SNMMI Image of the Year: Novel PET imaging shows tau buildup link to neurodegeneration

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Amyloid Plaques

^{11}C-PiB PET

3.0

0.0

Tau Fibrillary Tangles

^{18}F-AV1451 PET

3.0

0.0

Neuronal Dysfunction

^{18}F-FDG PET

3.0

0.0
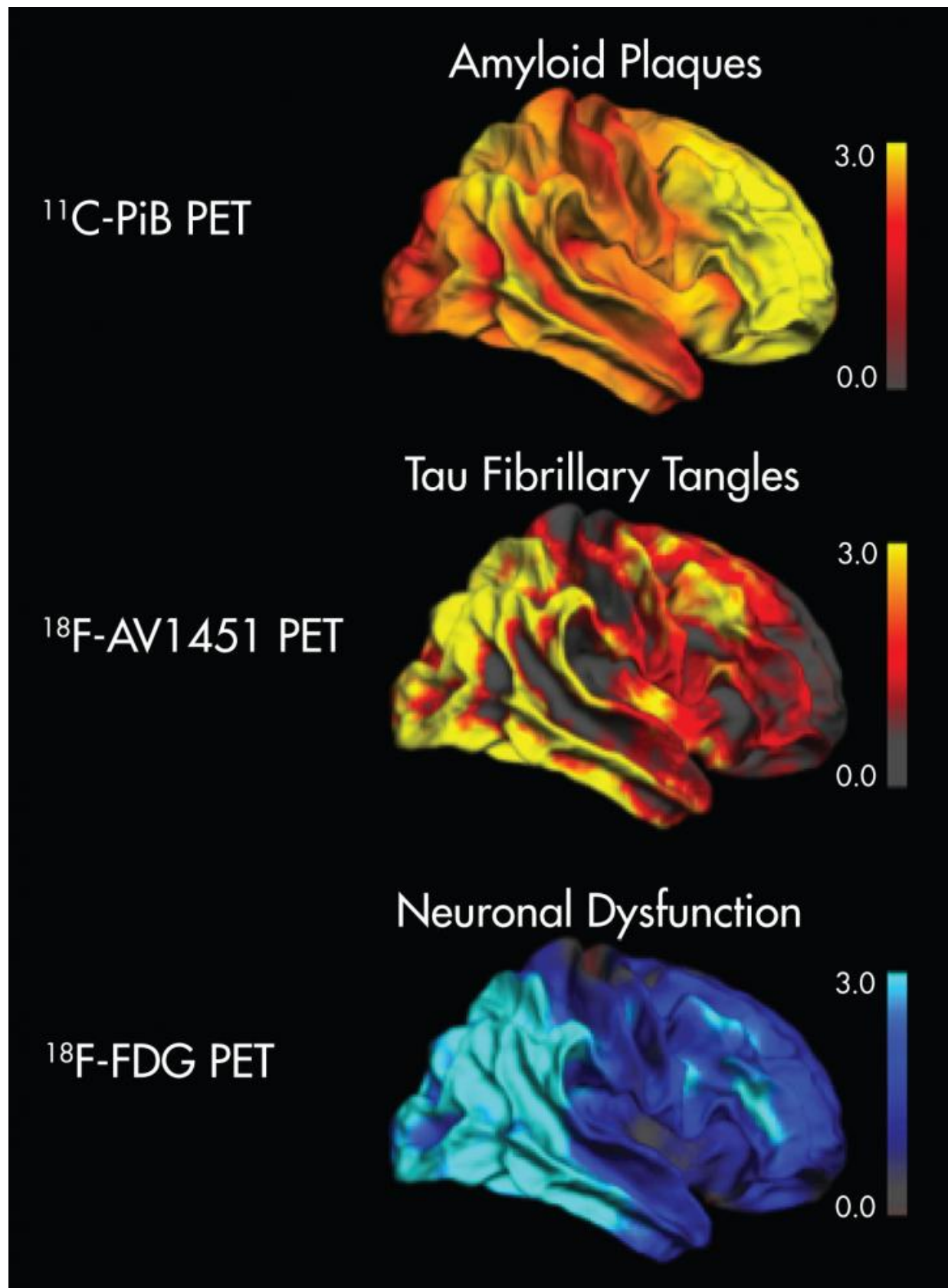
The right lateral surface of projected z-score images, reflecting deviation from healthy controls; Yellow/red: higher uptake, blue: lower uptake as compared to controls Credit: - Bischof, J. Hammes, T. van Eimeren, A. Drzezga, Multimodal Neuroimaging Group, Dept. of Nuclear Medicine, University of Cologne- Neumaier, Institute of Radiochemistry and Experimental Molecular Imaging, University of Cologne- Dronse, Ö. Onur, J. Kukolja, G. Fink, F. Jessen, Center for Memory Disorders, Depts. of Neurology & Psychiatry, University of Cologne- Fliessbach, Dept. of Neurology, University of Bonn

Positron emission tomography (PET) with three different radiotracers can now measure amyloid plaques, tau tangles and metabolic activity in the brains of living Alzheimer's patients. This multimodal study shows significant correlation between increased tau and decreased metabolic activity in the brain—a clear sign of neurodegeneration—reveal researchers at the 2016 Annual Meeting of the Society of Nuclear Medicine and Molecular Imaging (SNMMI).

Each year, SNMMI chooses an image that exemplifies the most promising advances in the field of nuclear medicine and molecular imaging. The state-of-the-art technologies captured in these images demonstrate the capacity to improve patient care by detecting disease, aiding diagnosis, improving clinical confidence and providing a means of selecting appropriate treatments. This year, the SNMMI Image of the Year was chosen from more than 2200 abstracts submitted to the meeting and voted on by reviewers and the society leadership.

The 2016 SNMMI Image of the Year goes to a German team of researchers from the University Hospital of Cologne; the Jülich Research Center; and the German Center for Neurodegenerative Diseases. Measuring tau deposits using the novel radiotracer F-18-AV-1451 (F-18-T807), in conjunction with C-11-PiB to measure

[amyloid plaques](#) and F-18-FDG to measure regional neurodegeneration, offers new insight into the neurodegenerative characteristics of Alzheimer's disease and shows that tau pathology may be an instrumental target for disease-modifying strategies.

"It is a big honor for us to receive this prestigious award. It represents a great reward for the entire team and will strongly motivate our group," said Alexander Drzezga, MD, of the Department of Nuclear Medicine at the University Hospital of Cologne in Cologne, Germany. "I am convinced that it will encourage particularly the young investigators involved in this project to continue with this type of research in the future. I would like to thank all the members of our team who contributed to this work. The study represents the result of an interdisciplinary effort, involving several clinical departments and scientists from different research centers. Also, I would like to thank all the subjects who participated in the study."

"We still do not understand fully how these abnormal amyloid and tau protein depositions affect brain functions and cause dementia," stated Satoshi Minoshima, MD, PhD, chair of the SNMMI Scientific Program Committee. "This Image of the Year study begins to address that fundamental question and leads to the next investigational study to determine the relative contributions of tau and amyloid pathology to neuronal dysfunction. In the United States, the Centers for Medicare and Medicaid Services are funding amyloid PET studies to demonstrate PET's potential clinical value. The Image of the Year study adds a new dimension to the role of PET in aiding the diagnosis and treatment of patients with dementia. It is a very exciting time for the field of [molecular imaging](#)."

More than 46 million people are currently living with Alzheimer's across the world, and that number is expected to rise steeply to 131.5 million by 2050. The global economic cost of the disease is expected to approach

$1 trillion in the same period, according to the newest data from Alzheimer's Disease International.

   More information: Scientific Paper 124: "Differential contributions of Amyloid and Tau burden to Neuro-degeneration in Alzheimer's Disease: A multimodal in vivo PET study." G. Bischof, J. Hammes, T. van Eimeren, and A. Drzezga, Multimodal Neuroimaging Group, Department of Nuclear Medicine, University Hospital of Cologne, Germany, and B. Neumaier, Institute of Radiochemistry and Experimental Molecular Imaging, University of Cologne, Germany. The study has been performed in close cooperation with the Departments of Neurology and Psychiatry, University of Cologne, Germany, the Research Center Jülich, Germany, and the German Center for Neurodegenerative Diseases. Presented at SNMMI's 63rd Annual Meeting, June 11–15, 2016, San Diego, Calif.

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