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Causes, Risk Factors, and Prevention of Ewing Tumors

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 Ewing tumors.

- [Risk Factors for Ewing Tumors](#)
- [What Causes Ewing Tumors?](#)

Prevention

The only known risk factors for Ewing tumors (age, gender, and race/ethnicity) can't be changed. There are no known lifestyle-related or environmental causes of Ewing tumors, so [at this time there is no way to protect against these cancers](#).

Risk Factors for Ewing Tumors

A risk factor is anything that affects a person's chance of getting a disease such as cancer. Different cancers have different risk factors.

Lifestyle-related risk factors such as body weight, physical activity, diet, and using tobacco play a major role in many adult cancers. But these factors usually take many years to influence cancer risk, and they are not thought to play much of a role in cancers that tend to affect children and teens, including Ewing tumors.

Studies of children with Ewing tumors have not found links to radiation, chemicals, or any other environmental exposures.

Some types of cancer tend to run in some families. But genetic changes passed along within families are not an important risk factor for Ewing tumors. Although the gene changes that cause most Ewing tumors are known (see [What Causes Ewing Tumors?](#)), these changes are not inherited from a parent.

Race/ethnicity

Ewing tumors are rare overall, but they are much more common among whites (either non-Hispanic or Hispanic) than among Asian Americans or African Americans. The reason for this is not known.

Gender

These cancers are slightly more common in males than in females.

Age

Ewing tumors can occur at any age, but they are most common in teens and are less common among young adults and young children. They are rare in older adults.

References

Anderson ME, Randall RL, Springfield DS, Gebhart MC. Chapter 92: Sarcomas of bone. In: Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa: Elsevier; 2014.

DeLaney TF, Hornicek FJ, Bahrami A. Epidemiology, pathology and molecular genetics of the Ewing sarcoma family of tumors. UpToDate. Accessed at www.uptodate.com/contents/epidemiology-pathology-and-molecular-genetics-of-the-ewing-sarcoma-family-of-tumors on February 27, 2018.

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What Causes Ewing Tumors?

The cause of Ewing tumors is not fully understood, but researchers are learning how certain changes in a cell's DNA can cause the cell to become cancerous. DNA is the chemical in each of our cells that makes up our **genes**. Genes tell our cells how to function. They are packaged in chromosomes, which are long strands of DNA in each cell. We normally have 23 pairs of chromosomes in each cell (one set of chromosomes comes from each parent). We usually look like our parents because they are the source of our DNA. But DNA affects more than how we look.

Some genes control when our cells grow, divide into new cells, and die:

- Genes that help cells grow, divide, or stay alive are called **oncogenes**.
- Genes that slow down cell division or make cells die at the right time are called **tumor suppressor genes**.

Cancers can be caused by changes in the cell's DNA that turn on oncogenes or turn off tumor suppressor genes.

Researchers have found chromosome changes that lead to Ewing tumors, but these changes are not inherited. Instead, they develop in a single cell after a child is born, for unknown reasons.

Nearly all Ewing tumor cells have changes that involve the *EWSR1* gene, which is found on chromosome 22. Most often, the change is a swapping of pieces of DNA (called a *translocation*) between chromosomes 22 and 11. Less often, the swap is between chromosomes 22 and 21, or rarely, between 22 and another chromosome. The translocation moves a certain piece of chromosome 11 (or another chromosome) just next to the *EWSR1* gene on chromosome 22, causing the *EWSR1* gene to be turned on all the time. Activation of the *EWSR1* gene leads to overgrowth of the cells and to the development of this cancer, but the exact way in which this happens is not yet clear.

In a very small portion of Ewing tumors, the cells have translocations that involve the *FUS* gene (on chromosome 16) instead of the *EWSR1* gene.

Lab tests can be used to find chromosome translocations in Ewing tumor cells (see [Tests for Ewing Tumors¹](#)). If doctors are not sure if a tumor belongs to the Ewing family, they can use these tests on tumor samples to look for translocations and confirm the diagnosis.

The gene changes that lead to Ewing tumors are now fairly well known, but it's still not clear what causes these changes. It might just be a random event that sometimes happens inside a cell, without having an outside cause. There are no known lifestyle-related or environmental causes of Ewing tumors, so it is important to remember that at this time, nothing could have been done to prevent these cancers.

Hyperlinks

1. www.cancer.org/cancer/ewing-tumor/detection-diagnosis-staging/how-diagnosed.html

References

DeLaney TF, Hornicek FJ, Bahrami A. Epidemiology, pathology and molecular genetics of the Ewing sarcoma family of tumors. UpToDate. Accessed at www.uptodate.com/contents/epidemiology-pathology-and-molecular-genetics-of-the-ewing-sarcoma-family-of-tumors on February 27, 2018.

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Can Ewing Tumors Be Prevented?

The risk of many adult cancers can be reduced with certain lifestyle changes (such as staying at a healthy weight or quitting smoking), but at this time there are no known ways to prevent most cancers in children and teens.

The only known **risk factors** for Ewing tumors (age, gender, and race/ethnicity) can't be changed. There are no known lifestyle-related or environmental causes of Ewing tumors, so at this time there is no known way to protect against these cancers.

References

Anderson ME, Randall RL, Springfield DS, Gebhart MC. Chapter 92: Sarcomas of bone. In: Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. *Abeloff's Clinical Oncology*. 5th ed. Philadelphia, Pa: Elsevier; 2014.

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