

TERRAPOWER ISOTOPES® PROGRAM: IMPROVING OPTIONS FOR CANCER DETECTION AND TREATMENT

Cancer remains one of the leading causes of death in the United States. Every year, nearly 2 million Americans are diagnosed with cancer; approximately 4,600 per day. However, outcomes for cancer patients have improved in recent decades with the detection and treatment options provided by nuclear science and technology. Today, TerraPower harnesses the spirit of innovation to accelerate better cancer detection and treatment options. New discoveries and technologies invigorate the potential to eliminate cancer as we know it.

Opportunities to revolutionize cancer prevention and treatment options have emerged with new approaches to the medical application of radioisotope technology. Materials stored by the U.S. Department of Energy (DOE) contain extremely rare and unique isotopes that may help treat cancer and other illnesses. Studies by TerraPower validate the potential of recovering important isotopes from the DOE-managed material while accelerating its disposition. TerraPower's commitment to do work that is challenging and important to humankind led to these studies. With positive results to date, TerraPower is very interested in advancing this potential medical capability.



IMPROVING TREATMENT OPTIONS

TerraPower's assessment shows that select materials may be effectively used in Targeted Alpha Therapy for cancer patients. Thorium-229 (^{229}Th), being the source of Actinium-225 (^{225}Ac), is the ingredient of particular interest. More than 100 types of monoclonal antibodies (mAb) have been approved, and a similar number are under development. They are the heat-seeking missiles of cancer treatment that target the proteins expressed by cancers. A specific mAb will find a specific type of cancer. Treatment can be improved by connecting these cancer-seekers to radionuclides that will destroy the targeted cancer cells with minimum damage to healthy cells.

Researchers believe that if alpha emitting isotopes were used to treat acute myeloid leukemia, colorectal, prostate and other cancers currently treated with mAb therapy, treatment would be more effective with less damage to healthy tissue.

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The TerraPower Isotopes (TPI™) program is investing in the cost of extraction of selected isotopes contained in DOE-managed material, whose life-saving qualities could otherwise have been irretrievably discarded. TerraPower's investment in the recovery of ²²⁹Th from the DOE-managed inventory will complement the other production methods under research at Oak Ridge National Laboratory and other DOE labs. Additionally, TerraPower's investment further reduces the time and costs of the cleanup of the associated DOE material.

TerraPower intends to provide material primarily to the R&D and pharmaceutical communities for drug development. If drug development is successful, then larger quantities will be needed. By recovering ²²⁹Th and engaging in near-term Targeted Alpha Therapy research, TerraPower can help the development of life-saving pharmaceuticals and helps create a market for radioisotopes produced using methods the DOE is currently researching.

SEEKING NEXT STEPS ON ISOTOPE RECOVERY

TerraPower has initiated a program to develop advanced radioisotope generators. These generators will increase efficiency and automation thereby enabling an even larger number of doses to be provided to medical researchers. In addition, TerraPower's new radiochemistry laboratory will support isotopic harvesting and distribution as well as other radioisotope development initiatives.

Medical research arrangements between the government and private companies represent a crucial step forward in the fight against cancer. New supplies of radioisotopes provide opportunities to create new markets and advance higher-impact technologies.



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