

BIOL 8801 SPECIAL TOPICS: READINGS IN SIGNALING MOLECULES

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Course summary: This course is designed to strengthen graduate students' knowledge and interpretation of research using the primary scientific literature in the area of chemical signaling.

This 1-credit course meets on Thursdays (4:35-5:55 pm) for 10 weeks (see schedule below) in EST room L1229. The course is intended to complement BIOL/CHEM 6756 Discovery of Signaling Molecules, which is offered during the same semester. Therefore, in order to participate fully in BIOL 8801, students either need to be concurrently enrolled in BIOL/CHEM 6756, or to have previously taken that course, or to have prior knowledge of the subject area (e.g., by having taken BIOL 6620 Aquatic Chemical Ecology or by having conducted research in this area). There is no textbook. Readings will be made available on the course t-square website (tsquare.gatech.edu) and students are encouraged to use library databases and the scientific literature to pursue topics in more detail. Since there is no textbook and all of the sessions involve class discussion rather than formal lecture, attendance is required. Any absences need to be approved by the instructor prior to the class to be missed.

Evaluation:

Discussion-leading based upon readings **75%**
Class participation when not leading discussion **25%**

Class calendar:

Week	Date	Topic	Reading assignment (read BEFORE class)
1	Aug 23	Introduction to course objectives and structure Assignment of discussion leaders for future weeks	Meinwald (2011)
2	Aug 30	<i>No class</i>	
3	Sept 6	Human sex pheromones, including the connections between exuded compounds, hormones, and the adaptive immune system	Bensafi et al (2004) + 1 other paper chosen by discussion leader
4	Sept 13	Bacterial quorum sensing, including how some organisms manipulate this process for their own benefit	Higgins et al (2007) + 1 other paper
5	Sept 20	Pheromones for mate finding and/or diapause: consequences of quality and quantity of structurally related molecules	Srinivasan et al (2008) + 1 other paper
6	Sept 27	<i>No class</i>	
7	Oct 4	Chemical defenses against predators	Kubanek et al (2002) + 1 other paper
8	Oct 11	Animals' use of smell and/or taste chemoreceptors for sensing deterrent molecules	Cohen et al (2010) + 1 other paper
9	Oct 18	<i>No class</i>	
10	Oct 25	How natural toxins interact with membrane-bound receptors to exert their toxic effects	Bricelj et al (2005) + 1 other paper
11	Nov 1	Chemical defenses that serve a host but are actually produced by a symbiont	Oh et al (2009) + 1 other paper
12	Nov 8	Small scale localization of secondary metabolites in and on live tissues	Lane et al (2009) + 1 other paper
13	Nov 15	Insect pheromones – challenges due to low concentration and immense potency of chemical signals	Nojima et al (2005) + 1 other paper
14	Nov 22	<i>Thanksgiving break – no class</i>	
15	Nov 29	<i>No class</i>	
16	Dec 6	<i>No class</i>	

Reading list – articles available on T-square

- Bensafi M, Brown WM, Khan R, Levenson B, Sobel N (2004) Sniffing human sex-steroid derived compounds modulates mood, memory and autonomic nervous system function in specific behavioral contexts. *Behavioural Brain Research* 152:11-22
- Bricelj VM, Connel L, Konoki K, MacQuarrie SP, Scheuer T, Catterall WA, Trainer VL (2005) Sodium channel mutation leading to saxitoxin resistance in clams increases risk of PSP. *Nature* 434:763-767
- Cohen SP, Vincent KK, Halstead-Nussloch GE, Hatt H, Kubanek J, McCarty NA (2010) RL-TGR, a co-receptor involved in aversive chemical signaling. *Proceedings of the National Academy of Sciences* 107:12339-12344
- Higgins DA, Pomianek ME, Kraml CM, Taylor RK, Semmelhack MF, Bassler BF (2007) The major *Vibrio cholerae* autoinducer and its role in virulence factor production. *Nature* 450:883-886
- Kubanek J, Whalen KE, Engel S, Kelly SR, Henkel TP, Fenical W, Pawlik JR (2002) Multiple defensive roles for triterpene glycosides from two Caribbean sponges. *Oecologia* 131:125-136
- Lane AL, Nyadong L, Galhena A, Shearer TL, Stout EP, Parry RM, Kwasnik M, Wang MD, Hay ME, Fernandez F, Kubanek J (2009) Desorption electrospray ionization mass spectrometry reveals surface-mediated antifungal chemical defense of a tropical seaweed. *Proceedings of the National Academy of Sciences* 106:7314-7319
- Meinwald J (2011) Natural products as molecular messengers. *Journal of Natural Products* 74:305-309
- Nojima S, Schal C, Webster FX, Santangelo RG, Roelofs WL (2005) Identification of the sex pheromone of the German cockroach, *Blattella germanica*. *Science* 307:1104-1106
- Oh DC, Poulson M, Currie CR, Clardy J (2009) Dentigerumycin: a bacterial mediator of an ant-fungus symbiosis. *Nature Chemical Biology* 5:391-393
- Srinivasan J, Kaplan F, Ajredini R, Zachariah C, Alborn HT, Teal PEA, Malik RU, Edison AS, Sternberg PW, Schroeder FC (2008) A blend of small molecules regulates both mating and development in *Caenorhabditis elegans*. *Nature* 454:1115-1119