

Syllabus
N237 Brain Aging, Winter 2019
Carl Cotman, PhD

- Jan. 8th** Introduction of Course and Goals. Survey of student's goals.
- Jan. 10th, 15th** What are the basic facts on brain aging and Alzheimer's disease
2018 Alzheimer's Disease Facts and Figures
- Jan. 15th** NIH and its Key Role in Sustaining the U.S. Economy / 2018 Update
- Jan. 17th** What are the Neuropathological Alterations In Alzheimer Disease
- "Neuropathological Alterations In Alzheimer Disease"
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3234452/>
 - "Clinicopathological Evaluation of Chronic Traumatic Encephalopathy in Players of American Football"
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5807097>
- Jan. 22nd** Principles of good experimental design
- "Strong Inference" by John R. Platt
<https://www.jstor.org/stable/1714268?seq=1#metadata>
 - "Fifty years of J.R. Platt's strong inference"
<http://jeb.biologists.org/content/jexbio/217/8/1202.full.pdf>
- Jan. 24th** Attend Research Seminar:
Albert La Spada, MD, PhD, FACMB – Duke University
"Convergent pathways in neurodegeneration: From polyglutamine disease targets to broad-based therapeutic opportunity". Hold class discussion.
- Jan. 29th** How do tangles develop and spread with disease progression?
- "Small misfolded Tau species are internalized via bulk endocytosis and anterogradely and retrogradely transported in neurons" <https://www.ncbi.nlm.nih.gov/pubmed/23188818>
 - "Prion-like propagation of protein aggregation and related therapeutic strategies"
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3701767/pdf/13311_2013_Article_196.pdf
 - "Widespread tau seeding activity at early Braak stages"
<https://link.springer.com/content/pdf/10.1007%2Fs00401-016-1644-z.pdf>
 - "Proteopathic tau seeding predicts taupathy in vivo"
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4205609/pdf/pnas.201411649.pdf>

Jan. 31st

Can Lifestyles can delay onset of AD?

- “Exercise and Brain Neurotrophins”
<https://www.nature.com/articles/373109a0.pdf>
- “Exercise training increases size of hippocampus and improves memory”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3041121/pdf/pnas.201015950.pdf>
- ‘MIND diet slows cognitive decline with aging’
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4581900/pdf/nihms693732.pdf>

Feb. 5th

Discussion:

- “Projected effect of risk factor reduction on ALZ disease prevalence”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3647614/pdf/nihms-353062.pdf>

Feb. 7th

What are the GWAS genetic risk factors and what is their impact?

Feb. 12, 14th

How does physical activity protect the aging brain

- “Running-induced systemic Cathepsin B secretion is associated with memory function”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6029441/pdf/nihms793180.pdf>
- “3-Hydroxybutyrate Regulates Energy Metabolism and Induces BDNF Expression in Cerebral Cortical Neurons”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5123937/pdf/nihms824349.pdf>
- ‘Exercise promotes the expression of brain derived neurotrophic factor (BDNF) through the action of the ketone body B-hydroxybutyrate’
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4915811/pdf/elife-15092.pdf>
- “Exercise-linked FNDC5/irisin rescues synaptic plasticity and memory defects in ALZ models”
<https://www.nature.com/articles/s41591-018-0275-4.pdf>

Feb. 14th

Discussions:

- “Multimodal interventions and the Finger Study”
<https://www.nature.com/articles/s41591-018-0275-4.pdf>

- “A 2 year multidomain intervention of diet, exercise, cognitive training, and vascular risk monitoring versus control to prevent cognitive decline in at risk elderly people (FINGER) a randomized controlled trial”
https://ac.els-cdn.com/S0140673615604615/1-s2.0-S0140673615604615-main.pdf?_tid=561c28b3-70f0-4845-8d57-a094217144e3&acdnat=1552439032_a5f75bfa9528875a34b1e4cb2404082d
- “Brain amyloid load and its associations with cognition and vascular risk factors in FINGER Study”
<https://n.neurology.org/content/90/3/e206.long>

Feb. 19th

What does physical activity do for brain health?

- “Physical activity, common brain pathologies, and cognition in community-dwelling older adults”
<https://n.neurology.org/content/92/8/e811>
- “Brain pathology is related to total daily physical activity in older adults” <https://n.neurology.org/content/90/21/e1911>
- “Total daily physical activity and the risk of AD and cognitive decline in older adults”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3335448/>

Feb. 21st

Continued discussion

- “Relationship between the gut microbiome and brain function”
<https://www.ncbi.nlm.nih.gov/pubmed/29701810>

Feb. 24th

What is the microbiome and how is it related to brain aging:

- "Ingestion of Lactobacillus strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve" <https://www.pnas.org/content/108/38/16050>
- "The neuroactive potential of the human gut microbiota in quality of life and depression"
<https://www.nature.com/articles/s41564-018-0337-x>
- "Effect of Probiotic Supplementation on Cognitive Function and Metabolic Status in Alzheimer’s Disease: A Randomized, Double-Blind and Controlled Trial"
<https://www.frontiersin.org/articles/10.3389/fnagi.2016.00256/full>

Feb. 26th, 28th

Class Discussions on HSV:

- “Alzheimer’s Disease-Associated B-Amyloid Is Rapidly Seeded Can Herpes virus Protect against Brain infection?”

<https://www.sciencedirect.com/science/article/pii/S0896627318305269?via%3Dihub>

- “Herpes Virus Implicated in Alzheimer’s Disease”
<https://www.the-scientist.com/news-opinion/herpes-viruses-implicated-in-alzheimer-s-disease-64246>

Mar. 5th

Can immunization protect the brain from Beta-amyloid?

- “Recent advancements toward therapeutic vaccines against AD’s disease”
<https://www.tandfonline.com/doi/full/10.1080/14760584.2018.1500905?scroll=top&needAccess=true>
- “Antibody Therapeutics targeting Amyloid-B and Tau”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5500436/pdf/nihms852837.pdf>
- “A fresh perspective from immunologists and vaccine researchers: Active vaccination strategies to prevent and reverse Alzheimer’s disease”
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4630107/pdf/nihms722588.pdf>

Mar. 7th

Invited lecturer: Dr. David Cribbs on Immunization progress

Mar. 12th

Discussion of Mini Presentations by students on their selected topic

Mar. 14th

Continued discussion with students on their papers

Mar. 19th

Class Presentations of paper topics

Mar. 21st

Class Finals

