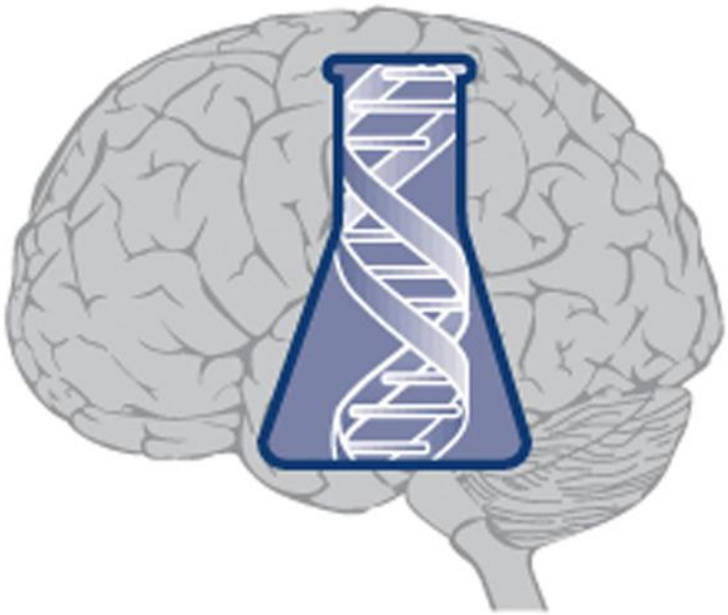
BISP 194: Advanced Topics in Modern Biology
Tu 3:30-5:00pm // YORK 3010

1) Course title: "Molecular genetic basis of neural function and neurological disease"

2) One of the greatest challenges remaining in biomedical research is to understand how the brain works. Given the complexity of the central nervous system, one useful approach to deconstructing the operation of the human brain and nervous system has been to determine the basis of neurological diseases, ranging from developmental disorders such as autism and mental retardation, to neurodegenerative disorders such as Parkinson's disease and Alzheimer's disease, to neuropsychiatric disorders such as schizophrenia and depression. In this course, we will examine the recent advances in our understanding of these disorders - progress that has been driven by molecular genetic and genomic technologies in most cases. The goal of this course is that you will not only learn about these exciting discoveries and their implications for treating these diseases, but also you will learn to read, critically evaluate, and present primary data from published recent articles in the scientific literature.



PREREQUISITES: BICD100 (Genetics), BIBC100[02] (structural/metabolic biochemistry), an introductory course in Neuroscience, and their prerequisites. Additionally, it is HIGHLY RECOMMENDED that you have completed BIMM100 (Molecular Biology) before taking this class.

3) Enrollment is limited to 30 students.

4) Tuesday afternoons, 3:30 to 5:00 PM, ending 80 minutes after the start time.
Dates (10): 1-10-12; 1-17-12; 1-24-12; 1-31-12; 2-7-12; 2-14-12; 2-21-12; 2-28-12;

3-6-12; 3-13-12

5) No textbook is required. However, Thompson & Thompson, Genetics in Medicine, 7th edition, Saunders-Elsevier, ISBN # 9781416030805, is a valuable reference book, chapters 1-4 and 9-14.

6) Instructors:

Al La Spada, MD, PhD
Professor of Pediatrics, Cellular & Molecular Medicine,
Biological Sciences, and Neurosciences
Associate Director, Institute for Genomic Medicine
University of California, San Diego
Skaggs School of Pharmacy & Pharm Sci Bldg., Room 4258
9500 Gilman Drive, MC 0642
La Jolla, CA 92093-0642
(858)-246-0148 [ph.] // alaspada@ucsd.edu

Alysson Muotri, PhD
Assistant Professor of Pediatrics and Cellular & Molecular Medicine
University of California, San Diego
Sanford Consortium for Regenerative Medicine Bldg., Room 3005
9500 Gilman Drive, MC 0695
La Jolla, CA 92093-0642
(858)-534-9320 [ph.] // muotri@ucsd.edu

7) Course coordinator

Ms. Christina Butler
Executive Assistant to Dr. Albert La Spada
9500 Gilman Drive, MC 0642
Skaggs Pharmaceutical Science Building, Room 4262
La Jolla, CA 92093-0642
(858)-246-0149 [ph.] // cpbutler@ucsd.edu

8) Requirements

Attendance is mandatory. Original papers will be selected and disseminated to students

by Ms. Butler about one week prior to each class. Students will be expected to discuss the distributed papers during class, and ask questions as to the scientific / biological significance of the work and how the study was performed. **Students are required to write and submit via email to cpbutler@ucsd.edu a total of 3 SUBSTANTIVE questions relating to the research papers assigned. The 3 questions must be received by 9 AM on the day of the class – late submissions will receive no credit: NO EXCEPTIONS!** At least one question per **original** paper must be provided (so no questions should be submitted for review articles).

Examples of exemplary questions are given here:

1. The authors reference mGluR1 in intro but only suppress mGluR5 50%. Is this typical? How can suppression of mGluR5 be maintained when challenged? I would have liked to see proof of the 50% specificity of mGluR5 in the body of the paper in comparison to other related proteins.
2. Does the degree of severity of the polyglutamine repeats impact the expression of the different protein complexes? While 32Q is considered WT and 82Q is considered expanded, this is not all-or-none in terms of polyglutamine expansion, so does some (linear) gradient exist as well for protein complex expression?
3. In my opinion the authors have omitted an interesting and straightforward control: Take an ESC from embryo with fragile X mutation that expresses the *FMR1* gene and differentiate the cell to a somatic phenotype that has undergone transcriptional silencing for that gene. Then induce pluripotency with iPSC factors and see if the reprogramming fails in the same cell line. If the cell does not fully reprogram, there is more support for ESC as a fragile X developmental model, otherwise, light may be shed on the mechanism of differential fragile X syndrome manifestation between ESC and iPSC.

9) Grading policy

Students are expected to attend all classes. Grades will be based upon the quality of the written questions that students turn in each week; attendance; and the quality of student participation at each meeting of the class.