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### New Industry Partnership to Secure Manufacture of Radioisotopes

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CEA (The French Alternative Energies and Atomic Energy Commission), IRE (National Institute for Radioelements, Belgium) and IBA (Ion Beam Applications S.A., Belgium), three major industrials in the sector of manufacturing radioisotopes for medical examinations in Europe, have signed an agreement to secure the supply of Technetium (Tc-99m) beyond 2015. This agreement enables the companies to respond to European needs in medical exams, currently estimated at eight million exams per year.

The supply of Tc-99m represents a major challenge in public health. This radioisotope is used in 80 percent of imaging scans performed in Europe. Its mother radioisotope Molybdenum (Mo-99) is manufactured in nuclear reactors worldwide whose numbers are steadily on the decline. The main reactors that manufacture Mo-99 are nearing the end of their lifecycle and, since 2008, have shown an increase in manufacturing problems that has led to several difficult periods. Any stoppage in Mo-99 production affects the availability of products used by specialists for patient exams, reducing the number of scans and, in turn, resulting in fewer diagnoses for treating serious illnesses.

In order to secure supplies for European hospitals, IBA and IRE, the main suppliers of Tc-99m and Mo-99 generators, and CEA, which operates research reactors that manufacture radioisotopes for medical use, initiated this strategic partnership.

This initiative combines the technological skills and know-how of each company to cover the entire radioisotope manufacturing and distribution chain:

- » CEA will guarantee the irradiation of uranium targets in reactors;
- » IRE will extract Mo-99 and deliver it to distributors of Tc-99m generators, and
- » IBA/CIS bio, using Mo-99, will manufacture and distribute Tc-99m generators for hospitals.

The partnership will rely on the following equipment that has recently been put into operation, or is still under development by the three companies. "This agreement will enable us to limit the important uncertainty surrounding the supply of Tc-99m. For IBA, any advances in molecular imaging start with securing the sector's supply chain. Thanks to this agreement between CEA, IRE and IBA, molecular imaging will continue to develop and demonstrate its full potential not only for specialists, but also for patients," said Renaud Dehareng, COO, IBA Molecular.

"This is positive news for global healthcare, as this will ensure a new and welcomed supply source given the current shortage," added Jean-Michel Vanderhofstadt, managing director of IRE. "This partnership confirms IRE as one of the key actors in nuclear medicine in the world today. IRE manufactures approximately 30 percent of the world's Molybdenum-99 and now supplies radioisotopes worldwide. In addition to these commercial developments, we will continue to invest in safety, which remains our main priority." The three companies will work in the coming months on the technical specifications of RJH reactor's irradiation systems, with the goal of beginning Mo-99 manufacturing as soon as it is operational, planned for 2015.

#### The Future of Novel MR Imaging

The consortium of the project "European Network for Cell Imaging and Tracking Expertise" (ENCITE) has the ambitious mission to develop and test new MR and optical imaging methods and biomarkers to draw a more comprehensive picture of cell fate and the reaction of the immune system. In the end cell therapy shall be improved for the benefit of the European patient. To exploit the superb spatial and temporal resolution of MRI in molecular imaging applications, it is necessary to improve the sensitivity and specificity of the currently available probes:

- » Sensitivity. A new high relaxivity tetrameric Gd-based agent has been shown to provide an impressive sevenfold sensitivity enhancement in respect to the commercial agents maintaining an analogous safety profile.
- » Specificity. An enzyme responsive Gd probe has been synthesised and tested. It reports about the activity of beta-galactosidase, an enzyme largely used by biologists as a reporter of gene expression.

Important advances have been made in the field of the new family of MRI-CEST agents (CEST= Chemical Exchange Saturation Transfer). These MRI probes have great advantages in respect to the classical relaxation agents. Being frequency-encoding systems, it is possible to visualise (using different colours) more probes in the same image as every CEST agent is responsive only to a specific irradiation frequency. In the project, a paramagnetic complex, present as a pair of nmr-detectable isomers, has been selected for its high sensitivity and its ability to act as pH sensor. Mapping pH appears to be an important task to get new functional information from MR images in the presence of relevant pathologies. Moreover, upon changing the Lanthanide ion in the complex, systems able to visualise different cell types have been prepared and successfully tested.

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