

Proton Therapy

Hope, starts here

Samsung Proton Therapy Center, equipped with the best medical staff and the most advanced radiation therapy devices, provides patients with new hope in their lives.

SAMSUNG

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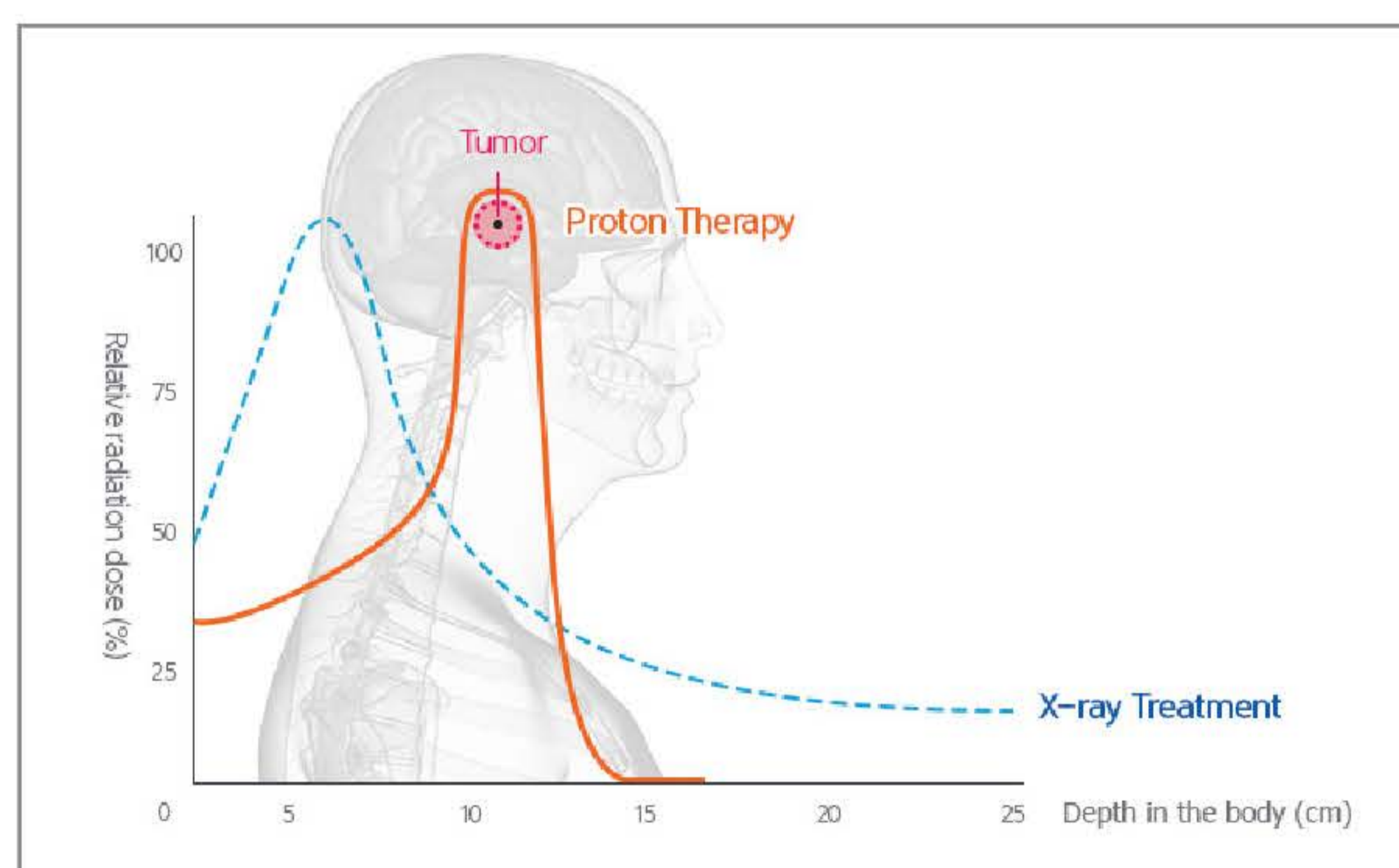


What is Proton Therapy?

Proton therapy is the treatment method that destroys cancer cells by using an accelerated high energy proton which is the nucleus of an hydrogen atom. The accelerated proton beam passes through body tissues and transfers most of their energy to cancer tissues and subsequently stops to minimize unnecessary radiation exposure to normal tissues.

This process is composed of physical characteristics called, "Bragg Peak," which achieves effective treatment results while decreasing the risks associated to side effects in comparison to the existing radiotherapy methods.

* Bragg Peak is a distinct property of protons and when it reaches cancer tissues after penetrating through the normal tissues in our body, it releases an immense amount of radiation energy to kill the cancer cells and subsequently, it stops instantaneously.



What type of cancer can be treated with Proton Therapy?

Although the proton therapy can be applied to all cancer treatments that involves radiotherapy, it is mainly used in cases where it is difficult to apply sufficient level of radiation to the cancer tissues while preventing safe range of radiation exposure to the surrounding normal tissues.

Especially, the proton therapy has been much applied to patients with pediatric cancer (brain tumor) who still have many years to live by minimizing the adverse effect of radiation and risk of secondary cancer occurrence, and patients with liver cancer, lung cancer, head and neck cancer, or recurrent cancer who need to minimize the radiation damage to nearby organs.

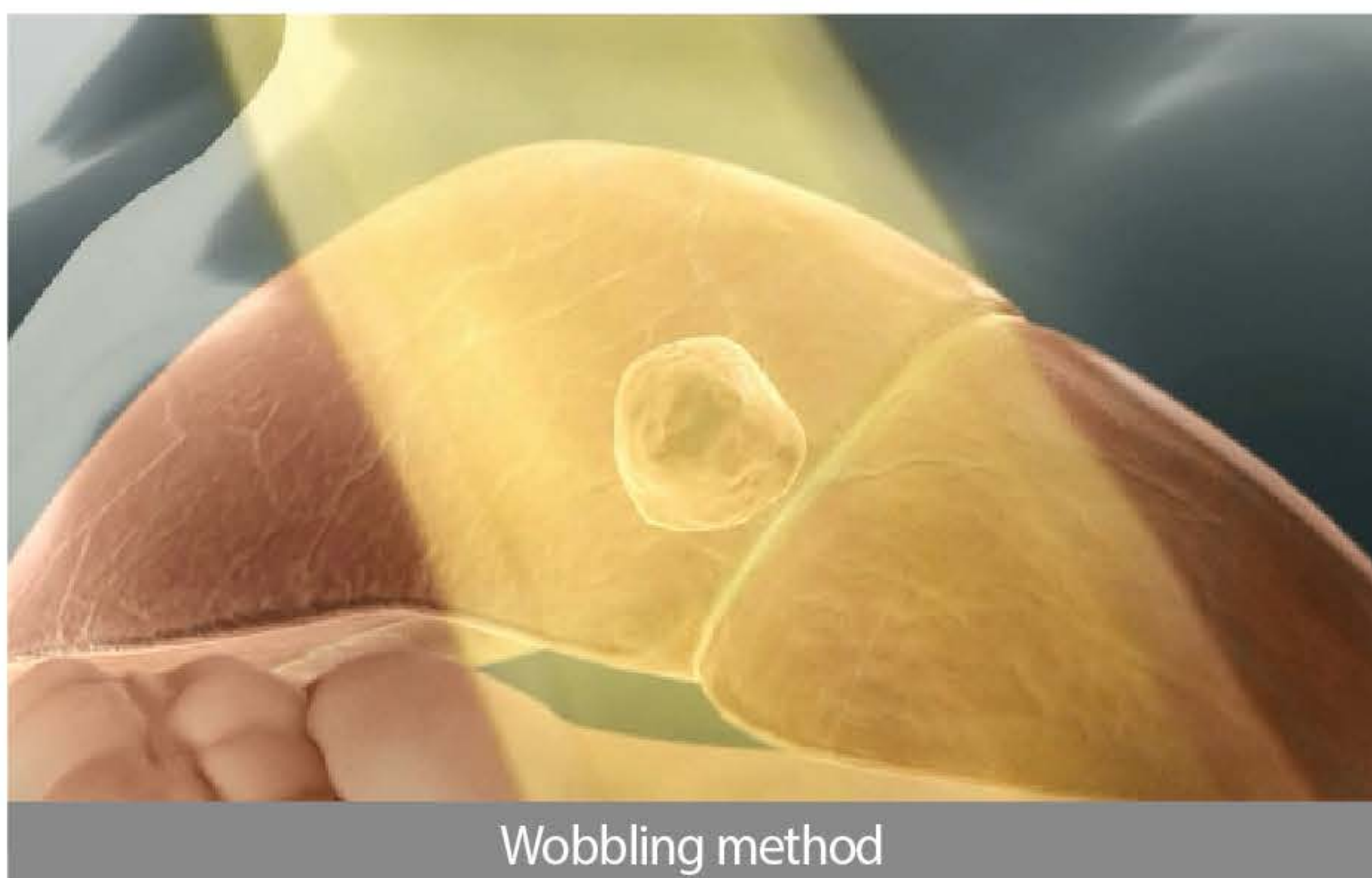


What are the distinguished points of Samsung Proton Therapy Center?

Next Generation Proton Therapy : Scanning Method (Pencil Beam Scanning)

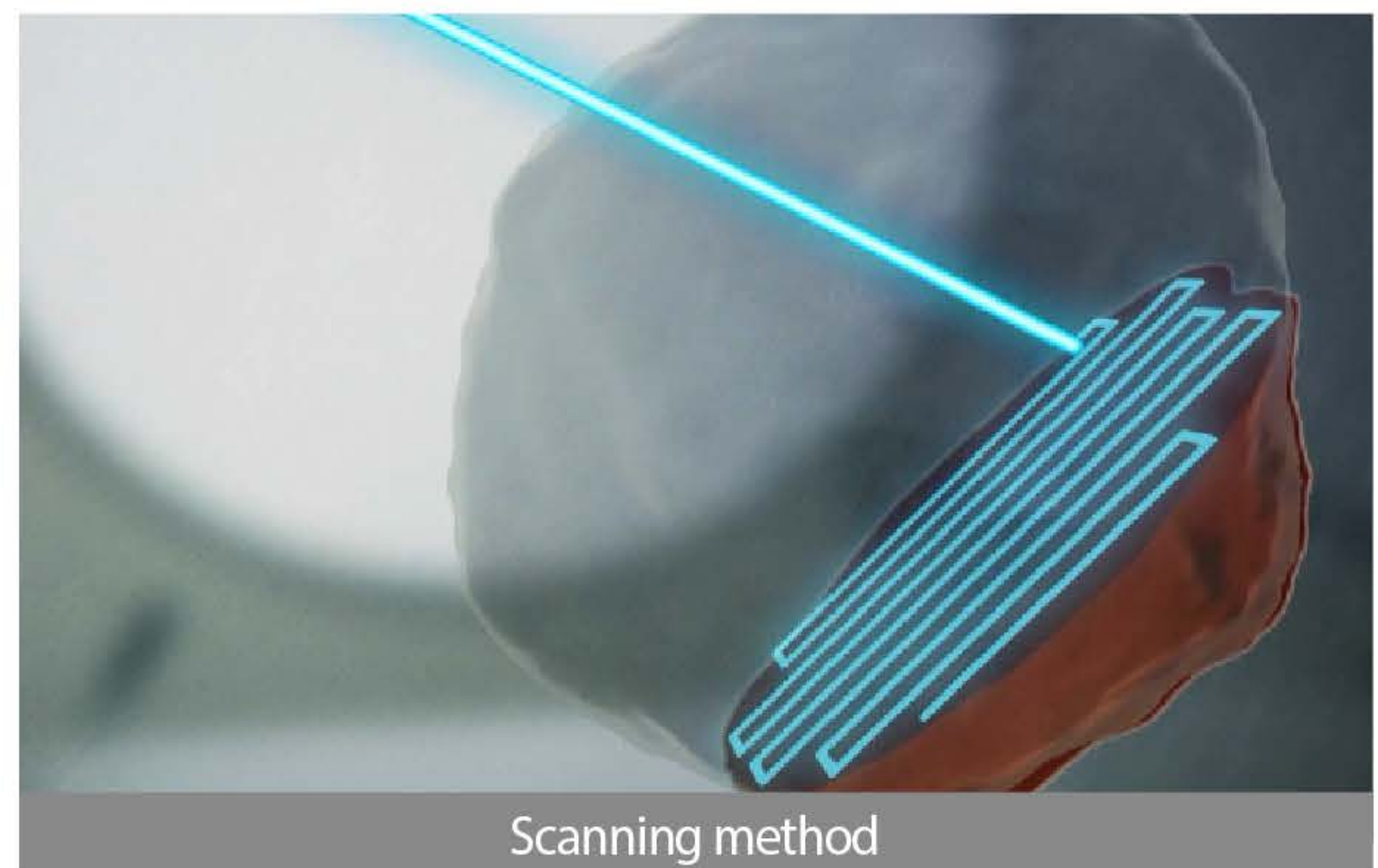
Samsung Proton Therapy Center applies ultra high speed line scanning treatment in 90% of total proton treatment and [only a limited number of medical institutions worldwide are able to perform the line scanning method.](#)

The Scanning method in comparison to the Wobbling method, has an advantage of transferring sufficient amount of radiation to the tumor while minimizing radiation exposure to the surrounding normal tissues to decrease the risk of side effect. Particularly, radiation can be accurately transferred to the tumor according to its shape. Therefore, the Scanning method can be regarded as the most exquisite proton treatment method.



Wobbling method

Using the block and compensator, it transfers the expanded proton beam to the corresponding tumor shape



Scanning method

Proton beam of a pencil thickness transferred to the corresponding tumor shape

Cutting-edge Proton Therapy Equipment

Samsung Medical Center introduced the advanced [2nd generation of proton equipment](#) and has been providing personalized treatments corresponding to the patient's characteristics to date since 2016.

- [Respiratory gated system](#) which firstly assesses the movement of the organs from respiration beforehand through the simulation treatment planning and then applies radiation on the tumor only during the patient's stabilized respiration period, therefore, allowing the beams to aim accurately at position of the tumor without exposing the normal tissues
- [Cone Beam CT\(CBCT\)](#) which can facilitate real time assessments through 3 dimensional imaging and rechecking the position of the tumor before every treatment, therefore, enhancing the accuracy of the treatment.
- [Advanced Robotic Couch](#) which enables proton treatment applied in 0.1mm units without any margin of error so that the patient does not have to move manually
- [360 Rotating Gantry](#) that allows various angles of beams when transferring proton beams precisely to the patient's tumor

Multidisciplinary approach with a team of experts for each patient's personalized and optimal treatment plans

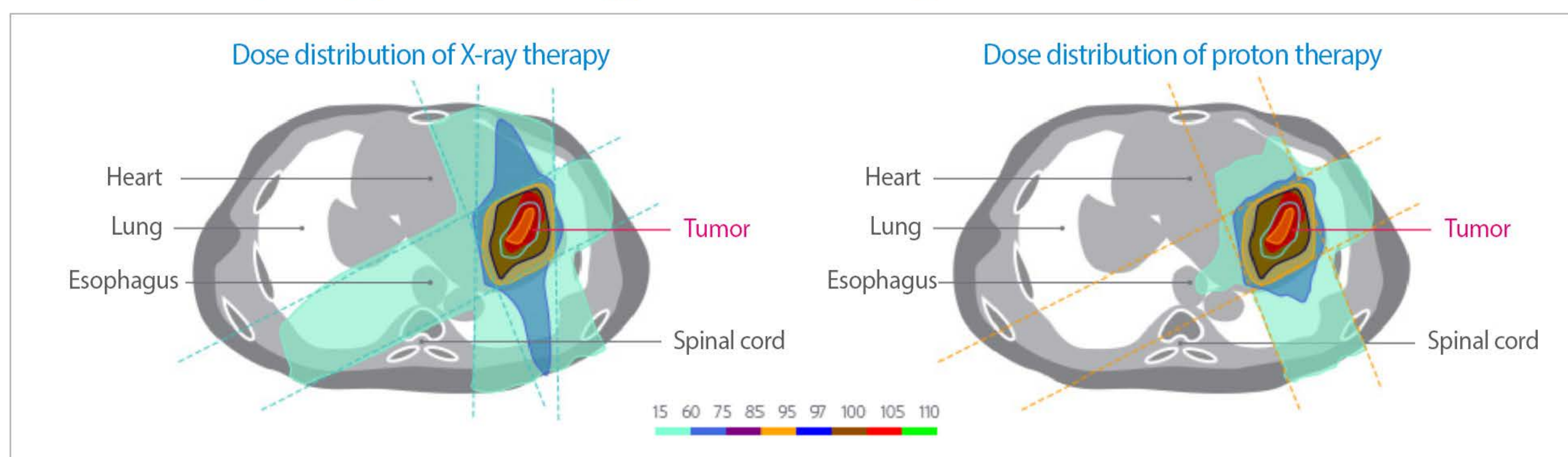
Our Proton Therapy Center consists of highly skillful specialist treatment teams with wide ranges of experience. Radiation oncologists, medical physicists, Radiologists and nurses cooperates closely and provides optimal proton treatment options possible through the multidisciplinary approach for the best outcome.



Treatment Outcome

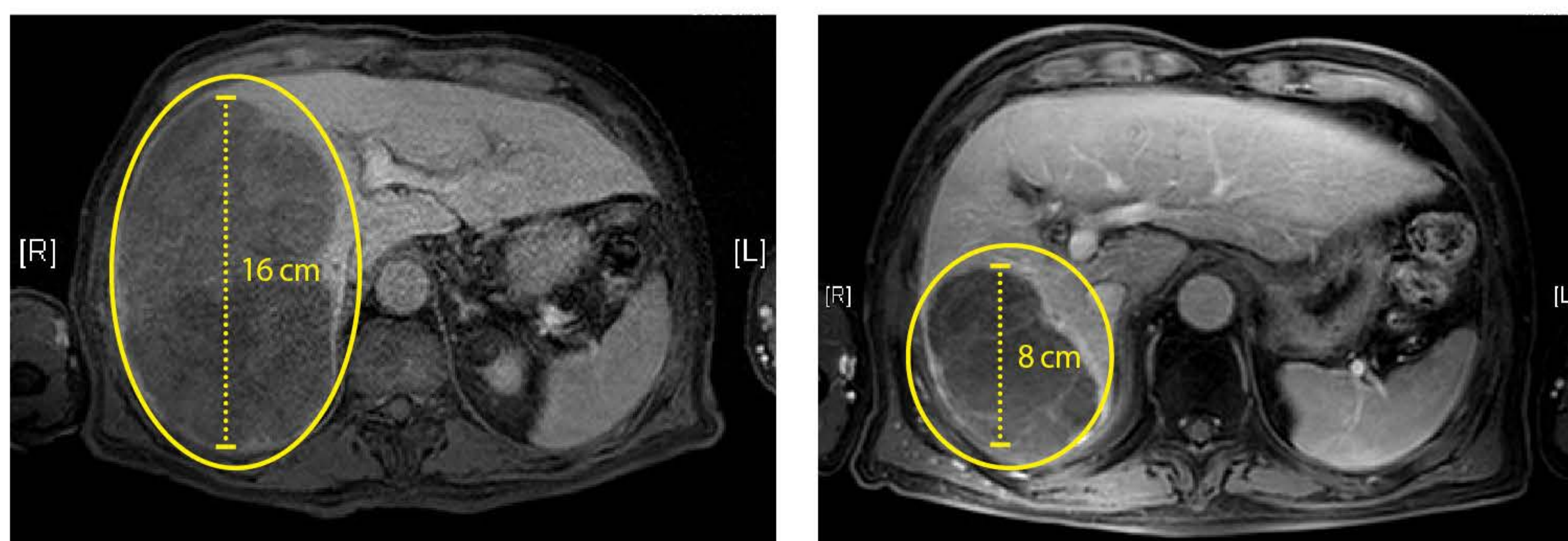
Samsung Proton Therapy Center started its operation in 2016, with over 9,000 treatment cases only after its first year. This number is more than twice the number of proton therapy treatment cases in other countries that opened around the same time. This shows a remarkable growth in a short period of time.

Conventional X-ray therapy vs. Proton therapy in treatment of Lung cancer



The treatment case of the over 10cm Tumor:

The tumor whose diameter was 16 cm on MRI before treatment was reduced significantly one month after completing the treatment.



Tumor Reaction Evaluation Results at 3 Months after Proton Therapy (78 Patients)

Among the 78 patients with hepatocellular carcinoma who had undergone a one-year proton therapy from January 2016 to February 2017 and completed the three-month posttreatment observation, complete remission was confirmed on 54 (69.2%), and tumor size reduction was seen in 14 (17.9%).

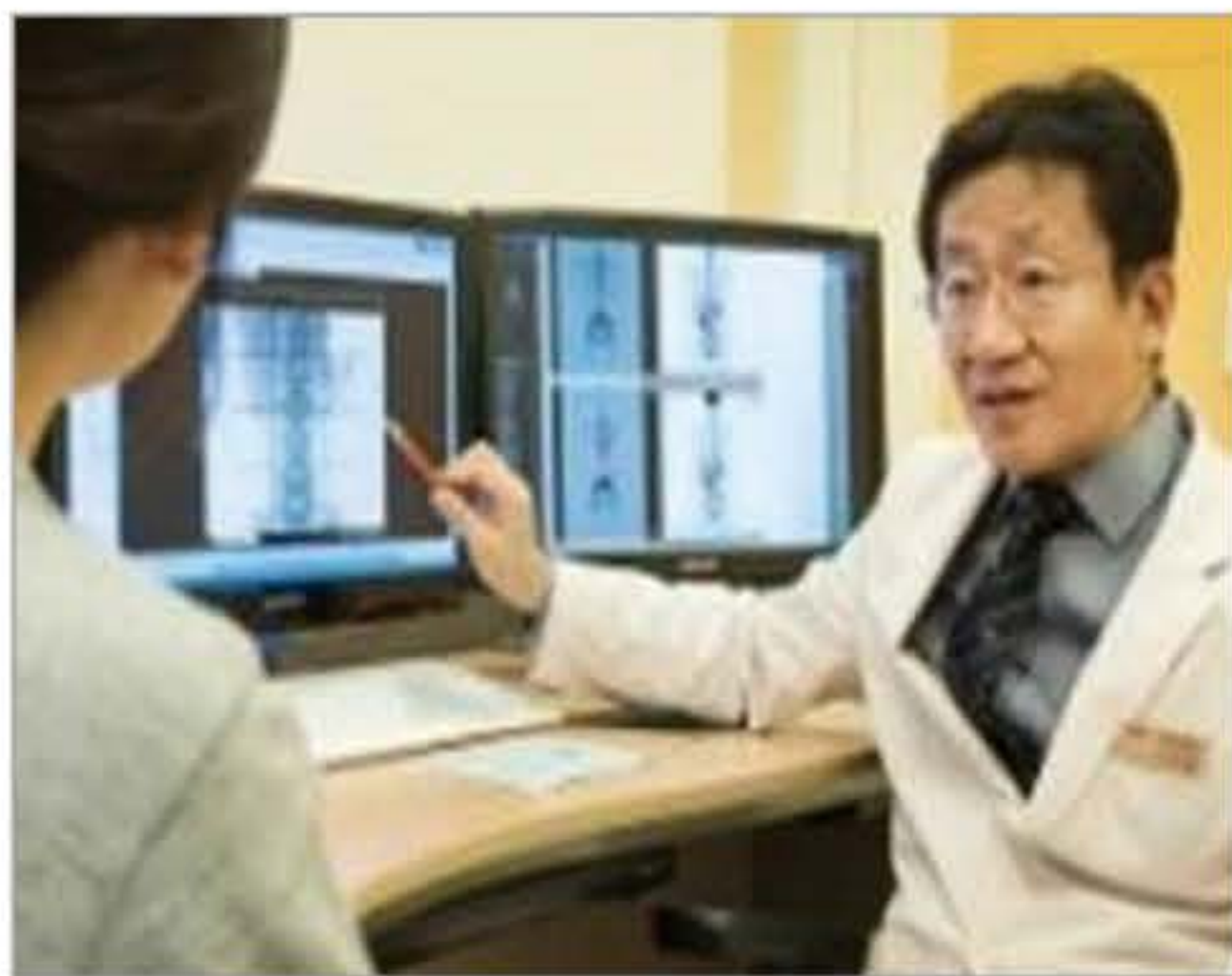
Tumor Reaction	Complete Remission	Partial Remission	No Change	Increase in Size
Patients (%)	54 (69.2%)	14 (17.9%)	8 (10.3%)	2 (2.6%)

Process of the Proton Therapy

The average number of treatment per one session

Brain Tumor	Liver Cancer	Lung Cancer	Head and Neck Cancer	Genitourinary cancer
25~30 times	4~10 times	8~30 times	10~30 times	28 times

Treatment Process



Consultation

- Through reviewing the patient's radiographic images and medical history, applicability of proton therapy, treatment method, and the number of treatment will be determined.
- Extra evaluation might be performed if necessary.
- Detailed information including proton treatment preparation, process, and schedules will be provided to the patient.



Simulation

- Breathing exercises before the simulation in accordance with the location of tumor
- Simulation using a 4 dimensional CT simulator to obtain images for enhancing precise treatment.
- MRI simulation treatment might proceed according to the location of tumor.
- Production of fixed equipment
- Indicating the treatment site



Establishment of the computerized planning

- When the treatment site is determined through the simulation, a most suitable treatment plan is created for the patient using a computer.
- The final treatment plan is entered into the automated device



Proton Treatment and Progress Observation

- In case of pediatric patients who have difficulties laying still, the patient needs to be under anesthesia before proton therapy. An anesthesiologist and a nurse will stay during treatment against emergencies.
- Consultation with doctors are scheduled once a week during the treatment period.



Follow up

- The periodic follow-up procedures will be facilitated to assess the reaction from the treatment and to check for any side effects after the completion of the proton treatment.

Best Professors in Proton Therapy



Hong Ryul Pyo, M.D., Ph.D.

Radiation Oncologist
Director of Proton Therapy Center

Areas of Expertise

Lung Cancer
Genitourinary Cancer



Yong Chan Ahn, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Head and Neck Cancer
Lung Cancer
Esophageal Cancer
Skull Base Tumor



Won Park, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Genitourinary Cancer
Gynecologic Cancer
Breast cancer



Dong Ryul Oh, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Head and Neck Cancer
Esophageal Cancer
Lymphoma



Jeong Il Yu, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Pancreaticobiliary Cancer
Colorectal Cancer
Liver cancer
Stomach Cancer Sarcoma
Skin Cancer



Hae Young Kim, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Breast Cancer



Doo Ho Choi, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Breast Cancer
Colorectal Cancer
Pancreaticobiliary Cancer



Do Hoon Lim, M.D., Ph.D.

Radiation Oncologist
Chair, Dept. of Radiation Oncology

Areas of Expertise

Stomach Cancer
Pediatric Cancer
Brain Tumor
Sarcoma
Hematologic Cancer



Hee Chul Park, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Liver Cancer
Stomach Cancer
Pancreaticobiliary Cancer



Jae Myung Noh, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Lung Cancer,
Mediastinal Cancer
Head and Neck Cancer
Multiple Myeloma
Carcinoma of Trachea



Hye Jung Cha, M.D., Ph.D.

Radiation Oncologist

Areas of Expertise

Breast Cancer
Gynecologic Cancer

Contact US International Health Services

Tel +82-2-3410-0200

Fax +82-2-3410-0229 /0231

E-mail ihs.smc@samsung.com

* Please send us an email to make an appointment

Web <http://www.samsunghospital.com/english>

Address Samsung Medical Center, 81, Irwon-Ro,
Gangnam-Gu, Seoul, 06351, Korea