Pituitary Tumors Causes, Risk Factors, and Prevention

Learn about the risk factors for pituitary tumors and if there are things you can do that might help lower your risk.

Risk Factors

A risk factor is anything that increases your chances of getting a disease. Learn more about the risk factors for pituitary tumors.

- Risk Factors for Pituitary Tumors
- What Causes Pituitary Tumors?

Prevention

The risk of many types of cancer can be reduced with certain lifestyle changes (such as staying at a healthy weight or quitting smoking). But pituitary tumors have not been linked with any known outside risk factors.

- Can Pituitary Tumors Be Prevented?

Risk Factors for Pituitary Tumors

- Family history
Genetic syndromes

A risk factor is anything that increases a person’s chances of getting a disease. For example, smoking is a risk factor for lung cancer and many other cancers.

But having a risk factor, or even many risk factors, does not mean that you will get the disease. And many people who get the disease may have few or no known risk factors.

Pituitary tumors have only a few known risk factors.

Family history

Most people who develop pituitary tumors don’t have a family history of the disease. But rarely, pituitary tumors can run in families.

Sometimes when pituitary tumors run in families, they are found as part of a genetic syndrome, often along with other types of tumors (see the next section).

Sometimes, though, the cause of pituitary tumors that run in families is not known.

Genetic syndromes

Pituitary tumors can sometimes be a part of a syndrome that often includes an increased risk of other types of tumors as well. These syndromes are caused by changes (mutations) in a person’s genes, which are often inherited from a parent. Syndromes that increase a person’s risk of pituitary tumors include:

Multiple endocrine neoplasia, type I (MEN1): This is a hereditary condition in which people have a very high risk of developing tumors of the pituitary, parathyroid, and pancreas. This syndrome is caused by changes in the \textit{MEN1} gene, and it is passed on to about half of the children of an affected parent.

Multiple endocrine neoplasia, type IV (MEN4): This rare syndrome is very similar to MEN1, in that people with MEN4 have increased risks of pituitary tumors and certain other tumors. But MEN4 is caused by changes in the \textit{CDKN1B} gene, which are most often inherited from a parent.

McCune-Albright syndrome: People with this syndrome often have brown patches on their skin (called \textit{café-au-lait spots}) and develop many bone problems. They can also have hormone problems and pituitary tumors. This syndrome is caused by changes in
the *GNAS* gene, which aren’t inherited but occur before birth.

**Carney complex:** This is a rare syndrome in which people have changes in skin coloring, as well as a high risk of some types of benign (non-cancerous) tumors, including pituitary tumors. Many cases are caused by inherited changes in the *PRKAR1A* gene, but some are caused by changes in other genes that have not yet been identified.

**Familial isolated pituitary adenoma (FIPA):** In this syndrome, only pituitary tumors run in the family. This syndrome is sometimes caused by changes in the *AIP* gene, although in many cases the gene changes that cause it aren’t yet known.

You can learn more about genetic cancer syndromes in [Family Cancer Syndromes](https://www.cancer.org/cancer/risk-prevention/genetics/family-cancer-syndromes.html).

### Hyperlinks


### References


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**What Causes Pituitary Tumors?**
Inherited versus acquired gene mutations

We don’t know exactly what causes most pituitary tumors. But in recent years, researchers have made great progress in understanding how certain changes in the DNA in pituitary cells can lead to them forming a tumor.

DNA in our cells makes up our genes, which control how our cells function. We usually look like our parents because they are the source of our DNA. But our genes affect more than how we look.

Some genes normally help control when our cells grow, divide to make new cells, repair mistakes in DNA, or cause cells to die when they’re supposed to. If these genes aren’t working correctly, it can lead to cells growing out of control. For example:

- Changes (mutations) in genes that normally help cells grow, divide, or stay alive can lead to these genes being more active than they should be, causing them to become oncogenes. These genes can result in cells growing out of control.
- Genes that normally help keep cell division under control or cause cells to die at the right time are known as tumor suppressor genes. Changes that turn off these genes can result in cells growing out of control.
- Some genes normally help repair mistakes in a cell’s DNA. Changes that turn off these DNA repair genes can result in the buildup of DNA changes within a cell, which might lead to them growing out of control.

Any of these types of DNA changes might lead to cells growing out of control and forming a tumor. To learn more, see Oncogenes, Tumor Suppressor Genes, and DNA Repair Genes.

Inherited versus acquired gene mutations

Some people inherit gene mutations (changes) that increase their risk for pituitary tumors from their parents. Some of these mutations and the genetic syndromes they cause are discussed in Risk Factors for Pituitary Tumors. Members of families with these genetic syndromes can think about having genetic testing to find out if they are affected.

But often, the gene changes that lead to pituitary tumors are acquired during life, rather than having been inherited. In some types of cancer, acquired gene mutations can be caused by outside exposures, such as radiation or cancer-causing chemicals. But there
are no known environmental causes for pituitary tumors. The gene changes in these tumors might just be random events that sometimes happen when a cell divides, without having an outside cause.

In pituitary tumors that don’t run in families, sometimes the tumor cells have acquired mutations in genes such as \textit{AIP}, \textit{GNAS}, \textit{USP8}, \textit{USP48}, and \textit{BRAF}. These mutations are much more common in some types of pituitary adenomas than in others.

Changes in other genes have also been found in some types of pituitary adenomas, but in many cases it’s not clear which gene changes might have caused the tumor, or even if abnormal genes are always needed for pituitary tumors to form.

Because there are no known lifestyle-related or environmental causes of pituitary tumors, it’s important to remember that there is nothing people with these tumors could have done to prevent them.

\textbf{Hyperlinks}

1. \url{www.cancer.org/cancer/understanding-cancer/genes-and-cancer/oncogenes-tumor-suppressor-genes.html}
2. \url{www.cancer.org/cancer/types/pituitary-tumors/causes-risks-prevention/risk-factors.html}
3. \url{www.cancer.org/cancer/risk-prevention/genetics/genetic-testing-for-cancer-risk.html}

\textbf{References}


Can Pituitary Tumors Be Prevented?

Certain lifestyle changes (such as staying at a healthy weight or not smoking) can lower the risk for many types of cancer. But pituitary tumors have not been linked with any known outside risk factors. Because of this, there is no known way to prevent these tumors at this time.

Still, for people who have a high risk of pituitary tumors (because of certain inherited syndromes), there may be ways to find and treat them early, before they cause problems. (See Can Pituitary Tumors Be Found Early?)

Hyperlinks


References


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Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as journalists, editors, and translators with extensive experience in medical writing.