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Leukemia

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Leukemia is cancer of the body's blood-forming tissues, including the bone marrow and the lymphatic system.

Many types of leukemia exist. Some forms of leukemia are more common in children. Other forms of leukemia occur mostly in adults.

Leukemia usually involves the white blood cells. Your white blood cells are potent infection fighters — they normally grow and divide in an orderly way, as your body needs them. But in people with leukemia, the bone marrow produces abnormal white blood cells, which don't function properly.

Treatment for leukemia can be complex — depending on the type of leukemia and other factors. But there are strategies and resources that can help to make your treatment successful.

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Symptoms

Leukemia symptoms vary, depending on the type of leukemia. Common leukemia signs and symptoms include:

- Fever or chills
- Persistent fatigue, weakness
- Frequent or severe infections

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- Losing weight without trying
- Swollen lymph nodes, enlarged liver or spleen
- Easy bleeding or bruising
- Recurrent nosebleeds
- Tiny red spots in your skin (petechiae)
- Excessive sweating, especially at night
- Bone pain or tenderness

When to see a doctor

Make an appointment with your doctor if you have any persistent signs or symptoms that worry you.

Leukemia symptoms are often vague and not specific. You may overlook early leukemia symptoms because they may resemble symptoms of the flu and other common illnesses.

Rarely, leukemia may be discovered during blood tests for some other condition.

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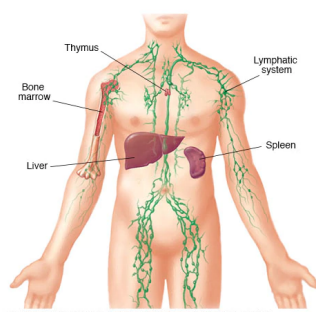
Causes

Scientists don't understand the exact causes of leukemia. It seems to develop from a combination of genetic and environmental factors.

How leukemia forms

In general, leukemia is thought to occur when some blood cells acquire mutations in their DNA — the instructions inside each cell that guide its action. There may be other changes in the cells that have yet to be fully understood that could contribute to leukemia.

Certain abnormalities cause the cell to grow and divide more rapidly and to continue living



Parts of the immune system

Your body's lymphatic system is part of your immune system, which protects you against infection and disease. The lymphatic system includes your spleen, thymus, lymph nodes and lymph

when normal cells would die. Over time, these abnormal cells can crowd out healthy blood cells in the bone marrow, leading to fewer healthy white blood cells, red blood cells and platelets, causing the signs and symptoms of leukemia.

channels, as well as your tonsils and adenoids.

How leukemia is classified

Doctors classify leukemia based on its speed of progression and the type of cells involved.

The first type of classification is by how fast the leukemia progresses:

- **Acute leukemia.** In acute leukemia, the abnormal blood cells are immature blood cells (blasts). They can't carry out their normal functions, and they multiply rapidly, so the disease worsens quickly. Acute leukemia requires aggressive, timely treatment.
- **Chronic leukemia.** There are many types of chronic leukemias. Some produce too many cells and some cause too few cells to be produced. Chronic leukemia involves more mature blood cells. These blood cells replicate or accumulate more slowly and can function normally for a period of time. Some forms of chronic leukemia initially produce no early symptoms and can go unnoticed or undiagnosed for years.

The second type of classification is by type of white blood cell affected:

- **Lymphocytic leukemia.** This type of leukemia affects the lymphoid cells (lymphocytes), which form lymphoid or lymphatic tissue. Lymphatic tissue makes up your immune system.
- **Myelogenous (my-uh-LOHJ-uh-nus) leukemia.** This type of leukemia affects the myeloid cells. Myeloid cells give rise to red blood cells, white blood cells and platelet-producing cells.

Types of leukemia

The major types of leukemia are:

- **Acute lymphocytic leukemia (ALL).** This is the most common type of leukemia in young children. ALL can also occur in adults.
- **Acute myelogenous leukemia (AML).** AML is a common type of leukemia. It occurs in children and adults. AML is the most common type of acute leukemia in adults.

- **Chronic lymphocytic leukemia (CLL).** With CLL, the most common chronic adult leukemia, you may feel well for years without needing treatment.
- **Chronic myelogenous leukemia (CML).** This type of leukemia mainly affects adults. A person with CML may have few or no symptoms for months or years before entering a phase in which the leukemia cells grow more quickly.
- **Other types.** Other, rarer types of leukemia exist, including hairy cell leukemia, myelodysplastic syndromes and myeloproliferative disorders.

Risk factors

Factors that may increase your risk of developing some types of leukemia include:

- **Previous cancer treatment.** People who've had certain types of chemotherapy and radiation therapy for other cancers have an increased risk of developing certain types of leukemia.
- **Genetic disorders.** Genetic abnormalities seem to play a role in the development of leukemia. Certain genetic disorders, such as Down syndrome, are associated with an increased risk of leukemia.
- **Exposure to certain chemicals.** Exposure to certain chemicals, such as benzene — which is found in gasoline and is used by the chemical industry — is linked to an increased risk of some kinds of leukemia.
- **Smoking.** Smoking cigarettes increases the risk of acute myelogenous leukemia.
- **Family history of leukemia.** If members of your family have been diagnosed with leukemia, your risk of the disease may be increased.

However, most people with known risk factors don't get leukemia. And many people with leukemia have none of these risk factors.

By Mayo Clinic Staff

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