THE GOAL OF THIS COURSE IS TO UNDERSTAND THE BIOLOGICAL CAUSES OF ALZHEIMER’S DISEASE, THE BEHAVIORS ASSOCIATED WITH THE DISEASE, AND POSSIBLE THERAPEUTIC APPROACHES.

SYLLABUS

JAN 22/24. Overview
History of AD.
AD is characterised by cognitive impairments and the presence of amyloid deposits, including plaques and tangles in the brain. Functional anatomy of the brain. There are different forms of memory which depend on different brain regions.
Julia vignettes in Decoding Darkness.
Lage

JAN 29/31. Correlates of brain pathology in AD and behavioural changes.
Assessment of behavioural changes.
Speaking our Minds. Aging with Grace, Chapter 9 pp 14-152.

How do you know what brain damage there is and where the amyloid is? Plaques are made of amyloid; there are different types of plaques and different forms of amyloid. Amyloid deposits are also found around blood vessels, cerebral amyloid angiopathy (CAA). Tangles are another marker for AD. Histological studies, Imaging studies. fMRI and PET.
Braak and Braak. Klunk et al.

FEB 12/14 The Forgetting. (Film)
Presentations of people with Alzheimer’s disease.

FEB 19/21. Where does amyloid come from?
Amyloid is produced from APP. There are 2 forms of AD, early-onset and late-onset. The search for the genes underlying AD.
Decoding Darkness.

FRIDAY FEB 22, LAST DAY TO DROP WITHOUT PENALTY OF "F"

FEB 26/28 Other factors involved in AD
Enzymes involved with APP and amyloid. A late-onset gene. The role of tau.
Decoding Darkness, Aging with Grace, Chapter 8, Selkoe
MAR 5/7 Animal models: Mice are useful. Soluble versus non-soluble amyloid. Transgenic mice have been used to model AD. They can be used to assess treatments and understand factors influencing the progress of the disease. Behavioral measures of memory loss; spatial memory, passive avoidance. LTP. Hsiao, Westaway and triple transgenic mice. Memory loss is seen before plaques appear. This may be due to soluble amyloid. Soluble amyloid precedes τ and causes cognitive impairments in Tg mice. There is synaptic damage. ADDLS, oligomers, etc. Billings et al.; Hardy & Selkow. Student presentation topics due.

MAR 11-17 SPRING BREAK

MAR 20/22 review, EXAM

MAR 27/29 Role of metals in AD. Possible role of the metals in AD. The plaques are high in iron, copper, zinc, and (?) aluminium. Zinc can cause memory loss in normal rats and mice, but this may be due to an induced copper deficit. Behavioral and histological data in normal and Tg rats and mice. Zinc, is prescribed for age-related macular degeneration. Cholesterol with copper may be a risk factor. Iron may be dangerous. Anti-cholesterol drugs. Drugs acting as Metal ionophores, Bush & Tanzi, 2008; Bush 2008 (Duce et al, 2010, James 2012. Sparks & Schreurs.

APR 2/4 Risk factors Lack of education, low SES, head injury (inflammation), stroke (smoking) are risk factors. Aging with Grace. Moceri et al. Student presentations begin.

APR 9/11 Preventative factors. Exercise and education are helpful. Diet can include foods that act as anti oxidants: blueberries, curcumin, pomegranates and folic acid. Adlard et al.

APR 16/18 Drugs AChE inhibitors; most AD drugs target target acetylcholine degradation. Memantine targets a glutamate receptors. Antibody treatment may be effective. Parsons et al..

APRIL 23/25 Student presentations.

APR30/MAY1 Summary, Student presentations.
PAPERS DUE MAY 7TH
FINAL EXAM DUE MAY 14TH (take home)

There will be a take home quiz most weeks on an assigned paper. The exams will be essay exams. Graduate student presentations should be ~ 20 mins (- points for going over!) Undergraduates should be 12- 15 minutes. Undergraduates may present as pairs.

GRADING
QUIZZES, 10%
IN CLASS PRESENTATIONS 10%
WRITE UP 10%
MID-TERM EXAM, 30%
FINAL EXAM 30%

OFFICE HOURS
T 3-4, Th 4:30-5:30
AND BY APPOINTMENT.

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Books
Aging With Grace, D. Snowden. Describes the School Sisters of Notre Dame study in which risk factors for Alzheimer’s disease are studied.

Speaking Our Minds, L. Snyder. Personal reflections from individuals with Alzheimer’s disease.


Required Papers


Parsons, C.G., Sto´ffler, A., Danysz, W. Memantine: a NMDA receptor antagonist that improves memory by restoration of homeostasis in the glutamatergic system - too little activation is bad, too much is even worse. Neuropharmacology 53 (2007) 699e723


Reference papers


Reference Books


Perry et al. Alzheimer’s Disease (2006). IOS (papers from the J. Alz. Dis. commemorating the 100 year “anniversary” of AD.

Thorndike J. The Last of His Mind. Swallow Press.

If you are a student with a disability and you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through that office.