Fred Hutch Cancer Center

Facts about Leukemia

← Leukemia

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Understanding Leukemia

Unlike many cancers, leukemia rarely forms solid tumors. Instead, leukemia is cancer of the bone marrow and blood.

What Is Leukemia?

In people with leukemia, the bone marrow produces abnormal (leukemic) blood cells.

- The leukemic cells divide and multiply but don't go through the normal process of maturing and eventually dying, like healthy blood cells do.
- The underdeveloped leukemic cells can't carry out their normal functions.
- They build up in your bone marrow and blood, crowding out normal, healthy blood cells that your body needs.

- Low levels of normal blood cells can lead to infection, anemia and excessive bleeding.
- The leukemic cells can travel around your body through your bloodstream and interfere with the function of your organs.

Fred Hutchinson Cancer Center offers comprehensive treatment from a team of experts for all types of leukemia, including:

- **Acute lymphoblastic leukemia**
- **Acute myeloid leukemia**
- **Chronic lymphocytic leukemia**
- **Chronic myeloid leukemia**

Understanding Your Bone Marrow and Blood

To understand leukemia, it helps to know the basics about your bone marrow and blood cells.

What Are Stem Cells?

Stem cells are cells in your body that have the potential to turn into any kind of cell, such as a skin cell, liver cell, brain cell or blood cell. Stem cells that turn into blood cells are called hematopoietic stem cells, or blood stem cells.

Why Are Blood Stem Cells Important?

When blood cells become old or damaged, they die, and blood stem cells produce new blood cells to replace them. Blood stem cells are mainly found in bone marrow (the soft, spongy tissue inside your bones), but some are also found in circulating blood.

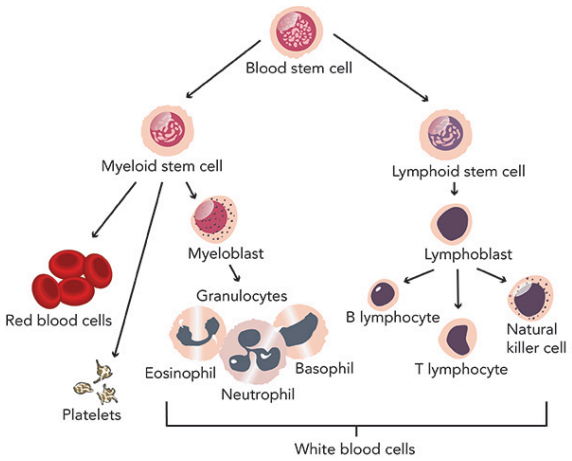
Blood stem cells produce lymphoid stem cells and myeloid stem cells.

- **Lymphoid stem cells** produce lymphoblasts, which in turn produce several types of white blood cells.
- **Myeloid stem cells** produce myeloblasts, which in turn produce white blood cells, red blood cells and platelets.

What Do Healthy Blood Cells Do?

Healthy white blood cells, red blood cells and platelets are essential.

- **White blood cells** fight infection.
- **Red blood cells** carry oxygen from your lungs to other parts of your body and take carbon dioxide back to your lungs to be removed
- **Platelets** make your blood clot and slow or stop bleeding.



Types

Leukemias are named for the type of blood stem cell — lymphoid or myeloid — that is affected and how quickly the disease develops and progresses.

- Acute leukemias grow rapidly, leading to symptoms, and they worsen quickly without treatment.
- Chronic leukemias are slower to develop.

There are four main types of leukemia in adults.

- Acute lymphoblastic leukemia, also called acute lymphocytic leukemia or acute lymphoid leukemia
- Acute myeloid leukemia, also called acute myelogenous leukemia or acute myelocytic leukemia

- Chronic lymphocytic leukemia, also called chronic lymphoid leukemia or chronic lymphoblastic leukemia
- Chronic myeloid leukemia, also called chronic myelogenous leukemia or chronic myelocytic leukemia

There are several other types of leukemia and related blood disorders, such as hairy cell leukemia and chronic myelomonocytic leukemia.

Classifying

Leukemias are further grouped into subtypes, phases and risk categories based on:

- Chromosomal and molecular abnormalities in your leukemia cells
- Whether you have had treatment
- How your disease responds to treatment

Your doctor uses this information, along with other factors, such as your age, your general health and your sex, to plan your treatment and predict the outcome.

Symptoms of Leukemia

For acute leukemia, many of the early signs are similar to the flu or other common, less serious diseases.

In the early stages, chronic leukemia usually doesn't cause symptoms, and it may take years before symptoms develop.

Check with your physician if you have any of these.

- Flu-like symptoms, such as fever, sweats and body aches
- Infections
- Pale skin
- Fatigue, weakness, lack of energy or sleepiness
- Shortness of breath
- Easy bleeding or bruising
- Red spots on your palate, ankles or skin

- Unexplained weight loss
- Pain or aches in your bones, joints, stomach, arms, legs or back
- Swelling of your abdomen or the lymph nodes in your neck, underarm, abdomen or groin

Types of Treatment for Leukemia

It is important to receive care at a specialized center with expertise in treating your specific type of leukemia.

Fred Hutch experts offer comprehensive leukemia care, including advanced treatments and new options available only through clinical studies

Diagnosing Leukemia

If your physician suspects you may have leukemia, they will want to perform a thorough physical examination and talk with you about your medical history. During the exam, your physician will check for signs of leukemia, such as swollen or enlarged lymph nodes or spleen.

An accurate diagnosis of leukemia requires several tests. You might have any or all of these:

- **Blood tests** — to check the type, number, size, shape and appearance of blood cells (complete blood count and peripheral blood smear) and to see if leukemic cells are present, which type they are and whether they show signs of slow-growing or more aggressive disease (immunophenotyping, or flow cytometry).
- **Bone marrow tests** — taking samples of bone marrow and a small piece of bone from your pelvis using a needle (bone marrow aspiration and biopsy) and checking them for leukemic cells.
- **Chromosome tests** — checking your blood or bone marrow cells for changes in chromosomes, such as an abnormal number of chromosomes or two chromosomes that have exchanged some DNA. Thesetests include cytogenetic analysis, fluorescent in situ hybridization and polymerase chain reaction.
- **Lumbar puncture** — taking a sample of cerebrospinal fluid from your spine with a needle to check whether leukemia has spread to your spinal cord and brain.
- **Imaging tests** — such as chest X-ray, computed tomography (CT) scan, magnetic resonance imaging (MRI) scan or ultrasound to check whether leukemia is impacting other parts of your body.

How Common Is Leukemia?

About 62,000 people are diagnosed with leukemia in the United States each year. More than 90 percent are adults over age 20.

What Causes Leukemia?

Doctors do not know what causes some blood cells to become leukemic. Often changes or mutations in specific genes or chromosomes are seen in people with leukemia.

For most people with leukemia, there are no obvious reasons why they developed the disease. Some factors that may increase risk include:

- Being exposed to certain viruses, chemotherapy or radiation

- Being exposed to certain chemicals, such as cigarette smoke, herbicides or pesticides
- Having certain genetic conditions, such as Down syndrome
- Having a family history of blood cancers or disorders

Race, ethnicity, sex and age also influence risk.

Keep in mind that most people who develop leukemia have no risk factors, and most people with the risk factors do not develop the disease.

Fred Hutch has researched and treated Leukemia for decades.

Learn More

Resources

There are many resources online for learning about your disease. Health educators at the Fred Hutch **Patient and Family Resource Center** have compiled a list of trusted sources to help you get started.

Whether you are newly diagnosed, going through treatment or know someone with cancer, our staff are available to tailor personalized resources and answer questions about support options in the community.

Cancer Research Organizations

American Cancer Society

Overview of Leukemia from the American Cancer Society (ACS)

If you have leukemia or are close to someone who does, knowing what to expect can be helpful. Here you can find out all about leukemia in adults, including risk factors, symptoms, and how they are found and treated.

Blood Cancer United

Overview of Leukemia from Blood Cancer United

If you have leukemia, Blood Cancer United is a good place to start to better understand your diagnosis, treatment and support options.

CancerCare

Leukemia: General Information & Support from CancerCare

CancerCare provides free, professional support services for people affected by leukemia, as well as leukemia treatment information and additional resources, including financial and co-pay assistance.

Cancer Support Organizations

AA MDS International Foundation

The Aplastic Anemia and MDS International Foundation, Inc.

The Aplastic Anemia and MDS International Foundation, Inc. website gives medical information, patient advocacy and support for bone marrow diseases that include aplastic anemia (AA), myelodysplas... syndrome (MDS) and paroxysmal nocturnal

Cancer Lifeline

Cancer Lifeline

Cancer Lifeline provides emotional support, resources, education classes and exercise programs designed to support people with cancer, caregivers and family members.

CancerCare

CancerCare: Blood Cancers Support Group

CancerCare offers an online blood cancers support group.

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(PNH).

CLL Society, Inc.

CLL Society, Inc.

CLL Society Inc., is a patient–centric, physician–curated nonprofit organization focused on patient education, support and research.

Myelodysplasia Syndromes Foundation, Inc.

MDS Foundation

The MDS information network provides patients with referrals to Centers of Excellence, contact names for available clinical trials, sharing of new research and treatment options between physicians, and extension of educational

support to
physicians,
nurses,
pharmacists
and patients.

Fred Hutchinson Cancer Center is an independent organization that serves as UW Medicine's cancer program.

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