

NROD67

Psychobiology of Aging
Tentative Syllabus 2013

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Lecture: Wed 3-5 pm in AA206

Office Hours: Tues 3 to 4 pm
Wed 2 to 3 pm

Fascinating psychological and biological questions cluster around the phenomenon of development and aging. Indeed, various lines of research are helping us to understand the aging process.

In this seminar course we will explore the neurobiological changes that occur during the process of aging and the relationship between these neurobiological changes and the cognitive changes that are experienced in the aged. We will examine both normal age-related changes and the cognitive changes that occur in age related disease states. Some of the questions we will discuss in this course include the following. Does every species age in the same way as the human? Is there a fundamental process of “aging” common to all organisms? How does the aging process deviate from the “normal” to cause aging-related disorders in long-lived species? Can one prevent and/or modify the aging process? What roles do nature and nurture play in this process? Can we learn something from various human lifestyles, diets, cultures, environments and even from other species in order to enhance healthy aging? Indeed, the quest to maintain a healthy, long life by mankind has been going on from time immemorial. Past and current research has focused on beginning to answer some of these questions. As we progress through this course we will observe that advances in aging research are contributed by worldwide researchers who cut across many disciplines.

Text: There is no text book for this course. Instead you will read various journal articles on topics related to aging.

Grading Scheme:

25% Leading In-Class Assigned Readings

16% Short Thought Papers

20% Class Participation

9% Proposal

30% Final Paper

Leading In-Class Assigned Reading Discussions

Each week a group of students will be responsible for presenting the articles to the class and to facilitate discussion of these articles. Each group should work together to come up with a good way to highlight the important issues discussed in the articles and to engage the rest of the class in a thoughtful and critical discussion of those issues. You will be graded on your ability to summarize/highlight the important issues in the articles, your presentation skills, your understanding of the readings, and your ability to lead and engage your peers in a group discussion. Your grade will be based on the group performance and your individual contributions. Each group should submit a near complete ppt of their presentation to me by Tues 5 pm.

Participation:

You are expected to read assigned papers before each class and attend regularly. You will be graded on your active participation in our discussions.

Short Reports:

Students will be required to submit a weekly thought question/idea/issue based on the assigned readings to our BB discussion board. This question/idea/issue must be posted no later than 9 am of the Tues morning prior to our Wed lecture. You are required to submit the answer to any 4 of your BB postings to me for grading. It is your choice which questions you choose to submit. Your response to your BB posting should be a maximum of 1 page and is due at the start of the lecture. Late papers will not be accepted.

The two main purposes of these assignments are to encourage you to 1) read the work in depth in advance of the class and (2) think about it. A good thought paper will demonstrate that you have read and thought about the readings in the course. The emphasis of the paper should be on some thought, idea, or criticism you have with respect to the material you read. You should identify some issue, and discuss that issue in light of the readings and/or the current research in the field. For example, you may choose to examine a problem with the assigned reading that could have been better addressed, try and extend the research based on current findings (what would be the next step), comment on how the paper integrates the findings with current developments in theories on the topic, or comment on the interpretation of the data analysis and statistical outcomes. Your goal is to clearly state your issue, and then express your thoughts on this issue.

During the lecture some thought questions/ideas may be chosen for class discussion.

Proposal and Literature Review:

Each student will write a review paper on a topic approved by me. Approval for the final paper topic must be completed by Feb 6. Please email your topic choice to me no later than this date. A proposal will be required on Feb 27, which should include a detailed outline of the topic you will be focussing on and include a near-complete list of

references. Each student will be required to meet with me individually on this date to discuss their progress. Your proposal will contribute 9% to your final grade.

The final paper will be no longer than 15 pages including the abstract, cover page, and reference pages. You are encouraged to be as concise as possible in this final paper while adequately covering the topic. APA format is required. Late papers will be accepted but docked 10% per day unless a medical note is provided. Please use only the medical form available from UTSC online. Final papers are due at the start of class on April 3, 2013. You are required to bring a paper copy to class and also submit a copy through Turnitin. Details on Turnitin follow and will be discussed at the first class.

Turnitin:

First, some background information on this program. Turnitin.com is a tool that assists in detecting textual similarities between compared works i.e.: it is an electronic resource that assists in the detection and deterrence of plagiarism.

Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

As indicated on the turnitin home page, all work submitted to Turnitin is checked against three databases of content:

- A current and archived copy of the publicly accessible Internet
- Millions of published works (from ABI/Inform, Periodical Abstracts, Business Dateline, ProQuest, the Gutenberg Collection of literary classics, and tens of thousands of electronic books)
- Millions of student papers submitted to Turnitin since 1996.

Students will submit all written reports to the turnitin.com site (www.turnitin.com). Detailed instructions on setting up your account can be found on this page. You must set up your own account and will need the following information: Course name, NROD67 2013 Class ID #, 5874588; Class Enrolment Password, oldage.

<http://www.turnitin.com>

Tentative Course Schedule

DATE	TOPIC	READINGS
Jan 9	Course Introduction	
Jan 16	Neurobiology of Healthy Aging	Geldmacher 2012

		Erickson 2003 Imhof 2007
Jan 23	Models of Aging	Alexander 2012 Roberson 2012 Roth 2004 Toescu 2005
Jan 30	Models continued	Kennard 2011 Schliebs 2006 Engle 2012 Bizon 2012
Feb 6	Nutrition and Aging Final Paper Topic must be approved no later than today.	Joseph 2009 Sinclair 2005 Stanner 2004 Piper 2008
Feb 13	Class cancelled Work on Paper Outline	
Feb 20	Reading Week- No classes	
Feb 27	Final Paper Outline Due Individual appointments scheduled	
Mar 6	Vascular Cognitive Impairments Cortical Changes	Jellinger 2005 Hinman 2007 Richards 2009 De la Torre 2004
Mar 13	Oxidative Stress/Chronic Stress	Martin 2006 Gems 2008 Lupien 2005
Mar 20	AD and MCI	Swerdlow 2007 Barberger-Gateau 2007 Albert 2006 Cotteli 2012 Ruby 2009
Mar 27	Exercise, Lifestyle and Aging	Coubard 2011 Hanna-Pladdy 2012 Buitenweg 2012 Muscarì 2010 Oomens 2009
April 3	Enrichment Final Paper Due	Siwak-Tapp 2008 Milgram 2005 Edwards 2009

Readings:

Albert MS & Blacker D. (2006). Mild cognitive impairment and dementia. *Annu Rev Clin Psychol* 2: 379-388.

Alexander GE, Ryan L, Bowers D, Foster TC, Bizon JL, Gelmacher DS & Glisky EL. Characterizing cognitive aging in humans with links to animal models (2012). *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2012.00021

Barberger-Gateau, et al. (2007). Dietary patterns and risk of dementia: the Three-City cohort study. *Neurology* 69: 1921-1930.

Bizon JL, Foster TC, Alexander, GE & GLisky EL (2012). Characterizing cognitive aging of working memory and executive function in animal models. doi: 10.3389/fnagi.2012.00019

Buitenweg J, Murre JM, Ridderinkhof KR (2012). Brain training in progress: a review of trainability in healthy seniors. *Frontiers in Human Aging*. doi: 10.3389/fnhum.2012.00183

Cotelli M, Manenti R, Zanetti O and Miniussi C. (2012). Non-pharmacological intervention for memory decline. *Frontiers in Human Neuroscience*. doi: 10.3389/fnhum.2012.00046

Coubard et al. (2011). Practice of contemporary dance improves cognitive flexibility in age. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2011.00013

De la Torre JC (2004). Is Alzheimer's disease a neurodegenerative or a vascular disorder? Data, dogma, and dialectics. *Lancet Neurol.* 3(3): 184-190.

Edwards, JD. (2009). Cognitive enhancement for older adults. *Frontiers in Neuroscience* 3(1) 108-109.

Engle JR & Barnes CA (2012). Characterizing cognitive aging of associative memory in animal models. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2012.00010

Erickson CA & Barnes CA (2003). The neurobiology of memory changes in normal aging. *Exp Gerontol* 38(1-2): 61-69.

Geldmacher DS, Levin BE & Wright CB (2012). Characterizing healthy samples for studies of human cognitive aging. *Frontiers in Neuroscience* doi: 10.3389/fnagi.2012.00023

Gems K & Partridge L (2008). Stress-response hormesis and aging: "that which does not kill us makes us stronger" *Cell Metab* 7:200-203.

- Hanna-Pladdy B & Gajewski B (2012). Recent and past musical activity predicts cognitive aging variability: direct comparison with general lifestyles. doi: 10.3389/fnhum.2012.00198
- Hinman JD & Abraham Cr (2007). What's behind the decline? The role of white matter in brain aging. *Neurochem Res* 32(12): 2023-2031.
- Imhof A. et al. (2007). Morphological substrates of cognitive decline in nonagenarians and centenarians: a new paradigm? *J Neuroscience*. 257(1-2): 72-79.
- Jellinger KA (2005). Understanding the pathology of vascular cognitive impairment. *J Neuroscience* 229-230: 57-63.
- Joseph, J et al. (2009). Nutrition, brain aging, and neurodegeneration. *J Neuroscience* 29(41): 12795-12801.
- Kennard & Woodruff-Pak (2011). Age sensitivity of behavioral tests and brain substrates of normal aging in mice *Frontiers in Aging Neuroscience*. Vol 3 Article 9 doi: 10.3389/fnagi.2011.00009
- Lupien et al. (2005). Stress hormones and human memory function across the lifespan. *Psychoneuroendocrinology* 30: 225-242.
- Martin I & Grotewiel MS (2006). Oxidative damage and age-related functional declines. *Mech Ageing Dev* 127(5): 411-423.
- Milgram, NW et al. (2005). Learning ability in aged beagle dogs is preserved by behavioral enrichment and dietary fortification: a two year longitudinal study. *Neurobiol Aging* 26: 77-90
- Muscari A, Giannoni C et al (2010). Chronic endurance exercise training prevents aging-related cognitive decline in healthy older adults: a randomized controlled trial *International Journal of Geriatric Psychiatry* 25 (10), pg. 1055-1064
- Oomens CA et al. (2009). Resveratrol preserves cerebrovascular density and cognitive functioning in aging mice. *Frontiers in aging*. doi: 10.3389/neuro.24.004.2009
- Piper MD & Bartke (2008). Diet and aging. *Cell Metab* 8: 99-104.
- Richards BA, et al. (2009). Patterns of cortical thinning in Alzheimer's disease and frontotemporal dementia. *Neurobiology of Aging* 30: 1626-1636.
- Roberson et al. (2012). Challenges and opportunities for characterizing cognitive aging across species. *Frontiers of Neuroscience Aging*. doi: 10.3389/fnagi.2012.00006

Roth GS et al. (2004). Aging in rhesus monkeys: relevance to human health interventions. *Science* 305: 1423-1426.

Ruby P, et al. (2009). Perspective taking to assess self-personality: What's modified in Alzheimer's disease? *Neurobiology of Aging* 30: 1639-1651.

Schliebs R & Arendt T (2006). The significance of the cholinergic system in the brain during aging and in Alzheimer's disease. *J Neural Transm.* 113(11): 1625-1644.

Sinclair DA (2005). Toward a unified theory of caloric restriction and longevity regulation. *Mech Ageing Dev* 126:987-1002.

Siwak-Tapp, CT et al. (2008). Region specific neuron loss in the aged canine hippocampus is reduced by enrichment. *Neurobiol Aging* 20:39-50.

Stanner, SA et al. (2004). A review of the epidemiological evidence for the 'antioxidant hypothesis'. *Public Health Nutr* 7: 407-450.

Swerdlow RH (2007). Is aging part of Alzheimer's disease, or is Alzheimer's disease part of aging?

Toescu EC. (2005). Normal brain ageing: models and mechanisms. *Philos Trans R Soc Lond B Biol Sci* 360(1464): 2347-2354.