

University of Toronto, Scarborough  
BIOD19H3 Epigenetics in Health and Disease  
Winter 2016

Instructor: Dr. Santiago Herrera; TA: Sameera Abuaish

**Course Description:** This is a lecture/seminar/discussion class on the emerging field of environmental epigenetics. We will cover basic epigenetic mechanisms, and will explore the primary scientific literature to learn about current methods and ideas in epigenetic research, including, but not limited to, the epigenetic control of gene function and the role of epigenetics in normal development and human disease.

**What is Environmental Epigenetics?** Environmental epigenetics is a field of study focusing on mitotically or meiotically heritable changes in gene regulation caused by environmental factors. There is evidence that epigenetic changes can occur through factors such as diet, toxicants (xenobiotics) and social interactions. This course will focus on the environmental epigenetic mechanisms that impact health and disease on eukaryotes, including humans.

### Course Generalities

Meetings: HW214 Fridays 10:00-12:00.

Calendar: A course calendar with the schedule for lectures and presentations will be available on Blackboard. This schedule is subject to change, so check back regularly.

- Meetings 1-2: Lectures on: (1) foundation topics in environmental epigenetics, (2) how to read and present a research article, (3) how to make and present a poster.
- Meetings 3-9: Student seminars on research articles.
- Meetings 10-11: Student poster presentations on research articles.

Office hours: Wednesdays 13:00-15:00 or by appointment. My office room is PO104 - RM110.

Course email address: [epigeneticsD19@gmail.com](mailto:epigeneticsD19@gmail.com)

Readings: Journal articles will be supplied on Blackboard as PDF files or hyperlinks. There will be no textbook for this class.

Exams: There will be no exams for this class.

### Anticipated Outcomes

1. You will gain breadth and depth of knowledge about basic concepts and ideas in epigenetics.

2. You will gain exposure to the current research in the field of Environmental Epigenetics.
3. You will learn how to critically read scientific articles.
4. You will develop presentation skills delivering scientific knowledge to specialized audiences through oral and poster presentations.

### Grading Scheme:

Quick-Write Assignments (6 x 3%)	18%
Article Presentation	35%
Article Discussions (2 x 6%)	12%
Poster Presentation	35%

**Quick-Write Assignments:** Quick-write assignments will constitute a few short questions addressing the articles presented in the class. You will answer questions about the background, approaches, results and/or conclusions of the articles. We will examine 3 articles in each class. The answers to the short questions must be submitted before midnight of the night before each class via Blackboard. There is a 100 word limit per answer (3-5 sentences).

**Article Presentation:** You and a classmate will present a 15 minute seminar to the rest of the class based on a research article from a list provided by the instructor on Blackboard. Alternatively, you can suggest an article to the instructor. The presenter(s) will be chosen randomly from your pair on the day of the presentation. When presenting, you are expected to provide printed handouts, which will be given to the class at the beginning of the seminar. Seminars will be graded based on the clarity of your presentation, your style and delivery, your use of visual aids, and your ability to generate interest in your classmates. Your slides must be submitted the night before your presentation via Blackboard.

**Article Discussions:** An important part of your mark in this class is based on your critical analysis of articles that we will examine. For each article presented, 4 students will be assigned randomly on the day of the presentation to lead a 10 minute discussion (you won't present and lead the discussion on the same article). Each student will lead 2 paper discussions during the course. You will be graded based on your capacity to engage other students into discussion, as well as on your critical analysis and understanding of the article.

**Poster presentation:** You and a classmate will design and present a poster based on an article from a list of articles provided by the instructor on Blackboard. Alternatively, you can suggest an article to the instructor. This will be a separate article from the one you present in class and cannot be repeated from any other article presented orally or in poster format by your

classmates. You and your partner will present the poster on-demand to your classmates and other interested people from the Biological Sciences department. Grading of your poster design, content and presentation will be performed by anonymous evaluators. You may be asked to evaluate some of your classmates posters on the day of the poster sessions. Your poster's PDF file must be submitted 3 days before your presentation via Blackboard. You are responsible for printing your own poster (dimensions 3ft x 4 ft).

## Deadlines

Quick-Write Assignments: Before midnight of the night before each class

Choice of Articles\* for Presentation: Friday January 15, 10:00

Choice of Articles\* for Poster: Friday March 4, 10:00

\*Articles will be assigned on a first-come first-served basis. Send your top 3 choices via Blackboard

## Suggested Readings (for background and reference):

Jirtle RL, Skinner MK. (2007) Environmental epigenomics and disease susceptibility. *Nature Reviews Genetics*. 8(4):253-62.

Petronis A. (2010) Epigenetics as a unifying principle in the aetiology of complex traits and diseases. *Nature*. 465(7299):721-7.

Youngson NA, Whitelaw E. (2008) Transgenerational epigenetic effects. *Annual Reviews in Genomics and Human Genetics*. 9:233-57.

Epigenetics, Second Edition. 2015. Eds. CD Allis, M Caparros, T Jenuwein, D Reinberg. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.