COST-EFFECTIVE, MORE EFFICIENT BATTERIES FOR MEDICAL DEVICES

Nuclear Batteries that Operate for 400 Years for Ventricular Assist Devices

Atlas Energy Systems, LLC is developing a patent-pending energy conversion mechanism capable of converting ionizing radiation from radioisotopes into electricity to provide a cheaper, more efficient nuclear battery than is currently on the market. This new technology opens the door for new uses in medical devices that are power dependent, such as heart pumps. The small size and high energy density enables lightweight and easy to carry batteries. The years to decade-long continuous life cycle of this battery removes the need for recharging.

TESTED, SAFE TECHNOLOGY

The use of radioisotope batteries for medical devices has been proven safe and effective for years. The most well known radioisotope-powered medical device is a pacemaker. Strontium-90 based pacemakers have been implanted in the human body for the past 40 years. That specific isotope can provide small amounts of power constantly for more than 20 years. While solid-state batteries have become the trend in pacemakers recently, other medical devices that use more energy still depend on radioisotopes as the only long-lasting high-energy power source on the market.

Radioisotope batteries are applicable anywhere long life and constant power output is required. The most readily available example of this is in ventricular assist devices (VAD). These devices help the heart pump blood throughout the body at a constant rate. The pumps require about 4 to 7 watts of continuous power. This means that even the most advanced chemical batteries must be changed out every 6 to 8 hours. If the user does not have access to batteries or a backup power supply, death can ensue.

PATENT-PENDING TECHNOLOGY IMPROVES PATIENT QUALITY OF LIFE

Atlas Energy System’s battery technology removes this need for continuous battery replacements and provides increased freedom for the patient because they do not need to stay in close proximity to backup power sources. Atlas Energy Systems’ solution for VADs is to use long lived, high energy density Americium-241 as the energy source in its patent-pending radioisotope batteries. The isotope is the same on used in-home smoke detectors and is an abundant byproduct of operating nuclear reactors. It has a lifetime of more than 400 years so if 200 grams are
paired with Atlas Energy System's technology, it can provide the 7 watts of power needed for a VAD systems to operate for 400 years before needing recharging. If nuclear waste is not readily available, the Atlas technology can use man-made isotopes.

Atlas Energy System, LLC is teaming with Radium Inc. to use its ClearView technology to develop the encapsulation and shielding system to make the total battery system no larger or heavier than the current batteries carried by VAD users.

A SUITE OF MEDICAL APPLICATIONS

The Atlas technology is being developed at Argonne National Lab through the Chain Reaction Innovations program, which gives leading startup companies’ access to cutting-edge R&D technology and global scientific expertise. The development of the energy conversion mechanism will allow for flexibility of application and radioisotopes. Other, mission critical, commercial applications of uninterruptable nuclear power supplies could be backup power supplies for hospitals or data centers and continuous power for off-grid telecommunication towers. However, the initial target market of the technology is underwater, unmanned vehicles for military and ocean monitoring applications.