

BISC 423

From Epilepsy to Ecstasy: Biological Basis of Neurological Disorders

General Information: Spring 2020  
T-Th; 12:30pm – 1:50pm  
RRI 101

Instructor: Michael W. Quick, Ph.D.  
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DML 234  
1-7023  
Office Hours: Absolutely anytime-- just contact me

Credit: This is a 4-unit course that includes lectures, clinical correlations, and case-based learning situations led by both the instructor and students.

Purpose: The recent explosion of research in the field of neuroscience has produced an increasingly thorough understanding, at multiple levels of description from the molecular to the behavioral, of many of the major disorders of the nervous system. These disorders span the range of neurobiological inquiry from development (e.g. intellectual disability, spina bifida, cerebral palsy) to signaling (e.g., myasthenia gravis, epilepsy, multiple sclerosis), to anatomical systems (e.g., Parkinson's disease, pain, amblyopia), to combinations of fields (e.g., schizophrenia, Alzheimer's disease, amyotrophic lateral sclerosis, addiction). Thus, these disorders will serve as entry points for students to learn the basic principles of nervous system function from the molecular, cellular and systems level.

Pre-Requisites: Either BISC 421 or permission of instructor.

Approach and Course Structure: I attach a rough draft of a syllabus that outlines the course. Briefly, I divide the course into seven modules: development, signaling, circulation, anatomy, sensory systems, motor systems, and higher brain function. Each section has a similar format. The first part of the block will be devoted to reviewing the major concepts in that topic area, concepts that were covered in-depth in BISC 421 or other classes. Within each block will also be one or two clinical correlations illustrating an important

disease state. The remaining hours in the block (3 - 4) are disorders that are presented in case-based question-and-answer learning situations.

Grading: There are five components to the final grade:

- 20% is your class participation, loosely defined
- 20% is your participation in a student-led presentation
- 20% is your contribution to a class project
- 20% is a final project which involves developing a case and its resolution
- 20% is one mid-term examination

Students with Disabilities: Students requesting academic accommodations based on a disability are required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP when adequate documentation is filed. Please be sure the letter is delivered to the instructor as early in the semester as possible. Disability Services and Programs is located in Student Union 301 and their phone number is (213) 740-0776.

Text: There is no mandatory text. Handouts will be provided. Access to general neuroscience textbooks will be useful. For example:

- Fundamental Neuroscience. Zigmond et al., eds.
- Neurobiology. Matthews, ed.
- Neuroscience. Purves et al., eds.
- Principles of Neural Science. Kandel et al, eds.

## Syllabus

### Module I: Introduction

Week: 1

Days: 1/14, 1/16

Lecture:

Overview of Course

Lecture:

Clinical Examination

### Module II: Disorders of Development

Week: 2, 3

Days: 1/21, 1/23, 1/28

Lecture:

Development

Clinical Correlation:

Cerebral Palsy

Two Clinical Cases

### Module III: Disorders of Cytology and Signaling

Week: 3, 4

Days: 1/30, 2/4, 2/6

Lecture:

Cytology and Transmitters, HPA axis and HPG axis

Clinical Correlation:

Myasthenia Gravis

Two Clinical Cases

### Module IV: Disorders of Cranium, CSF, and Blood Supply

Week: 5

Days: 2/11, 2/13

Lecture: Cranium, CSF, and Blood Supply

Clinical Correlation: Stroke

Module V: Disorders of Anatomy

Week: 6, 7, 8

Days: 2/18, 2/20, 2/25, 2/27, 3/3, 3/5

Lecture: Gross Anatomy; Anatomy of Spinal Cord and Brainstem; Cranial Nerves

Five Clinical Cases

Module VI: Disorders of Sensory Systems

Week: 9

Days: 3/10, 3/12

Lecture: Sensory Systems

Clinical Correlation: Headache

Spring Break: 3/16 – 3/20

Module VII: Disorders of Motor Systems

Week: 10, 11, 12

Days: 3/24, 3/31, 4/7

Lecture: Motor Systems  
Clinical Correlation: Parkinson's Disease  
One Case

Module VIII: Disorders of Higher Function

Week: 13, 14, 15  
Days: 4/14, 4/21, 4/28, 4/30

Lecture: Higher Order Function; End of Class  
Clinical Correlation: Epilepsy  
Two Cases

Student Group-Led Cases:

4/2: Case 1  
4/9: Case 2  
4/16: Case 3  
4/23: Case 4  
4/30: Case 5

Finals Week:

*Case Write-up Due*