



Experience of Boron Neutron Capture Therapy in Japan

Yoshinobu Nakagawa,
Tooru Kobayashi,
Fumio Sakurai,

National Kagawa Children's Hospital of Japan
Research Reactor Institute, Kyoto University
Japan Atomic Energy Research Institute

Neutron produced in research reactor can be used for neutron capture therapy on malignant of brain tumor and skin cancer. The principle is that boron compounds are injected selectively into cancer cells which are irradiated by thermal neutron. The cancer cell is destroyed by alpha particle and lithium particle, both of which are produced by nuclear reaction $^{10}\text{B}(n, \alpha)^7\text{Li}$.

In Japan, the research and test was started about 30 years ago, and necessary surgical and irradiation technologies were actively proceeded along with the development of the appropriate boric compounds which could be highly absorbed into the tumor cell. After the selectively absorbable compound $\text{Na}_2\text{B}_{12}\text{H}_{11}\text{SH}$ was found, the potential of this therapy has been remarkably increased. Now in Japan, the clinical results of BNCT have been promoted to be a survival rate of more than 50 percents for the therapy of hundreds cases.

Here, the progress and the results in Japan on BNCT for cancer mainly focusing to brain tumor together with the practice of the therapy, the applicable boric compounds, the neutron irradiation facilities, the methods of dosimetry including prompt gamma analysis, the improvement of BNCT by using epithermal neutron and other technologies are to be introduced.

