

THE CEREBELLUM: IS IT JUST FOR MOTOR CONTROL? AS.080.370(01)

FALL 2021

The cerebellum is traditionally thought to be involved in movement and motor control, and observations of patients with cerebellar damage do in fact show motor deficits. However, since the proliferation of functional MRI, cerebellar activations have been observed in a surprising number of brain activation studies that were designed to investigate the neural correlates of cognitive function, and cognitive deficits have been observed in cerebellar patients. Over the past 3 decades, an increasing number of investigators have tried to characterize the role of the cerebellum in cognitive function. Through lectures and reading discussions this course will survey cerebellar circuitry, neuroimaging and neuromodulatory methods for investigating the cerebellum, and traditional and non-traditional functions of the cerebellum, including cerebellar involvement in cognitive functions such as language, working memory, and executive control.

- Time: Tuesdays and Thursdays 10:30-11:45 am
- Location: Maryland 104
- Instructor: Dr. John Desmond (jdesmon2@jhmi.edu)
- Office hours: By Appointment, Reed Hall Room 106 (1620 McElderry St, East Baltimore campus, right next to outpatient center), or via Zoom
- Grading: Participation – 22%
3 Tests – 78% (26% each, non-cumulative)
- Participation: We will discuss 6 research papers related to lecture topics. All students are expected to participate in the discussions (voluntarily or as called upon by the instructor). Participation in the paper discussion classes will count 12% toward your grade. Students will also give a conference style slide presentation of a paper (approx. 5-10 minutes with questions, 10%). Attendance at lectures is also expected.
- Exams: There will be three exams (non-cumulative), with the last one occurring during the final exam period. These may consist of multiple choice, short answer, and long answer questions, and will cover both lecture material and the discussion papers. If a test cannot be taken on the regular day due to illness, family emergency, or extra-curricular activities, arrangements should be made to take the test in advance whenever possible. Students should inform instructors about such extra-curricular activities as early in the semester as possible.
- Goals: At the completion of this course students will have a better understanding of (1) cerebellar anatomy and connectivity; (2) symptoms of cerebellar damage; (3) cognitive neuroscience methods for studying the human cerebellum; and (4) the involvement of the cerebellum in non-motor functions, including higher-order cognition. Students will also gain experience presenting scientific data in a Society for Neuroscience style oral presentation format.

Schedule:

<u>Day</u>	<u>Date</u>	<u>Lecture Title</u>
Tue	31-Aug	Introduction, overview, cerebellar anatomy
Thur	2-Sep	Anatomy cont., motor symptoms, theories of motor function
Tue	7-Sep	Paper discussion
Thur	9-Sep	Methods for studying the human cerebellum: TMS
Tue	14-Sep	Methods for studying the human cerebellum: tDCS
Thur	16-Sep	Review for exam 1
Tue	21-Sep	Exam 1
Thur	23-Sep	Guest Lecture: Dr. Adrian Haith
Tue	28-Sep	Methods for studying the human cerebellum: fMRI
Thur	30-Sep	Paper discussion
Tue	5-Oct	Sensory Acquisition
Thur	7-Oct	Paper discussion
Tue	12-Oct	Classical conditioning
Thur	14-Oct	Timing
Tue	19-Oct	Paper discussion
Thur	21-Oct	Review for exam 2
Tue	26-Oct	Exam 2
Thur	28-Oct	Verbal working memory
Tue	2-Nov	Paper discussion
Thur	4-Nov	Language
Tue	9-Nov	Paper discussion
Thur	11-Nov	Student presentations
Tue	16-Nov	Student presentations
Thur	18-Nov	Student presentations
Tue	23-Nov	Thanksgiving
Thur	25-Nov	Thanksgiving
Tue	30-Nov	Executive function
Thur	2-Dec	Review for exam 3
	7-8 Dec	Reading period
	9-17 Dec	Final Exam Period