

Applied Accelerator Science for Preserving the Environment and the Human Health

Professor **Keizo Ishii**

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Born in Shizuoka Prefecture in 1948. Graduated from the doctoral course of the Graduate School of Science, Tohoku University. PhD in science. Worked as an associate professor at the Cyclotron and Radioisotope Center, and has been in his current position since 1994. Director of the Cyclotron and Radioisotope Center.

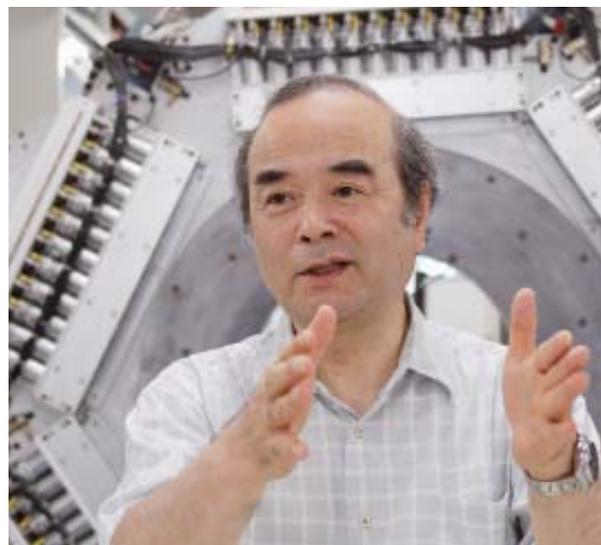
Tohoku University is the first state-run university in Japan that started the medical research using Positron Emission Tomography (PET). The history of PET study at Tohoku University played an important role in this field in Japan. PET is capable of imaging the functions of organs in a living body. By the use of the characteristic of cancer cells taking much more glucose than normal cells, it can image the degree of malignancy or growth of cancer. The process in PET study is that fluoro-deoxy-glucose (FDG) containing F18 nuclides produced by a cyclotron accelerator is injected into the body and, by the measurement of positron annihilation γ rays, the images of glucose metabolism can be obtained.

Prof. Ishii was the first to develop a highly sensitive 3D PET in Japan. This apparatus is 10 times more sensitive than the conventional 2D PET, and can reduce the exposure dosage to one-tenth of the conventional dosage, and thus, makes it possible to apply PET diagnosis to young patients. Recently, he developed a small animal semiconductor PET with a high spatial resolution of less than 1mm FWHM which was achieved for the first time in the world, and succeeded in imaging cancers with the size of approximately 1 mm.

In addition to research in medical applications of radiation, Prof. Ishii is doing research on environmental contamination by analyzing suspended dust in the air, river water, etc., by means of Particle-induced X-ray Emission (PIXE) Analysis using particle beams from an accelerator such as a cyclotron.

The Cyclotron and Radioisotope Center, headed by Prof. Ishii, is engaged in a 5-year project since 2009 on research and education for advanced uses of radiation in cooperation with the Hachinohe Institute of Technology and Aomori Prefecture.

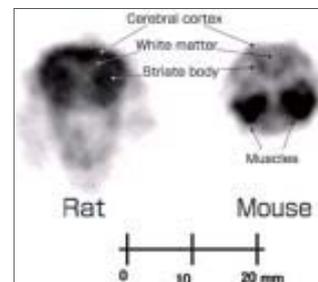
The Center has also engaged in a human resources development project to help laborers to acquire a master's degree or a doctor's degree in Rokkasho Village, Aomori Prefecture by providing lectures every week.



Behind Prof. Ishii is the first PET that Tohoku University introduced. PET has since evolved and developed over more than 30 years, and R&D on the first technologies in the world still continues.



Small animal semiconductor PET that has a high spatial resolution of less than 1 mm FWHM for the first time in the world. This makes it possible to do biomedical experiments with mice.



Complete works of World Heritage. "I want students to relax even when they are busy," said Prof. Ishii. The picture of Château de Chambord, designed by Leonard Da Vinci, reminds him of his staying in Europe for research.

<http://pixe.qse.tohoku.ac.jp/ishii/lab/index.html>