Retinoblastoma Causes, Risk Factors, and Prevention

Learn about the risk factors for retinoblastoma and if there are things that might help lower 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 retinoblastoma

- Risk Factors for Retinoblastoma
- What Causes Retinoblastoma?

Prevention

In adults, the risk for many cancers can be reduced by avoiding certain risk factors, such as smoking. B1d7dgsvt 0 chance GS12 gs (such ion)Tj 0 gbl for retinoblastoma

Risk Factors for Retinoblastoma

- Age
- Heredity
- Unclear risk factors

A risk factor is anything that increases 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 tobacco use 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 childhood cancers, including retinoblastomas.

Unclear risk factors

Some studies have suggested some parental factors that might be linked to an increased risk of retinoblastoma, such as:

- Diets low in fruits and vegetables among mothers during pregnancy
- Exposure to chemicals in gasoline or diesel exhaust during pregnancy
- Exposure of fathers to radiation
- Older age among fathers

The possible link between these factors and retinoblastoma is still being studied.

Hyperlinks

1. www.cancer.org/cancer/types/retinoblastoma/detection-diagnosis-staging/how-diagnosed.html

References

Hurwitz RL, Shields CL, Shields JA, et al. Chapter 27: Retinoblastoma. In: Pizzo PA, Poplack DG, eds. *Principles and Practice of Pediatric Oncology*. 7th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2016.

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(75%), this mutation occurs very early in development, while still in the womb. The other 25% of children inherit the gene mutation from one of their parents.

About 9 of 10 children who are born with this *RB1* germline mutation develop retinoblastoma. This happens when the second *RB1* gene is lost or mutated. Most often the retinoblastoma is **bilateral** (in both eyes), but sometimes it is found early enough that it is still only in one eye.

These children have heritable retinoblastoma (also called hereditary or congenital retinoblastoma). All bilateral retinoblastomas are considered heritable, although not all heritable retinoblastomas are bilateral when they are found.

Everybody has two *RB1* genes but passes only one on to each of their children. (The child gets the other *RB1* gene from the other parent.) Therefore there is a 1 in 2 chance that a parent who had heritable retinoblastoma will pass the mutated gene on to their child.

Most children with heritable retinoblastoma don't have an affected parent. But these children can still pass their *RB1* gene mutation on to their children. This is why this form of retinoblastoma is called "heritable" (even though neither of the child's parents may have been affected).

Because children with this form of retinoblastoma have *RB1* gene changes in all the cells in their body, they are also at higher risk for developing some other types of cancer. For more on this, see After Treatment for Retinoblastoma[1].

Non-heritable (sporadic) retinoblastoma

Most of the remaining 2 out of 3 children with retinoblastoma do not have the *RB1* gene mutation in all the cells of their body. Instead, the *RB1* mutation happens early in life and first occurs only in one cell in one eye. These children are not at risk for passing the gene mutation on to their offspring.

(In a very small portion of non-heritable retinoblastomas, there is no *RB1* gene mutation. Some of these retinoblastomas seem to be caused by changes in another gene, known as *MYCN*.)

Whether the changes in the *RB1* gene are heritable or sporadic, it's not clear what causes these changes. They may result from random gene errors that sometimes occur when cells divide to make new cells. There are no known lifestyle-related or environmental causes of retinoblastoma, so it's important to remember that there is

nothing these children or their parents could have done to prevent these cancers.

Hyperlinks

1. www.cancer.org/cancer/types/retinoblastoma/after-treatment/follow-up.html

References

Hurwitz RL, Shields CL, Shields JA, et al. Chapter 27: Retinoblastoma. In: Pizzo PA, Poplack DG, eds. *Principles and Practice of Pediatric Oncology*. 7th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2016.

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Rodriguez-Galindo C, Orbach DB, eds.

Can Retinoblastoma Be Prevented?

RB1 gene change that increases risk to their children. People who have had retinoblastoma might want to consider genetic counseling[1] before having children to learn more about the risks of passing on this gene change and perhaps to explore ways to avoid this. For example, an option some people might consider would be to use in vitro fertilization (IVF) and implant only embryos that don't have the gene change.

If a preventive option is not used, children born to a parent with a history of retinoblastoma should be screened carefully for this cancer starting shortly after birth, because early detection of this cancer greatly improves the chance for successful treatment. See Can Retinoblastoma Be Found Early?[2] for more information.

Hyperlinks

www.cancer.org/cancer/risk-prevention/genetics/genetic-testing-for-cancer-risk/what-happens-during-genetic-testing-for-cancer.html

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