









Saving lives with tomorrow's tech AIPES Symposium shows how molecular imaging is changing healthcare as we know it

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Molecular imaging is transforming healthcare as it finds new ways to diagnose and treat cancers and other conditions, experts told a symposium on nuclear medicine organized by the Association of Imaging Producers & Equipment Suppliers (AIPES) in Brussels.

The AIPES Symposium, at the historic Solvay Library, was entitled, 'Guided Cancer Management for European Citizens'. Top practitioners, researchers, economists and decision makers explained how new molecular imaging techniques could now show detailed pictures of tumours and other issues. They said that the image accuracy gave doctors precise tools to identify and treat cancer growths.

Prof Einat Even-Sapir Weizer, from the Tel Aviv Sourasky Medical Center, explained that Israel accelerated the use of PET across the country through its basket system for reimbursing drugs technologies and services that should be made available to all Israeli citizens.

The basket system is regulated by the Israeli Ministry of Health (MOH) deciding every year the licences to give out. That meant setting regulations, rewriting the syllabus, and appointing a gatekeeper or supervisor for each health maintenance organization (HMO). "But the really big task has been to educate the medical community to use PET-CT," she said.

How do the Israeli MOH decide what new technology to put in the basket? Prof Even-Sapir said that they examine the technology; they look at the published clinical data, including the added value and the expected change in patient management; they study the epidemiological data of the disease in Israel; and they look at the budgetary impact. As a result, they were able to introduce the latest technologies, including DOTATATE PET-CT, and Ga-PSMA.

While she hailed the evolution of the technology over the past decade, and the insights from combining PET and CT rather than using them separately, she also emphasizes the limits of current imaging. For example, PET-CT does not distinguish between malignant and benign tumours, as fluorodeoxyglucose (FDG) PET is not tumour specific and may be positive in non-oncologic findings. The latter, however, is an advantage if considering the use of FDG PET in patients with suspected infection or inflammation

Professor Dr Marcus Hacker, the Director of the Division of Nuclear Medicine at the Medical University of Vienna, predicted that molecular imaging would be able to show which patients had greater therapy needs, ensuring that the eventual treatment decisions were based on more informed criteria. He outlined the evolution in technologies in molecular diagnostics from immuno-histochemistry to gene mutation analysis to gene expression analysis. "These technologies are available and increasingly cheap," he said, pointing to the "complementary and incremental value" of combining molecular diagnostics and molecular imaging.







There is also an evolution in strategies, as medicine enters a personalised approach, Prof Hacker said, with treatments customized for individual patients. "We used to pour toxic drugs into the body to destroy any proliferating cells. Now we can be very targeted with our drugs," he said. "Nuclear medicine has a high potential to link target identification with therapy and thus personalise treatment. Just by linking the vehicle molecule with the radionuclide we can hit the target."

Prof Johannes Czernin, from the David Geffen School of Medicine at UCLA, said it was "a healthcare scandal" that imaging is so underused. "Not using and not approving PET under many conditions should be considered malpractice!" he said, arguing that healthcare professionals should image earlier, and more often.

Prof Czernin pointed to statistics showing that PET is dramatically underused, showing CT is used 6 times more to diagnose Non-Hodgkin Lymphoma, and MRI is used three times more for breast cancer. "PET is not a major contributor to cancer care costs," he noted. By contrast, many hospitals almost instinctively prescribe expensive and toxic chemotherapy, without knowing for sure whether the treatment works.

He noted that it was in 1971 that then-US President Richard Nixon announced a "war on cancer", with an initial investment of \$1.6 billion. since then, trillions of dollars have been spent yet the war has not been won.

Survival rates have improved but are not satisfactory. We don't detect cancer early enough and we don't monitor responses to therapy early and often enough. With PET we have the tool to do this now. " . He called for complete deregulation of diagnostics as long as they are safe." PET It's safe, as radiation exposure is minimal, and if PET is not helpful referring physicians will not use it for managing their patients. PET is also inexpensive as it accounts for 1% of cancer care costs in the US

Prof Dr Andreas Buck, the Director of the Clinic of Nuclear Medicine at Würzburg University in Germany, argued that some of the most effective diagnostic tools were combination technologies. He predicted that the MR/PET combination would be a powerful future technology. He noted that PET/CT has now become the standard imaging system for a number of cancers in Germany, including lung, head and neck, and lymphoma, but it is not yet widely accepted in other cancers, like colorectal, breast and pancreas. "It is not perfect, there are countless laws in Germany on radiotracer use, and you need lots of money, but it is a very, very useful non-invasive tool," Professor Buck said.

Siemens Healthcare Molecular Imaging CEO James Williams said healthcare authorities were stuck in an accounting mindset that only saw imaging costs on a spreadsheet. "That is the wrong way to look at it, as PET has proved itself," he said. Mr Williams said that imaging was transforming the diagnostics sector, helping answer key questions about a patient long before any treatment is considered. He said imaging would soon consign methods like deep biopsies to the history books, like "exploratory surgery" a generation ago

Noting that nuclear pioneer Ernest Rutherford had been at a famous Solvay Conference more than a century ago, Mr Williams said, "Splitting the atom is important. But so is putting it back together," he said. "Ultimately, we want to give people more time, and live better. We can sometimes cure them."





Kristoff Muylle, nuclear medicine physician at the University Hospital of Brussels (UZ Brussel) and president of the European Association of Nuclear Medicine (EANM), said the challenge for the sector remains making the innovations available. "How do we translate these new diagnostic and therapeutic compounds, with highly promising preliminary results in preclinical and early phase clinical studies, as fast as possible to clinical practice?" he asked. "Most innovations in nuclear medicine are developed in European academic centres, but a close collaboration between all stakeholders, including the European and National Authorities, industry, academic world and patient representatives, is needed to facilitate their introduction into the market, while maintaining high quality standards.

Wim Oyen, Professor of Nuclear Medicine and Molecular Imaging at the Institute of Cancer Research and the Royal Marsden Hospital in London, and the incoming EANM president, said the imaging community has a duty to reach out to stakeholders in the sector, including regulators and patient groups. "Our main driver is patient interest," he said. "Unless we effectively collaborate with regulators, it will take way too long for nuclear medicine procedures to reach our patients." Prof Oyen added that while nuclear medicine offers brilliant prospects, pricing needs to be reasonable. "We need competitive pricing of radiopharmaceuticals to move ahead and guarantee broad availability. For the benefit of our patients, we cannot shoot ourselves in the foot by pricing molecular imaging too high," he said.

