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Alzheimer's Disease Screening


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ALZHEIMER'S DISEASE SCREENING

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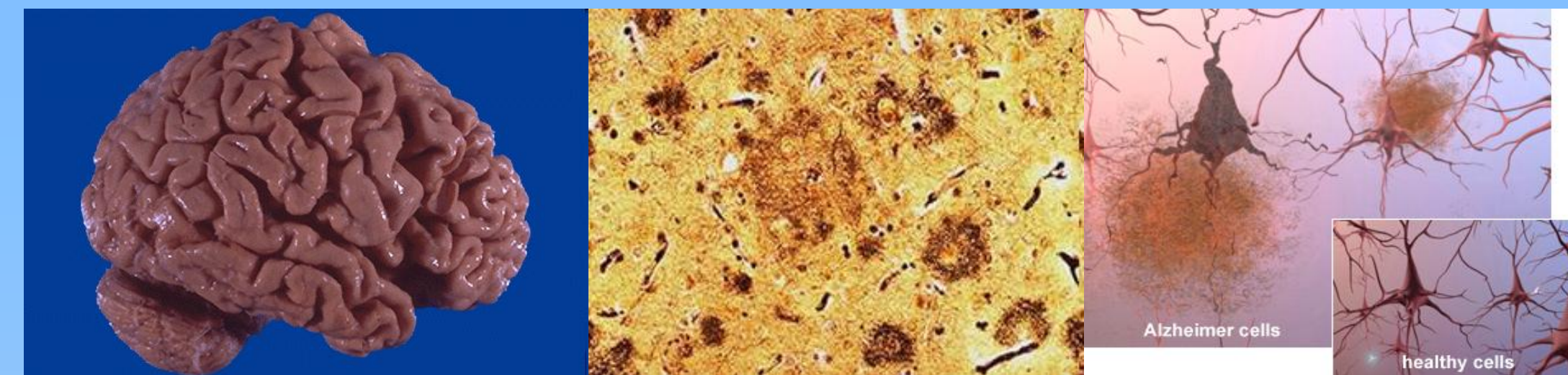
Project Goals

- Develop a plan for the screening of the general public for Alzheimer's Disease

Background

Cause:

- As the body ages, β -amyloid plaques and neurofibrillary tangles may build up in the brain
- These block communication between cells

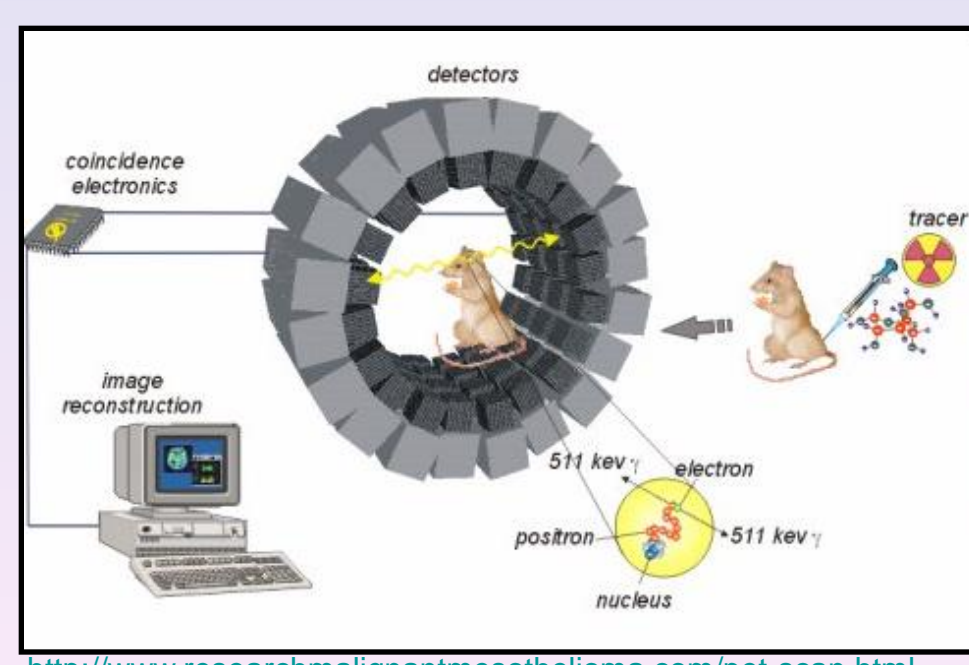


Diagnosis:

- Most widely used form of definitive diagnosis is an autopsy
- Patients can be diagnosed with "Alzheimer's Type" pathology based on symptoms such as memory loss and other cognitive tests
- A newly developed, accurate test for AD is a PET scan, administered with radioactive tracers
- Effective diagnosis of the disease can be achieved through an efficient, widespread system of screening

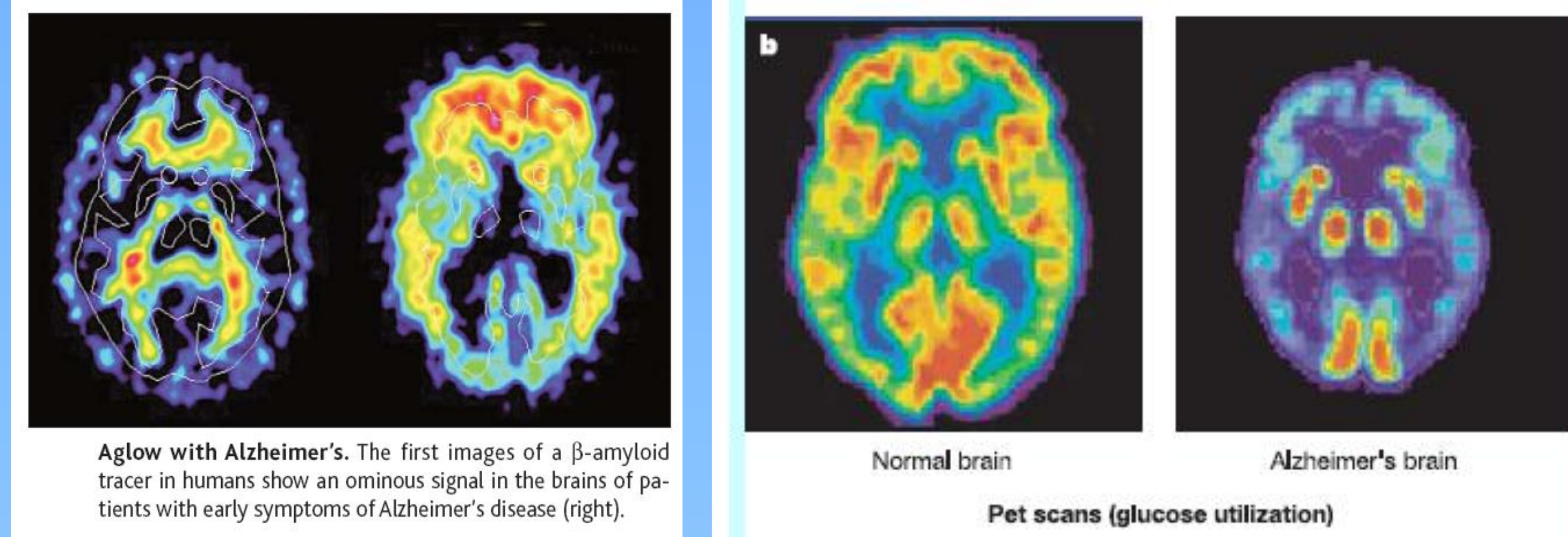
PET Scans

- Positron emission tomography shows how well cells are working based on the amount of sugar or oxygen the cell consumes
- A radioactive tracer can be given to the patient so that the PET scan will show the targeted cell



PET Scan Screening For Alzheimer's

- Used to measure the levels of β -amyloid plaques as well as neurofibrillary tangles
- A radioactive tracer, ^{18}F -FDDNP, binds to the plaques and tangles
- An administered PET scan shows where the tracer is greater in concentration



Helmuth L. (2002) *Science* 297: 752-753.

(2004) *Nature* 430: 631-639.

- FDG PET scans use the tracer ^{18}F FDG to show brain metabolic activity
- Administration of these two tests is enough to diagnose Alzheimer's Disease

"At Risk Patients"

- Patients already diagnosed with "Alzheimer's type" pathology
- Those with a family history of Alzheimer's over the age of 40

Funding and Cost

- The average cost of a basic PET scan is between \$3,000 and \$6,000
- Most insurance companies will cover the cost if it has been clinically indicated
- Changes in Medicare would result in the reimbursement of these costs to patients of a certain age

Ethics

- Does the treatment really improve their quality of life?
- Will the screening create more paranoia and harm?
- Will treatment create false hope?

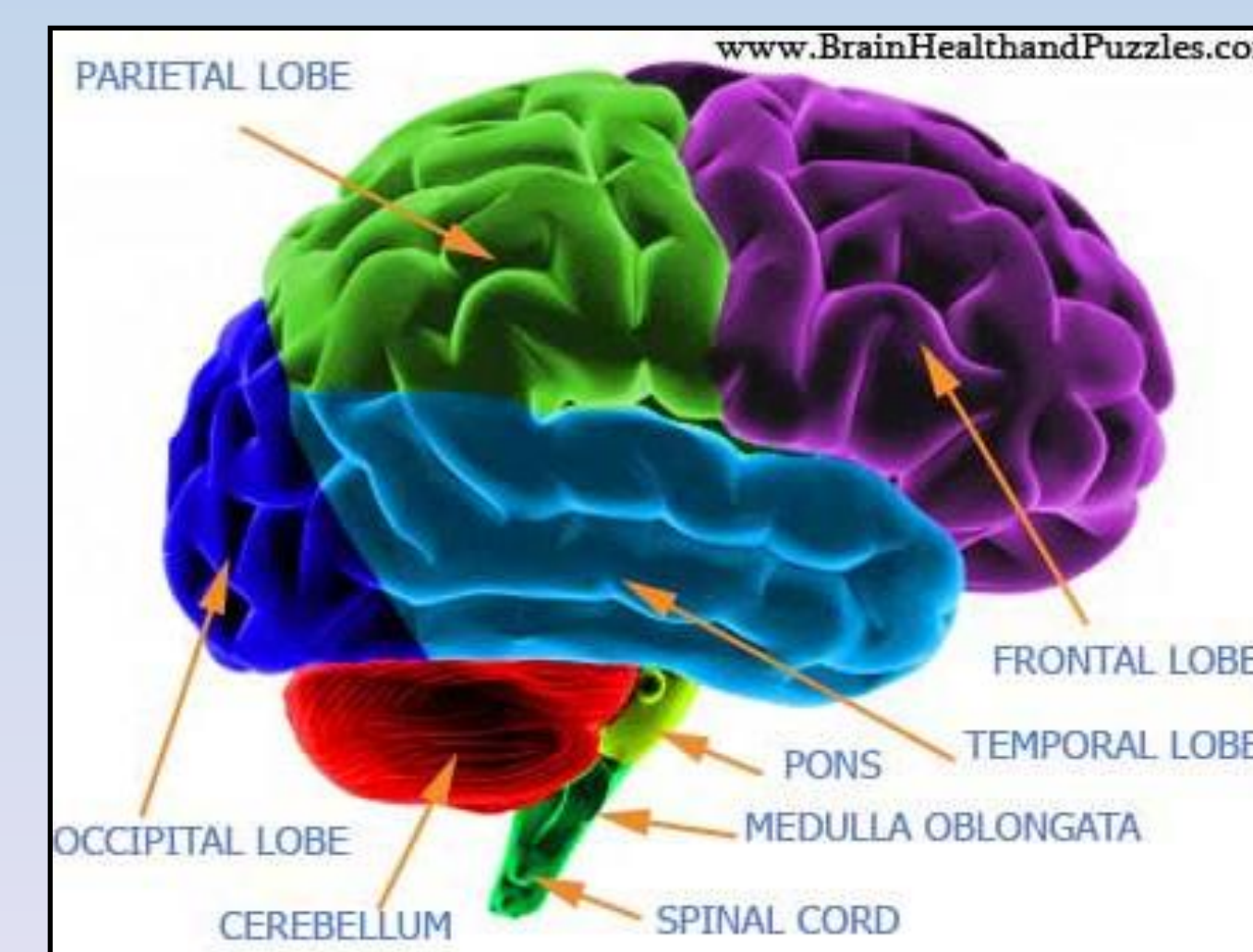


Diagnostic Screening System

- "At-risk" patients will be given a standard cognitive assessment called a Mental Status Examination (MSE) as a part of their yearly physical examination
- If the patient's score declines significantly over the course of one or more years, the physician must refer them to a hospital for plaque screening and a FDG PET scan
- If the results show that the patient has signs of AD, treatment will be carried out

Mental Status Examination (MSE)

- Evaluates:
 - Affect and mood
 - Attitude
 - Appearance
 - Behavior
 - Cognition
 - Insight judgment
 - Speech and language
 - Thought content
 - Thought processes



- The frontal lobe deals with thinking and planning
- Temporal lobe is responsible for memory and learning
- These are the two areas affected most by Alzheimer's

Percentage Changes in Selected Causes of Death, 2000 and 2006			
Cause	2000	2006	Percentage Change
Heart disease	710,760	629,191	-11.5
Breast cancer	41,200	40,970	-0.6
Prostate cancer	31,900	27,350	-14.3
Stroke	167,661	137,265	-18.1
Alzheimer's disease	49,558	72,914	+47.1

http://www.alz.org/national/documents/report_alzfactfigures2009.pdf

Conclusion

- An organized, widespread screening system for Alzheimer's Disease will result in the earlier treatment of patients and possibly a decrease in the mortality rate due to this degenerative condition.

Acknowledgements

DiPatri, Darren. "UCLA scientists use FDDNP-PET to detect and quantify Alzheimer's disease in living patients." *Medical News Today: Health News*. MediLexicon International Ltd, 22 June 2004. Web. 05 Dec. 2009. <<http://www.medicalnewstoday.com/articles/9768.php>>.

"PET Scan: Payment." *PET/CT Imaging of San Jose*. 2009. Web. 05 Dec. 2009. <http://www.pet-imaging.org/zportal/portals/pat/my_pet_scan/paying>.

"What is Alzheimer's." *Alzheimer's Association | Home*. Alzheimer's Association, 2009. Web. 05 Dec. 2009. <http://www.alz.org/alzheimers_disease_what_is_alzheimers.asp>.

Adams, David. Personal interview. 18 Nov. 2009.