



DEVELOPMENT OF A THORIUM/ACTINIUM GENERATOR AT CNL

FACT SHEET

OVERVIEW

For over 60 years, CNL has been a world leader in the production and supply of medical isotopes, contributing to over a billion medical procedures globally. CNL maintains diverse capabilities in areas of Health and Biodosimetry, including GLP animal studies, isotope production and processing, ISO-accredited Analytical Chemistry services and waste management solutions. CNL is an active participant in the Targeted Alpha Therapy (TAT) research area. TAT involves combining the destructive potential associated with alpha-emitting radionuclides with biological targeting vectors that deliver a cytotoxic payload to the diseased cells, limiting radiation exposure for healthy cell in vivo. ^{225}Ac is an alpha-emitting radionuclide having desirable physical decay characteristics. It has a 10 day half-life, leading to the rapid emission of 4 alpha particles and 2 beta particles, with no radon daughter isotopes. ^{225}Ac is produced following radioactive decay from a ^{229}Th generator, and can be periodically milked to yield an isotopically pure radionuclide suitable for TAT.

DETAILS

CNL has access to rare stockpiles of fuel and waste materials. Starting from a small stockpile of $^{233}\text{Uranium}$, CNL has constructed a thorium generator capable of producing up to 100 mCi of ^{225}Ac annually.

CNL has developed a process flow scheme and operating procedures for regular milking of the generator to produce high purity ^{225}Ac .

Using our ^{225}Ac , we have established in-house radiolabeling techniques for diverse biovectors ranging from small molecules → monoclonal antibodies.

Development of Quality Control assays for future implementation into a Quality Assurance program.

CAPABILITIES AND EXPERIENCE

- » Experience in production, compounding and Quality Control for clinical and preclinical radiopharmaceutical compounds.
- » Certified trained experts in cGMP and GLP for radiopharmaceuticals.
- » Wide ranging expertise in isolation, purification and characterization of bulk radioisotopes (α , β , SPECT and PET) used in the synthesis of radioactive compounds.
- » Expertise in extraction chromatography, ion exchange chromatography, solid phase extractions
- » Writing and validation of SOPs used in production and QC of radiopharmaceuticals.
- » Shipping of radioisotopes to collaborators and partners.

FACILITIES/RESOURCES

- » New Class C and Class B Radiological Laboratories capable of handling a wide range of isotopes and activity amounts, including α -emitters and other 'very high radiotoxicity' isotopes.
- » Multiple gloveboxes, shielded ISO Class 5 isolators available.
- » Access to heavily shielded hotcells.
- » Full complement of ISO-certified Analytical Chemistry services.
- » 20,000-mouse Biological Research Facility capable of handling a wide range of radionuclides.

COLLABORATORS

- » Collaboration with TRIUMF working on cyclotron commercial scale production of ^{225}Ac , along with associated research comparing accelerator-produced ^{225}Ac to generator produced ^{225}Ac
- » Collaboration with the University of Saskatchewan performing TAT studies with ^{225}Ac -labelled antibodies (Herceptin) for targeting Her-2 positive animal cancer models
- » Collaboration with Fedoruk Centre focusing on technology transfers for novel TAT agents and optimization of targeting vectors, including chelate development