Course outline: NROD60 Cognitive Neuropharmacology
FALL: 2007

Course Details

Instructor: Norton W. Milgram
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Classroom and Scheduled Times:
Friday, 11:00 - 1:00, Room AA 205

Course Description

1. General Purpose

The overall goal of this course is to provide a critical overview of the drug development process as applied to the development of pharmaceuticals for enhancing cognitive function. The target population for the application of these drugs consists of (1) individuals showing impairment linked to age (age associated memory impairment); and (2) cognitive disorders associated with neuropathology, including Alzheimer's disease, Frontal- Temporal Dementia, and Parkinson's disease.

2. Topics Covered

The first part of the course focus on the process of developing interventions for treatment of behavioral disorders, with the specific goal being to develop pharmacological strategies for treatment of cognitive dysfunction. The second part will examine specific strategies currently under development and the underlying theoretical basis. Topics that will be covered in Part I include:

a. Use of drugs to modify behavior: lessons learned from the study of psychotherapeutic drugs.
b. The drug approval process
c. Components of cognition and the effect of dementia. Before considering drug design, we must have an identifiable target.
d. Animal models of human cognitive decline. What species and what types of tasks can be used to model human cognition? How do we model cognitive impairment.
e. Clinical evaluation of cognitive function. What kinds of tools are used to evaluate cognition in humans? How reliable are they? Do the different tests measure different functions?

These topics will be covered using a lecture-discussion format. Test 1 will follow the conclusion of this part of the course.

Part II will focus on current and emerging pharmaceutical treatments.

3. Grades:

Grades will be based on:

a. Performance on examinations - 45%
b. Class participation - 15%
c. Term paper - 40%

The term paper must deal with a specific type of intervention. The paper should summarize pertinent research on both human and animals and discuss potential mechanisms of action. If possible the research and developmental process should be linked to the material discussed in the course. The paper should also provide a comprehensive review of clinical trials, when appropropriate. Use main headers that include: Summary, Introduction, Discussion, and References. The use of further subheadings is also encouraged. The papers should follow the format of the Publication Manual of the American Psychological Association. The length excluding references must not exceed 15 double spaced pages.

Grading will be based on organization, clarity, scholarship (thoroughness of literature search) and originality.

The following are potential interventions that can be used in your term paper. The topic you select must be approved.

The following are potential interventions that can be used in your term paper.

a. anticholinesterases (including, but not limited to tacrine and aricept) - note that more than one student can take this topic
b. nicotinic agonists
c. phospohodiesterase inhibitors
d. ampakines
e. adrenergic agonists
f. antioxidants
g. gonadal hormones (estrogen and testosterone)
h. selegiline hydrochloride (l-deprenyl)
i. adrafinil and modafinil
j. secretase inhibitors
k. serontonergic receptor-specific agonists and antagonists
l. statins
m. stimulants (methylphenidate, amphetamines, caffeine)
n. nootropics
o. growth factors (NGF, BDNF)
p. neuropeptides (ACTH and vasopressin analogs)
q. vaccines and other beta amyloid modifying therapeutics
r. memantine
s. NSAIDS (Non-steroidal anti-inflammatories)
t. Exercise and/or cognitive stimulation

u. Phosphatidylserine
v. Omega 3 Fatty Acids (DHA and EPA)
w. Lipoic acid and acetyl l carnitine
x. Medium chain triglycerides (MCTs)

Readings

Brown, K. (2004). A radical proposal. Scientific American, 14, 30-35.
Boller, F and Duyckaerts, C. Alzheimer's disease: clinical and anatomic aspects. 521-543.

Butters, N and Delis, DC. (1995). Clinical assessment of memory disorders in amnesia and dementia. Annual Review of Psychology, 493-523.

Harvey, P.D., & Mohs, R.C. (2001). Memory changes with aging and dementia. In: Hof, PR and Mobbs, CV (Eds): Functional Neurobiology of Aging. Academic Press, San Diego, pp 53-63.

Larrabee, GJ and Crook, T (1988). Assessment of drug effects in age-related memory disorders: clinical, theoretical and psychometric considerations. Psychopharmacology Bulletin, 24, 515-522.

Leber, P. Guidelines for the clinical evaluation of antidementia drugs. Draft (1990).

Sarter, M.(2004). Animal cognition: defining the issues. Neuroscience and Biobehavioral Reviews, 28, 645-650.

Ringman, JM & Cummings, JL. (2006). Current and emerging pharmacological treatment options for dementia. Behavioral Neurology, 17, 5-16.

Sinclair, D & Guarente, L. (2006). Unlocking the secrets of longevity genes. Scientific America, 294, 48-57.

Tapp, PD., & Siwak, C.T. (2006). The canine model of human brain aging: cognition, behavior and neuropathology. In: Handbook of models for human aging. Academic Press, pp 415- 434.

Valenstein, E., (1998). Blaming the brain. The Free Press.
Wolf, M.S. (2006). Shutting down Alzheimer's. Scientific American, 294, 72-79.

Zivin, J.A. (2000). Understanding clinical trials. Scientific American, 282, 69-75

Tentative Schedule

Date	Topic	Assigned Reading
1 -Sept 14	Introduction - Course outline	
2 -Sept 21	Use of drugs to modify behavior I	Valenstein (1998)
3- Sept 28		Valenstein
4- Oct 5	Use of drugs to modify behavior I The drug approval process	Valenstein Zevin (2000)
5- Oct 12	Targets for Cognitive modifying drugs Cognitive Processes and Aging-	Leber (1990) Harvey and Mohs
6- Oct 19	Alzheimer's disease: Neuropathology and Clinical Assessment	Butters and Delis Boller and Duyckaerts
7- Oct 26	Midterm Exam	
8 -Nov 2	Animal models -	Sarter (2004) Tapp and Siwak (2006)
9 - Nov 9	Cholinesterase Inhibitors and nicotinic agonists	Ringman and Cummings (2006)
10 -Nov 16	Beta amyloid modifying drugs	Wolfe (2006)
11 -Nov 23	Nutritional and genetic strategies	Brown (2004) Sinclair and Guarente (2006)
12 –Nov	Final Exam (Comprehensive)	Term Paper Due Date