Centre hospitalier universitaire de Sherbrooke
Centre de recherche clinique Étienne-Le Bel

CHUS Centre hospitalier universitaire de Sherbrooke

Press Release
For immediate release

A Complementary Solution for Production of Medical Isotopes
Researchers from Sherbrooke succeed in producing technetium 99m with a cyclotron.

Sherbrooke, QC, Wednesday, January 20, 2010— Researchers at the CHUS's Centre de recherche clinique Étienne-Le Bel (CRCELB) and the Université de Sherbrooke, in collaboration with Advanced Cyclotron Systems Inc. in Vancouver, have just demonstrated that technetium 99m can be produced using a cyclotron. Diagnostic testing indicates that cyclotron-produced technetium 99m is fully equivalent to that obtained from nuclear reactor, such as the Chalk River facility.

The team at the Molecular Imaging Center of Sherbrooke (CIMS), under the direction of Drs. Brigitte Guérin and Johan van Lier, has demonstrated that three of the technetium 99m radiopharmaceuticals most commonly used in nuclear medicine for diagnostic purposes yield exactly the same results, whether produced in a cyclotron or a nuclear reactor.

Dr. van Lier stated that "the next step is to optimize production to yield technetium 99m in quantities sufficient to meet the daily demand of local hospitals. Moreover, we intend to acquire a second high-energy cyclotron, which would enable us to secure the supply of medical isotopes and provide for a backup supply of technetium 99m for a large part of the province of Quebec." The CHUS currently uses an average of 10 000 millicuries of technetium per week.

The report of the expert review panel appointed by Natural Resources Canada recommended supporting research and development programs for the direct production of technetium 99m with cyclotrons. According to the experts, "the cyclotron option would be an important means by which to ensure security of supply over the long term because it would build in all of the elements needed for security -- capacity, redundancy, and diversity."

Dr. Guérin observed that "we have the expertise and knowledge to pursue research and development into cyclotron-based production of technetium 99m. A minimum investment, compared to the costs associated with nuclear reactors, would enable us to immediately play a major role in implementing this novel approach."

Repeated shutdowns of the aging nuclear reactors in Chalk River (Canada) and Petten (Netherlands) have caused the current worldwide shortage of technetium 99m. The fact that these two facilities produce 70% of the world's supply underscores the urgency of diversifying sources of medical isotopes. “A National Cyclotron Network would meet all of Canada’s medical isotopes needs, while ensuring supply-chain redundancy and flexibility” says Richard Eppich, CEO of Advanced Cyclotron Systems Inc.

As Dr. van Lier firmly stated, "the cyclotron is a proven, safe technology that offers many tangible advantages. Cyclotron production of radioisotopes does not require highly enriched weapons grade uranium—used in today's nuclear reactors—and does not generate nuclear waste. Indeed, it constitutes a solution that is sustainable and clearly more ecologically sound."

Our Expertise in Medical Imaging

The Sherbrooke Molecular Imaging Center (cims.med.usherbrooke.ca), integrated into the CRCELB, was inaugurated in 1998. The center houses a medical-imaging platform with cutting edge technology. Our TR-19 cyclotron produces medical isotopes for PET imaging on a daily basis. From the outset, the CIMS embarked on an ambitious research and development program investigating all aspects of PET imaging, from radioisotope production to using new radiopharmaceuticals for human clinical diagnostics, including radiochemical synthesis and preclinical animal model validation.

Since 2003, the CIMS has been supplying many hospitals in Quebec and Eastern Canada with radiotracers for PET imaging. In anticipation of a growing demand, the CHUS began planning back in 2005 to acquire a second cyclotron to secure the supply of medical isotopes. This second high-energy cyclotron could be brought on-stream in the short term and provide a backup supply of technetium 99m for a large part of the province of Quebec. In 2008, the CIMS of the CHUS was granted an Establishment Licence to produce radiopharmaceuticals for medical applications by Health Canada.

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Cyclotron: A cyclotron is a particle accelerator with a circular acceleration track. Cyclotrons play an essential role in producing medical isotopes and provide for producing a wide variety of isotopes, including those already used for positron emission tomography (PET). Many of these isotopes are already being used as alternatives to technetium 99m when shortages occur. This technology allows for adjusting production in response to market demand, either upwards or downwards, and, in all probability, at a lower real cost than with a nuclear reactor.

About the Centre de recherche clinique Étienne-Le Bel at the CHUS ::: www.crc.chus.qc.ca

The Centre de recherche clinique Étienne-Le Bel of the Centre hospitalier universitaire de Sherbrooke (CHUS) is at the forefront of current health issues. The center stands out for its integrated approach, bringing together fundamental, clinical, epidemiological, and evaluative research. More than 175 basic-science researchers and clinicians have been pooling their knowledge and expertise for more than 28 years targeting the shared objective of developing new knowledge to maintain health and prevent disease.

About the Centre hospitalier universitaire de Sherbrooke (CHUS) ::: www.chus.qc.ca

The Centre hospitalier universitaire de Sherbrooke has two constituent institutions: the CHUS – Fleurimont Hospital and the CHUS – Hôtel-Dieu. Its mission is fourfold: care, teaching, research, and assessment of health-care technologies and modes of intervention. The fourth largest hospital center in Quebec, the CHUS plays a triple role of local, regional, and provincial hospital. The CHUS stands out for its many cutting-edge specialties such as gamma-knife radiosurgery, positron emission tomography (PET), interventional angiography, and neuro-oncology. The CHUS hospital community comprises nearly 9000 individuals (employees, physicians, researchers, students, trainees, and volunteers) with a single objective: serving life.