

# Tau imaging detects distinctive distribution of tau pathology in ALS/PDC on the Kii Peninsula

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## Study objective

To characterize tau pathology distribution in a form of amyotrophic lateral sclerosis/parkinsonism-dementia complex associated with Japan's Kii Peninsula (Kii ALS/PDC).

## Summary results

Patients with Kii ALS/PDC exhibit increased tau deposition in the hippocampus and in frontal and parietal white matter areas.

## What is known and what this paper adds

The brains of patients with Kii ALS/PDC contain tau fibrils and tau-positive astrocytes. This study provides a neuro-imaging-based characterization of the dissemination of tau pathologies in patients' brains.

## Participants and setting

This study recruited 5 men with Kii ALS/PDC and 1 asymptomatic man with a dense family history of Kii ALS/PDC (mean age, 76 ± 8 years). This study also recruited 13 healthy men as controls (HCs; mean age, 69 ± 6 years).

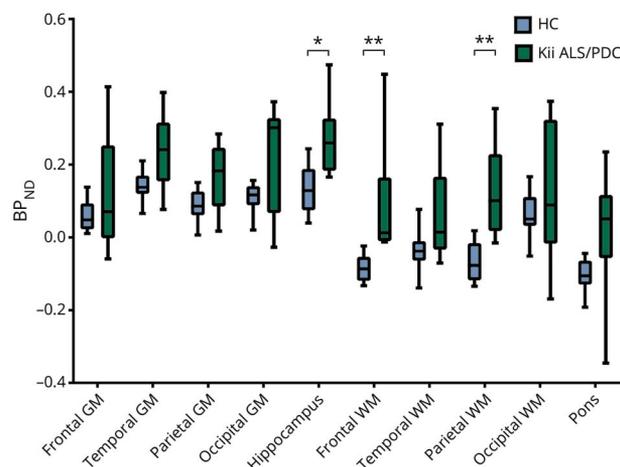
## Design, size, and duration

The participants underwent neuropsychological assessments, MRI scans, and PET scans with 2-((1E,3E)-4-(6-([<sup>11</sup>C]methylamino)pyridin-3-yl)buta-1,3-dienyl)benzo[d]thiazol-6-ol ([<sup>11</sup>C]PBB3) for tau imaging. This study used a multilinear reference tissue model for voxel-by-voxel binding potential ( $BP^*_{ND}$ ) calculations to generate parametric PET images. A group-wise volume-of-interest analysis of [<sup>11</sup>C]PBB3 PET data was used to identify areas in which the Kii ALS/PDC group and the HCs differed in terms of  $BP^*_{ND}$  values.

## Primary outcome measures

The primary outcomes were differences between the Kii ALS/PDC group and the HCs in terms of  $BP^*_{ND}$  values.

**Figure** Regional  $BP^*_{ND}$  values in the HC and Kii ALS/PDC groups



\* $p < 0.05$ , \*\* $p < 0.005$  by the Holm-Šidák multiple comparisons test. Abbreviations: GM, gray matter; WM, white matter.

## Main results and the role of chance

Compared to the HCs, the Kii ALS/PDC group had higher  $BP^*_{ND}$  values in the hippocampus and in frontal and parietal white matter areas.

## Bias, confounding, and other reasons for caution

This study had a small sample size.

## Generalizability to other populations

Kii ALS/PDC is not sex-specific, but this study's participants were all men. This may limit the generalizability of this study's results to women with Kii ALS/PDC.

## Study funding/potential competing interests

This study was funded by the Japanese government and various Japanese foundations. Some authors report holding a patent on compounds relevant to this study. Go to [Neurology.org/N](http://Neurology.org/N) for full disclosures.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The authors of the full-length article and the journal editors edited and approved the final version.

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