

*NRO D67S PSYCHOBIOLOGY OF AGING AND SELECTED DISEASE STATES*

*SPRING, 2004 ROOM AC332, THURS. 4-6 P.M.*

*INSTRUCTOR: PROFESSOR GWEN O. IVY*

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*OFFICE HOURS: THURSDAY AFTER CLASS UNTIL .....?, OR BY APPOINTMENT*

*COURSE DESCRIPTION:*

Aging is a complex biological phenomenon which is, at present, a universal and inevitable fact of life. The goal of this course is to characterize the morphological, biochemical and physiological changes in aging neural tissue, as well as to delineate various behavioral and cognitive deficits that occur with age. We will explore the association between cognitive deterioration and age related neuropathologies. Further, we will define the relationship of numerous and diverse phenomena which occur during normal aging to those which occur in a number of related disease states, such as Alzheimer disease, Down syndrome, Parkinson disease, Neuronal Ceroid Lipofuscinosis and Progeria, with the aim of achieving a better understanding of factors which may cause aging at the cellular as well as the organismic level. Finally, we will evaluate the validity of several current unifying hypotheses of aging and will elucidate current and future prospects for research on the underlying mechanisms of aging using animal models.

*ORGANIZATION:*

The course will meet weekly for two hours and will consist of lectures by the instructor, as well as oral presentations by members of the class. Discussion will follow each presentation. Each person will select a topic from a list compiled by the instructor and will write a 20 page term paper (typed, double spaced, submitted in duplicate) and present a 15 to 20 minute talk to the class on that topic with a typed summary to be distributed to the class. Approximately 10 minutes of questions and discussion will follow. The student will be required to place one representative research or review article on his or her topic on reserve in the library (for the class) and to provide one copy of same for the instructor at least one week prior to the oral presentation. Note: Copies may be made for individual class members. There is no textbook. (Literally, NO comprehensive text on Aging, which includes up-to-date material on the variety of theories, experimental approaches, related disease states and numerous and diverse cellular and organismic phenomena that we cover in this course, exists !)

EVALUATION:

Term Paper (2 copies due April 2 <sup>th</sup> ):	25%
Oral Presentation, includes summary handout and article placed on reserve	15%
Midterm (essay, short answer): 2 hrs. February 7, 2004, 9-11am.	15%
Midterm (essay, take home portion)	10% Due in class March 4, 2004
Final Exam (essay, short answer): 3 hrs. During Final Exam Period	20%
Final Exam (essay, take home portion) Due at time of Final Exam	10%
Class Participation: (Includes questions, comments and presence in class)	5%

*SCHEDULE OF TOPICS TO BE COVERED*

<u>DATE</u>	<u>GENERAL TOPIC</u>	<u>SPECIFIC TOPIC</u>
Jan. 8	Introduction	Course overview/Selection of paper topics
Jan. 15	Morphological and some biochemical and physiological	A. Age pigments (Lipofuscin & other pigments: ceroids) B. Dolichols C. Gross brain changes D. Vascular System Changes E. Dendritic changes F. Synaptic changes
Jan. 22	changes in neural tissue with age, and in certain diseases with some similarities to aging: Lectures	G. Changes in glial cells H. Cell loss I. Amyloid and senile plaques J. NFT, PHF K. Progeria and NCL
Jan. 29	by G.O. Ivy	L. <i>The Protease Inhibitor Model of Aging</i>

Feb. 12 Class Discussion M. Aging in Canada:  
 Seniors hooked on Drugs (P. 52)  
 Eye Disease (P. 58)  
 Retirement (P. 62)  
 Incontinence (P. 68)  
 Healthy Longevity (P. 106)  
 Foods for Longevity (P. 116)

Feb. 16-20 *READING WEEK !!!! NO CLASS !!!*

Student Oral presentations:

- Feb. 26 Sensory motor and anatomical changes with age and disease
1. Sensory deficits, aging of sense organs
  2. AD & Down's syndrome: morphological changes in brain, descriptive
  - \*\*\* 5. Pathogenesis of Amyloid Plaques and NFT
  4. Risk factors and Safety factors in AD - etiology, familial vs. sporadic
- March 4 Changes in anatomy and neurotransmitter systems in aging, AD and PD; immune system
6. Dopaminergic Systems in Aging and PD; PD genesis
  7. Cholinergic systems in aging and AD
  8. Immune system changes in aging - how to prevent
- Mar. 11 Theories on mechanisms underlying the aging process
9. Free radical theory of aging (FRTA)
  10. Mitochondria and aging
  11. Genetic theories of aging: cell culture
- Mar. 18 Theories (cont'd.)
12. Changes in DNA: damage and repair
  13. Telomere shortening and telomerase intervention for life extension
  14. Caloric Restriction and its mechanisms for prolonging life
- Mar. 25 Other factors in Aging:
15. Dietary antioxidants and Longevity
  16. Adrenocortical axis in aging: stress and glucocorticoids
  17. Changes in Sex hormones with age

Apr. 1

Other factors of Aging (con'd)

18. Exercise and mitochondria in skeletal muscle (athletes)
19. Summary, Conclusions - Ivy and Class