Third publishable summary

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Summary of the context and overall objectives of the project

PRISMAP, the European programme on medical radionuclides, has supplied unconventional radionuclides, some for the first time, to biomedical research teams across Europe. Nearly 50 selected user projects covered various disciplines in this field. These radionuclides contributed to the development of advanced imaging techniques and new therapeutic drugs, while enabling cross-comparison and calibration of medical equipment in European hospitals.

Since their discovery, radionuclides have demonstrated immense medical potential. Two years ago, for the first time in history, a European-developed radiotherapeutic drug became a "blockbuster," surpassing $1 billion in sales, with a second drug expected to reach this milestone soon. These radiopharmaceuticals are providing life-saving treatments for patients worldwide suffering from late-stage prostate and digestive cancers.

Despite recent progress, cancer incidence remains high. In 2025, 2.7 million European citizens were diagnosed with cancer, while 1.28 million lost their lives to the disease, representing a slight decrease in mortality. While new radiopharmaceuticals have entered advanced clinical trials, many innovative compounds still lack both suitable radionuclide matches and coordinated access across Europe. Upscaled production methods and reliable supply networks are not often established before a larger and economical attractive market situation is demonstrated. These bottlenecks hinder the rapid execution of necessary preclinical and clinical validations of the next generation diagnostic and radiotherapeutic drugs for yet unmet medical needs. PRISMAP, the European programme on medical radionuclides, alleviates this situation.

Work performed during the second period (May 2024 – Dec 2025)

Over the past five years, PRISMAP has successfully served a fragmented biomedical research landscape by providing non-conventional radionuclides to bring next-generation drugs to market. A prime example is the provision of terbium-161 to numerous research groups. This treatment radionuclide was dispatched from the production nodes of PRISMAP for different research projects and standardisation procedures across several European countries, enabling a first early-phase clinical validation in Italy. Simultaneously, PRISMAP has reinforced the theranostic approach by combining diagnostic and therapeutic compounds. A diagnostic molecule labelled with lead-203 was used for a first-in-human application in a German hospital. It was used to decide if a new targeted alpha-therapy treatment based on the therapeutic companion lead-212 should be proposed to patients suffering from late-stage prostate cancers. The combination of these two theranostic radionuclides presents numerous advantages, one of those being able to first detect small cancer lesions, and to proposing an efficient new generation cure based on targeted alpha therapy, that is a radiotherapeu-

tics emitting a localised radiation emitting alpha particles from lead-212 decay. PRISMAP has been able to jointly develop new nuclear production routes, radiochemical and physical purification methods, selecting the radionuclides according to their mass. This allowed PRISMAP to evolve its supply and service portfolio, and offer along the years new diagnostics and therapeutic radionuclides, notably some presenting short range Auger electron radiation, following the rapid and evolving needs expressed by the growing PRISMAP user community.

These milestones, alongside significant innovations in imaging, dosimetry, drug development, and the harmonisation of regulatory procedures, have been presented at prestigious venues such as the European Association of Nuclear Medicine (EANM) Congress, which hosts about 10,000 professionals and at frontier research conferences such as the International Conference on Isotopes. These findings are extensively documented in the scientific literature.

Beyond the state of the art, expected results and potential impact

The overarching goal of PRISMAP has been to provide long-term sustainability to Europe's fragmented research community in nuclear medicine and resolve existing bottlenecks for the benefit of citizens and healthcare systems. By doing so, PRISMAP ensured that the European biomedical and industrial sectors remain global centres of excellence. This support reinforced economic growth—already evidenced by the recent market success of blockbuster radiopharmaceuticals—in a field projected to grow at more than 7.5% annually, to pass the €10's billion annual sales in the coming years.

The PRISMAP outcomes have contributed to trigger new phases of clinical validation with innovative radionuclides supported across Europe. This was witnessed with several new European and national programmes coordinated in different countries directly benefitting from newly available PRISMAP inputs. Each of these programmes secured the necessary funding of €5-10 million to enter a clinical phase and which can address unmet medical needs, particularly in the case of aggressive forms of cancer.

The Council of Europe recently recommended the establishment of a sustained and resilient supply of medical radionuclides in Europe. The follow-up initiative, PRISMAP+, aims to advance the European medical radionuclides programme further for biomedical research. Our aim is to implement this evolution in the coming years, providing deeper integration and innovation within the rapidly evolving landscape of precision medicine and ultimately improving health outcomes for all European citizens.

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