Radioisotope Production and Radiation Technology

Objective

To strengthen Member State capability to produce radioisotope products and radiopharmaceuticals and to apply radiation technology, thus contributing to improved health care, sustainable industrial development and cleaner environment in Member States.

Radioisotopes and Radiopharmaceuticals

In 2018, the Agency implemented several activities aimed at supporting Member States in the production of important medical radioisotopes such as molybdenum-99 and emerging medical radioisotopes such as the alpha emitter actinium-225 (Ac-225). Ac-225 has had remarkable results in clinical trials performed worldwide for the treatment of advanced prostate cancer using the radiopharmaceutical Ac-225-PSMA (prostate-specific membrane antigen). Recognizing the growing interest in targeted alpha therapy using Ac-225, the Agency held a two day workshop on the supply of actinium-225, co-hosted by the Joint Research Centre, in Karlsruhe, Germany. Participants discussed the need for diverse production methods to ensure that the supply of Ac-225 meets the ever-increasing demand. The meeting, held in Vienna in October, was attended by 70 participants from 17 Member States.

Results of clinical trials conducted to date (Fig. 1), and data on the worldwide demand for Ac-225 for targeted alpha therapy, were presented by several participants from the medical and radiopharmaceutical community. Three main production routes for meeting this projected demand were discussed: 'milking' of stockpiled uranium-233, spallation of thorium-232 with high energy proton accelerators, and production of Ac-225 from radium-226 with either proton cyclotrons or electron linear accelerators. The advantages

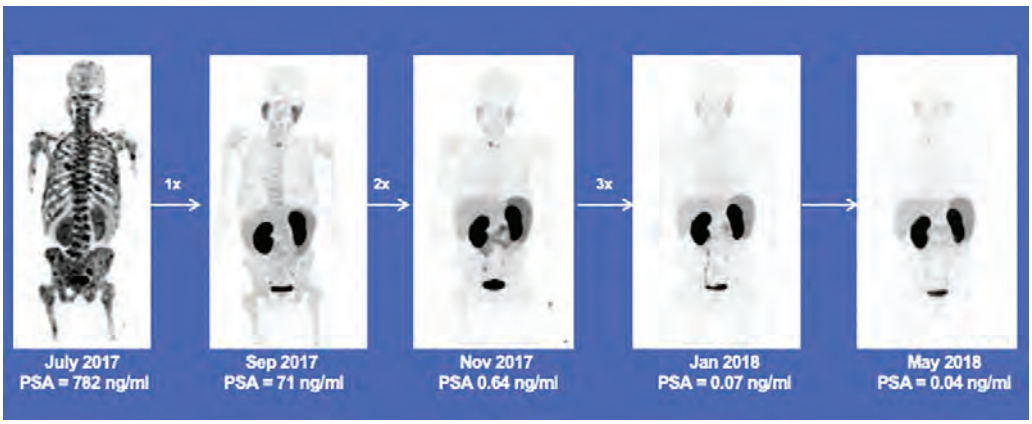

FIG. 1. Results presented by a participant at the Technical Meeting on Supply of Ac-225 showing the successful use of Ac-225-PSMA to treat prostate cancer.

FIG. 2. View of Saint Martin's chapel in Stari Brod, Croatia, after conservation and restoration using radiation technology. (Photograph from the archive of the Croatian Restoration Institute (CRI), Croatia; reproduced with permission.)

and disadvantages of each of the production methods were presented, along with Ac-225 supply projections. The meeting provided the participants a unique opportunity to exchange ideas and discuss results and the challenges in establishing a reliable supply of the promising therapeutic radioisotope Ac-225. It also allowed for the strengthening of existing collaborations and the creation of new ones.

Industrial Applications of Radiation Technology

The application of ionizing radiation for the inactivation of microorganisms is a powerful technique for disinfecting paper, textiles and wood based cultural heritage artefacts. In June, the Agency held a Technical Meeting on Strategies for Preservation and Consolidation of Cultural Heritage Artefacts through Radiation Processing at the Ruđer Bošković Institute in Croatia. The meeting brought together 30 experts in the use of this technique from 20 Member States (Fig. 2). The participants shared their experiences regarding the recent advances in radiation technology for cultural heritage preservation with stakeholders such as conservators and restorers. The meeting participants proposed the development of harmonized guidance, expected to benefit future activities in the field directly by ensuring safe cultural heritage irradiation practices in the future.

The demand from Member States for training and certification of professionals in the use of radiotracers and sealed sources continues to increase. To meet the growing need for development in this area, the Agency organized four training and certification courses in 2018. Technical backstopping was provided by the Agency, and certification was provided by the International Society for Tracer and Radiation Applications (ISTRA). In total, 40 radiotracer specialists from 25 Member States were trained and certified according to ISTRA standards.