

## Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

### Online Proceedings

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#### POSTER SESSION 1

Commons West, Easel 11

11:00 AM to 1:00 PM

##### **Sleep Experiences during Pregnancy in Women of Color**

*Jessica Ordaz, Senior, Nursing*

*UW Honors Program*

*Fanus A. Aregay, Senior, Nursing*

*UW Honors Program*

*Mentor: Ira Kantrowitz-Gordon, Child, Family, and Population Health Nursing*

About 75% of women experience sleep disturbances during pregnancy. Sleep problems during pregnancy are associated with prolonged labor, preterm birth, an increased risk for cesarean delivery, gestational hypertension, glucose intolerance, and depression. To our knowledge, no research has explored the experience of sleep difficulties in pregnant women of color, despite the evidence that racial and ethnic minorities have an increased risk for poor sleep quality. The purpose of this study is to describe the sleep experiences in pregnant women of color during the second half of their pregnancy and to examine the personal and systemic contexts for their sleep. We conducted qualitative semi-structured interviews with 10 women recruited from a local prenatal clinic. Questions explored the internal physical and emotional challenges as well as the external challenges to getting sufficient quality and quantity of sleep during pregnancy. We audio recorded interviews, transcribed verbatim, and analyzed data using qualitative description methodology. We expect that health disparities faced by women of color will be manifested as personal, environmental, and systemic factors that contribute to their difficulty sleeping during pregnancy. Findings from this study will have implications for the design of culturally appropriate prenatal interventions to facilitate improved sleep for minority women.

#### POSTER SESSION 1

Commons East, Easel 71

11:00 AM to 1:00 PM

##### **Spectroscopic Studies of Purified Rat TRPV1**

*Marium Raza, Senior, Biochemistry, Comparative History of Ideas*

*UW Honors Program*

*Mentor: Sharona Gordon, Physiology and Biophysics*

*Mentor: Gilbert Martinez, Physiology and Biophysics*

Transient receptor potential vanilloid-1 (TRPV1) ion channels are polymodal signal integrators of noxious stimuli including heat, vanilloids such as capsaicin, peptide toxins, acid, and inflammatory mediators. It is unknown whether activation of TRPV1 by different stimuli is achieved through the same structural mechanism or if different stimuli activate the channel through different structural mechanisms. Clinical trials using TRPV1 antagonists resulted in patients exhibiting hyperthermia, suggesting that TRPV1 plays a role in maintaining body temperature, and highlighting the need to ensure that therapeutics targeting the channel do not disrupt thermal homeostasis. Hence, knowledge of different structural mechanisms for channel activation would aid in the design of therapeutic agents targeting TRPV1. To address this, we have expressed a series of functional single-cysteine rat TRPV1 channels for spectroscopic analysis, with techniques such as electron paramagnetic resonance, double electron-electron resonance, and Förster resonance energy transfer spectroscopy. By probing several structural regions within TRPV1 we can determine which regions of the channels move during activation and whether those are the same for different noxious stimuli.

#### POSTER SESSION 1

Commons West, Easel 10

11:00 AM to 1:00 PM

##### **Perception of Nursing Students on Caring for Mothers of Infants with Neonatal Abstinence Syndrome**

*Janice Lin, Fifth Year, Nursing*

*UW Honors Program*

*Alisa S. Monda, Senior, Nursing*

*UW Honors Program*

*Mentor: Ira Kantrowitz-Gordon, Child, Family, and Population Health Nursing*

The growing opioid use epidemic in the United States affects all aspects of the population, including pregnant women. The fetus may have chronic exposure to opioids from the pregnant woman's substance use or from addiction treatment with

legally prescribed opioids such as methadone or buprenorphine. These fetuses are likely to go through withdrawal after birth when the supply of opioids from placental transfer is removed. This withdrawal is called neonatal abstinence syndrome (NAS) and often leads to prolonged hospitalization to treat the symptoms of withdrawal, including irritability, feeding intolerance and poor sleep. Studies have found that the mothers of these infants often feel judged by the nurses caring for their infants and they are unable to build a trusting therapeutic relationship due to stigma. Nursing curricula have limited content on substance use disorder; this leaves nursing students and future nurses unprepared to care for childbearing families affected by opioid use disorder. The purpose of the study is to explore the knowledge, attitudes, and beliefs of undergraduate nursing students about opioid use disorder in pregnancy and NAS. We will conduct an anonymous online survey to explore students' perceptions of caring for mothers and infants affected by NAS. We will also examine student characteristics (demographics, personal or professional exposure to substance use) that may predict stigmatizing attitudes. Findings will inform development of educational materials and programs that can better prepare future nurses to care for this population. These educational tools may address stigma towards opioid use disorder, best practices in caring for infants with NAS, and promoting mothers' engagement in the care for their infants while hospitalized.

## POSTER SESSION 4

**Balcony, Easel 87**

*4:00 PM to 6:00 PM*

### **Using Calcium Imaging to Create a Database of Functional TRPV1 Single-Cysteine Mutants for Future Structural Studies in Protein Targeting for Pain Relief**

*Margot T Maraghe, Senior, Biochemistry, Biology (Molecular, Cellular & Developmental)*

*Mentor: Sharona Gordon, Physiology and Biophysics*

*Mentor: Gilbert Martinez, Physiology and Biophysics*

The transient receptor potential vanilloid 1 (TRPV1) ion channel is well known for its role in sensing numerous "noxious" stimuli. It responds to noxious heat, acid, capsaicin (the active compound that makes chili peppers "spicy"), and inflammatory signals, which can be perceived by the brain to be painful. When the TRPV1 channel senses a signal such as capsaicin, it goes from a closed, non-conducting state, to an open state that allows the passage of ions into the cell, generating an electrical signal. Since TRPV1 is activated by a variety of different stimuli one of our aims is to determine if the structural mechanisms that open the channel is the same or different for each stimulus, which could have important clinical implications. For example, failed clinical trials of some TRPV1 antagonists resulted in elevated body temperatures in patients, indicating that the body's ability to regulate body

temperature is impaired when TRPV1 is completely inhibited. Hence, if TRPV1 can be inhibited in most cases, but still respond to temperature, it will be a better target. We aim to combine cysteine-scanning mutagenesis with spectroscopic techniques to map the structural changes of TRPV1 activation in response to different stimuli. Since introduction of mutations can result in impaired channel function, each mutant needs to be functionally verified. My research will be to generate a broad library of single-cysteine TRPV1 mutants and verify their function using calcium imaging. Mutants that preserve TRPV1 function can then be used for further spectroscopic studies.