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## OPENING LECTURE - The Road to Cyclotron Produced Tc-99m

*Wednesday, 19 September 2012 11:00 (20 minutes)*

Researchers at the University of Alberta have demonstrated that it is possible to produce and extract clinically significant quantities of  $^{99m}\text{Tc}$  via the  $^{100}\text{Mo}(p,2n)^{99m}\text{Tc}$  nuclear reaction. Cyclotron targets have been engineered which significantly enhance their power-handling capacity to allow for extended high current irradiation. In addition, a process has been developed which allows for the efficient dissolution of the cyclotron target substrate, separation of the  $^{99m}\text{Tc}$  and unreacted  $^{100}\text{Mo}$  and recovery of the expensive  $^{100}\text{Mo}$  for recycling. The quality of the extracted  $^{99m}\text{Tc}$  has been verified by appropriate quality control protocols and animal biodistribution studies were performed which culminated in the completion of the first human clinical trial comparing with cyclotron produced  $^{99m}\text{Tc}$  with reactor produced  $^{99}\text{Mo}/^{99m}\text{Tc}$ . Details will be presented on each of the steps in this process that highlight our solutions to the major problems that were overcome to produce a reliable alternative source for this key medical radionuclide.

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