

Why Europe should support nuclear medicine

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Opinion

Nuclear medicine is a discipline at the forefront of science and healthcare, providing remedies for previously untreatable conditions, and it deserves Europe's support, writes Antonis Kalemis.

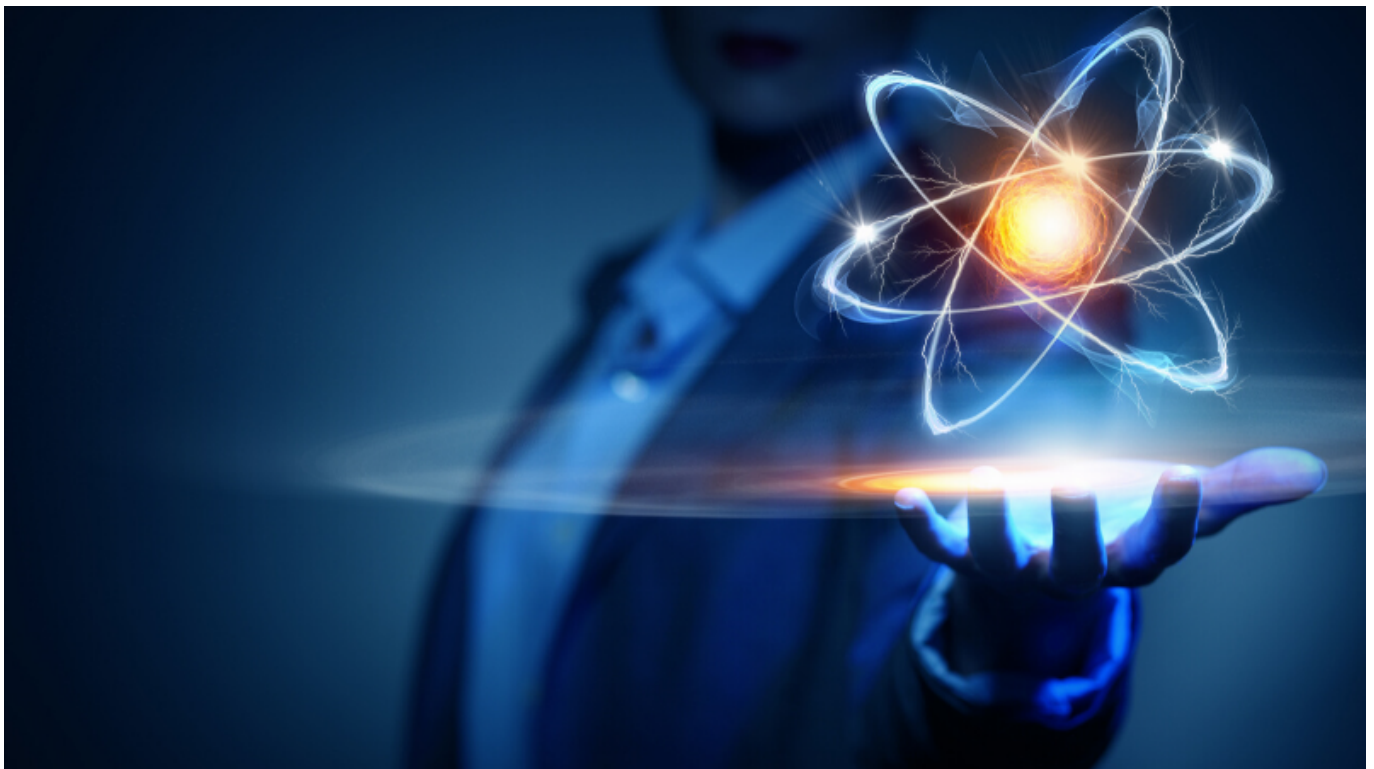


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Nuclear medicine is a scientific miracle. It is a way of using radiological technologies to see into the body, diagnose problems and treat or guide treatments with a precision that would have been unthinkable a generation ago.

Nuclear medicine, also known as molecular imaging, is particularly useful in cancer care, offering solutions that reduce uncertainty, help select the right remedies, and help doctors save lives. And Europe is at the forefront of this revolution.

Yet the chances are, you have never heard about nuclear medicine. Indeed, many of you will probably

be wondering how medicine can even be associated with anything nuclear.

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These technologies have a surprisingly long history that goes back to radionuclides experiments in the 1920s.

In 1934, Nobel Prize laureates Frédéric and Irène Joliot-Curie discovered artificially produced radionuclides. John Lawrence, the father of nuclear medicine, first applied these radionuclides to patients in 1936. A 1946 article in the Journal of the American Medical Association (JAMA) described the successful use of treating Graves' Disease with radioactive iodine.

How does it work? Imaging agents mix radioactive isotopes with molecules that target specific physiological processes to highlight growths such as cancer, neurological, metabolic or other abnormalities at the cellular level.

In short, it reveals the body's chemical and biological processes – contrasting it with other medical imaging modalities, such as X-rays, which provide just a snapshot of anatomy. Nuclear medicine does not just show how your body looks, but also how it functions.

The ability to accurately locate disease helps doctors make better and earlier diagnoses. Although nuclear imaging is commonly used for diagnostic purposes, it also has valuable therapeutic applications such as treatment of different types of cancer, hyperthyroidism and types of arthritis.

With therapy, radioactive atoms bind with highly specific molecules that identify and kill cancer cells, but not the surrounding healthy cells.

“Nuclear medicine is particularly useful in cancer care, offering solutions that reduce uncertainty, help select the right remedies, and help doctors save lives”

Today, a new breed of nuclear-imaging cameras and tomographs promises even more accurate prognosis and treatment. The images themselves are now processed in a fraction of the time it took 10 years ago.

Tomography can now reconstruct promptly 3D or even 4D images of the body. Fusing morphological (CT, MRI) and functional imaging can precisely locate and measure changes in physiology accurately and reproducibly.

Before we go any further, we should address the one question that is always about nuclear medicine. Yes, it is safe. Really. As with all ionising radiation applications, it should be used only when they are needed.

However, as it uses very small amounts of highly specific radioactive pharmaceuticals, called radiotracers. These are typically injected into the bloodstream, inhaled or swallowed.

The radiotracer travels to the area being examined and gives off energy in the form of gamma rays which are detected by a special camera. The radiation exposure is equivalent to that of an X-ray.

In more than half a century of diagnostic nuclear medicine procedures, there have been no known long-term adverse side effects.

Nuclear medicine is an integrated discipline that covers the nuclear industry, the processing plants used to make pharmaceutical products, the heavily regulated transporters of the material, the technologically complex cameras used to perform the imaging, and the physicians and hospitals involved in performing the patient procedures.

“The ability to accurately locate disease helps doctors make better and earlier diagnoses”

And yet, there is very little public understanding of nuclear medicine, and many health authorities in Europe are reluctant to invest in the technology.

Part of this is down to questions about cost. Some people see the imaging equipment as expensive to purchase and operate. But that is a short-sighted way of seeing the technology.

Nuclear medicine is today one of the closest paths to realising personalised medicine, i.e. detecting the extent of the disease, selecting the right patients that will benefit from a certain targeted therapy and monitor the course of therapy and recovery. It can eventually reduce costs from the health system as well as contribute significantly in patients' quality of life.

As the EU begins its discussions on budgeting priorities, we need to promote innovative industry sectors in the EU like nuclear medicine. This is an area where Europe has taken a technological lead, with many of the world's best research and strongest companies based here.

We have the manufacturing tools, reactors and accelerators, as well as the cameras for imaging. And we have the expertise in hospitals and in industry.

Europe should speed up the new era of personalised medicine that delivers the right treatment at the right time to the right person, taking into account an individual's health history, genes, environment, and lifestyle.

This already transforming the way diseases like cancer and mental health conditions are treated, allowing doctors to select treatments that improve chances of survival and reduce adverse effects.

“Nuclear medicine is a discipline at the forefront of science and healthcare, providing remedies for previously untreatable conditions”

The EU is closely involved in the sector because it involves the transport of nuclear isotopes. But there is uncertainty about EU support for the next generation of imaging technologies.

For example, the rules for market authorisation of new products are slow and need to be streamlined. Nuclear research reactors need to invest in new technologies to produce medical isotopes. The EU is facing growing competition from other economies who are investing heavily in nuclear medicine

infrastructure.

That is not to mention other challenges too, like the possible impact of a no-deal Brexit on cancer patients in the United Kingdom, which depends on radiopharmaceuticals and/or nuclear isotopes crossing into the country without delays.

This week, on November 14, the European Parliament is hosting [a symposium](#) [6] on nuclear medicine. It will showcase the latest technologies and look at how they can continue to defeat cancer.

Nuclear medicine is a discipline at the forefront of science and healthcare, providing remedies for previously untreatable conditions. At the same time, it is cutting overall healthcare costs, as its precision ensures that the treatments go only where it is needed.

It is a safe, painless, and cost-effective way of looking inside the body. It deserves Europe's support.

About the author

Antonis Kalemis is president of Nuclear Medicine Europe (NM-EU)

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