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**Thyroid hormone levels are associated with fronto-parietal cortical gray matter thickness in the elderly**

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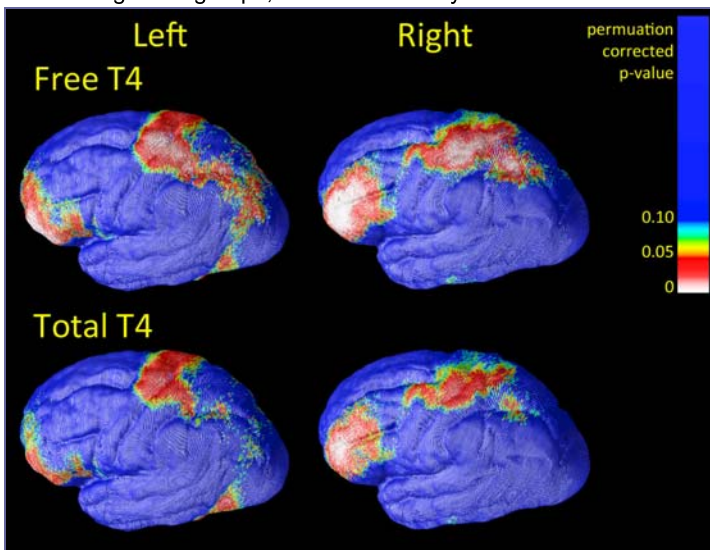
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*Abstract:*

Thyroid dysfunction is associated with higher risk for dementia and thyroid hormones influence amyloid precursor processing and plaque deposition, suggesting a role for thyroid hormones in Alzheimer's disease (AD). To investigate this, we examined cortical thickness and thyroid hormone levels in blood in an elderly sample.

14 elderly subjects received an MRI scan, neuropsychological testing, and blood draw at the UCLA Center on Aging (age = 71.9 yrs; 10 women/4 men; education = 15.9 yrs; 5 cognitively healthy, 4 mild cognitive impairment, 3 AD; free and total thyroxine (T4)). Additional subjects are being added to increase sample size.

After standard MRI preprocessing, cortical pattern matching aligned each subject's cortical anatomy using hand-traced sulcal landmarks. Gray matter (GM) thickness was calculated after rigid body registration and resampling to 0.33 mm isotropic voxels. GM thickness values were computed on a spatially normalized 3D cortical surface mesh model. Regression analysis was performed at each surface point for associations between thyroid hormone values and GM thickness; controlling for age, sex, education, and dementia. Permutation testing controlled for multiple comparisons. Thyroid hormone levels were compared across diagnostic groups using ANCOVA, covarying for age, sex, and education. Both free and total T4 were positively correlated with GM thickness in frontal and parietal regions. Thyroid hormone levels were not different across diagnostic groups, in ANCOVA analyses.



This is the first study to find associations between thyroid hormone levels and GM thickness in the elderly. Although a larger sample is needed for replication, free and total T4 were associated with frontoparietal GM thickness; regions implicated in age-related changes in attention and executive function. These regions become functionally disconnected in early AD, as GM is lost. Thyroid hormone levels may interact with these age-related brain changes and with accumulation of amyloid plaques in AD.

Future studies will incorporate amyloid PET imaging acquired in these subjects.

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