Radionuclides for nuclear medicine: a nuclear physicists' view

The Nuclear Physics European Collaboration Committee (NuPECC) has the mission to strengthen European Collaboration in nuclear science through the promotion of nuclear physics and its trans-disciplinary use and application. NuPECC is currently working on a report on "Nuclear Physics for Medicine" and has set up a working group to review the present status and prospects of radionuclides for nuclear medicine. An interim report will be presented to seek comments and constructive input from EANM members. In particular it is investigated how nuclear physics methods and nuclear physics facilities are supporting the development and supply of medical radionuclides and how this support could be further strengthened in future.

Aspects that will be addressed: • In recent years, the reactor-based supply chain of 99Mo/99mTc generators was repeatedly challenged by unforeseen outages. This triggered the proposition and development of complementary accelerator-based production methods of 99mTc. Long-term prospects for 99mTc supply in Europe will be discussed. • The emergence of new applications as well as rising costs and regulations for radioactive transport of individual doses lead to a renewed interest in radionuclide generators such as 68Ge/68Ga, 82Sr/82Rb or even 44Ti/44Sc. For long time such generator nuclides were mainly produced at non-European accelerators (BNL, LANL, TRIUMF, iThemba Labs) that are mainly devoted to support nuclear physics facilities. The recent addition of ARRONAX, a dedicated production facility in Nantes, France, and the upcoming inauguration of a 70 MeV cyclotron at the nuclear physics facility SPES at Legnaro, Italy will greatly improve Europe’s production capabilities of these nuclides. • Ongoing accelerator R&D for new nuclear physics facilities led to improved technologies for linear accelerators which could in future be used for providing intense beams of alpha particles cost-effectively, thus facilitating access to nuclides such as 211At, 43Sc, 67Cu, etc. • The evaluation of trends in radionuclide demand requires reliable statistical data. The working group is promoting the collection of data on the production and use of medical radionuclides in European countries. Trends and prospects, in particular for non-conventional radionuclides will be discussed. • Nuclear medicine departments interested in using, or performing research with non-conventional radionuclides are sometimes faced with the problem of identifying an adequate supplier since many of these nuclides are not yet commercially available. The working group is preparing a database of regular and potential producers of emerging radionuclides such as 64Cu, 67Cu, 44Sc, 89Zr, 211At, etc. in Europe.

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