Senior Thesis
Course Manual

Cannabis Leaf. Cannabinoids activate the CB1 receptor.

BIOL 499 (6 credits)
University of Alaska Fairbanks
Summer and Fall 2018
Abel Bult-Ito
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1. Detailed Description of Senior Thesis

Welcome to BIOL 497 Senior Thesis! During this summer and fall 2018 semester, you will participate in biomedical research on mice, including data collection, data analysis, interpretation of results, write a manuscript, and present your work.

The goals of this course are:
Perform research on the role of CB1 receptor antagonist (SR) pretreatment on the effects of CB1 receptor agonists WIN and URB on compulsive-like behaviors and anxiety-like behaviors in compulsive-like mice.

The learning objectives of this course are:
1. Perform biomedical behavioral neuroscience research appropriately.
2. Analyze and interpret data and discuss results in the context of other published research appropriately.
3. Write a manuscript for publication in a peer-reviewed journal.
4. Effectively present your work in a public forum.

The OCD mouse model you will be using:
The compulsive-like mouse model was developed from mouse strains artificially selected for high levels of nest-building behavior (compulsive-like big nest-builders; HA1 and HA3), low levels of nest-building behavior (non-compulsive-like small nest-builders; LA1 and LA2), and randomly-bred control mice (CA1 and CA3), with intermediate nest-building levels (Bult and Lynch, 2000). These mice show face, predictive, and construct validity for a compulsive-like phenotype, using behavioral assessments and pharmacological treatments (Greene-Schloesser et al., 2011; Mitra et al., 2016, 2017a, 2017b, 2017c; Winter et al., 2018). You will be using female and male HA3 mice for this senior Thesis project.

References:
Mitra S, Mucha M, Khatri SN, Glenon R, Schulte MK, Bult-Ito A 2017b Attenuation of
compulsive-like behavior through positive allosteric modulation of α4β2 nicotinic acetylcholine receptors in non-induced compulsive-like mice. *Front Behav Neurosci* 10:244. doi: 10.3389/fnbeh.2016.00244.


We will use a variety of approaches to accomplish the goals and learning outcomes.

1. **Perform laboratory research (about 200 hours).** You will test baseline levels of compulsive-like and anxiety-like behaviors in female and male compulsive-like mice after treatment with CB1 receptor agonists WIN and URB. Subsequently, you will test the effect of CB1 receptor antagonist (SR) pretreatment on the effects of CB1 receptor agonists WIN and URB on compulsive-like and anxiety-like behaviors in the same compulsive-like mice. Finally, you will test for residual SR effects by again testing levels of compulsive-like and anxiety-like behaviors in compulsive-like mice after treatment with the CB1 receptor agonists WIN and URB in the same mice.

2. **Writing a manuscript (about 75 hours).** You will write all sections of the manuscript to a level that it is publishable in a peer-reviewed journal.

3. **Give a presentation of your work in a public forum (25 hours).** You are expected to give a 15-20 minute presentation, using PowerPoint, and in a public forum.

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**Course Meeting Times and Locations**
As appropriate for laboratory research, preparation of experiments, writing of the manuscript, and presenting in a public forum.
Course Section
BIOL F499; F01; CRN xxxxx.

Disabilities Services
The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. We will closely work with the Office of Disabilities Services (208 Whitaker Building, 474-5655 or TTY at 474-1827; email: uaf-disabilityservices@alaska.edu) to provide reasonable accommodation to students with disabilities.

To ensure that everyone has equal opportunities to succeed in this course, please let me know if I need to accommodate any disabilities that you may have with assistance of Disability Services. Any information you provide will be held strictly confidential.

Support Services
The Division of Student Services provides student-centered programs and services designed to assist students in achieving their personal, academic and career goals. In collaboration with the academic deans, we lead the university in recruiting a diverse student body. With the use of ongoing assessment, we support and develop programs and communities that contribute to the retention, success and leadership development of students. Go to http://www.uaf.edu/sss/ to learn more.

Writing support services are available to UAF students through the Writing Center, located in 801 Gruening, 474-5314, online at: http://www.alaska.edu/english/writing-center/. You are encouraged to use this resource to meet writing expectations.

Technology support services are available through the OIT Support Center, 450-8300 (Toll Free: 800-478-8226), online at: http://www.alaska.edu/oit/sc/about/contact.xml, and via email to helpdesk@alaska.edu.

2. Course Requirements
To do well in this course you must participate in all course activities. Your grade will be based on the following criteria:

1. Proficiency in laboratory techniques 25%
2. Data collection and analysis 25%
3. Manuscript writing 25%
4. Public presentation 25%

Total: 100%

Grading
The class will be graded on a straight percentage basis:
97.0-100% is an A+ 87.0-89.9 is a B+
93.0-96.9% is an A 83.0-86.9 is a B
90.0-92.9 is an A- 80.0-82.9% is a B-
77.0-79.9 is a C+ 60.0-69.9% is a D
73.0-76.9 is a C < 60% is an F
70.0-72.9% is a C-

I will not grade on a curve. Be aware that the grading scale above will be used without exception. Therefore, for example 89.9% will result in a final grade of B+ and 59.9% will result in a final grade of F. The 0.1% difference may seem like a small difference, but since it is based on four separate grades, it truly reflects a level of performance that does not warrant a higher grade. Being on the right side of the cut-off is your responsibility!

Explanation of NB, W, and Incomplete Grades
This course adheres to the UAF guidelines regarding the granting of NB Grades: The NB grade is for use only in situations in which the instructor has No Basis upon which to assign a grade. In general, the NB grade will not be granted.

Your instructor follows the UAF Incomplete Grade Policy: The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, he has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an "I" grade.

Information about last date to drop, last day for full tuition and fees refund, and last date to withdraw from the course can be found on the UAF academic calendar at http://catalog.uaf.edu/calendar/.

3. Students' Rights and Responsibilities

The university subscribes to principles of due process and fair hearings as specified in the "Joint Statement on Rights and Freedoms of Students." This document can be found in the Division of Student Services. You are encouraged to read it carefully.

Most students adjust easily to the privileges and responsibilities of university citizenship. The university attempts to provide counsel for those who find the adjustment more difficult. UAF may terminate enrollment or take other necessary and appropriate action in cases where a student is unable or unwilling to assume the social responsibilities of citizenship in the university community.

STUDENT CODE OF CONDUCT
UAF students are subject to the Student Code of Conduct. In accordance with board of regents' policy 09.02.01, UAF will maintain an academic environment in which freedom to teach, conduct research, learn and administer the university is protected. Students will benefit from this environment by accepting responsibility for their role in the academic community. The principles of the student code are designed to encourage communication, foster academic integrity and defend freedoms of inquiry, discussion and
expression across the university community.

UAF requires students to conduct themselves honestly and responsibly, and to respect the rights of others. Conduct that unreasonably interferes with the learning environment or violates the rights of others is prohibited. Students and student organizations are responsible for ensuring that they and their guests comply with the code while on property owned or controlled by the university or at activities authorized by the university.

The university may initiate disciplinary action and impose disciplinary sanctions against any student or student organization found responsible for committing, attempting to commit or intentionally assisting in the commission of any of the following prohibited forms of conduct:

a. Cheating, plagiarism or other forms of academic dishonesty  
b. Forgeroy, falsification, alteration or misuse of documents, funds or property  
c. Damage or destruction of property  
d. Theft of property or services  
e. Harassment  
f. Endangerment, assault or infliction of physical harm  
g. Disruptive or obstructive actions  
h. Misuse of firearms, explosives, weapons, dangerous devices or dangerous chemicals  
i. Failure to comply with university directives  
j. Misuse of alcohol or other intoxicants or drugs  
k. Violation of published university policies, regulations, rules or procedures  
l. Any other actions that result in unreasonable interference with the learning environment or the rights of others.

This list is not intended to define prohibited conduct in exhaustive terms, but rather offers examples as guidelines for acceptable and unacceptable behavior.

Honesty is a primary responsibility of you and every other UAF student. The following are common guidelines regarding academic integrity:

1. Students will not collaborate on any quizzes, in-class exams, or take-home exams that contribute to their grade in a course, unless the course instructor grants permission. Only those materials permitted by the instructor may be used to assist in quizzes and examinations.
2. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports.
3. No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors.

Alleged violations of the Code of Conduct will be reviewed in accordance with procedures specified in regents' policy, university regulations and UAF rules and procedures. For additional information and details about the Student Code of Conduct, contact the dean
of students or visit www.alaska.edu/bor/.

STUDENT BEHAVIORAL STANDARDS
Education at the university is conceived as training for citizenship as well as for personal self-improvement and development. Generally, UAF behavioral regulations are designed to help you work efficiently in courses and live responsibly in the campus environment. They are not designed to ignore your individuality but rather to encourage you to exercise self-discipline and accept your social responsibility. These regulations, in most instances, were developed jointly by staff and students. Contact the dean of students for more information.

4. Course Schedule

1 October 2018: Submit CB1 manuscript results section for review.
15 October 2018: Submit CB1 manuscript discussion section for review.
29 October 2018: Submit CB1 manuscript abstract and introduction section for review.
12 November 2018: Submit CB1 manuscript methods section for review.
Submissions of revised sections when ready for review.
15 December 2018: Final manuscript due.

The instructor will provide detailed feedback on each submitted section within 7-10 days. You are then to incorporate the comments and suggestions and resubmit the section for review within two week of receiving the comments. This cycle of submission and revision will happen at least three times for each section.