

A Guide to Proton Therapy for Patients with Ocular Cancer



Ocular Tumors and Proton Therapy

Cancers of the eye, also called ocular cancers, are rare. Localized eye tumors have a high chance of being cured when treated with surgery or radiation, however, they can be difficult to treat because they are close to vital organs. Proton therapy can effectively treat ocular tumors while aiming to lower the risk of complications by minimizing radiation exposure to healthy tissue.

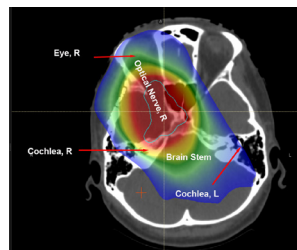
Treatment Options at a Glance

- **Laser treatment:** If the tumor is small, laser treatment is sometimes an option.
- **Surgical removal of the eye:** This is called enucleation and is usually required if the tumor is very large. Outcomes are excellent for tumor control. Unfortunately, it involves the loss of the eye.
- **Brachytherapy:** In brachytherapy, radioactive seeds are placed inside or near the tumor. A large comparative study of patients with medium-size tumors found that brachytherapy was a good equivalent option to removal of the eye. It is now routinely used to treat all but the largest tumors, and preservation of the eye is a priority.

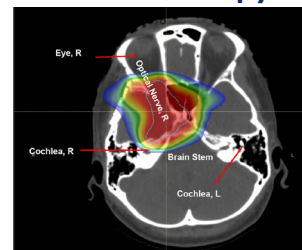
- **Proton Therapy:** Studies comparing patient treatment histories suggest that proton therapy works as well as or better than brachytherapy. Proton therapy is very effective in achieving local control of the tumor. In addition, it can be used to treat tumors too large for brachytherapy. It is good for treating tumors next to the optic nerve because proton therapy can be precisely controlled to release its energy within the tumor and therefore avoid radiation to this sensitive structure. Ocular melanoma was one of the earliest cancers treated with proton therapy. In the U.S., eye tumors have been treated with proton therapy since 1994.

Proton Therapy vs. Standard Therapy with X-rays

Standard radiation



Proton therapy



Radiation levels



The illustration is an example of a brain cancer treatment plan which shows the difference between proton therapy on the left, where less healthy tissue is subjected to radiation, and standard X-ray radiation on the right, where more radiation affects surrounding, healthy tissue.

Ocular Cancers Which Benefit From Proton Therapy Include

- Intraocular melanoma: Proton therapy results in excellent eye retention rates, even in less favorable cases.
- Other eye tumors not optimally treated with other forms of radiation, due to tumor size or location.

Our Approach

At Fred Hutch Cancer Center we treat patients seated or lying down. We work closely with local and regional ocular oncology experts to tailor our treatment approach to each individual. Patients undergo a minor surgical procedure to place marker clips for positioning.

Treatment and care are given by a team of specialized doctors, nurses and healthcare professionals.

Proton therapy is generally preferred for treating ocular tumors because it delivers less radiation to healthy tissue. To better understand the use of proton therapy in your treatment, call today to schedule a consultation with a radiation oncologist. The doctor will discuss different treatment options with you and determine if you will benefit from proton therapy.

Find out more.

To learn more about proton therapy for ocular cancer or to schedule a consultation, please call us at **(888) 645-6934** or visit **FredHutch.org/protontherapy**

About Proton Therapy

The Bragg Peak

During proton therapy, a beam of subatomic particles called protons is sped up in an accelerator and then aimed at the tumor. The nature of protons is such that the radiation dose increases suddenly, in what is called a Bragg Peak. Then the radiation falls effectively to zero. This allows radiation oncologists to precisely target tumors, minimize radiation to healthy tissue in front of the tumor, and avoid healthy tissue behind the tumor. Radiation oncologists can spread the Bragg Peak to cover the entire tumor.

The Advantages of Pencil Beam Scanning (PBS)

PBS is the latest proton technology that allows for even greater accuracy when treating cancer with proton radiation. PBS uses a narrow proton beam to paint the tumor with radiation. Because the pencil beam can be targeted even more precisely, higher, more effective doses can be used. The pencil beam deposits radiation starting at the deepest layer, and works slice by slice through the tumor.

About our Specialists

All our radiation oncologists are faculty at the University of Washington School of Medicine and all are board certified. All our physicians are experts in proton therapy and other forms of radiation. They will provide you with an expert recommendation for you to consider.

Fred Hutch Cancer Center - Proton Therapy

Located on UW Medicine's Northwest Campus
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