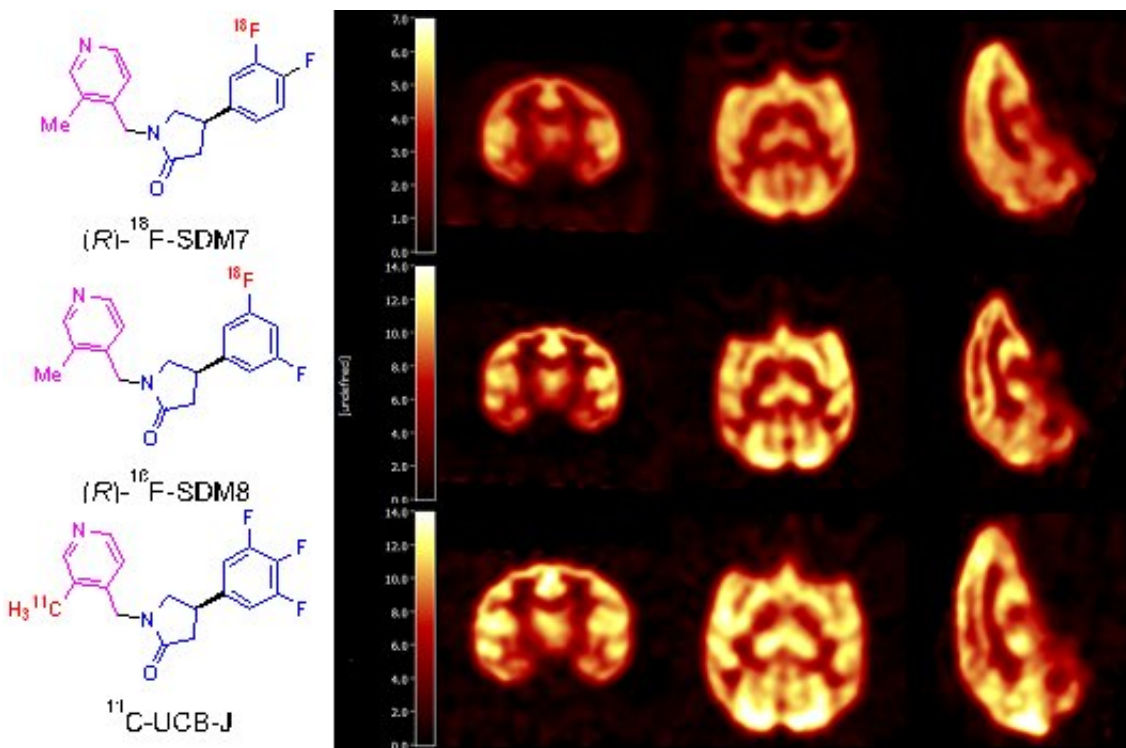# Novel nuclear medicine probe will help assess new drugs for neurodegenerative diseases

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The chemical structures and brain PET images of the novel ^{18}F-labeled SV2A PET tracers, ^{18}F-SDM-7, ^{18}F-SDM-8, and the lead tracer ^{11}C-UCB-J in nonhuman primates. Credit: Z Cai and S Li et al., Yale University, New Haven, Conn.

New nuclear medicine tracers could help medical researchers find a cure for Alzheimer's and other neurodegenerative diseases. The research was presented today at the SNMMI 2018 Annual Meeting, June 23-26 in

Philadelphia.

The development of therapies for <u>neurodegenerative diseases</u> has been hampered by the lack of a reliable and sensitive method to detect disease early and to effectively monitor the performance of experimental drugs. Synapse loss is one of the earliest and most robust biomarkers for Alzheimer's disease, and quantification of synaptic density in the central nervous system could be used to detect a variety of neurodegenerative diseases at their earliest stage, track <u>disease</u> progression and monitor the effect of therapy.

Positron emission tomography (PET) imaging can obtain crucial information about synaptic density that cannot be acquired through other approaches. Previous research identified a radiotracer (^{11}C-UCB-J) for the synaptic vesicle protein 2 (SV2A) that was successfully used to image synaptic density in vivo; however, its characteristics were not conducive to clinical use.

"We set out to develop ^{18}F-labeled SV2A tracers with imaging characteristics comparable to those of ^{11}C-UCB-J," said Zhengxin Cai, Ph.D., of the Department of Radiology and Biomedical Imaging at Yale University. Cai, together with Songye Li, Ph.D., and colleagues from the Yale PET Center, were able to successfully synthesize and evaluate a number of novel SV2A tracers with attractive imaging properties: high brain uptake, fast tissue kinetics, and high specific binding signals in the brain. "With a longer half-life," Cai said, "our new tracers are suitable for multicenter clinical trials, routine clinical use and potential commercialization."

As new generations of drugs are undergoing clinical trials for neurodegenerative diseases, the new radiotracers will be able to facilitate the development of therapies, providing a novel tool for identifying which patients may benefit from a particular treatment and then for

assessing its therapeutic effect.

"The successful development of our new SV2A PET tracers for synaptic density imaging and their use in the study of a variety of neurologic and psychiatric disorders will play a crucial role in CNS drug discovery and development," said Yiyun Henry Huang, professor of Radiology and Biomedical Imaging, Director of Chemistry at the Yale PET Center, and senior author of the research presented at the meeting.

More information: Abstract 69: "In vivo imaging evaluation of a novel ^{18}F-labeled SV2A PET tracer in nonhuman primates," Zhengxin Cai, Songye Li, Daniel Holden, Shu-fei Lin, Anupama Shirali, Paul Emery, Michael Kapinos, Jim Ropchan, Nabeel Nabulsi, Richard E. Carson and Yiyun Huang, Yale University, New Haven, CT; and Wenjie Zhang, West China Hospital, New Haven, CT. SNMMI 2018 Annual Meeting, June 23-26, 2018, Philadelphia. jnm.snmjournals.org/content/59 … 33-a2c3-ac4375122329

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