Researchers develop magnetic resonance compatible brain PET scanner with high performance

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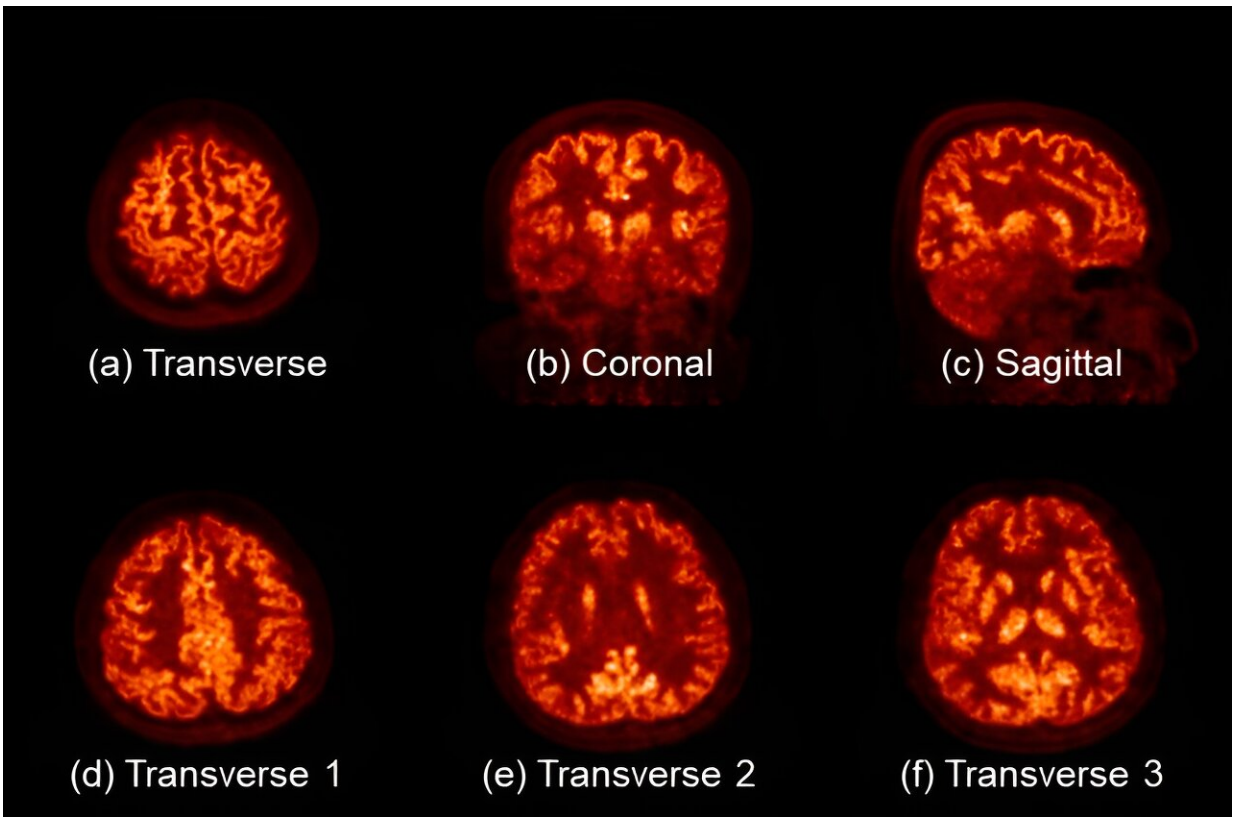

Images of a human brain injected with ^{18}F-FDG obtained with SIAT bPET. Credit: SIAT

Positron emission tomography/magnetic resonance imaging (PET/MRI)

represents a potent instrument for brain imaging. However, the current spatial resolution of PET scanners utilized for brain imaging leaves room for enhancement.

A team of researchers led by Profs. Zheng Hairong and Yang Yongfeng from the Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, have developed an MR-compatible brain PET scanner, referred to as the SIAT bPET. It uses dual-ended readout depth encoding detectors and achieves both uniform high spatial resolution and high sensitivity.

The study was published in the *European Journal of Nuclear Medicine and Molecular Imaging* on Oct. 2.

Results showed that the SIAT bPET boasted an average spatial resolution of 1.2 millimeters across the entire field of view. At the center of the field of view, it exhibited a sensitivity of 11.0% when employing an energy window spanning from 350 to 750 keV.

Notably, the operation of MRI sequences had an almost negligible impact on the performance of the PET scanner. The subsequent reduction in signal-to-noise ratio and homogeneity of MRI images, as the PET scanner was inserted into the MRI scanner and powered on, reached to less than 2%.

"SIAT bPET is the sole MR-compatible dedicated brain PET scanner developed in China so far, boasting spatial resolution and sensitivity significantly superior to all previously developed MR-compatible brain PET scanners," said Prof. Yang.

More information: Zhonghua Kuang et al, Development and performance of SIAT bPET: a high-resolution and high-sensitivity MR-compatible brain PET scanner using dual-ended readout detectors,

European Journal of Nuclear Medicine and Molecular Imaging (2023).
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