About Chronic Myelomonocytic Leukemia

Overview of CMML

If you have been diagnosed with chronic myelomonocytic leukemia or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- What Is Chronic Myelomonocytic Leukemia?

Research and Statistics

See the latest estimates for new cases of chronic myelomonocytic leukemia in the US and what research is currently being done.

- What Are the Key Statistics About Chronic Myelomonocytic Leukemia?
- What's New in Chronic Myelomonocytic Leukemia Research and Treatment?

What Is Chronic Myelomonocytic Leukemia?

Chronic myelomonocytic leukemia (CMML) starts in blood-forming cells in the bone marrow and invades the blood.

Cells in nearly any part of the body can become cancer and can spread to other areas of the body. To learn more about how cancers start and spread, see What Is Cancer?[1]

Normal bone marrow

Bone marrow is found inside certain bones such as the skull, ribs, pelvis, and spine. It's made up of blood-forming cells, fat cells, and supporting tissues that help the blood-forming cells grow. A small fraction of the blood-forming cells are a special type of cell known as **stem cells**. Stem cells are needed to make new cells. When a stem cell divides, it makes 2 cells: one cell that stays a stem cell and another cell that can keep changing and dividing to make blood cells.

There are 3 types of blood cells[2]: red blood cells, white blood cells, and platelets.

Red blood cells pick up oxygen in the lungs and carry it to the rest of the body. These cells also bring carbon dioxide back to the lungs. Having too few red blood cells is called anemia[3]. People with anemia can look pale and feel tired and weak. Severe anemia can cause shortness of breath.

White blood cells (also called *leukocytes*) are important in fightinginfection[4].

- Lymphocytes are immune cells in the bone marrow, the blood, and in lymph nodes[5]. Some kinds of lymphocytes make the antibodies that help your body fight germs. Other kinds directly kill invading germs by making toxic substances that damage the cells.
- Granulocytes are white blood cells that destroy bacteria. They contain granules that are made up of enzymes and other substances which can destroy germs that cause infections. In the bone marrow, granulocytes develop from young cells called myeloblasts. The most common type of granulocyte is the neutrophil; which is crucial in fighting bacteria. Other types of granulocytes arebasophils, and eosinophils. When the number of neutrophils in the blood is low, it is called **neutropenia**. This can lead to severe infections.
- Monocytes are related to the granulocyte family. They also help protect you against bacteria. The early cells in the bone marrow that turn into monocytes are called monoblasts. When monocytes leave your bloodstream and go into tissue, they become macrophages. Macrophages can destroy germs by surrounding and digesting them. They're also important in helping lymphocytes recognize germs and start making antibodies to fight them.

Platelets are thought of as a type of blood cell, but they're really small pieces of a cell. They start as a large cell in the bone marrow called the megakaryocyte. Pieces of this cell break off and enter your bloodstream as platelets, which you need for your blood to clot. Platelets plug up damaged areas of blood vessels caused by cuts or bruises. If you have a shortage of platelets (a condition called thrombocytopenia) you can bleed and bruise a lot.

Features of chronic myelomonocytic leukemia

- People with CMML may have shortages of some blood cells, but a main problem is **too many monocytes**. (at least 1,000 per mm^3). Often, the monocyte count is much higher, causing their total white blood cell count to become very high as well.
- Usually there are some abnormal cells, called blasts, in the bone marrow. The amount of blasts in CMML is below 20%.
- Many people with CMML have enlarged spleens (an organ that lies just below the left rib cage).
- About 15% to 30% of people with CMML go on to develop acute myeloid leukemia[6].
- The DNA inside the abnormal cells does not have certain changes in the genes called BCR/ABL (philadephia chromosome), or PDGFRA and PDGRFRB. For more information about these gene changes, see How is CMML diagnosed?

Since CMML has features of both a myelodysplastic syndrome[7] and myeloproliferative neoplasm, experts created a new category for it: **myelodysplastic/myeloproliferative neoplasm** (myelo -- bone marrow, proliferative -- excessive growth, dysplastic -- abnormal looking).CMML is the most common disease in this group. Much less common diseases in this group are atypical chronic myeloid leukemiaand juvenile myelomonocytic leukemia. All of these diseases produce a lot of abnormal blood cells.

Chronic myeloid leukemia[8] is an example of a myeloproliferative neoplasm where there' is an over-production of white blood cells.

Hyperlinks

1. https://www.cancer.org/content/cancer/en/cancer/cancer-basics/what-is-cancer.html
2. https://www.cancer.org/content/cancer/en/treatment/understanding-your-diagnosis/tests/understanding-your-lab-test-results.html
3. https://www.cancer.org/content/cancer/en/treatment/treatments-and-side-effects/physical-side-effects/low-blood-counts/anemia.html

4. https://www.cancer.org/content/cancer/en/treatment/treatments-and-side-effects/physical-side-effects/infections.html
5. https://www.cancer.org/content/cancer/en/cancer/cancer-basics/lymph-nodes-and-cancer.html
6. https://www.cancer.org/content/cancer/en/cancer/acute-myeloid-leukemia.html
7. https://www.cancer.org/content/cancer/en/cancer/myelodysplastic-syndrome.html
8. https://www.cancer.org/content/cancer/en/cancer/chronic-myeloid-leukemia.html

References

See all references for Chronic Myelomonocytic Leukemia (https://www.cancer.org/content/cancer/en/cancer/chronic-myelomonocytic-leukemia/references.html)

National Cancer Institute. Chronic Myelodysplastic/Myeloproliferative Neoplasms treatment (PDQ) - Patient Version. August 12, 2015.

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What Are the Key Statistics About Chronic Myelomonocytic Leukemia?

Chronic myelomonocytic leukemia (CMML) is rare, only occurring in 4 of every million people in the United States each year. That works out to about 1,100 cases each year.

This disease is rare in young people. Almost 9 of 10 of cases are diagnosed in people 60 and older. CMML occurs more often in men than in women.

Visit the American Cancer Society's Cancer Statistics Center for more key statistics.

References

See all references for Chronic Myelomonocytic Leukemia (https://www.cancer.org/content/cancer/en/cancer/chronic-myelomonocytic-leukemia/references.html)

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What's New in Chronic Myelomonocytic Leukemia Research and Treatment?

Genetics

Research on the causes[1], diagnosis[2], andtreatment[3]of chronic myelomonocytic leukemia (CMML) is being done at many cancer research centers. Scientists are making progress in understanding which changes in a person's DNA and RNA can cause normal bone marrow cells to develop into leukemia cells.

Studies have found that changes in the structure or activity of certain genes[4] in CMML cells may help predict patients' outcomes and how likely they are to go on to develop acute leukemia. Research continues in this area, and someday, this information may help guide treatment decisions.

As more information from this research unfolds, it may be used in designing new drugs or developing gene therapy. This approach replaces the abnormal DNA of cancer cells with normal DNA to restore normal control of cell growth.

Chemotherapy

Studies are in progress to find the best combination of chemotherapy drugs while trying to limit side effects. New drugs are continually being developed and tested.

As researchers have learned more about what makes cancer cells different from normal cells, they've begun to develop drugs that target these differences. Studies are looking at targeted therapies[5] to treat CMML. These therapies target things like specific cell signaling pathways to shut down cancer cell growth. Some of these drugs are already being used to treat other cancers.

Stem cell transplant

Scientists continue to refine this procedure so that it works better and causes fewer problems. They are also looking at which patients will benefit the most and hownewer transplant methods[6] might be used to treat CMML.

Hyperlinks

1. https://www.cancer.org/content/cancer/en/cancer/chronic-myelomonocytic-leukemia/causes-risks-prevention/what-causes.html
2. https://www.cancer.org/content/cancer/en/cancer/chronic-myelomonocytic-leukemia/detection-diagnosis-staging/how-diagnosed.html
3. https://www.cancer.org/content/cancer/en/cancer/chronic-myelomonocytic-leukemia/treating.html
4. https://www.cancer.org/content/cancer/en/cancer/cancer-causes/genetics/genes-and-cancer.html
5. https://www.cancer.org/content/cancer/en/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html
6. https://www.cancer.org/content/cancer/en/treatment/treatments-and-side-effects/treatment-types/stem-cell-transplant.html

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See all references for Chronic Myelomonocytic Leukemia (https://www.cancer.org/content/cancer/en/cancer/chronic-myelomonocytic-leukemia/references.html)

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Patnaik MM, Tefferi A. Chronic myelomonocytic leukemia: 2016 update on diagnosis, risk stratification, and management. *Am J Hematol*. 2016;91(6):631-642.

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Written by

The American Cancer Society medical and editorial content team (https://www.cancer.org/content/cancer/en/cancer/acs-medical-content-and-news-staff.html)

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