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# Brain Tumor

## Pilocytic Astrocytoma

### Definitions

**Astrocytoma:** A tumor type originating in the brain or spinal cord, consisting of star-shaped cells called astrocytes.

**Malignant:** Cancerous.

**Pilocytic:** Made up of cells that look like fibers when viewed under a microscope.

**Primary brain tumor:** A tumor that originates from cells within the brain or spinal cord tissue rather than from a tumor that spreads to the brain from another part of the body.

**Pathologist:** A physician who examines tissues and fluids to diagnose disease in order to assist in making treatment decisions.

### What is pilocytic astrocytoma?

Pilocytic astrocytoma is a type of benign brain tumor that rarely spreads into surrounding tissues. Starting in brain cells called astrocytes, this type of tumor is slow-growing tumor but can become very large. Pilocytic astrocytoma is usually treated successfully by surgery. Brain tumors are graded on an I-IV scale, with IV the worst; pilocytic astrocytoma is Grade I, the most favorable grade.

### Who is likely to have pilocytic astrocytoma?

Pilocytic astrocytoma is the most commonly diagnosed benign brain tumor in children. It also occurs in young adults.

### What characterizes pilocytic astrocytoma?

Pilocytic astrocytoma can affect parts of the brain that control balance and coordination. For this reason, symptoms often include balance and coordination difficulties. Hydrocephalus—the build-up of fluid in the brain—may develop, causing headaches, nausea, vomiting, or blurry vision. Problems with speech or seizures may also occur.

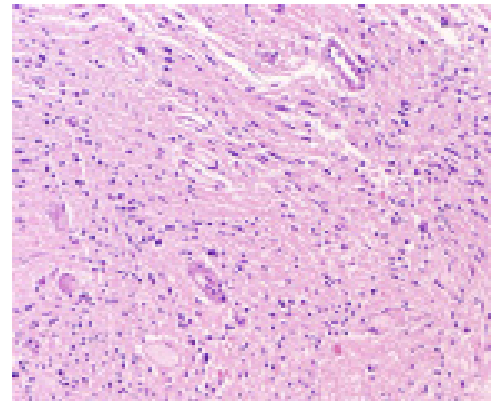
### How does the pathologist make the diagnosis?

If brain tumor symptoms are present, your primary care physician performs a thorough neurological exam to check vision, hearing, balance, coordination, and reflexes. To see inside the brain and locate the problem, the physician will order imaging tests such as **magnetic resonance imaging (MRI)**, **computed tomography (CT)**, or **positron emission tomography (PET)**. A **radiologist** reviews these images and, in many cases, can determine whether a tumor is likely to be malignant or benign. In most instances, the tumor will be biopsied or completely resected. The pathologist examines the tissue under the microscope and is able to give a specific diagnosis based on the features that are seen. It is important that a pathologist experienced in examining brain tumors performs this review. Studies show that the diagnosis may change substantially for at least one-third of patients when an experienced pathologist does the review.

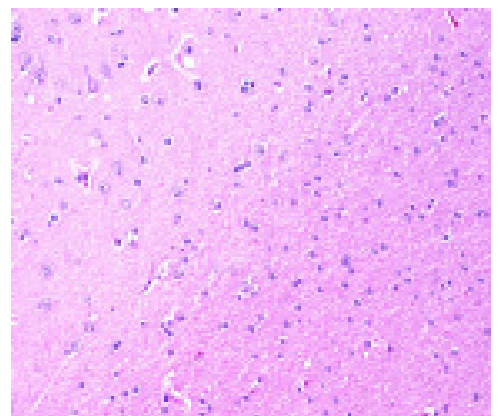
### What is meant by the grade of the cancer?

The **grade** of a tumor refers to how the benign or malignant it appears under a microscope and how aggressively the cells are growing. Primary brain tumors are graded on a I-IV scale, with IV the worst. In a grade I tumors, the cells look close to normal, with only slight abnormal changes. At this stage, the cells are slow growing and benign. Grade IV cancer cells bear little or no resemblance to normal cells, and the cells are growing quickly and are malignant. Grades II and III describe conditions between these two extremes.

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Pilocytic astrocytomas are a low-grade subtype of astrocytomas that are usually circumscribed and that are often composed of elongated, spindle-shaped neoplastic astrocytes.



Normal brain cells.

## What kinds of questions should I ask my doctors?

Ask any question you want. There are no questions you should be reluctant to ask. Here are a few to consider:

- Please describe the type of cancer I have and what treatment options are available.
- What is the grade of the cancer?
  - What are the chances for full remission?
  - What treatment options do you recommend? Why do you believe these are the best treatments?
- What are the pros and cons of these treatment options?
- What are the side effects?
- Is your medical team experienced in treating the type of cancer I have?
- Can you provide me with information about the physicians and others on the medical team?
- If I want a second opinion, could you provide me with the names of physicians and/or institutions that you would recommend?

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## How do doctors determine what treatment will be necessary?

Your treatment will depend on the size, stage and location of the tumor, as well as your age. The pathologist consults with your primary care physician. Together, using their combined experience and knowledge, they determine treatment options most appropriate for your condition. It's important to learn as much as you can about your treatment options and make the decision that's right for you.

## What kinds of treatments are available for pilocytic astrocytoma?

Treating pilocytic astrocytoma is a complex process, requiring a variety of techniques and procedures. The initial treatment often includes **steroid medications** to reduce swelling and inflammation of brain tissue, as well as **anticonvulsant medications** to prevent and control seizures if you have experienced them. If fluid has built up in the brain, a physician may insert a **shunt**—a long, thin tube that draws excess fluid from the brain.

Common treatments to remove or reduce the size of pilocytic astrocytoma most often involve **surgery**. Only occasionally will this be combined with **radiation therapy** or **chemotherapy**. To make sure that treatment is consistent with current best practices, you may wish to obtain a second opinion from a brain tumor specialty center for adults or children.

Surgeons work to remove as much of the pilocytic astrocytoma as possible while trying to minimize damage to healthy tissue. Some tumors can be removed completely while others only partially or not at all. To gain access to the tumor, surgeons may cut bone from the skull in a procedure called **craniotomy** and replace the bone after the procedure. Some surgeons use a high-powered microscope (microsurgery) or computer programs to create 3-D maps of the tumor's location; these maps help surgeons to remove tumors with minimal damage to healthy tissue and can reduce your pain and recovery time. In some situations, ultrasonic waves can be used to break apart the tumor, with the fragments removed by suction, in a procedure called **ultrasonic aspiration**.

Radiation therapy—pinpointed high-energy beams—can shrink tumors or destroy cancer cells remaining after surgery. This treatment is also an option if surgery is not possible. Radiation therapists sometimes use 3-D maps similar to what surgeons use to deliver radiation in the exact size and shape of the tumor. In **stereotactic radiosurgery**, radiation therapy is used to damage cancer cells, taking away their ability to reproduce. Because the dose of radiation used in this procedure does not harm normal tissue, this therapy is used to treat tumors that have tentacles reaching into parts of the brain that are difficult to reach.

You may consider enrolling in a **clinical trial** testing new treatments, especially if pilocytic astrocytoma comes back or recurs after surgery. These treatments are highly experimental in nature but may be an option, especially for advanced cancers. Some trials may involve chemotherapy or **biologic therapy**, which uses the natural defenses of the immune system to fight cancer. Clinical trials for pilocytic astrocytoma may be found at [www.cancer.gov/clinicaltrials](http://www.cancer.gov/clinicaltrials) or by calling NCI's Cancer Information Service at 800-4-CANCER (800-422-6237) or NCI's Neuro-Oncology Branch at 301-402-6298.

**For more information**, go to [www.cancer.gov](http://www.cancer.gov) (National Cancer Institute) or [www.abta.org](http://www.abta.org) (American Brain Tumor Association). Type the keywords **pilocytic astrocytoma** or **brain tumor** into the search box.