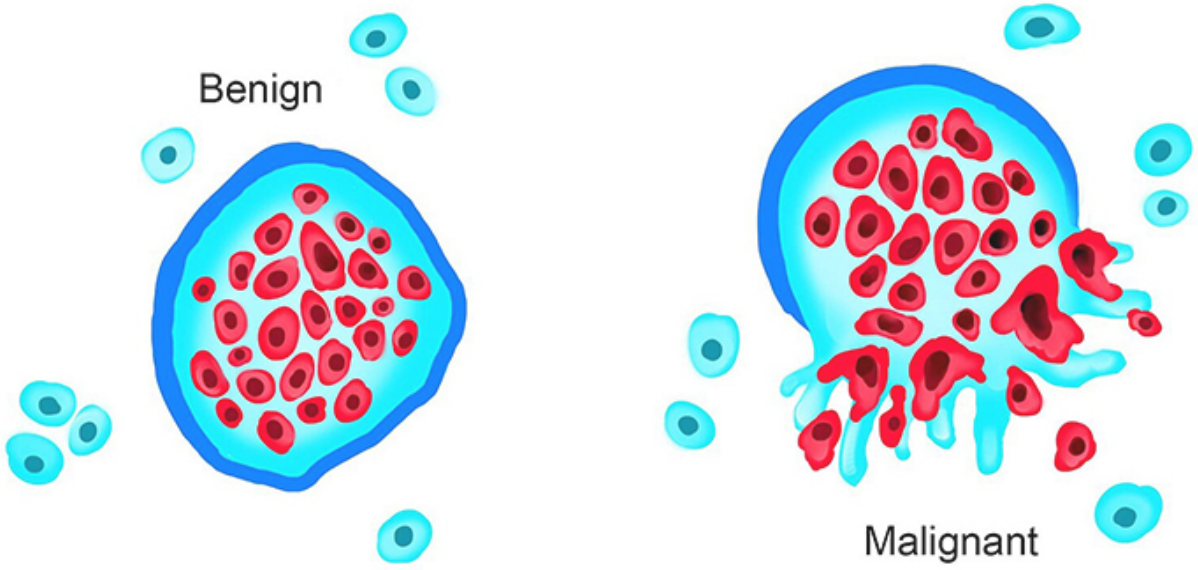
Because neoplasms and tumors can be serious, any lump, growth, mass, or lesion you might notice or feel should be evaluated by a doctor.

Benign versus malignant neoplasms and tumors

Not all tumors are cancer. Tumors and neoplasms are considered **malignant** if their abnormal cells can invade surrounding tissue and spread to other parts of the body. The ability of cancer cells to grow into and spread to other parts of the body is called

metastasis[1].

If the abnormal cells cannot do this, the tumor is **benign** (not cancer).



Benign neoplasms and tumors

A **benign neoplasm or tumor** is a noncancerous growth. This means it:

- Does not have cancer cells inside it
- Tends to grow slowly
- Is usually not serious
- Is usually contained to one area
- Cannot spread to other parts of the body

However, benign tumors can sometimes grow quite large or press on organs, nerves, or blood vessels. In these cases, it can be serious and might need to be removed.

Examples of **benign** neoplasms or tumors:

- **Lipoma:** A benign growth filled with fat cells. It usually grows just under the skin, such as on the breast.
- **Fibroma:** A benign growth filled with fibrous tissue, such as scar tissue. These are

mostly found in the skin or lungs.
- **Adenoma:** A benign growth in glands or glandular tissue, usually found in the thyroid or colon. These might be called nodules, such as a thyroid nodule. They can also be called polyps, such as an adenomatous polyp, a common type found in the colon or rectum.
- **Hemangioma:** A benign cluster of blood vessels that form a reddish or purplish lump. These are commonly found on the skin.
- **Meningioma:** A benign growth in the layers of the brain and spinal cord. These are often removed because they can cause problems if they put pressure on the brain or spinal cord.

Malignant neoplasms and tumors

A **malignant neoplasm or tumor** is a cancer. The term “malignant” means cancer cells are present, and the tumor is considered cancerous. Tests are done to know the exact type of cancer cells and to determine the cancer’s stage[2].

Malignant tumors:

- Tend to grow quickly
- Can invade nearby tissue
- Can spread to other parts of the body
- Are serious and often life-threatening

How serious a malignant neoplasm or tumor is depends on:

- The type of cancer cells found in it
- Where it’s located
- How big it is
- Whether it has spread
- How it’s affecting the person’s health

Examples of malignant neoplasms or tumors include all cancers:

- Hematologic (blood) cancers[3]**:** These are cancers of the blood cells, including leukemia, lymphoma, and multiple myeloma. These cancers do not always form tumors, but are still considered a type of neoplasm.

- Solid tumor cancers[4]**:** Cancers of any of the other body organs or tissues. The most common solid tumors are breast, prostate, lung, and colorectal cancers.

Do all neoplasms and tumors need to be removed?

The decision to remove a tumor or neoplasm depends on its size, location, type, and whether it is benign or malignant.

- **Benign** neoplasms and tumors may need to be removed, or a person may choose to have them removed. In some cases, they can be left alone or watched and rechecked to see if they change or grow in any way.
- **Malignant** neoplasms and tumors, or cancers, are approached differently. Ideally, doctors want to be able to completely get rid of a malignancy. In some cases, all of it can be removed with surgery. In other cases, only part of the cancer can be removed. And for some, the cancer can't be removed and is considered to be inoperable.

A tumor or neoplasm might **not** be removed if it:

- Is very large
- Is in a hard-to-reach area
- Is in a sensitive place next to important organs, blood vessels, or nerves, and if removing the cancer could cause damage to the surrounding tissues and structures
- Has its own blood supply and removing it might cause excessive bleeding
- Is a very aggressive type of cancer or the cancer has already spread
- Another treatment would be more effective

Hyperlinks

1. www.cancer.org/cancer/managing-cancer/advanced-cancer/what-is.html
2. www.cancer.org/cancer/diagnosis-staging/staging.html
3. www.cancer.org/cancer/types/blood-cancer.html
4. www.cancer.org/cancer/types.html

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Patel A. Benign vs Malignant Tumors. *JAMA Oncol.* 2020;6(9):1488. doi:10.1001/jamaoncol.2020.259

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What Are Precancers and Precancerous Cells?

Precancerous cells, also called **premalignant cells**, are abnormal cells that have changes in how they look or grow. The cells are not cancer, but they show changes that raise the risk of turning into cancer over time.

A **precancer** is a group, mass, or clump of precancerous cells. Sometimes they are called precancerous or premalignant lesions and conditions.

Types of precancerous cells

Precancers are usually named or described based on where they are located in the body and what type of cell change they have. Two common types are dysplasia and hyperplasia.

Dysplasia

Dysplasia means cells are growing abnormally and have changes in their structure that are not yet cancerous. It can range from mild to severe, depending on how abnormal the cells are. Common places where dysplasia can develop are:

- Cervix[1] or lower part of the uterus (cervical dysplasia and cervical intraepithelial neoplasia, or CIN)
- Colon or rectum[2] (adenomatous polyps)
- Mouth (leukoplakia and erythroplakia)
- Skin[3] (actinic keratosis, Bowen disease, and keratoacanthoma)

Hyperplasia

Hyperplasia means there are more cells than usual in a tissue, but the cells look normal and are not cancer. Common types of hyperplasia include:

- Breast hyperplasia[4]
- Prostate hyperplasia[5]
- Endometrial (uterine) hyperplasia[6]

Is a polyp a precancer?

A **polyp** is an abnormal growth or bump that can form in certain tissues. Not all polyps are considered precancers. Some are harmless. Others may contain precancerous cells, such as dysplasia, or may eventually become cancer if not removed.

Common types of polyps include:

- Colon or colorectal polyps[7]

- Stomach polyps[8]
- Nasal (nose) polyps[9]

How serious are precancers and precancerous cells?

Precancerous cells aren't cancer and don't have the ability to spread to different parts of the body like cancer cells do. But they can still be serious because they have the potential to turn into cancer if not treated or removed.

How long does it take for precancerous cells to become cancer?

This depends on the type and features of the cell. The process of becoming cancer can take many years. But early detection and treatment of precancers can prevent cancer from developing. Getting regular check-ups and recommended cancer screenings[10], like cervical and colorectal screening tests, helps find precancers and precancerous cell changes early so they can be removed or treated.

Do precancers always need to be removed?

While not all precancers will turn into cancer, they are warning signs. Ideally, precancers are removed when they are found or shortly after.

If precancers aren't removed, they need to be tested and monitored regularly. Depending on the type of precancerous cells, other treatments, like topical medicines, freezing (cryotherapy), or laser therapy might be used instead of surgery.

Can precancers and precancerous cells come back?

Yes, a precancerous condition can come back. This might happen if:

- The precancerous cells were not completely removed
- Known risk factors, such as smoking, inflammation, or infection are not addressed
- Treatment for the precancers was not successful

Ongoing monitoring after being diagnosed with a precancer or precancerous condition is very important. Regular check-ups and follow-up testing can help find any sign of more or new precancerous changes. If caught early, these changes can be

treated again before they turn into cancer.

Hyperlinks

1. www.cancer.org/cancer/types/cervical-cancer/about/what-is-cervical-cancer.html
2. www.cancer.org/cancer/types/colon-rectal-cancer/about/what-is-colorectal-cancer.html
3. www.cancer.org/cancer/types/basal-and-squamous-cell-skin-cancer/about/what-is-basal-and-squamous-cell.html
4. www.cancer.org/cancer/types/breast-cancer/non-cancerous-breast-conditions/hyperplasia-of-the-breast-ductal-or-lobular.html
5. www.cancer.org/cancer/diagnosis-staging/tests/biopsy-and-cytology-tests/understanding-your-pathology-report/prostate-pathology/benign-prostate-disease-pathology.html
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8. www.cancer.org/cancer/types/stomach-cancer/causes-risks-prevention/risk-factors.html
9. www.cancer.org/cancer/types/nasal-cavity-and-paranasal-sinus-cancer/about/what-is-nasal-paranasal.html
10. www.cancer.org/cancer/screening/get-screened.html

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What Is a Cyst?

A **cyst** is an abnormal sac-like growth or mass that looks like a pouch or capsule. Cysts can be filled with air, fluid, pus, or tissue. They can form just about anywhere in the body. Cysts are different from tumors, and are almost always benign (not cancer.)

What causes a cyst?

A cyst develops when a structure in the body gets blocked, such as a duct that carries or drains fluids. The blockage can be caused by an infection or another problem in the duct or nearby tissue or organ. The blockage can cause air, fluid, blood, or pus to build up, leading to a sac forming around the buildup. The sac and its contents make up what is called a cyst.

Types of cysts

Examples of common cysts include:

- Cysts found under the skin, such as ganglion, sebaceous, pilonidal, and dermoid cysts
- Fibrous and simple breast cysts[1]
- Follicular and dermoid ovarian cysts and polycystic ovaries

- Simple renal (kidney) cysts and polycystic kidney disease

Symptoms of cysts

Cysts can have many different sizes and shapes. Some cysts can be felt with your hand, but some are deeper inside the body and can only be seen with x-rays or other imaging tests. If a cyst is in a spot where you can see and feel it, it may be soft or pliable to the touch if it contains air or fluid. But if it is filled with tissue, it can feel more firm and solid.

Is a cyst cancer?

Almost all cysts are benign (not cancer). This means they do not have cancer cells inside them. While cysts have some cells, they are not usually filled with abnormal cells like cancerous neoplasms or tumors are. However, some cysts may contain cells that show signs of abnormal changes, and it's possible they can turn into cancer.

Cyst versus tumor or neoplasm

A cyst is different from a neoplasm or tumor. Here are the key differences:

- Most cysts are benign. Tumors and neoplasms can be benign or malignant.
- Cysts are sacs or pouches filled with air, fluid, pus, or tissue. Tumors and neoplasms are made up of abnormal cells.
- Cysts form due to a blockage or infection in the body. Tumors and neoplasms form when something happens during the cell cycle process that results in abnormal cells forming, growing, and developing into a lump or mass.

Does a cyst need to be removed?

Some cysts might be removed due to size, location, or other concerns, while others can be left alone. If the cyst has fluid or pus that can be drained out, the cyst might go away after it's drained. Sometimes it can refill with fluid or pus, or another cyst might form in the same area.

While most cysts are harmless, any cyst that changes in size or shape, or causes symptoms, should be checked by a doctor. They can help you understand what might

have caused a cyst to form and decide if it should be removed or not.

Hyperlinks

1. www.cancer.org/cancer/types/breast-cancer/non-cancerous-breast-conditions/fibrosis-and-simple-cysts-in-the-breast.html

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