



## RECENT PROGRESS IN TARGETED RADIOISOTOPE THERAPY (TRT) AT QST, JAPAN

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Targeted Radioisotope Therapy (TRT) is known as a radiotherapy using cytotoxic radioisotopes which are administered orally or intravenously in a patient and accumulate in a targeted organ or a tumor. Recently, QST started a joint clinical trial of our newly-developed TRT agent, Cu-64 ATSM, a radionuclide which emits  $\beta$ -rays, with National Cancer Center Hospital for the treatment of brain tumors. This is the first time in Japan to have a clinical study of Japan-made TRT agent.

Although only beta emitters had been utilized, an alpha emitter, Radium-223 (Ra-223), was introduced in this field recently. The treatment number of Ra-223 therapy is increasing rapidly world-wide and also in Japan. Alpha emitters are known with its high LTE (linear transfer effect), high RBE (relative biological effect) and their short ray range in the body. Because of these characteristics, several alpha emitters are expected to be promising TRT agents. In this session, I would like to talk about Actinium-225 (Ac-225) and Astatine-211 (At-211) and their radiolabeled agents. In Japan, several At-211 radiolabeled agents have been developed and showed their strong therapeutic effects. In our QST, Ac-225 was synthesized by cyclotron for the first time in Japan, recently.

In TRT, treatment eligibility can be confirmed through molecular imaging with diagnostic RI on the same (or similar) chemical structure of a radiopharmaceutical replacing therapeutic RI. "Theranostics" is a new term which means the combination of therapy and diagnosis and has become a new field of medicine. In QST, this "theranostics" research is also conducted actively. For the development of TRT, we have to overcome several technological barriers and social obstacles. We will show you some of our social activities.