

## Molecular Imaging Approaches in Dementia

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Not only can molecular imaging using PET help show the pathologic hallmarks of Alzheimer disease and assess loss of dopaminergic terminals in parkinsonian disorders, but the development of novel tracers for neuroinflammation and synaptic density further allows for elucidation of the molecular pathologic characteristics of dementia disorders.

The increasing prevalence of dementia worldwide places a high demand on healthcare providers to perform a diagnostic work-up in relatively early stages of the disease, given that the pathologic process usually begins decades before symptoms are evident. Structural imaging is recommended to rule out other disorders and can only provide diagnosis in a late stage with limited specificity. Where PET imaging previously focused on the spatial pattern of hypometabolism, the past decade has seen the development of novel tracers to demonstrate characteristic protein abnormalities. Molecular imaging using PET/SPECT is able to show amyloid and tau deposition in Alzheimer disease and dopamine depletion in parkinsonian disorders starting decades before symptom onset. Novel tracers for neuroinflammation and synaptic density are being developed to further unravel the molecular pathologic characteristics of dementia disorders. In this article, the authors review the current status of established and emerging PET tracers in a diagnostic setting and also their value as prognostic markers in research studies and outcome measures for clinical trials in Alzheimer disease.

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