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Production of innovative radionuclides at ARRONAX and 211At RIT

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ARRONAX, acronym for "Accelerator for Research in Radiochemistry and Oncology at Nantes Atlantique", is a high energy and high intensity cyclotron. It will turn into operation in the beginning of 2010 in Nantes (France). It is mainly devoted to the production of radionuclides for medicine. A priority list based on the capability of the machine as well as on the need expressed by the European medical community through a questionnaire has been set.It contains isotopes for imaging (82Sr/82Rb and 68Ge/68Ga generators and 64Cu, 44Sc) and for therapeutic use (67Cu, 47Sc and 211At).
Astatine is the heaviest radiohalogen and 211At is one of the most promising -emitters for medical applications. The half-life of 211At is relatively long compared with that of other radionuclides available for -RIT (T1/2 = 7,2 h).
A large collaboration effort has been done in Nantes for many years both on the production and extraction of 211At and its labelling.The production will be done in ARRONAX using a 28 MeV alpha beam hitting a bismuth target evaporated under vaccum on AlN support. For recovery of astatine, two methods have been developped : liquid extraction and dry extraction. For labelling, a special attention has been focused on antibodies. Succinimidyl AstatoBenzoate (SAB) is used to bind 211At on the antibody by esterification of lysin residue. In vitro as well as in vivo stability have been tested on a murine model. An overall labelling yield of around 50 % was obtained.In the near future, ARRONAX will participate in a radioimmunotherapy collaborative project (Alpha-RIT) using 211At coupled to a specific antibody to treat patients with disseminated residual disease of prostate cancer. ARRONAX will have to produce large activities of 211At for phases I and II clinical studies.

Please submit a short bio (max 1500 characters)

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