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**2019 CURS Summer Scholars program**

Department of XXXX

Augusta University

May 20, 2019-July 19, 2019

**Mentor**: Johny Researcher, PhD

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**Course: CURS 2990**

**Project Title:**

**curs summer scholars program Goals**

* To provide intentional mentoring and professional development through collaborative research and creative scholarship;
* To increase opportunities for underrepresented students to become actively engaged in research and creative scholarship;
* To provide undergraduates with intensive experiential learning through engagement in research and creative scholarship;
* To support high impact scholarly activity that yields significant student development and academic achievements while furthering the research productivity of Augusta University.

**Educational goals for this project**

1. Increase student understanding of the causes and treatment of pain
2. Increase student understanding of the methods used to conduct pain research
3. Increase student understanding of career issues in sciences (e.g. ethics, publishing)
4. Prepare students for future training and/or career opportunities

**SCHOLARLY objectives for this project**

1. Development, evaluation, and refinement of new approaches for the preclinical study of pain
2. Examination of the effects of a sustained pain stimulus on memory in mice
3. Examination of the effects of monoamine uptake inhibitors in the presence and absence of a pain stimulus on memory in mice

**Participant roles for this project**

Dr. Researcher will provide guidance and oversight of research activities. Dr. Researcher will conduct weekly laboratory meetings that include discussion of research articles, analysis of data, and ultimately drafting of portions of a manuscript. The aim of these meetings is to provide the students with an introduction to core concepts in the experimental analysis of behavior, pharmacology, neurobiology, and ethical and professional issues in research.

Student researchers will have five primary roles. First, they will read impactful research articles from the pain literature. Second, they will collect data in a conscientious manner, with the welfare of the research animals among our primary concerns. Third, they will assist in the analysis and interpretation of those data. Fourth, they will prepare and present our findings to CURS colleagues and at external scientific meetings. Fifth, they will contribute to the authorship of a manuscript submitted for publication in peer-reviewed journals.

**EXPECTATIONS**

**Professionalism and Respect.** It is expected that all lab members conduct themselves in a professional and respectful manner. We value diversity along many dimensions in the lab, and expect members to reflect these values. Please be supportive of your fellow lab members, and respect their strengths and weaknesses. If you’re struggling or don’t understand something, please ask for help, and if someone asks you for help, please put forth a good faith effort. Please adhere to any deadlines we agree on, and if you determine that you will be unable to keep a deadline, please communication this in a timely manner.

**Animal Research**. This project includes working with rodents in behavioral pharmacology studies examining the effects of noxious stimuli and drugs on behavior. Animal welfare is a major priority. The procedures associated with this project have been approved by the Augusta University Institutional Animal Care and Use Committee (IACUC, protocol # 2014-0675), and are supported by the CURS Summer Scholars Program and a Research Scholarship and Creative Activity Program grant from the Office of the Senior Vice President for Research. All research activities must be consistent with the IACUC protocol and funding agreements. If you have questions about procedures, protocols, or animal welfare please err on the side of caution and feel free to ask questions.

**Scheduling and Communication**. The CURS SSP requires 20 hours of work per week. This project will include in-lab activities (e.g. data collection and weekly lab meetings), and out of lab work (e.g. literature searches) that will all contribute to the 20 hour per week requirement. All lab members are expected to maintain the schedule that is agreed upon for in-lab activities, and if circumstances arise that do not permit this, timely communication is expected. Email is the appropriate means of communication for standard issues, but text or a phone call is appropriate for more urgent issues. We will also be giving “Freedcamp” a trial run. Freedcamp is a free, online project management system that includes communication, task assignment and scheduling, and resource storage functions. Please be sure to check both email and Freedcamp regularly throughout the SSP.

**General Laboratory Etiquette.** Animal behavior is the primary endpoint in our studies, and behavior is sensitive to a number of variables. In an effort to ensure that the only variables influencing our data are the variables that we control, please keep noise volume in the laboratory low and refrain from bringing food or drink into the lab. Moreover, please dress in lab-appropriate attire (e.g. no open toed shoes or flip flops).

**Data Management.** Data should be stored in multiple places: lab notebooks (i.e. original hard copies), and in the shared BOX file. General data management guidelines include: when in doubt, err on the side of including more information; adhere to the lab file naming and organization policy (to be discussed early in the summer); do not remove lab note books from the lab; never delete or discard anything.

**required trainingS**

* Chemical and Lab Safety Training
* Animal and Lab Safety Training (lab-specific occur also)
* Biosafety and Bloodborne Pathogen Training

**key dates and events**

* Program Duration: May 20, 2019-July 19, 2019
* Orientation: May 20, 2019 at 10am
* Workshops (**attendance is required**): Wednesdays from 12-1:30 (starts May 29, 2019)
* Symposium and reception: July 18, 2019 4-6pm

**TIMELINE OF MAJOR ACTIVITIES**

The first week and a half of the summer scholars program will be devoted to laboratory-specific training including animal handling, drug administration, and data collection. Starting at the beginning of week 2 we will begin data collection, and I predict this will continue through week 8. During this time we will also conduct weekly laboratory meeting where we will discuss peer reviewed articles (see reading list below) and the data we have collected. Weekly CURS workshops will also occur during this time, and attendance is required. We will begin formal preparation of the poster (i.e. final data analysis, data visualization, etc.) around week 7. The Summer Scholars Program will end with a symposium on July 19, 2019, and you will have an opportunity to present your research at this time.

**Week 1 2 3 4 5 6 7 8 9**

Animal Handling \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Collection \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_ \_

Data Analysis/Presentation \_\_\_\_\_\_\_\_ \_\_\_\_\_\_

**reading list**

**Preclinical Assessment of Pain**

Mogil, J. S. (2009). Animal models of pain: progress and challenges. *Nat Rev Neurosci, 10*(4), 283-294. doi:10.1038/nrn2606

Negus, S. S., Vanderah, T. W., Brandt, M. R., Bilsky, E. J., Becerra, L., & Borsook, D. (2006). Preclinical Assessment of Candidate Analgesic Drugs: Recent Advances and Future Challenges. *J Pharmacol Exp Ther, 319*(2), 507-514. doi:10.1124/jpet.106.106377

**Expression and Treatment of Pain-Related Behavioral Dysfunction**

Miller, L. L., Leitl, M. D., Banks, M. L., Blough, B. E., & Negus, S. S. (2015). Effects of the triple monoamine uptake inhibitor amitifadine on pain-related depression of behavior and mesolimbic dopamine release in rats. *Pain, 156*(1), 175-184. doi:10.1016/j.pain.0000000000000018

Negus, S. S., Neddenriep, B., Altarifi, A. A., Carroll, F. I., Leitl, M. D., & Miller, L. L. (2015). Effects of ketoprofen, morphine, and kappa opioids on pain-related depression of nesting in mice. *Pain, 156*(6), 1153-1160. doi:10.1097/j.pain.0000000000000171

Alexander, K. S., Rodriguez, T. R., Sarfo, A. N., Patton, T. B., & Miller, L. L. (In Press). Effects of monoamine uptake inhibitors on pain-related depression of nesting in mice. *Behavioural Pharmacology*.

**Novel Object Recognition as a Measure of Memory in Rodents**

Ennaceur, A. (2010). One-trial object recognition in rats and mice: methodological and theoretical issues. *Behav Brain Res, 215*(2), 244-254. doi:10.1016/j.bbr.2009.12.036

Mange, A., Cao, Y., Zhang, S., Hienz, R. D., & Davis, C. M. (2018). Whole-Body Oxygen ((16)O) Ion-Exposure-Induced Impairments in Social Odor Recognition Memory in Rats are Dose and Time Dependent. *Radiat Res, 189*(3), 292-299. doi:10.1667/rr14849.1

Spinetta, M. J., Woodlee, M. T., Feinberg, L. M., Stroud, C., Schallert, K., Cormack, L. K., & Schallert, T. (2008). Alcohol-induced retrograde memory impairment in rats: prevention by caffeine. *Psychopharmacology (Berl), 201*(3), 361-371. doi:10.1007/s00213-008-1294-5

**Preclinical Assessment of Pain and Memory**

Albuquerque, B., Haussler, A., Vannoni, E., Wolfer, D. P., & Tegeder, I. (2013). Learning and memory with neuropathic pain: impact of old age and progranulin deficiency. *Front Behav Neurosci, 7*, 174. doi:10.3389/fnbeh.2013.00174

Wu, X., Chen, H., Huang, C., Gu, X., Wang, J., Xu, D., . . . Cui, W. (2017). Curcumin attenuates surgery-induced cognitive dysfunction in aged mice. *Metab Brain Dis, 32*(3), 789-798. doi:10.1007/s11011-017-9970-y