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Can Accelerators Meet the Medical Isotopes Needs of the World?

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Over 80% of all Nuclear Medicine procedures make use of the radionuclide Tc-99 for SPECT imaging of heart disease, cancer and other disorders. Historically TC-99 has been produced from a generator through the decay of Mo-99 where the Mo-99 is a fission product of U-235. Five reactors around the world supply the market. However, these reactors are aging (many over 50 years old) and governments are reluctant to replace them. Therefore researchers have turned to accelerators as a potential source of this important radionuclide. In Canada the government has funded research project for two accelerator approaches: Mo-100(γ, n)Mo-99 and Mo-100($p, 2n$)Tc-99m where the photons are generated from the conversion of high powered electrons into Bremsstrahlung radiation and the protons generated in low energy cyclotrons (15-25 MeV). The goal of these project is to provide the Government with sufficient information so that an informed decision can be made with respect to future supplies of medical isotopes for Canada. International interest has been expressed by the IAEA as a way to allow Member States with existing cyclotron programs to take advantage of the direct production route. This talk will describe the challenges with the approaches and the progress to date.