

General Information

The Neurobiology of Disease course is an integrated course with the following goals:

1. To provide a foundation in the Underlying Mechanisms of neurological and psychiatric disease. The course has a theme-oriented approach to fundamental molecular, cellular and organismal mechanisms rather than a disease-specific approach. This will engage students who are interested in basic aspects of brain function. This will also help students become "ready observers" of disease-related topics in their own research.
2. To provide a Toolbox of topical methods and issues in the neurobiology of disease. These toolbox sessions will also probe the links between basic mechanisms and behavioral manifestations of disease.
3. To provide a sampling of neuropsychiatric disorders that serve as training examples for the themes addressed in goal one. These examples are based on OHSU faculty expertise and will change with each course presentation so that the course will remain vibrant and relevant to students, as well as other trainees and faculty.
4. To provide hands-on exposure to Clinical Situations through live patient presentations, multimedia presentations, and visits to clinics, hospital wards, and other clinical settings. These clinical demonstrations will stress hands-on interactive experience so that graduate students experience first-hand the impact of neurological and psychiatric disease on brain function, and on the social fabric of the patient's life, their families and their community.

Course Outline

The course will cover 10 Themes (the pilot year, 2006, will address 4) underlying basic mechanisms of neurological and psychiatric disease. Each theme will occupy 1 week (3 contact hours) in the course and will be organized and taught by teams from the participating faculty of basic and clinical investigators. Reading materials for each theme will be prescribed for students. Examples of illness will be chosen to illustrate the principles contributing to each theme, using both common and rare conditions.

Week One: Cell Death

The focus this week will be on Parkinson's disease. The first session will examine some of the mechanisms of death of dopamine neurons. In the ToolBox, an overview of current approaches to gene therapy will be presented. In the Clinical Demonstration, we will interview and examine a patient with Parkinson's disease, followed by the movie *Awakenings* based on Oliver Sacks' experiences with the postencephalitic form of Parkinsonism.

April 10 - Mechanisms of cell death in Parkinson's disease

April 12 - Gene Therapy (ToolBox)

April 14 - Parkinson's Disease (Clinical Demonstration)

Week Two: Adaptive Neuroplasticity and Addiction

The linkage between the normal reward pathways and addictive behavior have been intensively studied. We will examine some of the basic components of adaptive and maladaptive plasticity involving the mesolimbic dopamine system. The ToolBox this week will provide a hands-on exposure to MRI and fMRI. Readings include the application of imaging to drug addiction (also see Links for an NIH Webcast on imaging in the addicted brain). The Clinical Demonstration, we will interview a patient with drug addiction, followed by the movie *28 Days* concerning alcoholism and alcohol rehab.

April 17 - Adaptive plasticity, basic aspects of addiction

April 19 - MRI & fMRI (ToolBox) *(location to be announced)*

April 21 - Addiction (Clinical Demonstration)

Week Three: Neural Repair and Replacement Strategies

The sessions this week will focus on neural regeneration and repair with an example of successful neural replacement therapy for the Wednesday ToolBox (cochlear implants). The Clinical Demonstration will include an interview with a patient with multiple sclerosis (MS), a disease that demonstrates many issues related to repair and regeneration.

April 24 - Regeneration and repair Gary Westbrook, M.D.

April 26 - Cochlear Implants (ToolBox)

April 27 - 1:00 p.m. lunch with visiting scientist, Ben Barres, Ph.D.

April 28 - Multiple Sclerosis (Clinical Demonstration)

Week Four: Single Gene and Polygenic Diseases

The genetic basis of neurological disease includes both diseases with simple Mendelian genetics as well as others with contributions from many genes. We will discuss one from each category this week, Huntington's disease and schizophrenia. Instead of the ToolBox this week, we will use a debate format to argue two issues relevant to disease-related research in neuroscience.

May 1 - Huntington's Disease

May 3 - Student Presentations

May 5 - Schizophrenia (Clinical Demonstration)