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ORNL's awake imaging device moves diagnostics field forward

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A technology being developed at Oak Ridge National Laboratory promises to provide clear images of the brains of children, the elderly and people with Parkinson's and other diseases without the use of uncomfortable or intrusive restraints.

Awake imaging provides motion compensation reconstruction, which removes blur caused by motion, allowing physicians to get a transparent picture of the functioning brain without anesthetics that can mask conditions and alter test results. The use of anesthetics, patient restraints or both is not ideal because they can trigger brain activities that may alter the normal brain functions being studied.

With this new capability, researchers hope to better understand brain development in babies, pre-teens and teen-agers. In addition, they believe the technology will provide unprecedented insight into conditions such as autism, drug addictions, alcoholism, traumatic brain injuries and Alzheimer's disease.

"With this work, we're hoping to establish a new paradigm in noninvasive diagnostic imaging," said Justin Baba, a biomedical engineer who heads the ORNL development team.

The study, which was performed in collaboration with Thomas Jefferson National Accelerator Laboratory and Johns Hopkins University, utilized an awake imaging scanner and awake, unanesthetized, unrestrained mice that had been injected with a radiotracer known as DaTSCAN, provided

by GE-Medical.

With awake imaging using DaTSCAN and other molecular probes, Baba and colleagues envision development of new, more effective therapies for a wide assortment of conditions and diseases while also contributing to pharmaceutical drug discovery, development and testing. The technology could also help with real-time stabilization and registration of targets during surgical intervention.

Baba noted that this technical accomplishment, detailed in a paper published in *The Journal of Nuclear Medicine*, has its origins in past Department of Energy-supported research on biomedical imaging. The paper is titled "Conscious, Unrestrained Molecular Imaging of Mice with AwakeSPECT." Jim Goddard of ORNL's Measurement Science and Systems Engineering Division is a co-author.

While a working prototype scanner is located at Johns Hopkins School of Medicine, ORNL is pursuing commercialization of the technology.

Provided by Oak Ridge National Laboratory

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