

# Cyclotrons and Medical Isotopes

**Best Theratronics announces plans to address the medical isotope shortage by manufacturing a range of cyclotrons.**

**Ottawa, Ontario, Canada, March 1, 2012.** Best Theratronics Ltd [BTL] plans to address the worldwide medical isotope shortage by manufacturing a range of cyclotrons for the production of diagnostic and therapeutic medical isotopes. BTL will enter into partnerships with hospitals, clinics, medical and research institutions and distributors to supply isotopes as needed and at a reasonable cost.

Drawing on more than 50 years in medical equipment manufacturing, this innovative new product line offers a cost-effective alternative to both short- and long-lived medical isotopes.

A cyclotron uses a combination of magnets and radio frequency electric fields to accelerate ions to velocities high enough to create isotopes. BTL has a unique cost-effective technology to manufacture five types of cyclotrons: 14 MeV (B14), 25 MeV (B25), 25 MeV upgradable to 35 MeV (B25u), 35 MeV (B35) and 70MeV (B70). These cyclotrons will focus on isotopes used in Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT) and Therapy by virtue of their respective energies.

## CYCLOTRONS FOR SPECIFIC NEEDS

### Systems for Technetium-99m ( $Tc^{99m}$ ) Direct Production

**B14 for  $Tc^{99m}$  Radioisotopes** –  $Tc^{99m}$  is an important radiochemical that is used in more than 90% of radiodiagnostic procedures. TeamBest has developed a cyclotron based production system for the delivery of  $Tc^{99m}$ . The B14 can produce  $Tc^{99m}$  using a TeamBest target and processing system. The high intensity of the cyclotron (400 micro-amperes) allows production runs to supply large urban centers with an adequate supply of  $Tc^{99m}$ .

**B14 for PET Isotopes** – The B14 Cyclotron is designed for local and regional use to generate radioisotopes with short half lives. Its energy is selected to be optimum for PET radioisotopes such as Fluorine-18 (for FDG), Nitrogen-13 (for Ammonia), and Carbon-11 (for Raclopride and other neuroreceptor agents). The energy of the B14 allows the generation of other PET agents such as Copper-64 and Iodine-124.

**B25/B35 for SPECT and Generator Radioisotopes** – The B25 and B35 Cyclotrons are designed for the production of single photon emitting radioisotopes used in SPECT such as Iodine-123, and Thallium-201. The selection of the cyclotron within this energy region and beam intensity is dependent upon the user's needs. In particular, a user may start with a B25 configuration and upgrade the accelerator and facility to a B35 when the need arises. This provides a low startup cost and the option for future enhancements as the required throughput demand increases. The B35 is capable of creating generator systems for both PET radioisotopes, such as Gallium-68, and radio therapeutic isotopes, such as Cesium-131. The B35 is a high intensity cyclotron whose radioisotope production capability can meet the demand on a national and international scale.

**B70 for Generator and Therapy Radioisotopes** – The B70 Cyclotron is designed to produce generator radioisotopes for PET, such as Strontium-82, and large quantities of therapeutic isotopes, such as Copper-67. The combination of high energy and high intensity provides adequate quantities of medical radioisotopes that can only be produced at 70 MeV.

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## NEW RADIOISOTOPE PROCESSING SYSTEMS

**High Yield and Purity PET Production** – A full suite of PET targets and processing systems have been developed by TeamBest. Fluorine-18 targets for the TeamBest Systems are designed for maximum power use, with chemical passivation of surfaces to eliminate contamination arising from the harsh conditions during production. Carbon-11 targets are designed to eliminate any source of naturally occurring carbon that would degrade the diagnostic capability of the radioisotope. Nitrogen-13 targets are designed to deliver labeled Ammonia in a streamlined process, making the imaging compound more suitable for diagnostic cardiology procedures.

## DIRECT PRODUCTION OF Tc<sup>99m</sup> SYSTEMS

This unique processing system, available from TeamBest, can be used with Best Theratronics' B14 and B25 Cyclotrons or other suppliers' cyclotrons to produce enough Tc<sup>99m</sup> to adequately meet the clinical needs of large urban centers. The long term supply of Tc<sup>99m</sup> for nuclear medicine is no longer dependent on reactor supplied material. The TeamBest system can use the existing, yet small, cyclotron infrastructure or with new cyclotron sites, all for a much lower incremental cost compared to alternative systems and other isotope production technologies.

**About Best Theratronics Ltd** – Best Theratronics Ltd. has been manufacturing, marketing, selling and servicing cobalt-based cancer therapy systems for more than 50 years. It began as a division of Atomic Energy of Canada Limited. The company is located in Ottawa, Ontario, Canada, and its 160 employees cover expertise in manufacturing, engineering, design, radiation physics, dosimetry, worldwide logistics, sales, marketing and service. Find out more at [www.theratronics.com](http://www.theratronics.com).

**About Best Medical International** – Best Medical International has served the medical community with the highest quality products and unparalleled customer service for more than 35 years. Best Medical International, headquartered in Springfield, Virginia, USA, encompasses a family of medical companies known as TeamBest, with a proven track record of innovation, quality and service. Find out more at [www.teambest.com](http://www.teambest.com).

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