

Partners

Three operational hubs (Greece, Cyprus, Slovenia) complemented by a dedicated mentoring hub (Bosnia and Herzegovina) form the backbone of our project, supported by the expertise and strategic guidance of three parenting institutes, CERN, DKFZ, and GSI, which ensure scientific excellence and regional impact. Together, we are establishing a sustainable platform for the production of novel radioisotopes that will enable the advancement in radiopharmaceutical production, training, and innovation across the Balkans and Europe in general.



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IFIGENEIA

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Innovative Facility for Isotope GENERation with Efficient Ion Accelerator

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Advancing Nuclear Medicine in Europe



IFIGENEIA is a European Union-funded research project that develops innovative LINAC (LINear ACcelerator) technology for the production of radioisotopes for medical use. These isotopes are key to both modern diagnostic imaging and cancer therapy.

Our Goals:

Improve healthcare in Europe by implementing Linear Accelerator (LINAC) technology to produce a wide range of radioisotopes for therapy, diagnostics, and theranostics.

- Establish Centres of Excellence in Greece, Slovenia, and Cyprus to operate a LINAC facility to be established in Greece and can produce a wide range of medical radioisotopes
- Design sustainable facilities for the production of radiopharmaceuticals
- Strengthen collaboration between science, industry, and healthcare

Motivation and Current Status



Cyclotrons



Nuclear Reactors

In Europe, more than 10 million people each year need nuclear medicine procedures for diagnosis or treatment. At the moment, the only sources of radioisotopes for the production of radiopharmaceuticals are the cyclotrons and the ageing nuclear reactors. Both technologies have well-known limitations.

The IFIGENEIA Project

Our project introduces advanced LINAC technology as a complementary approach to cyclotrons and nuclear reactors, offering a safer, more flexible, and sustainable way to produce a wide range of radioisotopes.

By designing modern production facilities and establishing Excellence Hubs in Greece, Slovenia, and Cyprus, we aim to strengthen regional capabilities and ensure that patients across Europe can access life-saving treatments without delays.

Through new laboratories, virtual training tools, and strong partnerships between science, healthcare, and industry, this initiative will help build a more resilient and innovative radiopharmaceutical landscape for the future.

Key Activities:

- Technical design and safety studies for a unique LINAC facility targeting societal and medical applications in Europe.
- Design and development of laboratory infrastructure fully compatible with current Good Manufacturing Practices (cGMP) for production of a wide range of mainstream and emerging radioisotopes enabling the production of novel radiopharmaceuticals.
- Tailored training programmes using innovative virtual training tools and researcher exchanges to build technical capacity across Europe through inclusive participation, mentoring and regional collaboration.
- Creation of an investment strategy and plan towards the sustainable future of the Excellence Hubs.
- Communication of project outcomes and wide dissemination of knowledge through targeted communication activities.
- Definition and prioritisation of a LINAC-based portfolio of diagnostic, therapeutic and theranostic radionuclides to meet current and future needs of the Balkan region.

Our Vision

Introduce the Linear Accelerator technology in Europe to provide access to diagnostic, targeted therapies and theranostic radiopharmaceuticals.

A LINAC system designed for the production of a wide range of medical radioisotopes, including:

- **Diagnostic isotopes** (for imaging),
- **Therapeutic isotopes** (for treatment),
- **Theranostic isotopes** (for both diagnosis and therapy),
- **Generator-produced isotopes,**
- **Other emerging medical isotopes.**

1. To generate multiple medical isotopes simultaneously, creating a sustainable supply at commercial scale to support next-generation cancer diagnostics and therapies.
2. A compact and sustainable facility, designed with advanced shielding and safety standards, located close to hospitals for direct patient benefit.
3. Multipurpose facility (Cultural heritage and industrial applications, irradiation facility for clinical tests).
4. In the long term, the facility could evolve to include proton therapy (>50 MeV), broadening its impact in cancer treatment.