Acute Myeloid Leukemia Causes, Risk Factors, and Prevention

Learn about the risk factors for acute myeloid leukemia (AML) and what you might be able to do to help lower your risk.

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 acute myeloid leukemia.

- Risk Factors for Acute Myeloid Leukemia (AML)
- What Causes Acute Myeloid Leukemia (AML)?

Prevention

There is no way to completely prevent cancer. But there are things you can do that might lower your risk. Learn more.

- Can Acute Myeloid Leukemia (AML) Be Prevented?

Risk Factors for Acute Myeloid Leukemia (AML)

- Getting older
- Being male
- Smoking
- Being exposed to certain chemicals
- Being treated with certain chemotherapy drugs
- Being exposed to radiation
- Having certain blood disorders
- Having a genetic syndrome
- Having a family history
- Uncertain, unproven or controversial risk factors

A risk factor is something that affects your chance of getting a disease, such as 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 having a risk factor, or even several risk factors, does not always mean that a person will get the disease, and many people get cancer without having any known risk factors.

There are some known risk factors for acute myeloid leukemia (AML).

Getting older

AML can occur at any age, but it becomes more common as people get older.

Being male

In general, leukemia is more common in men than women, including AML. The reason for this is not clear.

Smoking

The only proven lifestyle-related risk factor for AML is smoking[1]. Many people know that smoking is linked to cancers of the lungs, mTf fs 0 gnr hlo63l

doctors try to limit radiation exposure from tests as much as possible, especially in children and pregnant women.

For more information, see X-rays, Gamma Rays and Cancer Risk[7].

Having certain blood disorders

People with certain blood disorders seem to be at increased risk for getting AML. These include chronic myeloproliferative disorders such as polycythemia vera, essential thrombocythemia, and idiopathic myelofibrosis. The risk of AML increases if these disorders are treated with some types of chemotherapy or radiation.

Some people who have a myelodysplastic syndrome (MDS)[8] may develop AML. Patients with MDS have low blood cell counts and abnormal cells in the blood and bone marrow. MDS can evolve over time into AML. AML that develops after MDS is often hard to treat.

Having a genetic syndrome

Some syndromes that are caused by genetic mutations (abnormal changes) present at birth seem to raise the risk of AML. These include:

- Fanconi anemia
- Bloom syndrome
- Ataxia-telangiectasia
- Diamond-Blackfan anemia
- Shwachman-Diamond syndrome
- Li-Fraumeni syndrome
- Neurofibromatosis type 1
- Severe congenital neutropenia (also called Kostmann syndrome)

Chromosomes are long strands of DNA (genes) inside our cells. Some chromosome problems present at birth are also linked to a higher risk of AML, including:

- Down syndrome (being born with an extra copy of chromosome 21)
- Trisomy 8 (being born with an extra copy of chromosome 8)

Having a family history

Although most cases of AML are not thought to have a strong genetic link, having a close relative (such as a parent, brother, or sister) with AML increases your risk of getting the disease.

Someone who has an identical twin who got AML before they were a year old has a very high risk of also getting AML.

Uncertain, unproven or controversial risk factors

Other factors that have been studied for a possible link to AML include:

- Exposure to electromagnetic fields[9] (such as living near power lines)
- Workplace exposure to diesel, gasoline, and certain other chemicals and solvents
- Exposure to herbicides or pesticides

So far, none of these factors has been linked conclusively to AML. Research is being done in these areas.

Hyperlinks

1. www.cancer.org/cancer/risk-prevention/tobacco.html
2. www.cancer.org/cancer/risk-prevention/chemicals/benzene.html
3. www.cancer.org/cancer/risk-prevention/chemicals/formaldehyde.html
4. www.cancer.org/cancer/types/myelodysplastic-syndrome.html
5. www.cancer.org/cancer/risk-prevention/radiation-exposure/x-rays-gamma-rays.html
6. www.cancer.org/cancer/diagnosis-staging/tests/imaging-tests/understanding-radiation-risk-from-imaging-tests.html
7. www.cancer.org/cancer/risk-prevention/radiation-exposure/x-rays-gamma-rays.html
8. www.cancer.org/cancer/types/myelodysplastic-syndrome.html
9. www.cancer.org/cancer/risk-prevention/radiation-exposure/extremely-low-frequency-radiation.html

References

Appelbaum FR. Chapter 98: Acute leukemias in adults. In: Niederhuber JE, Armitage

What Causes Acute Myeloid Leukemia (AML)?

that increase their risk for the disease. Although this can happen sometimes with AML, such as with the genetic syndromes discussed in Risk Factors for Acute Myeloid Leukemia (AML), inherited mutations are not a common cause of AML.

Most DNA changes related to AML occur during a person's lifetime, rather than having been inherited before birth. Some of these acquired changes may have outside causes like radiation or cancer-causing chemicals, but in most cases the reason they occur isn't clear. Many of these gene changes are probably just random events that sometimes happen inside a cell, without having an outside cause. They seem to happen more often as we age, which might help explain why AML usually occurs in older people.

Hyperlinks

1. www.cancer.org/cancer/types/acute-myeloid-leukemia/detection-diagnosis-staging/how-classified.html

References

Appelbaum FR. Chapter 98: Acute leukemias in adults. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa. Elsevier: 2014.

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Stock W, Thirman MJ. Pathogenesis of acute myeloid leukemia. UpToDate. 2018. Accessed at www.uptodate.com/contents/pathogenesis-of-acute-myeloid-leukemia on June 14, 2018.

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Can Acute Myeloid Leukemia (AML) Be Prevented?

It's not clear what causes most cases of acute myeloid leukemia (AML). Since most people with AML don't have risk factors that can be changed, at the present time there is no known way to prevent most cases of AML.

Smoking is by far the most significant controllable risk factor for AML, and quitting[1] offers the greatest chance to reduce a person's risk of AML. People who don't smoke are also much less likely to develop many other cancers, as well as heart disease, stroke, and some other diseases than people who do.

Treating some other cancers with chemotherapy[2] orradiation[3] may cause secondary (treatment-related) leukemias in some people. Doctors are trying to figure out how to treat these cancers without raising the risk of secondary leukemia. But for now, the obvious benefits of treating life-threatening cancers with chemotherapy and radiation must be balanced against the small chance of getting leukemia years later.

Avoiding known **cancer-causing chemicals**, such as benzene[4], might lower the risk of getting AML. But most experts agree that exposure to workplace and environmental chemicals seems to account for only a small portion of leukemias.

Hyperlinks

1. www.cancer.org/cancer/risk-prevention/tobacco/guide-quitting-smoking.html
2. www.cancer.org/cancer/survivorship/long-term-health-concerns/second-cancers-in-adults/treatment-risks.html
3. www.cancer.org/cancer/survivorship/long-term-health-concerns/second-cancers-in-adults/treatment-risks.html
4. www.cancer.org/cancer/risk-prevention/chemicals/benzene.html

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Appelbaum FR. Chapter 98: Acute leukemias in adults. In: Niederhuber JE, Armitage JO, Dorshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa. Elsevier: 2014.

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