Neurobiology of Disease

Feb 28-May 30, 2003
Fridays 1:30-4:30pm, Room A2015, USUHS

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All lectures are to be given by Dr. Verma

Textbooks/resources:

a. Neurology and Neurosurgery Illustrated .
b. Basic Neurochemistry , Seigal et al.
c. Scientific American Medicine (SAM)

A. Clinical approach to neurological disease

Feb. 28 **1. Clinical reasoning**

a. Overview of course philosophy, structure, and student requirements.
b. Clinical reasoning vs. scientific reasoning. Clinical definitions.
c. Clinical categorization of neurological disorders: cause vs. effect.
d. Review of clinically relevant neuroanatomy.

Mar. 7 **2. Clinical evaluation**

a. Clinical evaluation of the nervous system.
b. The neurological exam

Mar. 12 **3. Clinical evaluation (continued)**

a. The neurological exam (continued).
b. Tools for exploring clinical neurobiology

Mar. 21 **B. Mechanistic approach to neurological disease**

a. Cellular structure and dysfunction
b. Cell death: necrosis, apoptosis, senescence.
c. Repair and regeneration
d. Introduction to cell constituents of the nervous system.

Mar. 28 **Spring Break (EXAM #1).**

Apr. 4 **C. Cellular and sub-cellular approach to neurological disease**

1. Neuronal cells

a. Neuronal diversity and selective vulnerability (Polio, ALS, Huntington's disease, Parkinsonism)
b. Axonopathies: channelopathies, tauopathies, synucleinopathies.
c. Synaptic junctions and neurotransmission.

Apr. 11 **2. Synaptic transmission**

a. Neurotransmission review: Ach, 5-HT, Catecholamines, GABA/glycine, glutamate.

b. Neuropeptides and neurotrophic factors.
c. Novel neurotransmitters: lipid-amides, NO, CO, H_2S
d. Intracellular signaling cascades.

Apr. 18 **3. Synaptic disorders**
a. Myasthenia gravis, neuromuscular toxins
b. Botulism, tetanus, Stiff person syndrome
c. Excitotoxicity and synaptic energetics.

Apr. 25 **Synaptic disorders (continued)**

May 2 **4. Non-neuronal cells**
4.1 Myelinating cells
a. Oligodendrocytes
b. Schwann cells
c. Myelin biology and dismyelinating diseases
d. Demyelination (multiple sclerosis, Guillan-Barre syndrome, leprosy)
e. Blood brain barrier
4.2 Astrocytes
f. Role in brain energy metabolism
a. Support of neurotransmission
b. Role in neuroprotection
d. Astrocyte-specific disorders (hyperammonemia, astrocytosis)
4.3 Microglia
a. origins
b. Role in brain disorders
4.4 Ependymal cells, meninges Endothelium.
a. Functions
b. Dysfunctions
c. Hydrocephalus
d. Intracranial pressure dynamics

(EXAM #2)

C. Neurobiology of specific neurological disorders

May 9 **1. Neurovascular disease (stroke); Nervous system trauma**

May 16 **2. Parkinsonism, Schizophrenia**

May 23 **3. Cortical Dementia (Alzheimer's disease)**

May 30 **4. Epilepsy; Pain disorders.**

(EXAM #3)