One in three people will be diagnosed with cancer in their lifetime. Fortunately, outcomes for cancer patients have improved, in part, due to nuclear science and technology. Today, TerraPower harnesses the spirit of innovation to accelerate better cancer treatment options, advancing technologies with the potential to eliminate cancer as we know it.

Opportunities to revolutionize cancer treatment have emerged with new approaches to the medical application of radioisotope technology. Uranium-233, a legacy nuclear material stored by the U.S. Department of Energy (DOE), contains extremely rare and unique isotopes that may help treat cancer and other illnesses.

**EXTRACTING RARE RADIONUCLIDES FOR POTENTIAL CANCER TREATMENT**

TerraPower’s assessment shows that Actinium-225, a rare radionuclide, may be effectively used in Targeted Alpha Therapy for cancer patients. This radionuclide can be attached to cancer-seeking monoclonal antibodies, small molecules or other vectors unique to disease. Once injected, these Actinium-225 labeled drug products destroy the targeted cancer cells with minimum damage to healthy cells.

The TerraPower Isotopes (TPI™) program is investing in the cost of extracting Thorium-229, the source of Actinium-225, from Uranium-233 managed by DOE. Along with realizing the potentially lifesaving benefits of this material, TerraPower’s investment further reduces the cleanup time and cost associated with the ultimate disposal of Uranium-233.

**IMPROVING TREATMENT OPTIONS**

More than 100 types of monoclonal antibodies and other small molecules and peptides have been identified as compatible with the treatment and many others are under development. These monoclonal antibodies, ligands and other small molecules are the heat-seeking missiles of cancer treatment that target the proteins expressed by the disease. This mimics or enhances the body’s normal immune response and can target specific cancers.
Researchers believe that if Actinium-225 was used to treat acute myeloid leukemia, colorectal, prostate and other cancers currently addressed through traditional forms of cancer treatment today, the remedies would be more effective with less damage to healthy tissue.

TerraPower intends to provide Actinium-225 primarily to the research and development and pharmaceutical communities for drug development. If drug development is successful, then larger quantities will be needed. By working with its partners to recover Thorium-229, harvest Actinium-225, and engage in near-term Targeted Alpha Therapy research, TerraPower will support the development of lifesaving pharmaceuticals.

SEEKING NEXT STEPS ON ISOTOPE RECOVERY

TerraPower’s experts developed advanced radioisotope generators that will increase efficiency and automation, thereby enabling an even larger number of doses to be provided to medical researchers. In addition, TerraPower’s 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.