About brain tumors
There are two general types of brain tumors: a primary tumor starts in the brain. It can be benign (less likely to grow and/or spread to other parts of the body) or malignant (more likely to grow and/or invade the normal functioning brain). Primary tumors in the brain or spinal cord rarely spread to distant organs.

A metastatic tumor is caused by cancer elsewhere in the body that spreads to the brain. Metastatic tumors are always malignant.

This brochure is designed to address primary brain tumors. For information about metastatic brain tumors ask your nurse or doctor for the brochure Radiation Therapy for Brain Metastases or go to www.r墁ins.org.

Treating Brain Tumors
If doctors determine that you have a brain tumor, the treatment options and prognoses are based on many factors including tumor type, location and size of the tumor, grade (how aggressive it appears), molecular characteristics of your tumor, your age and your overall health. Depending upon these and other factors, surgery, radiation therapy and/or medical therapy (chemotherapy) may be treatment options.

Surgery
For many brain tumors, surgery is an important part of treatment. A neurosurgeon may perform a surgical biopsy to determine what kind of tumor you have. Sometimes only a part of the tumor can be safely removed in order to study the effects on your normal functioning, while other times all of the visible tumor can be safely removed. The extent of surgery is mainly based on the location of the tumor. Depending on your tumor, surgery may be the only treatment needed. However, radiation is often used after surgery to lessen the chances of the tumor coming back in the same place or growing in another part of the brain. Ask your surgeon about the type and extent of surgery that is recommended for you.

Medical Therapy
Anti-cancer drugs known as chemotherapy may be given in addition to radiation to make treatment more effective or instead of radiation. Chemotherapy has the ability to destroy cancer cells by different methods. Depending upon the kind of drug best suited for your kind of brain tumor, chemotherapy may be given as a pill or through an intravenous (IV) line directly into your bloodstream on a set schedule. Chemotherapy can be given before, during or after radiation therapy. The type of chemotherapy you receive may be dependent upon the molecular characteristics of your tumor. For more details about chemotherapy or other medications, ask your medical oncologist or neuro-oncologist which medications may be best for you.

RADIATION THERAPY
External beam radiation therapy usually involves a series of outpatient treatments with a machine called a linear accelerator, or linear. Similar to a chest X-ray, X-rays cannot be seen or felt and the machine does not touch you. Treatments are given daily. Monday through Friday, usually over three to seven weeks.

Before beginning treatment, you will be scheduled for a planning session to map out your treatment area. Depending on the size and type of your tumor, a simulation involves a CT scan which is performed while lying on a table, usually with aid of a form-fitting mask to make sure treatment is delivered the same way every time. Your doctor will design an individualized treatment plan based on the results of the simulation scan together with other imaging studies you have completed (including MRIs). Marks are made on the mask to help the radiation therapist precisely position you for daily treatment.

Different techniques can be used to give radiation for brain tumors. Three-dimensional conformal radiation therapy (3-D CRT) combines multiple X-ray beam treatment positions and beam shapes to deliver precise doses of radiation to the brain. Tailoring each of the radiation beams to the patient’s tumor allows coverage of the diseased cells while keeping radiation away from nearby organs, such as the eyes.

Intensity modulated radiation therapy (IMRT) is a form of 3-D CRT that further modifies the amount (intensity) and shape of the radiation within each of the radiation beams. At most centers, X-rays (photons) are used for treatment.

Image-guided radiation therapy (IGRT) can be used with any of these techniques. These more precise treatment techniques can be used if the tumor is in a sensitive part of the brain or if you have had radiation treatments in the past. Ask your radiation oncologist about which radiation technique is best for treating your tumor.

Proton beam therapy
Proton beam therapy delivers radiation using particles instead of an X-ray beam. The benefit of proton therapy is that there is little to no radiation delivery beyond the treatment area. This means that your doctor may be able to decrease dose to the surrounding healthy brain, which could lead to fewer side effects during or after completion of radiation therapy. Proton therapy also may allow delivery of radiation a second time or a higher dose of radiation for certain tumors involving the base of the skull. This treatment is not yet readily available throughout the United States. Ask your doctor or proton therapy might be beneficial for you.

STEREOTACTIC RADIOSURGERY / RADIOTHERAPY
Stereotactic radiosurgery (SRS) and stereotactic radiotherapy (SRT) are ultrasound-like therapies. In certain situations, a stereotactic form of radiation may be recommended by your radiation oncologist or neurosurgeon to be used in addition to regular radiation, on its own or possibly instead of surgery. Sometimes a patient may need the placement of a frame that attaches to the brain while some systems allow the use of a tight fitting mask. The benefit of SRS/ SRT is that the total radiation dose (which can be a higher dose than standard radiation) is delivered in one to five treatment sessions with very little radiation to the surrounding healthy tissue. You can ask your doctor to learn more about stereotactic radiosurgery and whether this technique will be a helpful part of your treatment.

Caring for yourself during treatment
Battling cancer is tough. Seek out help from support groups and friends.

• Get plenty of rest during treatment, and don’t be afraid to ask for help.
• Follow your doctor’s orders. Ask if you are unsure about anything. There are no stupid questions.
• Tell your doctor about any medications, vitamins or supplements you are taking to make sure they are safe to use during radiation therapy.
• Eat a balanced diet. If food tastes funny or if you’re having trouble eating, tell your doctor, nurse or dietitian. They might be able to provide you with some helpful suggestions.
• Treat the skin exposed to radiation with special care. Stay out of the sun, avoid hot or cold packs, only use lotions and ointments after checking with your doctor or nurse, and keep the area warm with warm water and mild shampoo or baby shampoo.

• No need to wash your hair. However, if shampooing is necessary, use a mild shampoo or baby shampoo.

• Avoid tight fitting headbands or hair accessories if possible. If you must wear them, use a soft rubber band.

• Avoid tight clothing on the treatment area.

• Avoid situations that cause you to sweat, such as hot or cold weather and exercise.

• Avoid contact sports and other activities that may cause injury to the treatment area.

• If you do not have a cold, take over the counter cold medications to keep your nose clear.

• Ask your doctor if radiation therapy might be beneficial for you.

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Side effects are different for everyone. Some patients feel fine during treatment while others may feel uncomfortable. Before treatment, ask your doctor to describe what you can expect.

- **Fatigue**, or mild tiredness, may develop starting in the middle of the treatment course. However, tiredness from radiation should improve within a few weeks after radiation treatment ends.
- **Hair loss** may occur but only in the area being treated.
- **Mild skin irritation**, itch or red scalp and/or dry peeling of the skin may occur with external beam radiation. Clean the area regularly with mild soap and warm water.
- **Headaches** are a common side effect of any treatment for brain tumors.
- **Decreased or muffled hearing** may occur. Additionally, you may experience inflammation of the ear canal with irritation, discharge, redness or sense of “fullness.”
- **Irritation** • **Redness** • **Hair loss (partial or complete)** • **Possible peeling and/or blistering** • **Permanent changes to the skin**

Side effects may also cause short-term memory loss, difficulty thinking and slowness in completing tasks. Some patients benefit from medicine or a specialized radiation technique that can reduce short-term memory loss. Ask your doctor if these options are available for you.

Side effects are different for each patient. Medications may be prescribed to make you as comfortable as possible. If at any time during your treatment you feel discomfort, tell your doctor or nurse.

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Possible Side Effects

Visit [www.rttanswers.org](http://www.rttanswers.org) to download a complete chart of side effects.

ABOUT THE RADIATION ONCOLOGY TEAM

Radiation oncologists are the doctors who oversee the care of each person undergoing radiation treatment. Other members of the treatment team include radiation therapists, radiation oncology nurses, medical physicists, dosimetrists, social workers and nutritionists. For information on what each of these professionals does or to locate a radiation oncologist near you, visit [www.rttanswers.org](http://www.rttanswers.org).

ABOUT ASTRO

The American Society for Radiation Oncology is the premier radiation oncology society in the world with more than 10,000 members who specialize in treating cancer with radiation therapies. ASTRO’s is dedicated to improving patient care through education, clinical practice, advancement of science and advocacy.