UNIVERSITY of WASHINGTON

Undergraduate Research Symposium May 18, 2018 Mary Gates Hall

Online Proceedings

Poster Session 1

Balcony, Easel 99

11:00 AM to 1:00 PM

Insula Activation and What it May Tell Us About Food Motivation in Anorexia Nervosa: A Systematic Literature Review

Roxana Karina Vazquez, Senior, Psychology, Biology, Neuroscience, University of Nevada Las Vegas
McNair Scholar
Mentor: Kristen Culbert, University of Nevada, Las Vegas

Anorexia nervosa (AN) is characterized by severe dietary restriction that results in significant malnourishment and weight loss. Regions in the brain related to appetitive drives and interoceptive awareness could be key biological factors that contribute to this severe dietary restriction. The insular cortex may be a particularly important region, as it is thought to be involved in a neural network that processes gustation and the integration of emotional valence with visceral input. A systematic review was conducted to explore links between AN and the insula using the following inclusion criteria: peer-reviewed fMRI studies that incorporated only adult samples of the AN population, were published in the last ten years, and measured activation in response to food-related stimuli. Eleven fMRI studies that addressed patients with current or past anorexia nervosa and the insula met inclusion criteria and were reviewed for qualitative analysis. Studies used a range of different methods, including different task paradigms, making it difficult to make between-study comparisons. Thus, although the insular cortex has been linked in the past to AN, if or how the insular cortex is implicated in restrictive eating in AN remains unclear. Additional studies are needed to clarify links between the insular cortex and AN to distinguish between disturbances that are present during the ill-state versus those that may occur prior to illness onset or following recovery. Studies that use larger sample sizes from both ill and recovered groups with AN will be necessary to further elucidate the potential insula dysregulation in AN and its role in food motivation.

Session 2B

Enhancing Immune Responses Targeting Infection, Injury and Cancer

Session Moderator: Kristin Anderson, Immunology

MGH 228

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Increased Immune Response in Male Rats with Acute Spinal Cord Injury

Seph Williams, Senior, Neuroscience, Seattle Central College
Mentor: David Baisch, Biology, North Seattle College

Statistics have revealed that males are more susceptible to significant spinal cord injuries than females. Carlos Ayala, MD-PhD student from the Keck Center of Collaborative Neuroscience at Rutgers University, has found preliminary evidence that males have a heightened immune response comparison to females following injury. This immune response involves an increase in inflammation surrounding the injury site, and the release of damaging cytokines that suppress neuronal growth and promote axon demyelination following injury. At the injury site, there is also an aggregation of M1 macrophages, which are known to have inflammatory properties and are involved in the promotion of cell death in the surrounding tissues. Another type of macrophage present are M2 macrophages, which are known to be anti-inflammatory and promote tissue regeneration, but these macrophages appear to be suppressed at the site of injury due to myelin debris and other chemical signals. Recent studies suggest that human umbilical cord blood (hUCB) has anti-inflammatory properties which could be beneficial in decreasing the inflammatory response that occurs in males. In this study, we propose to investigate the use of hUCB derived monocytes to treat spinal cord injury in male rats to determine whether it causes the polarization of monocytes into M1 or M2 macrophages *in vivo*. Using the classification of monocytes standard of myself, Carlos Ayala, Cameron Wolf, and Johvany Plaisime of Rutgers Univerity, the next step is to determine which monocytes are precursor cells to M1 (inflammatory) and M2 (anti-infammatory) macrophages. Monocytes are a heterogeneous population with cells found at various stages of life. Some

of the critera include size of the cell, amount of and form of cytoplasm (smooth vs jagged), density of the cytoplasm, how indented the nucleus is, number of nuclei the cells have, and cell markers that are present for monocyte/macrophage specific cell membrane receptors. If this study is successful, hUCB could be further studied for possible therapeutic applications for the treatment of spinal cord injury.