Syllabus
Biol/Chem 455/505 - Special Topics in Biochemistry
Nucleic Acids Biochemistry

We now realize that the human genome contains at least 80,000 non-redundant non-coding RNA genes, outnumbering protein-coding genes by at least 4-fold, a revolutionary insight that has led some researchers to dub the eukaryotic cell an “RNA machine”. How exactly these ncRNAs guide every cellular function – from the maintenance and processing to the regulated expression of all genetic information – lies at the leading edge of the modern biosciences, from stem cell to cancer research. This course will provide an equally broad as deep overview of the structure, function and biology of DNA and particularly RNA. We will explore important examples from the current literature and the course content will evolve accordingly*.

The class will be taught from a chemical/molecular perspective and will bring modern interdisciplinary concepts from biochemistry, biophysics and molecular biology to the fore.

*Handouts and primary literature will be available on the Canvas course web site.

Prerequisites: Biochemistry survey course covering the fundamental principles of proteins and nucleic acids (equivalent to Chem 351, Biolchem 415, or MCDB 310).

Faculty Instructor:  Prof. Nils G. Walter, Ph.D.
Room 2405 Chemistry
E-mail: nwalter@umich.edu; http://sites.lsa.umich.edu/walter-lab
Office hours: Mondays 3-5 PM

Graduate Student Instructor:  Kevon Stanford
Room 4215 Life Sciences Institute (LSI)
E-mail: sdkevon@umich.edu
Office Hours: Wednesdays 3-5 PM, Room 4215 LSI

Course meeting schedule: Tuesdays & Thursdays, 2:30 – 4 pm, Room G115 Angell Hall

Grading:
Your grade will be a composite of the grades obtained from four assigned 2-page reviews of the primary literature, one in-class “journal club” presentation, one Wikipedia entry on a topic related to RNA, and class participation as outlined below. In two of the four reviews, you will be asked to play the role of a journal editor and write a “News and Views”-style summary; in the remaining two cases, you will be asked to play the role of a peer reviewer and critique a published article. In addition, you can earn credit from the in-class quizzes on the papers presented and for active class participation (as well as class attendance; please notify us if you cannot make it).

- 4 Reviews: each 25 points, for a total of 100 points
- Journal club presentation: 30 points
- Wikipedia entry: 40 points
- 10 Quizzes: each 2 points for a total of 20 points
- Class participation (includes not doing Facebook 😊): 10 points
- 10 extra credit points will be given to the entire class if >90% of all students fill out the course evaluation (a normal response rate for online evaluations is ~50-60%)

Total: 200 points
Textbooks


Tentative Class Schedule *(on dates in red Nils will be out of town)*:

9/6 - Lecture 1: Introduction, syllabus and modern genetics
9/8 - Lecture 2: DNA & The modern toolkit of techniques to probe DNA and RNA
9/13 - Lecture 3: DNA & The modern toolkit of techniques to probe DNA and RNA
9/15 - Lecture 4: DNA & The modern toolkit of techniques to probe DNA and RNA
9/20 - Lecture 5: Introduction to Wikipedia (Scott Martin & Justin Schell)
9/22 - Lecture 6: The modern toolkit of techniques to probe DNA and RNA
9/27 - Lecture 7: DNA; Wiki topic suggestions due
9/29 - Lecture 8: Tips on presentations
10/4 - Lecture 9: Group Presentation 1
10/6 - Lecture 10: RNA; News & Views article 1 due
10/11 - Lecture 11: Group Presentation 2
10/13 - Lecture 12: RNA; Wiki draft due
10/20 - Lecture 13: Group Presentation 3; Wiki peer review due
10/25 - Lecture 14: RNA; Paper critique 1 due
10/27 - Lecture 15: Group Presentation 4
11/1 - Lecture 16: Wiki topic presentations
11/3 - Lecture 17: Wiki topic presentations
11/8 - Lecture 18: Group Presentation 5
11/10 - Lecture 19: Group Presentation 6
11/15 - Lecture 20: RNA; Move Wiki article to Wikipedia page
11/17 - Lecture 21: Group Presentation 7; Add final touches to finalize Wiki article
11/22 - Lecture 22: RNA; News & Views article 2 due
11/29 - Lecture 23: Group Presentation 8
12/1 - Lecture 24: RNA; Paper critique 2 due
12/6 - Lecture 25: Group Presentation 9
12/8 - Lecture 26: RNA
12/13 - Lecture 27: RNA
General Notes

Academic integrity
The College of LSA is a community in which personal responsibility, honesty, fairness, respect, and mutual trust are maintained. You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment, and will result in additional disciplinary measures. This includes, but not limited to, cheating, using unauthorized material during exams, using or copying another student’s work, and any other form of academic misrepresentation. For a list of actions that constitute misconduct, and possible sanctions for those actions, please see the Code of Conduct at http://www.lsa.umich.edu/academicintegrity/.

Commitment to equal opportunity
We are committed to a policy of equal opportunity for all persons and do not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status. Please feel free to contact us with any problem, concern, or suggestion. We ask that all students treat each other with respect.

Accommodations for Students with Disabilities
If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way the course is usually taught may be modified to facilitate your participation and progress. As soon as you make us aware of your needs, we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations. SSD(734-763-3000; http://ssd.umich.edu) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. Any information you provide is private and confidential and will be treated as such.

Student Mental Health and Wellbeing
University of Michigan is committed to advancing the mental health and wellbeing of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and https://caps.umich.edu/ during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and https://www.uhs.umich.edu/mentalhealthsvcs, or for alcohol or drug concerns, see www.uhs.umich.edu/aodresources.
For a listing of other mental health resources available on and off campus, visit: http://umich.edu/~mhealth/.