PSY D67S PSYCHOBIOLOGY OF AGING AND SELECTED DISEASE STATES

SPRING, 2001 ROOM R4208 , THURS. 7-9 P.M.

INSTRUCTOR: PROFESSOR GWEN O. IVY

OFFICE: S-569, PHONE: 287-7438

EMAIL: ivy@scar.utoronto.ca

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 complied by the instructor and will write a 20 page term paper (typed, double spaced, submitted in duplicate) and present a 15 minute talk to the class on that topic with a typed summary to be distributed to the class. Approximate 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. 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 6th):	25%
Oral Presentation, includes summary handout and article placed on reserve	15%
Midterm (essay, short answer): 2 hrs. week of Feb. 26th, 5-7 p.m.	20%
Final Exam (essay, short answer): 3 hrs. During Exam Period	20%
Final Exam (essay, take home portion) Due at time of Final Exam	15%
Class Participation: (Includes questions, comments and presence in class)	5%

SCHEDULE OF TOPICS TO BE COVERED

DATE	***GENERAL TOPIC***	***SPECIFIC TOPIC***
Jan. 11	Introduction	Course overview/Selection of paper topics
Jan. 18	Morphological and some biochemical and physiological	A. Age pigments (Lipofuscin & other pigments: ceroids) B. Dolichols C. Dendritic changes D. Synaptic changes E. Amyloid and senile plaques
Jan. 25	changes in neural tissue with age, and in certain diseases with some	F. NFT, PHF G. Changes in glial cells H. Cytoskeletal changes I. Cell loss
Feb. 1	similarities to aging: Lectures	J. Gross brain changes K. Progeria, Werner's syndrome and NCL L. Vascular System Changes
Feb. 8	by G. Ivy	The Protease Inhibitor Model of Aging

Student Oral Presentations:

Feb. 15 — Sensory motor and cognitive changes with age and disease

1. Sensory deficits, aging of sense organs
2. AD & Down's syndrome. morphological changes in brain
3. Cognitive changes in normal aging animals and also (briefly) in Alzheimer's Disease
4. Risk factors and Safety factors in AD - etiology, familial vs. sporadic

Feb. 19 -23 — ***READING WEEK !!!! NO CLASS !!!***

Week of Feb. 26 — ***MIDTERM EXAM 5-7 P.M. (TBA)***

Mar.1 — Changes in anatomy and in neurotransmitter systems in aging, AD and PD

5. Pathogenesis of Amyloid Plagues
6. Blood Brain barrier in aging and AD
7. Dopaminergic systems in aging and PD
8. Cholinergic systems in aging and AD
9. Immune system changes in aging

Mar. 8 — Theories on mechanisms underlying the aging process

10. Free radical hypothesis of aging
11. Mitochondria and aging
12. Changes in DNA: damage, repair, telomere shortening
13. Modifications of proteins in aging: gycosylation , methylation, ubiquitination

Mar. 15 — Theories (cont'd.)

14. Genetic theories of aging; cell culture
15. Metabolic rate and aging - house flies, fruit flies, anti-oxidants
16. Exercise mitochondria in skeletal muscle
17. Caloric restriction and its mechanisms for prolonging life

Mar. 22 — Theories (cont'd.)

18. Telomere shortening and telomerase intervention for life extension
19. Drugs and other interventions in the aging process or antioxidants exercise; l-deprenyl , Vitamin E, melatonin
20. Dietary antioxidants and Longevity
21. Changes in protein turnover activities with age

Mar. 29	22.	Changes in enzymes (activities) with age
	23.	Animal Models: Nematodes (flat-worms)
	24.	Senescence Accelerated Mice (SAM)
	25.	Adrenocortical axis in aging (stress)
Apr. 5	26.	Summary, Conclusions - Ivy and Class