

# Study could lead to new way to detect brain changes associated with Alzheimer's risk

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David Vaillancourt, Ph.D., (left) is a senior author on a new study linking abnormal amyloid in the blood with brain changes on diffusion MRI. Credit: University of Florida

New research suggests there is a link between abnormal blood levels of amyloid—a protein associated with Alzheimer's disease—and subtle

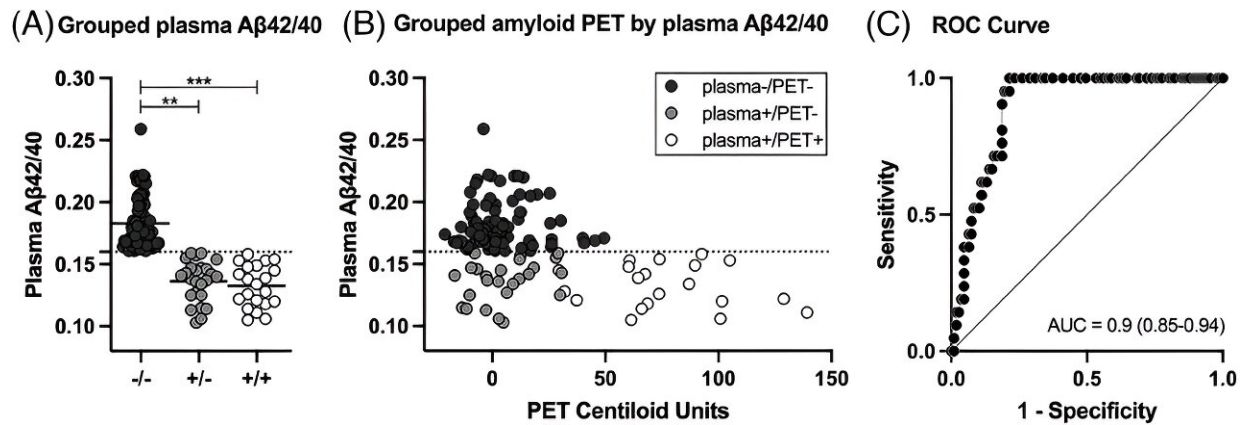
changes in brain microstructures on a type of MRI, findings that could lead to a new way to detect Alzheimer's earlier in people with no clinical signs.

Researchers analyzed the results of 128 [human participants](#) with and without dementia from the 1Florida Alzheimer's Disease Research Center who underwent imaging scans using an established diagnostic tool called [positron emission tomography](#), or PET, which can detect [amyloid plaques](#) in the brain, a hallmark of Alzheimer's disease.

Even when a PET scan was negative for amyloid and a participant free of [dementia](#) symptoms, researchers found there was an association in those who showed abnormal amyloid levels in the blood and structural abnormalities in the brain detected through a newer method called diffusion MRI, also known as "free-water" imaging.

A team led by investigators from UF's Evelyn F. and William L. McKnight Brain Institute and the Norman Fixel Institute for Neurological Diseases at UF Health reported that the results represent a novel finding that free-water imaging is sensitive to early stages of decline in brain tissue and tiny structures in key parts of the brain—even when a PET scan is negative. The results [were published](#) in *Alzheimer's & Dementia*.

"Previously people would say one of the earliest events you would see is amyloid positivity in the brain on a PET scan," said senior author David Vaillancourt, Ph.D., a professor and chair of the UF College of Health & Human Performance's department of applied physiology and kinesiology. "Our findings suggest there seem to be events occurring both in the blood and in the brain before you detect amyloid positivity in the brain."



Relationship between plasma amyloid- $\beta$  (A $\beta$ 42/40) and A $\beta$  positron emission tomography (PET). (A) Grouped strip plots representing individual plasma A $\beta$ 42/40 measurements and groups means (horizontal black lines) in plasma-/PET- (dark gray: -/-), plasma+/PET- (light gray: +/-), and plasma+/PET+ (white: +/+) groups. Statistical denotations for nonparametric independent samples permutation tests: \*\* pFDR

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