

## **NGG 6180 - Nervous System Injury & Repair (Spring 2024)**

**Instructors:** *D. Kacy Cullen, PhD*, Associate Professor of Neurosurgery & Bioengineering  
*Victoria E. Johnson, MBChB, PhD*, Assistant Professor of Neurosurgery

**Course Objective:** NGG 6180 provides a broad view of the neurotrauma field and addresses emerging trends in treatment and repair strategies. The main focus is on traumatic brain injury (TBI), including incidence, injury mechanisms, sequelae, neuroinflammation, and links to chronic neurodegenerative diseases, as well as current clinical management in context with emerging therapeutics. To a lesser extent, the course also covers spinal cord injury (SCI) and peripheral nerve injury (PNI), and addresses advanced regenerative therapies for TBI, SCI, and PNI including gene therapies, cell transplants, and tissue engineered medical products.

**Schedule:** In-person lectures in **Barchi Library (140 John Morgan Building) on Mondays & Wednesdays, 10:15–11:45 EST**. You are required to have instructor approval to miss a class.

**Course Structure:** The format of the class is lectures on Mondays (given by the lead instructors, Dr. Cullen and Dr. Johnson, or another faculty subject matter expert) and in-class discussions of seminal and/or current literature on Wednesdays.

**Material:** Reading material (e.g., journal articles or textbook chapters) and slides will be provided.

**Grading:** Grades are based on in-class presentations (40%; anticipate 2 per semester) and class participation (60%). There are no exams or homework assignments.

### **Lecture Topics and Presenters:**

Week 1 (Jan 22 & 24)	Overview of Neurotrauma – <b>Victoria Johnson &amp; D. Kacy Cullen</b>
Week 2 (Jan 29 & 31)	TBI Biomechanics – <b>D. Kacy Cullen</b>
Week 3 (Feb 5 & 7)	Diffuse Axonal Injury & Neurodegenerative Sequelae – <b>Victoria Johnson</b>
Week 4 (Feb 12 & 14)	Brain Injury Excitatory-Inhibitory (E-I) Imbalance – <b>Akiva Cohen</b>
Week 5 (Feb 19 & 21)	Epidemiology of TBI – <b>Andrea Schneider</b>
Week 6 (Feb 26 & 28)	Spinal Cord Injury – <b>Ali Ozturk</b>
Week 7 (Mar 4 & 6)	Neurogenesis After Brain Injury – <b>Erin Purvis</b>
Week 8 (Mar 11 & 13)	Peripheral Nerve Injury – <b>Suradip Das</b>
Week 9 (Mar 18 & 20)	Deep Brain Stimulation – <b>Isaac Chen</b>
Week 10 (Mar 25 & 27)	Oxidative Stress/Free Radical Biology – <b>Harry Ischiropolous</b>
Week 11 (Apr 1 & 3)	Clinical Management and Outcomes After Severe TBI – <b>Dmitriy Petrov</b>
Week 12 (Apr 8 & 10)	TBI-Induced Sleep Disturbances – <b>Danielle Sandsmark</b>
Week 13 (Apr 15 & 17)	TBI Treatment Strategies – <b>Akiva Cohen</b>
Week 14 (Apr 22 & 24)	Inflammation & Blood Brain Barrier (BBB) – <b>Kelly Jordan-Sciotto</b>
Week 15 (April 29 & May 1)	Gene Therapy & Cell Reprogramming – <b>D. Kacy Cullen</b>
Week 16 (May 6 & 8)	Cell & Tissue Therapies – <b>D. Kacy Cullen</b>