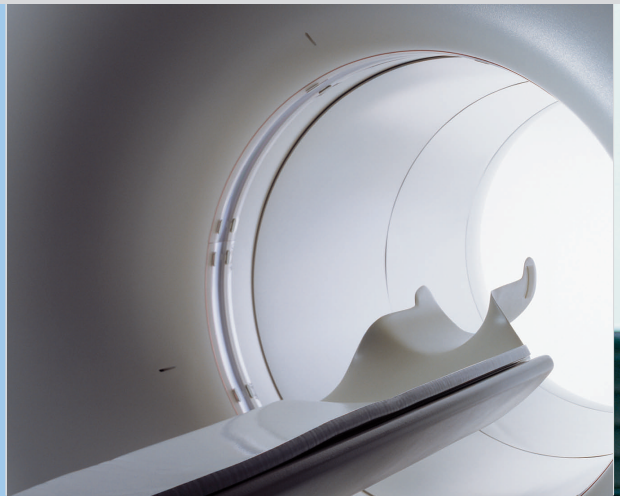

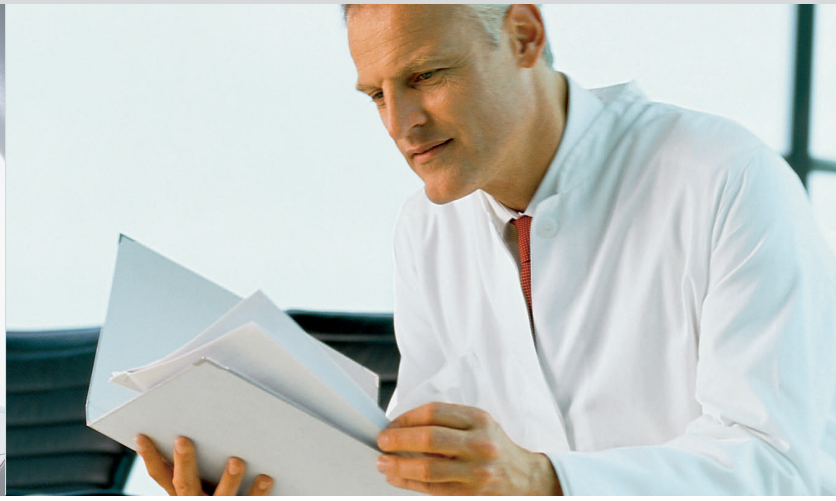

Positron Emission Tomography:
Earlier, more accurate detection of Alzheimer's disease

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Earlier, more accurate detection of Alzheimer's disease

PET Imaging with FDG:

- Detects Alzheimer's disease (AD) accurately at its earliest stages
- Differentiates between AD, normal aging, and neuropsychiatric conditions (i.e., depression)
- Differentiates between AD and other frontotemporal dementia (i.e., dementia with Lewy bodies, Parkinson's disease, and Huntington's disease)
- Determines the likelihood of future deterioration of mental status

PET offers improved diagnostic accuracy compared to conventional imaging.

Compared with SPECT imaging, FDG PET offers superior spatial resolution, image quality, and accuracy, paticularly at early stages of disease as well as more advanced stages.[1]

Anatomical imaging (i.e., MRI or CT) of the brain is often used to identify unsuspected, clinically significant lesions (i.e., strokes and tumors). However, in patients with AD, such scans are typically read as normal or misinterpreted as cerebrovascular disease.[2]

Early diagnostic accuracy leads to more effective disease management.

Superior sensitivity, specificity, and diagnostic accuracy of FDG PET provides the information needed to effectively evaluate dementia.

	Sensitivity	Specificity	Accuracy
PET	93%[3]	63%[3]	82%[3]

PET using FDG provides measures of glucose metabolism that allows clinicians to make an early diagnosis of Alzheimer's disease and other neurodegenerative disorders, predicting clinical progression and autopsy diagnosis with superior sensitvity and accuracy, especially in the earliest stages of dementia when clinical impressions are least certain.[2]

PET differentiates between dementia and other cognitive function diseases.

The specific pattern of glucose metbolism using FDG PET can distinguish between dementia and mild decline in memory, normal aging, and other neuropsychiatric conditions such as depression.[2]

PET shows a specific pattern of decreased glucose metabolism beginning in the parietal, temporal, and posterior cingulate regions and later spreading to prefrontal cortices as the disease progresses. The extent of hypometabolism correlates with severity of cognitive impairment, and because of different patterns of glucose metabolism PET assists the clinician with differential diagnosis of dementing illnesses.[2]

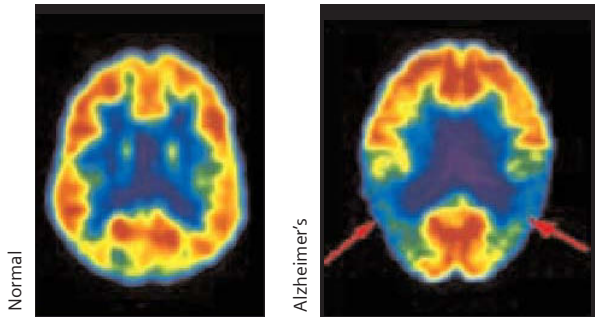
Early differential diagnosis of Alzheimer's disease is critical in making decisions regarding treatments and patient management.

Detecting alterable predisposing factors or identifying patients in preclinical or early-stage illness offers the greatest potential to modifying disease course.[4]

The need for early, accurate diagnosis has become more important now that several medications for the treatment of mild to moderate AD are available. Controlled clinical trials have demonstrated that cholinesterase inhibitors can improve, or delay decline in, memory and other cognitive functions in mild to moderately affected AD patients. Due to advances in potential preventative and disease-modifying treatments, early detection and diagnosis will play an increasing role in the management of dementing illness.[5]

Alzheimer's Disease

PET reveals Alzheimer's disease



Figures and captions provided courtesy of Daniel H. Silverman, M.D., Ph.D., Head, Neuronuclear Imaging Section, UCLA Medical Center David Geffen School of Medicine, University of California, Los Angeles

Normal
This FDG PET image represents an axial slice through the brain of a normal subject, at the level of inferior parietal/ superior temporal cortex. The color displayed in each part of the brain reflects the concentration of the radioactive glucose analog [F-18]fluorodeoxyglucose accumulating at that site, which in turn corresponds to how metabolically active the neurons in that region are. Red, orange, and yellow areas are (in decreasing order) the most active, while green, blue, and purple areas are progressively less active. Note that in neurologically healthy individuals, the entire cerebral cortex has a moderately high level of metabolism.

Alzheimer's Disease
This FDG-PET image shows the effects of Alzheimer's disease on the activity of the brain. Red, orange, and yellow colors correspond to the relatively high level of metabolism normally present throughout the cerebral cortex. Arrows indicate areas of low activity located in the patient's parietotemporal cortex, a region important for processing of language and associative memories.

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3. Hoffman J.M., Welsh-Bohmer K.A., Hanson M., Crain B., Hulette C., Earl N., Coleman R.E. "FDG PET Imaging in Patients with Pathologically Verified Dementia," *Journal of Nuclear Medicine*, Vol 41, No 11 (2000): 1920–1928.
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Note: FDG PET has not been determined by the FDA to be safe and effective in diagnosing Alzheimer's disease.

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