

St. Jude Children's Research Hospital opens world's first proton therapy center dedicated solely for the treatment of children

St. Jude Children's Research Hospital announced today the opening of the "St. Jude Red Frog Events Proton Therapy Center" on the hospital's campus in Memphis. The new facility is the world's first proton therapy center dedicated solely for the treatment of children.

Key messages:

- St. Jude Children's Research Hospital is the only children's cancer hospital in the world with a proton therapy center dedicated to pediatric cancer treatment.
- The center is named in honor of a \$25 million pledge made by Red Frog Events LLC made in 2013.
- The design, development and implementation of the particle-accelerating technology was a partnership with Hitachi.
- The total cost of the project to date (construction and launch) is \$90 million
- The new technology will be used to treat brain tumors, Hodgkin lymphoma and other solid tumors such as Ewing sarcoma, rhabdomyosarcoma, neuroblastoma and retinoblastoma.
- Proton therapy is the most advanced form of radiation technology available to patients because it allows doctors to precisely target cancerous cells with high doses of radiation while sparing nearby healthy cells and vital organs located beyond the tumor.
- Proton therapy offers great benefit for children with brain tumors and other cancers treated with radiation therapy as it reduces harm to the child's developing body and lessens the risk of secondary tumors later in life.
- The FDA approved the unique features of the proton therapy system on November 2, 2015.

About the technology and therapy

- A proton beam can be calibrated to stop in the tumor which makes it the radiation treatment of choice to spare nearby healthy cells and vital organs in the vicinity of a tumor.
- A proton is the nucleus of a hydrogen atom. When the proton beam reaches the patient it measures only a few millimeters in diameter. The protons are produced from hydrogen gas by stripping of an electron. For protons to be effective they must be accelerated to very high speeds. The protons are first guided through a linear accelerator and introduced into the synchrotron, a type of circular particle accelerator that pushes particles to 60 percent the speed of light. The particles make 8 million turns around the synchrotron within one second which is the same as 4.5 times around the Earth in one second. By the time they leave the synchrotron, protons are moving at a speed of more than 150 000 times faster than a speeding bullet.
- What is actually used on the patient is not a single beam but a series of small carefully calibrated beams of protons. Clinicians can apply the radiation dose “layer by layer and spot by spot” to give a very precise radiation treatment of the cancerous tissue.
- Treatment is a team effort. Patients are familiarized with treatment settings and procedure in consultations with trained nurses. Radiation therapists are trained to deliver radiation treatments. Imaging specialists ensure that proton therapy is delivered accurately to the right location. Simulations are part of the treatment process. Child life specialists interact closely with the patients to provide assistance, guidance and support.
- A three-dimensional imaging system (Cone beam X-ray computed tomography (CT) scanner) ensures that the patient and tumor are in exactly the right position for treatment.

About the space and construction

- A three-story high gantry that weighs 100 tons allows scientists to rotate the proton beam 190 degrees around the patient. The gantry houses the equipment needed to deliver the proton beam to the patient.
- The building that is home to the proton beam center also houses a state-of-the-art surgical suite, new intensive care unit and a Global Education and Collaboration Center.
- Construction of the St. Jude Red Frog Events Proton Therapy Center began in October 2011 and officially concluded in October 2014.