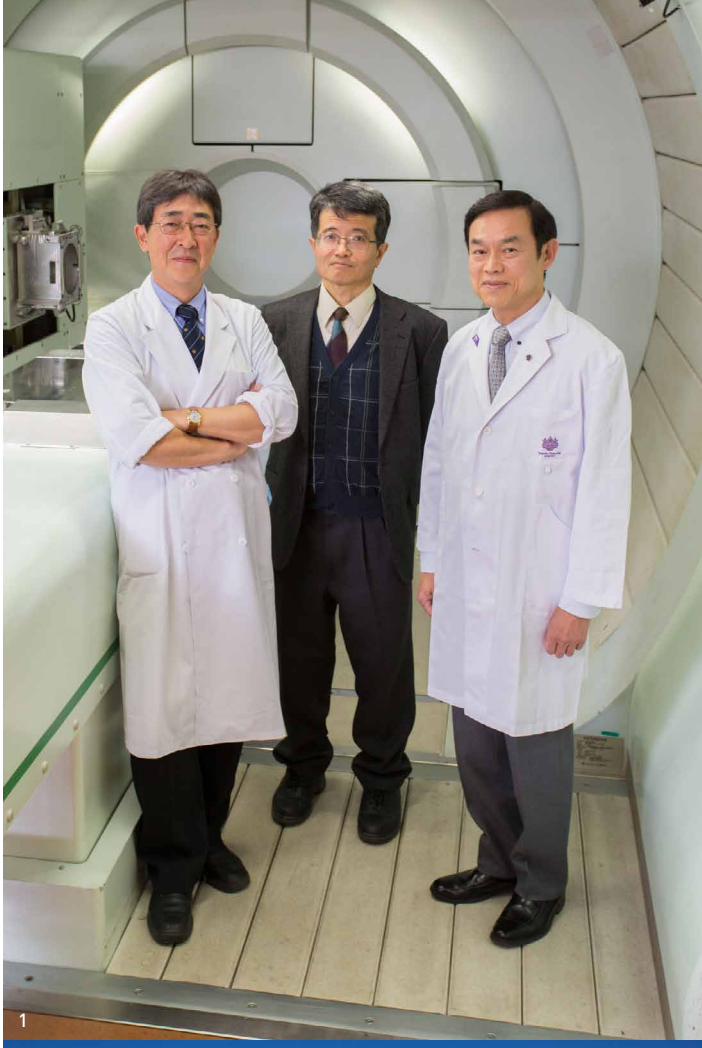
For Patients Who Are Considering Proton Therapy

Proton Beam Therapy Center
University of Tsukuba Hospital

筑波大学
University of Tsukuba

Contents


1


2


3


4

1. Prof. Hideyuki Sakurai, Director of the Proton Beam Therapy Center (left), Prof. Takeji Sakae, Head of the Medical Physics Group (center), and Koji Tsuboi, Director of the Proton Medical Research Center (right)
2. The Proton Beam Therapy Center is part of the University of Tsukuba Hospital, which aims to provide effective patient-centered care through the collaboration of teams of medical practitioners.
3. The team of doctors who provide proton therapy, striving to ensure that patients receive the best possible treatment while also maintaining a good quality of life
4. The team of medical physicists who engage in research in radiation physics to develop proton therapy which is safe and minimizes the physical side effects on the patient

The University of Tsukuba: Pioneer of a worldwide standard in proton therapy

The University of Tsukuba began full-scale clinical research in proton therapy in 1983, as the first facility in Japan to pursue research in the field. The university has achieved a number of significant developments in the field, in particular internationally pioneering the use of proton therapy to treat cancerous liver tumors and other tumors deep inside the body by developing the treatment method known as respiratory-gated radiotherapy, which is now highly regarded and considered as a worldwide standard in proton therapy.

A significant characteristic of proton therapy is that the proton-beam can be targeted at a tumor with pinpoint precision such that the healthy cells surrounding it are left undamaged and only mild side effects are produced. As this therapy minimizes the physical side effects on the patient, it can be a highly effective means of treating aged or frail cancer patients with complications such as a heart disease. Proton therapy is also a good method for treating and helping to ensure a healthy future for children or young cancer patients, because the risks that it will inhibit their physical growth and development or cause secondary cancer are low.

As the Proton Beam Therapy Center is part of the University of Tsukuba Hospital, the center staff are able to cooperate closely with doctors and medical practitioners specializing in internal medicine, surgery, and a number of other fields, working in teams and adopting a multidisciplinary perspective in order to provide the best possible therapy. There is no universal method of treating cancer and each patient needs to receive treatment that has been adapted to their individual condition. We place the utmost importance on providing the most suitable means of treatment for each patient by carefully examining their physical and mental condition, such as their symptoms, age, physical strength, or ways of thinking about medical treatment.

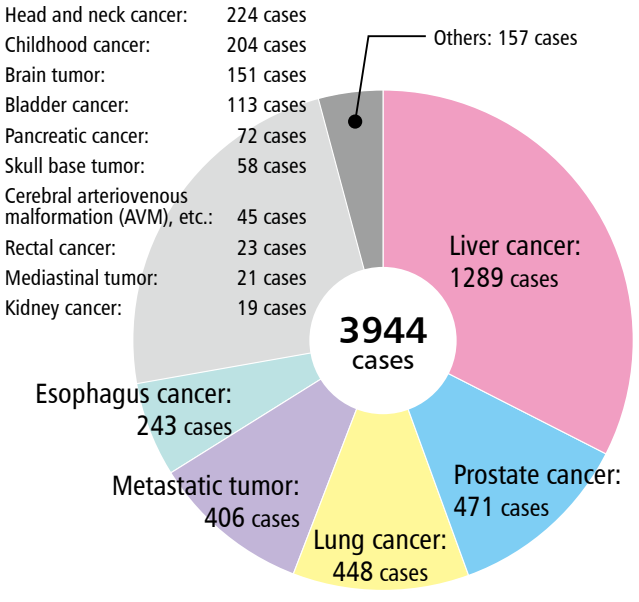
Cancer treatments today generally adopt a combination of methods such as surgery, chemotherapy, and radiation treatment, utilizing the elements of each method which are most suited to treating the patient's condition. Proton therapy can be used as part of such combined treatment methods to ensure that patients maintain a good quality of life.

Through our clinical practice and research, we strive to assist a greater number of patients by providing and developing proton therapy. If you are considering proton therapy as a treatment option, please do not hesitate to consult with us.

Hideyuki Sakurai
Director, Proton Beam Therapy Center,
University of Tsukuba Hospital

History

1973 National Laboratory for High Energy Physics (KEK)—currently the High-Energy Accelerator Research Organization—proposes particle therapy using a large-scale proton accelerator.
1975 KEK, the National Institute of Radiological Sciences, and the University of Tsukuba agree to implement a particle therapy project.
1976 The "Working Group for Research in Medical and Biological Use of High LET Particles" is established at the University of Tsukuba. The group is renamed the "Preparatory Committee for the Committee for Study of Biological and Chemical Use of High-LET Radiation" in December, and the particle therapy project is developed as a university-wide initiative.
1977 A joint experiment using a large-scale proton accelerator commences.
1979 The project organization is renamed the Particle Medical Center, with the project duration set as ten years.
1982 A proton facility is built, and work is commenced on proton experiments on living creatures.
1983 The world's first clinical study using a vertical beam begins.
1990 The Particle Medical Center reaches the end of its ten-year duration, and the Proton Medical Use Research Center is established in its place.
2001 A new facility is built at the University of Tsukuba Hospital and becomes the new location of the Proton Medical Use Research Center.
2004 The Proton Medical Use Research Center is made an affiliated organization of the hospital following the reorganization of the university as a national university corporation
2008 Proton therapy is recognized as an advanced medical treatment.
2014 The Proton Beam Therapy Center is established as a clinical department.



(As of July 2014)

Treatment results:

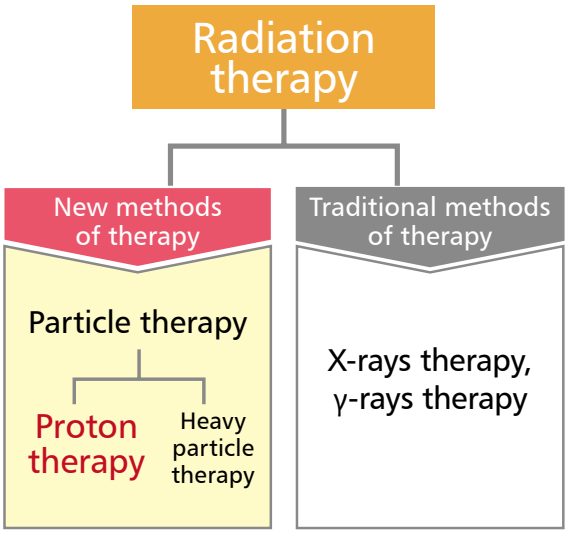
As of July 2014, the Proton Beam Therapy Center has treated 3,944 patients, including those treated by the National Laboratory for High Energy Physics (KEK)—currently known as the High-Energy Accelerator Research Organization—between 1983 and 2000.
The largest portion of cases treated were cases of liver cancer, followed by prostate cancer and lung cancer.
Our center provides proton therapy for any condition in which the therapy can be effectively applied to the tumor.

What is proton therapy?

1 Proton therapy is a type of radiation therapy

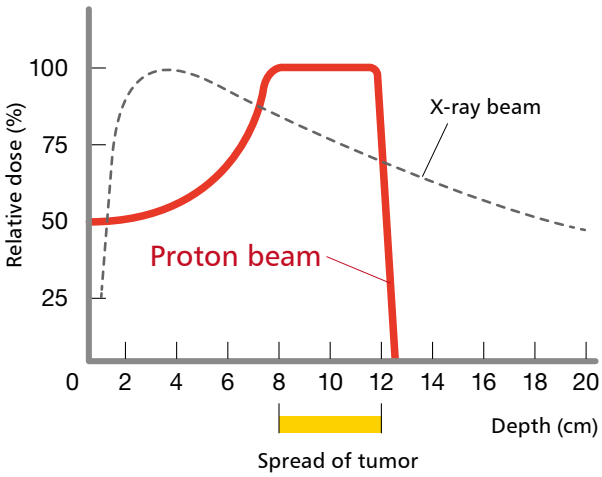
The three main types of cancer treatment are:
surgery, chemotherapy, and radiation therapy.

Proton therapy is a type of radiation therapy which is recognized as an advanced medical treatment. While traditional radiation therapies use photon rays such as X-rays and γ-rays, proton therapy uses a proton beam made by accelerating the nuclei of hydrogen atoms (protons) to increase their energy. Proton therapy has been attracting attention in recent years due to the fact that the physical properties of a proton beam allow for highly effective treatment with only mild physical side effects on the patient.



2 The proton beam can be directed at a tumor with pinpoint precision

In traditional radiation therapy, a radiation ray beam such as an X-ray beam releases its maximum energy dose close to the surface of the body and continues to release an energy dose which declines as it travels deeper into the body. As the beam continues beyond the tumor, depositing energy as it passes through the body, it unavoidably damages healthy tissue or organs behind the tumor.
By contrast, in proton therapy the physical properties of the proton beam allow it to release its maximum energy dose at a set depth inside the body and end there. Therefore, if the proton beam is adjusted to the depth of the tumor, the beam releases the maximum energy dose when it arrives at the tumor, and ends there without travelling any farther.
By planning the optimal therapy for each individual patient, the proton beam can be used to effectively destroy the tumor with pinpoint accuracy while producing only a small effect on the surrounding healthy tissue.

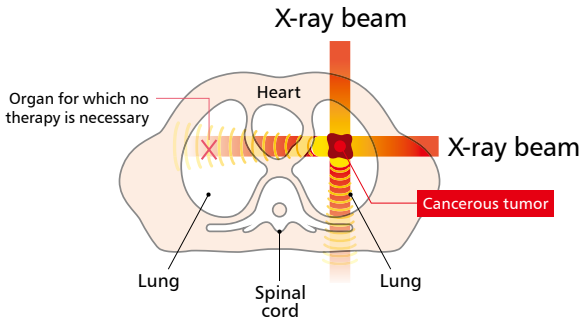


The point where a proton beam releases its maximum energy dose is called the "Bragg peak." In proton therapy, this Bragg peak is set to match the location and size of the tumor. Proton therapy is highly effective as it allows the energy dose released by an emitted beam to be more accurately concentrated on a tumor than is possible in traditional radiation therapy.

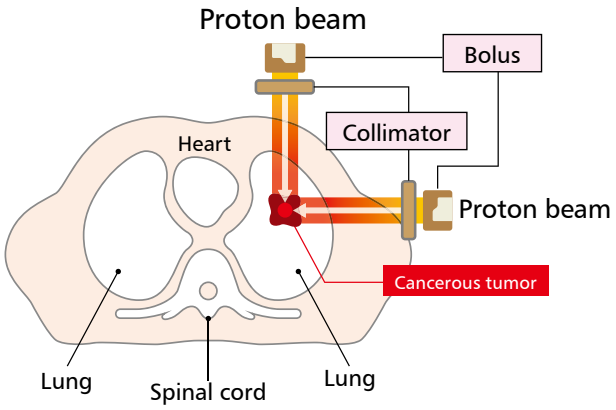
Illustrations of X-ray and proton beams inside the body

In traditional X-ray therapy, the beam goes past the tumor. It therefore delivers radiation not only to the tumor but also to other organs such as the heart and lung. In proton therapy, if the Bragg peak is set at the tumor, the beam ends there, therefore having less effect on healthy organs around the tumor.

Traditional radiation therapy

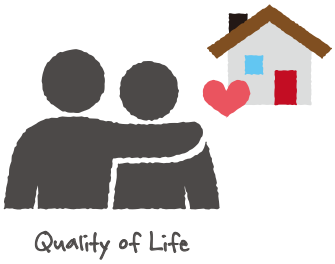


Proton therapy



3 Proton therapy has limited physical side effects and helps ensure a good quality of life

Proton therapy allows for cancer cells to be accurately targeted, causing much less damage to other healthy cells. In comparison with traditional radiation therapy, it produces milder side effects, resulting in only a small physical burden on the patient. The patient therefore has little trouble returning to his or her everyday life and maintaining a good quality of life. As a general rule, patients receiving proton therapy are treated as outpatients and do not need to be hospitalized.

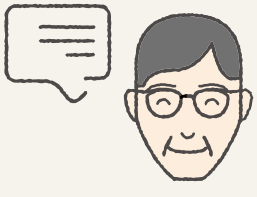


The benefits of proton therapy

- The proton beam can be delivered directly to the tumor with high amounts of energy and precision, resulting in highly effective treatment.
- It can be accurately targeted at a tumor, minimizing the side effects on organs susceptible to the effects of radiation.
- It can be used for the treatment of aged and frail patients due its reduced physical side effects.
- The risks of secondary cancer in children or young people are low.
- It can also be used to treat cancer patients who have complications and are unable to undergo surgery.
- Patients can visit the hospital for daily treatment as outpatients and do not need to be hospitalized.
- Patients are likely to have less difficulty returning to daily life in society, and can maintain a good quality of life.

Side effects of proton therapy

While proton therapy minimizes the effects on healthy tissues and organs and therefore causes relatively fewer physical side effects than traditional radiation therapy, it may produce some side effects. For example, in some cases patients develop sunburn-like symptoms on the skin of the part of the body which the proton beams were directed at. The side effects of proton therapy may differ according to the part of the body in which the tumor is located and the angle of the proton beam. A specialist will explain such side effects in detail if you are considering receiving proton therapy, and it is important to ensure that you understand the possible side effects before deciding to proceed with the therapy.



For non-Japanese patients:

Arranging to receive proton therapy

If you would like to receive proton therapy, please follow these steps:

Step 1

Fill in all of the required items on the inquiry form and send by email to:

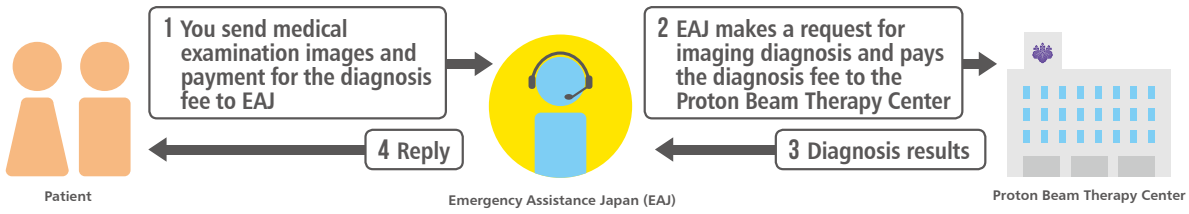
proton_therapy@pmrc.tsukuba.ac.jp

The inquiry form can be downloaded at:
http://www.pmrc.tsukuba.ac.jp

A doctor at the Proton Beam Therapy Center will send you a reply regarding the possibilities for you to receive proton therapy.
(This step is free of charge).

Step 2

If a more detailed imaging diagnosis is required, you are requested to use a support service provided by Emergency Assistance Japan (EAJ), which is a medical coordination service company designated by the University of Tsukuba Hospital (This step is not free of charge).



Contact:

Emergency Assistance Japan

NRK Koishikawa Bldg.,
1-21-14 Koishikawa, Bunkyo-ku,
Tokyo, JAPAN 112-0002

+81-3-3811-8600 [English and Japanese]
+81-3-3811-8271 [Russian]
+81-3-3811-8251 [Chinese]

If it is not possible to make a diagnosis based on the images and/or medical information you provide, you may be requested to take another medical examination (the same applies when visiting the hospital directly for diagnosis).

When you consult with us about proton therapy

We always use a support service and a medical interpreter arranged by EAJ.
This is to ensure that you are able to understand the method of treatment well and receive treatment with peace of mind, free from concerns that might arise from factors such as the unfamiliar language, medical care customs, or living environment.

We are not able to assist in arranging visas or accommodation which you may require in order to receive proton therapy at our center.
Please consult with EAJ for assistance with immigration requirements, living arrangements, or other such matters.

After receiving proton therapy

We request that communication with the Proton Beam Therapy Center after your treatment is complete is carried out through your local doctor.

You (patient) → Your local doctor → Proton Beam Therapy Center

If you would like our medical follow-up service, please contact EAJ.

You (patient) → EAJ → Proton Beam Therapy Center

The stages of pre-treatment preparation

**Below is a general overview of the stages of proton therapy.
It is necessary to ensure that treatment is suited to each individual patient, by devising treatment plans and creating immobilization and treatment devices to help you to remain still during treatment and ensure that the proton beam is administered accurately.**

To start of proton therapy treatment

1 Initial visit and medical examination

We ascertain the condition of the tumor and your overall physical condition by performing a physical examination and checking the referral and the medical image data which you bring to the first visit. We consider whether proton therapy is appropriate for you on the basis of a comprehensive assessment of your condition.
On your first visit, we arrange for medical examinations and tests as necessary.
We begin preparations for treatment after it is determined that proton therapy is the most suitable treatment for you.

A doctor carefully explains the patient's symptoms and treatments.

2 About seven to ten days of preparations before treatment is started

2-1 Creating immobilization device

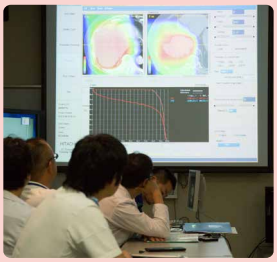
An immobilization device is custom made to fit your body shape, in order to help you to remain still during treatment and ensure that the proton beam is always targeting the correct area.

2-2 CT imaging of your body in the immobilization device

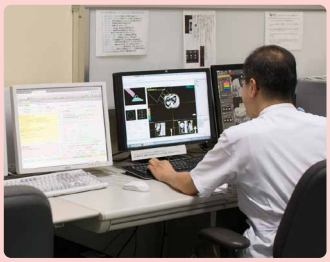
CT images of your body in the immobilization device are taken for use in the planning of treatment.

2-3 Developing a treatment plan

We make a concrete and detailed proton-dosing plan, by calculating the suitable angle, depth, dose, and frequency at which to administer the proton beam according to your medical condition. The doctor in charge of your treatment and other medical staff including doctors, medical physicists, radiological technicians, and nurses meet at regularly intervals to share information on the treatment plan and progress of treatment.



All the doctors take part in a meeting every morning.



Medical physicists check treatment plans in the treatment planning room.

2-4 Creating treatment devices

We make two devices—called a collimator and a bolus—each with the same shape as your tumor in order to ensure that the shape and depth of a proton beam matches the tumor.

We aim to ensure that treatment is highly accurate and minimizes the physical side effects on the patient.

2-5 Measuring the proton beam dose

We set-up the collimator and bolus in the dedicated proton beam equipment, emit a proton beam and measure its dose and distribution. Once it has been confirmed that the dose measured matches the treatment plan, the actual administration of proton therapy is begun.

Preparation period before the start of treatment

During and after treatment

Once all of the preparatory stages have been completed, your treatment will begin.
During the treatment period, you visit the Proton Beam Therapy Center to receive treatment every weekday.*1
The number of times and the period for which treatment is administered vary according to the medical condition of the patient.

*1 Except for maintenance days and public holidays.

Checking the correct positioning of the proton-beam X-ray imaging

We take X-ray images of you in two directions to check the positioning of the proton-beam and ensure that it targets the tumor exactly.

Setting two important devices in the emission port to improve the precision of proton beam emission

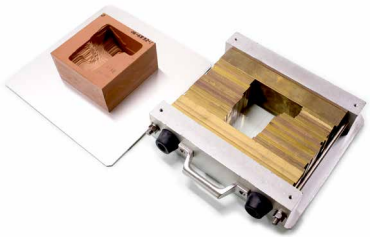
We install two devices on the tip of the emission port: a collimator (right), which shapes the contours of the proton beam to fit the tumor and a bolus (left), which sets the beam at the depth of the tumor.
These devices are remodeled each time the size of the tumor is reduced.

The respiratory-gating system—pioneered by the University of Tsukuba—ensures that the proton beam accurately targets the tumor

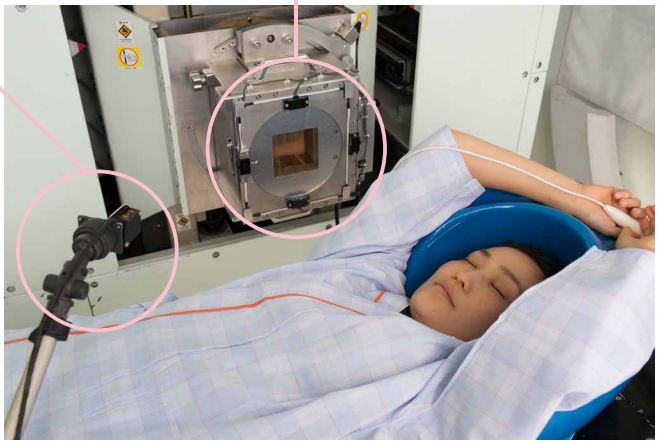
As a person breathes, their diaphragm moves up and down three to four centimeters, moving the liver and lungs up and down. The University of Tsukuba has developed a method known as respiratory-gating which ensures that the proton beam equipment is not affected by such movement and targets the same point every time. A laser sensor placed on the abdomen of the patient senses the movement of the body and a proton beam is emitted only when it is in the correct position.

Each treatment session lasts 15-30 minutes

You will not feel pain while you are treated with the proton beam. The administration of the proton-beam only takes one to three minutes each time. However, a session of treatment takes 15-30 minutes in total as it includes other steps, such as checking the position of the beam.



A bolus (left) and a collimator (right) are custom-made for each patient so as to fit the size and depth of his or her tumor. If a proton beam is administered from different angles, a bolus and a collimator are made to fit each angle.



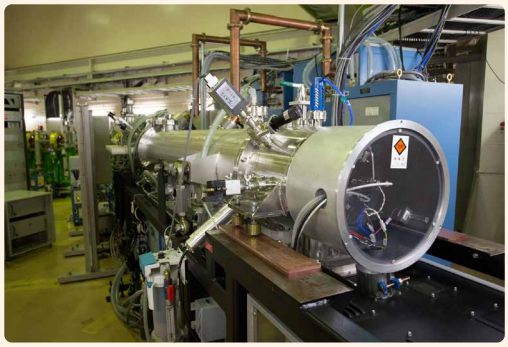
The patient lies in an immobilization device which has been custom-made to the shape of the patient's body to help him/her keep still while receiving proton therapy.
(The patient may also have to wear an immobilization device for his or her head).

Follow-up after treatment

After proton therapy is complete, we provide a medical follow-up service in cooperation with the doctor who initially referred the patient to us. Patients visit our Outpatient section once every three months for consultations regarding the progress of their condition the results of medical examinations under the referring doctor's medical care. We continue to observe the progress of a patient's condition for five years after the proton therapy treatment, giving necessary advice to him or her from the viewpoint of a proton therapy specialist. We provide consultations or respond to inquiry any time after the treatment as requested.

Therapy equipment created through collaboration between the fields of medical science and physics

Producing a proton beam for use in proton therapy requires the use of massive equipment composed of various components. The following images provide rare glimpses of the proton-beam equipment.



LINAC

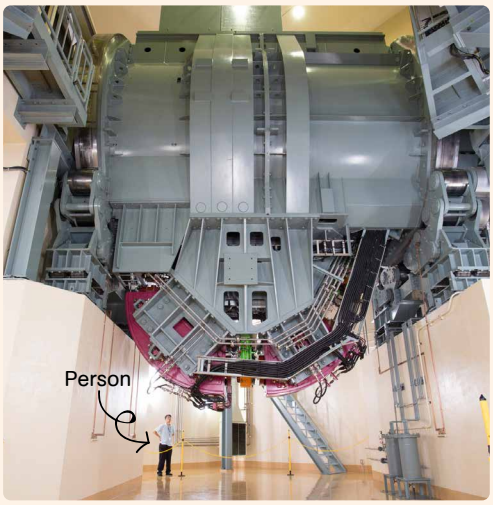
The LINAC is the first component to accelerate the protons. The protons accelerated by the LINAC go into a type of accelerator known as a "synchrotron."

Synchrotron

The synchrotron further accelerates the protons on a circular orbit up to 60% of light speed. The synchrotron is about seven meters in diameter. When protons are accelerated to such a speed, they can reach more than 30 cm deep in the human body. A proton beam at such a particle speed can therefore be used for treating patients with larger bodies.

Rotating gantry

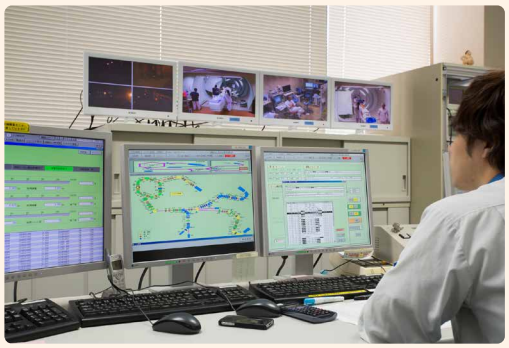
The rotating gantry is a drum-shaped apparatus which is 10 m high and weighs 200 tons. It contains an emission port and is connected to the proton therapy treatment room.
Rotating the gantry rotates the emission port 360 degrees around the treatment bed.
Our center is equipped with two such gantries.



Look how huge the equipment is in comparison with a person!

The accelerator control room for monitoring the stable supply of protons

The accelerator control room constantly monitors the equipment described here to ensure that the protons they create are stably supplied.



The main conditions treated with proton therapy

Proton therapy is an effective option for treating cancer because it provides highly effective treatment while causing only mild physical side effects. At the same time, not all forms of cancer can be treated using proton therapy.
Please note that proton therapy can only be administered if all of the basic conditions described below apply.
A specialist at this center will diagnose whether or not your condition is suited to receiving proton therapy on the basis of a comprehensive overview.
If alternative treatments are more suitable for you due to the type and conditions of your disease, we will consult with specialists in the relevant field at our hospital to propose such treatments.

Basic conditions

- The tumor has not spread to any other organ in the body, and is limited to a small area.
- The patient has not already received radiation therapy on the part of the body where the proton therapy is to be applied.
- The patient can lie still in the same position for 30 minutes.
- The patient has been informed about his or her disease, and he or she wishes to receive proton therapy.

Liver cancer

Treatment period: 2-7 weeks

In most cases of liver cancer (hepatocellular carcinoma), the onset of the disease occurs after suffering from cirrhosis caused by chronic hepatitis B or C. As proton therapy allows the radiation beam to be focused on the tumor, it causes significantly less damage to the healthy portions of the liver and is therefore much less likely to cause a decline in liver function.
In most cases, the liver itself is susceptible to cancer due to being affected by hepatitis and cirrhosis for a number of years and may have other tumors.
It is therefore necessary for a specialist to monitor the patient's condition following treatment.

Pathological and other conditions for proton therapy

- There are no more than three tumors, and none of the tumors are in contact with the digestive tract.
- There are no tumors other than those in the liver.
- The liver functions are still intact to some extent.

Notes regarding treatment:

The patient may be requested to have a metal marker the size of a mechanical pencil lead inserted in his or her liver in order to allow the proton beam to be administered with a higher precision. The procedure to insert such a marker is arranged on the basis of consultation with the patient's referring doctor and doctors from the relevant departments of our hospital.

Prostate cancer

Treatment period: 5-8 weeks

The treatments for prostate cancer include surgery, radiation therapy, and hormone therapy. Treatment methods are decided on the basis of the results of blood tests, imaging examinations, and pathological examinations. Proton therapy is one of the most effective and safest treatments among the treatments using radiation. Proton therapy treatment methods can be arranged promptly if the patient first consults with his or her urology doctor about cancer treatments and brings the examination results (in particular, a biopsy tissue sample) to the initial proton therapy consultation.

Pathological and other conditions for proton therapy

- The cancer has not spread to other organs or lymph nodes.
- Cases of prostate cancer are classified as either low-risk, a medium-risk, or high-risk according to the condition of the tumor. For cases classified as low-risk, only proton therapy is administered, and in medium- and high-risk cases proton therapy is combined with hormone therapy.

Notes regarding treatment:

The patient may be requested to have a metal maker the size of a mechanical pencil lead inserted in his or her prostate gland in order to allow the proton beam to be administered with a higher precision. The procedure to insert such a marker is arranged on the basis of consultation with the patient's referring doctor and doctors in the department of urology.

Lung cancer

Treatment period: 2-7 weeks

There are a number of types of lung cancer which differ according to the form of the cancer cells. Patients with cases of stage I lung cancer, in which cancer cells are localized in a lung, may be treated using proton therapy as outpatients for a period of about two weeks. In cases of stage II and III lung cancer, in which cancer has spread to nearby lymph nodes, it is likely that proton therapy treatment will need to combined with chemotherapy, and be administered for six to seven weeks.
In comparison with traditional radiation therapy, proton therapy has fewer side effects on the lung and bone marrow.

Pathological and other conditions for proton therapy

- The cancer is non-small cell lung cancer of stage I, II or III and has not spread to any other organs.
- In cases of stage I lung cancer, proton therapy is provided for patients who do not wish to or are unable to receive surgical treatment for some reason.
- In cases of stage II or III lung cancer, proton therapy is combined with treatment by anti-cancer medication, in cooperation with the department of respiratory medicine.

Notes regarding treatment:

No smoking is allowed during and after the treatment.
In cases in which chemotherapy is used alongside proton therapy, the patient may need to be hospitalized.

Esophagus cancer

Treatment period: 6-7 weeks

The most common means of treating esophagus cancer is surgical removal of the tumor. However, in cases in which surgical procedures incur a high risk due to the age or clinical complications of the patient, radiation therapy combined with chemotherapy is a more suitable means of treatment. In this case, the radiation therapy can be provided in the form of proton therapy. The proton therapy can be effective in treating esophagus cancer while at the same time minimizing the side effects on other important organs such as the spinal cord, lungs or heart.

Pathological and other conditions for proton therapy

- The cancer has not spread to other internal organs.
- Treatment may take the form of chemoradiotherapy, which is a method combining proton therapy and anti-cancer medication.
- Proton therapy is not used in cases in which the cancer has spread to nearby lymph nodes such that the proton-beam irradiation field cannot fully cover the cancer spread.

Notes regarding treatment:

- It is necessary for the patient to avoid drinking alcohol for a certain time after each proton beam administration session.
- The patient may be requested to have a metal maker the size of a mechanical pencil lead inserted in his or her esophagus in order to allow the proton beam to be administered with a higher precision.
- In cases in which proton therapy is combined with chemotherapy, the treatment is provided in close cooperation with specialists in internal medicine and surgery of the digestive organs.

Head and neck cancer

Treatment period: 6-7 weeks

There are a number of types of head and neck cancer. Proton therapy is currently used for the treatment of nasal cavity cancer, paranasal sinus cancer, and external auditory canal cancer. It is most often used for the treatment of squamous cell carcinoma, but can also be administered for the treatment of adenocarcinoma and malignant melanoma. The actual method of treatment varies according to the location of the tumor, results of pathological tissue examinations, and the progress of the disease. A multidisciplinary treatment combining surgery, radiation treatment, and chemotherapy may be used for the treatment of these conditions.

Pathological and other conditions for proton therapy

- The cancer has not spread to other organs.
- The cancer has not spread to nearby lymph nodes, or, the whole tumor can be fully covered by a single irradiation field.

Notes regarding treatment:

The possible side effects differ depending on the size of a tumor. A detailed explanation of such effects will be given as part of consultations regarding treatment.

Brain tumor

Treatment period: 5-6 weeks

Brain tumors can be classified as one of two types: primary tumors which occur inside the skull, and metastatic tumors which have been transferred from other organs. In suspected cases of brain tumors, diagnosis is carried out using imaging, such as MRI procedures using a contrast dye. In the case of suspected primary brain tumors, ultimately tumors are removed by surgery and the removed tissue is examined and used to decide treatment strategies.

Pathological and other conditions for proton therapy

- Proton therapy may be used to treat primary brain tumors, such as malignant glioma, and meningioma and schwannoma which are difficult to remove by surgery.
- Proton therapy is not used to treat metastatic brain tumors because it is possible to use other radiation therapies.

Notes regarding treatment:

When treating brain tumors with proton therapy, care is taken to ensure that as far as possible the proton beam is emitted in directions along which it is unlikely to come into contact with optic nerves or the brain stem. Proton therapy may not be suitable in some cases depending on the patient's condition.

Skull base tumor

Treatment period: 5-6 weeks

Skull base tumors occur in the portion of the skull supporting the brain. These tumors lie deep inside the skull, and in many cases, are attached to or fused with a number of important nerves or major blood vessels, making surgical treatment very difficult. Specific examples of such conditions include chordoma and chondrosarcoma. In some cases, cancer that occurs in the nasal cavity, paranasal sinus, or eye sockets may develop into skull base tumors.

Pathological and other conditions for proton therapy

- Proton therapy is used in cases in which surgery cannot be used or in which tumors cannot be fully removed by surgery.

Notes regarding treatment:

When treating skull base tumors with proton therapy, care is taken to ensure that as far as possible the proton beam is emitted in directions along which it is unlikely to come into contact with optic nerves or the brain stem. As the treatment is applied to an area containing a dense concentration of important nerves and organs, a detailed explanation will be given as part of consultations regarding treatment.

Childhood cancer

Treatment period: 2-6 weeks

Children are susceptible to the effects of radiation. If children receive more than a certain amount of radiation dose, there may be adverse effects on their bone growth, intellectual development, or endocrine functions. In some cases, long after the childhood cancer has been completely cured through radiation therapy, a new cancer, known as a secondary cancer, may occur, and it is thought that such secondary cancers may be a side-effect of the radiation therapy. Proton therapy can limit the risk of such complications by minimizing the exposure of healthy tissue to radiation.

Pathological and other conditions for proton therapy

- Proton therapy is used to treat childhood solid tumors which need radiation therapy. We may propose other radiation therapies according to the medical condition of the patient.

Notes regarding treatment:

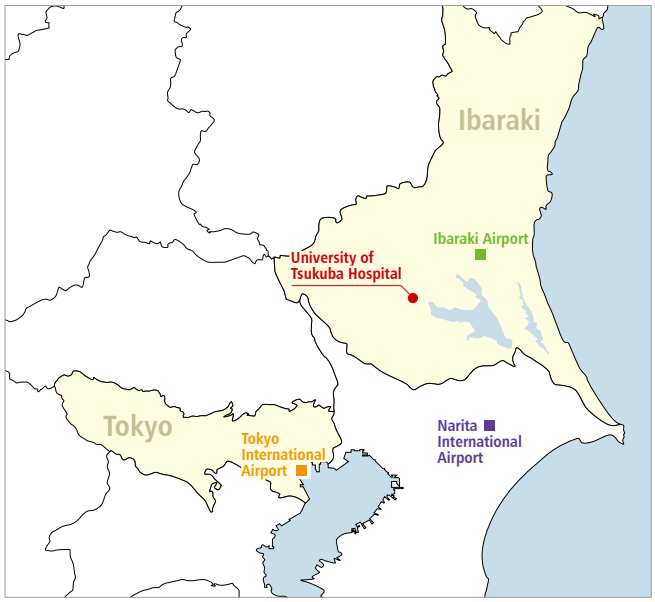
As it is necessary to combine this therapy with chemotherapy and surgery, please consult with your family doctor first.
It is important that therapy is provided at the right timing, so please seek consultation as soon as possible.

Travelling to the Proton Beam Therapy Center from overseas

The center can be easily accessed from the airports listed below.

Approximate travel times from each airport to the center by car:

- Narita International Airport — **80 min**
- Tokyo International Airport (Haneda Airport) — **70 min**
- Ibaraki Airport — **55 min**



Access

Coming to the University of Tsukuba Hospital by car

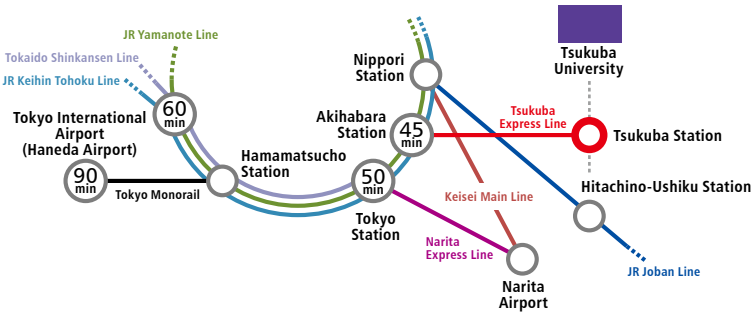
Exit the Joban Expressway at Sakura-Tsuchiura IC and head for Tsukuba. Turn right at the Sasagi intersection onto Ibaraki Prefectural Route 55 (Gakuen-Higashi Odori Ave.) toward Shimotsuma. Turn left at the Saiki intersection onto Gakuen Kita Odori Ave. Turn right at the second traffic light, then left at the next traffic light, and you will see a sign for the University of Tsukuba Hospital.

Alternatively, exit the Ken-O Expressway (Metropolitan Inter-City Expressway) at Tsukuba Chuo IC and take Prefectural Route 19 (Science Odori Ave.) toward Kenkyu Gakuen Station. Turn right at the Ozakai intersection onto Prefectural Route 24 (Tsuchiura Gakuen Line). Turn right at the Kasuga 3-chome intersection, and you will see a sign for the University of Tsukuba Hospital.

Coming to the University of Tsukuba Hospital by public transport

Take a train to Tsukuba Station on the Tsukuba Express line. The hospital is a 10-minutes bus ride from Tsukuba Station. From Bus Stop No. 6 of the Tsukuba Center Bus Terminal, take a bus on the University of Tsukuba Loop Line (clockwise direction) or a bus bound for the University of Tsukuba Central Area (Tsukuba Daigaku Chuo), and get off at the entrance to the University of Tsukuba Hospital (Tsukuba Daigaku Byoin Iriguchi).

Alternatively, take a train to Tsuchiura Station on the JR Joban line. The hospital is a 45-minute bus ride from Tsuchiura Station. From Bus Stop No. 2 of the Tsuchiura Station West Entrance (Nishi-guchi) Bus Terminal, take a bus bound for the the University of Tsukuba Central Area (Tsukuba Daigaku Chuo), and get off at the entrance to the University of Tsukuba Hospital (Tsukuba Daigaku Byoin Iriguchi). Alternatively, take a bus to Tsukuba Center and change buses there, following the directions given above.



It takes around 45 minutes by train from Akihabara Station to the closest station to the center, Tsukuba Station on the Tsukuba Express line. As central Tokyo is accessible in around one hour, it is possible to make one-day sightseeing trips to Tokyo from central Tsukuba City.

For assistance regarding travel from the airport to the hospital, or accommodation or sightseeing arrangements during your stay in Japan, please contact Emergency Assistance Japan (EAJ), the hospital's designated medical coordination service company (See page 6 for more information).

Proton Beam Therapy Center,
University of Tsukuba Hospital
Amakubo 2-1-1, Tsukuba City, Ibaraki Prefecture, Japan 305-8576

http://www.pmrc.tsukuba.ac.jp