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Chronic Lymphocytic Leukemia Causes, Risk Factors, and Prevention

Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for chronic lymphocytic leukemia.

- [What Are the Risk Factors for Chronic Lymphocytic Leukemia?](#)
- [Do We Know What Causes Chronic Lymphocytic Leukemia?](#)

Prevention

There are very few known risk factors for chronic lymphocytic leukemia (CLL), and most of these cannot be avoided. Most people with CLL have no known risk factors, and there's no way to prevent these cancers.

What Are the Risk Factors for Chronic Lymphocytic Leukemia?

A risk factor is something that affects a person's chance of getting a disease like cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But risk factors don't tell us everything. Having a risk factor, or even many risk factors,

doesn't mean that you will get the disease. And some people who get the disease may not have had any known risk factors. Even if a person has a risk factor and develops cancer, it's often very hard to know how much that risk factor may have contributed to the cancer.

There are very few known risk factors for chronic lymphocytic leukemia (CLL). These include:

- Age
- Exposure to certain chemicals
- Family history
- Gender
- Race/ethnicity

The risk of CLL does not seem to be linked to smoking, diet, or infections.

Age

The risk of CLL goes up as you get older. About 9 out of 10 people with CLL are over age 50.

Certain chemical exposures

Some studies have linked exposure to [Agent Orange](#)¹, an herbicide used during the Vietnam War, to an increased risk of CLL. Some other studies have suggested that farming and long-term exposure to certain pesticides may be linked to an increased risk of CLL, but more research is needed to be sure.

Radon exposure at home has been linked to an increased risk.

Family history

First-degree relatives (parents, siblings, or children) of people with CLL have more than twice the risk for this cancer.

Gender

CLL is slightly more common in males than females. The reasons for this are not known.

Race/ethnicity

CLL is more common in North America and Europe than in Asia. Asian people who live in the United States do not have a higher risk than those living in Asia. This is why experts think the differences in risk are related to [genetics](#)² rather than environmental factors.

Hyperlinks

1. www.cancer.org/cancer/cancer-causes/agent-orange-and-cancer.html
2. www.cancer.org/cancer/cancer-causes/genetics.html

References

American Society of Clinical Oncology. Leukemia - Chronic Lymphocytic - CLL: Risk Factors (06/2016). Accessed at www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/risk-factors on April 12, 2018.

National Cancer Institute. Chronic Lymphocytic Leukemia Treatment (PDQ®)—Patient Version. March 28, 2018. Accessed at www.cancer.gov/types/leukemia/patient/cll-treatment-pdq on April 12, 2018.

Oancea SC, Rundquist BC, Simon I, et al. County level incidence rates of chronic lymphocytic leukemia are associated with residential radon levels. *Future Oncol.* 2017;13(21):1873-1881.

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Do We Know What Causes Chronic Lymphocytic Leukemia?

The exact cause of most cases of chronic lymphocytic leukemia (CLL) is not known. But scientists have learned a great deal about the differences between normal lymphocytes and CLL cells.

Normal human cells grow and function based on information in each cell's chromosomes. Chromosomes are long molecules of DNA. DNA is the chemical that carries our genes—the instructions for how our cells work. We look like our parents because they are the source of our DNA. But our genes affect more than the way we look.

Each time a cell prepares to divide into 2 new cells, it must make a new copy of the DNA in its chromosomes. This process is not perfect, and errors can occur that may affect genes within the DNA.

Some [genes](#)¹ contain instructions for controlling when our cells grow and divide.

- Certain genes that promote cell growth and division are called **oncogenes**.
- Genes that slow down cell division or cause cells to die at the right time are called **tumor suppressor genes**.

Cancers can be caused by DNA mutations (changes) that turn on oncogenes or turn off tumor suppressor genes.

Each human cell contains 23 pairs of chromosomes. In most cases of CLL, a change can be found in at least one of these chromosomes. Most often this change is a deletion—that is, loss of part of a chromosome. The loss of part of chromosome 13 is the most common deletion, but other chromosomes such as 11 and 17 can also be affected. You might see this written as del(13q), del(11q), or del(17p). Sometimes there is an extra chromosome 12 (trisomy 12). Other, less common abnormalities may also be found. Scientists know these chromosome changes are important in CLL, but it's not yet clear which genes they involve or exactly how they lead to leukemia.

We do know that normal B lymphocytes are part of the immune system. They're programmed to grow and divide when they come into contact with a foreign substance called an **antigen**. (Scientists call substances foreign if they don't normally occur in a person's body and can be recognized by their immune system. Germs contain foreign antigens. So do blood cells from someone else with a different blood type.) Scientists think that CLL begins when B lymphocytes continue to divide without restraint after they have reacted to an antigen. But why this happens is not yet known.

Sometimes people inherit DNA mutations from a parent that greatly increase their risk of getting certain types of cancer. But inherited mutations rarely cause CLL. DNA changes related to CLL usually occur during the person's lifetime, rather than having been passed on from a parent.

Hyperlinks

1. www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html

References

American Society of Clinical Oncology. Leukemia - Chronic Lymphocytic - CLL: Diagnosis (06/2016). Accessed at www.cancer.net/cancer-types/leukemia-chronic-lymphocytic-cll/diagnosis on April 12, 2018.

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Can Chronic Lymphocytic Leukemia Be Prevented?

Many types of cancer can be prevented by lifestyle changes to avoid certain risk factors, but there are very few [known risk factors for chronic lymphocytic leukemia \(CLL\)](#), and most of these cannot be avoided. Most CLL patients have no known risk factors, so there is no way to prevent these cancers.

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