Course Outline for HGEN696/697/698/699: Advanced Readings in Genetics series
FALL 2018: Advanced Readings in Neuro-Genetics

Lecturers:
Ziv Gan-Or (Coordinator), Thomas Durcan, Genevieve Bernard, Jean-Baptiste Riviere, Austen Milnerwood

Schedule:
This course will be offered in 3 hour blocks (weekly) for 13 classes during the FALL 2018 semester.

Aims:
This course aims to review critically and discuss recently published original articles, reviews and/or commentaries in the field of neuro-genetics and to hone oral and written presentation skills

Scope:
This course will cover various, current topics in neuro-genetics, focusing on the genetics of diseases such as Parkinson’s disease, dementias, amyotrophic lateral sclerosis, and other common and rare neurological disorders. Through covering controversial topics, the students will develop abilities for critical analysis of published genetic studies, and will be able to design their own experiments in the most appropriate way for their needs. Methodological issues related to genome wide association studies, whole exome/genome studies, CRISPR experiments, genetic animal models and others will be discussed. The students will get experience in critically presenting data, performing peer review, and basic writing skills.

Enrolment:
The course will be limited to 20 students to facilitate discussion sessions and coordinate oral presentations by each student. The course is open to all graduate students in the Faculty of Medicine with priority given to graduate students enrolled in the Department of Human Genetics.

Course Type:
This is a Seminar and Readings course held over a 13-week period (3hr/week) worth 3 credits.

Typically, with the exception of the first two sessions that will include lectures by the course instructors, each session comprises of a 1-hour seminar followed by a 1-2 hour class discussion of selected scientific papers. The 13th session is a 1-hour seminar given by a guest speaker.

Information about reading material for each class will be available 1-2 weeks prior to each class through the MyCourse portal or by email. Due to copyright restrictions, papers will be selected that are freely accessible or available through McGill’s online library resources.

There will be “a meet and greet” session with an invited speaker followed by a research seminar. The invited speaker session will be held during the usual Department of Human Genetics seminar series, usually held on Thursdays. This seminar will be open to the faculty, graduate students and postdoctoral fellows.

Course Evaluation:
This is a PASS/FAIL or GRADED course, determined by consensus by the students before the course drop date.

Method of Evaluation:

Oral Presentation (40%) – 45-minute session per student - evaluated by a course instructor

Each student will present a 45-minute seminar describing an original research paper assigned by the course coordinator or instructors. The oral presentation (worth 20/40 points) is formal and should include background information (introduction, hypothesis and objectives), a discussion of the experiments described in the
research paper, the authors’ conclusions, and critique of work.

The oral presentation will be facilitated by slides (i.e., power point), a copy is due at end of presentation class (submitted electronically to course coordinator), and will be evaluated for organization and clarity (worth 10/40 points).

The student also will be evaluated for answering questions from their peers and course coordinator (15-minute session, worth 10/40 points).

Note: In case there will be less than 10 students in the course, there will be an option for additional oral presentation that will be given instead of a written assignment or as a bonus. This option will be voluntary.

Written Assignment #1: Research commentary (25%) – evaluated by course coordinator

Students will be evaluated for 1000-word paper (maximum, excluding title, 30-word lead-in, author acknowledgement, and 10 references (max); 12 point Times New Roman Font, 1.5 cm margin) Nature research News & Views-style commentary highlighting significance of research findings, identifying knowledge gaps affected by the research findings, and addressing at least 1 remaining unanswered question arising from a research article selected by the course coordinator. The commentary is due before the 6th session of the course (submitted electronically to course coordinator). The assignment will be evaluated for clarity and style aimed at a scientific audience.

Written Assignment #2: Peer review (25%) – evaluated by course coordinator

Students will be evaluated for 700-word peer review of a paper (maximum excluding title, and 30-word lead-in; 12 point Times New Roman Font, 1.5 cm margin) selected by the course coordinator, highlighting the pitfalls and significance of research findings from the selected research article, written in the style for a peer review as will be discussed in class. The peer review is due before the 12th session of the course (submitted electronically to course coordinator). The assignment will be evaluated for clarity and scientific reasoning.

Class participation (10%) – evaluated by instructors

Students are expected to have read the assigned readings for each class and are to prepare 2 questions or comments from the reading assignments. Questions are submitted electronically to the course coordinator (Gan-Or) 3 days before each class and will be distributed to the lecturer and students the day before class.

The questions serve as a guide for the discussion session and are not graded. Students are expected to voluntarily participate in the discussion session and should be prepared to address questions when called upon by the lecturer.

Attendance is mandatory for graduate classes. Failure to attend class without permission (by course coordinator) will be reflected in the class participation grade.

McGill Policy Statements

Language of Submission:

“In accord with McGill University’s Charter of Students’ Rights, students in this course have the right to submit in English or in French any written work that is to be graded. This does not apply to courses in which acquiring proficiency in a language is one of the objectives.” (Approved by Senate on 21 January 2009 - see also the section in this document on Assignments and Evaluation.)

Academic Integrity:

“McGill University values academic integrity. Therefore, all students must understand the meaning and
consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures” (see www.mcgill.ca/students/srr/honest/ for more information). (Approved by Senate on 29 January 2003)

Additional policies governing academic issues which affect students can be found in the McGill Charter of Students’ Rights (see the Handbook on Student Rights and Responsibilities).

Course Schedule:

<table>
<thead>
<tr>
<th>Class</th>
<th>Dates (FALL 2018)</th>
<th>Instructor</th>
<th>Topic</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>05/09/2018</td>
<td>Ziv Gan-Or</td>
<td>The uniqueness of brain disorders and the need for unique study approaches, or – &quot;where are the medications?&quot;</td>
<td>Introduction to Neurogenetics</td>
</tr>
<tr>
<td>2</td>
<td>12/09/2018</td>
<td>Ziv Gan-Or</td>
<td>The various genetic methodologies used for studying neurological disorders.</td>
<td>Introduction to Neurogenetics</td>
</tr>
<tr>
<td>3</td>
<td>19/09/2018</td>
<td>Ziv Gan-Or</td>
<td>The advantages and limitations of genome wide association studies in neurological diseases – Parkinson’s disease as a case study</td>
<td>Genome-wide association studies in complex neurological disorders</td>
</tr>
<tr>
<td>4</td>
<td>26/09/2018</td>
<td>Jean-Baptiste Riviere</td>
<td>The applications, advantages and limitations of targeted next-generation sequencing for rare diseases</td>
<td>Targeted next generation sequencing – methodology and uses</td>
</tr>
<tr>
<td>5</td>
<td>03/10/2018</td>
<td>Austen Milnerwood</td>
<td>Does identification of disease causing mutations produce useful rodent models or treatment strategies emerging from them?</td>
<td>From genes to mechanism – Huntington’s &amp; Parkinson’s disease</td>
</tr>
<tr>
<td>6</td>
<td>10/10/2018</td>
<td>Genevieve Bernard</td>
<td>The advantages, limitations and pitfalls of next generation sequencing for rare neurological diseases</td>
<td>Whole exome / genome sequencing in rare neurological disorders</td>
</tr>
<tr>
<td>7</td>
<td>17/10/2018</td>
<td>Thomas Durcan</td>
<td>Understanding Parkinson’s disease through genetics</td>
<td>From genes to mechanism – Parkinson’s disease</td>
</tr>
<tr>
<td>8</td>
<td>24/10/2018</td>
<td>Jean-Baptiste Riviere</td>
<td>Genetic mosaicism, mechanisms, methods of detection, and implications for neurological diseases.</td>
<td>Genetic mosaicism in brain disorders</td>
</tr>
<tr>
<td>9</td>
<td>31/10/2018</td>
<td>Austen Milnerwood</td>
<td>Can one mutation cause multiple diseases or does genetic data force a reappraisal of diagnoses? ALS, FTD and the curious case of C9orf72</td>
<td>From genes to mechanism – Dementias</td>
</tr>
<tr>
<td>10</td>
<td>07/11/2018</td>
<td>Ziv Gan-Or</td>
<td>Different genetic models and the advantages and disadvantages in neurological diseases.</td>
<td>Genetic models of neurological diseases</td>
</tr>
<tr>
<td>11</td>
<td>14/11/2018</td>
<td>Thomas Durcan</td>
<td>The advantages and limitations of iPSCs in studying human disease and disease-causing mutations</td>
<td>Human stem cells – A new model of human diseases</td>
</tr>
</tbody>
</table>
**Course Outline for HGEN696/697/698/699: Advanced Readings in Genetics series**  
**FALL 2018: Advanced Readings in Neuro-Genetics**

<table>
<thead>
<tr>
<th>Date</th>
<th>Date</th>
<th>Presenter</th>
<th>Topic</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>21/11/2018</td>
<td>Thomas Durcan</td>
<td>The good and bad sides of CRISPR genome editing</td>
<td>CRISPR editing</td>
</tr>
<tr>
<td>13</td>
<td>28/11/2018</td>
<td>Alastair Noyce</td>
<td>Mendelian randomization studies in neurological disorders + meet and greet with students</td>
<td>Mendelian randomization</td>
</tr>
<tr>
<td>14</td>
<td>TBD</td>
<td>Alastair Noyce, MD, PhD, Queen Mary University of London</td>
<td>Mendelian randomization studies in neurological disorders.</td>
<td>Gan-Or, host 4:00-5:00 pm Seminar*</td>
</tr>
</tbody>
</table>

* Guest speaker session held as part of the “Wednesday Dept. of Human Genetics” seminar series.