UNIVERSITY of WASHINGTON

Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

MGH 206, Easel 175

11:00 AM to 1:00 PM

Sex-Linked Reversibility of Endothelial to Mesenchymal Transition in Human Neonatal Pulmonary Cells

Sienna Pyle, Junior, Biomedical Engineering, Univ Of Delaware

McNair Scholar

Mentor: Jason Gleghorn, Biomedical Engineering, University of Delaware

Mentor: Brielle Hayward-Piatkovskyi, Biomedical Engineering, University of Delaware

The endothelial to mesenchymal transition (EndMT) has been identified as a key part of organ development as well as many disease pathways. EndMT is characterized by endothelial cells, which make up the inner lining of blood and lymphatic vessels and are adhesive and non-migratory, gaining mesenchymal markers and invasive, migratory behaviors. This overall change in phenotype is normal in embryonic development where EndMT is linked to development of organs but has also been linked to numerous diseases in adults including cerebral malformations, Alport nephropathy, fibrosis, heart disease, and bronchopulmonary dysplasia. Whereas it appears that EndMT does not discriminate by organ, it does by sex. The diseases mentioned previously have a significantly higher incidence in males. To understand the role that sex plays on the EndMT pathway, human neonatal pulmonary cells with a gestational age of 18 to 19 weeks from three female and three male donors were routinely cultured and monitored for changes in phenotype. Using angiogenesis sprouting assays, western blot protein analysis and immunostaining, we collected quantifiable data on the reversibility of the EndMT process in each donor. We found that cells from male donors had lower plasticity, characterized as shifting between the two phenotypes, and generally existed in an endothelial state until pushed into a mesenchymal phenotype through a stressor. Female cells were more likely to shift between phenotypes regardless of conditions and exhibited more angiogenic potential, suggesting a heightened ability to transition between phenotypic states. Future experiments include placing cells in environments with differing stressors to mechanistically determine what drives EndMT processes and monitoring cells with time-lapse imaging to quantify the dynamics of the transition.

POSTER SESSION 3

Balcony, Easel 121

2:30 PM to 4:00 PM

Investigating the Presence of Carbapenem-Resistant Enteribacteriaceae in Possession Sound

Lucy Maki-Fern, Freshman, Biomedical Engineering, Everett Community College

Mentor: Robin Araniva, Life Sciences, Everett Community College

Over the past 15 years, early college students of the Ocean Research College Academy (ORCA), which is offered through Everett Community College, have collected information about fecal coliform levels in Possession Sound. This research is comprehensive spatially and temporally, but does not include information about potentially dangerous antibiotic resistance. Carbapenem-resistant enterobacteriaceae (CRE) are a class of antibiotic-resistant gram-negative bacteria that are specifically resistant to Carbapenem-class antibiotics, which are often considered last-resort antibiotics. As such, CRE pose a major health risk and cases are often difficult to treat. This study will investigate the presence of CRE in Possession Sound at 5 public-access beaches. Samples will be collected using sterile containers and then cultured on selective media containing graduated levels of imipenem using MacConkey agar. Viable CRE colony-forming units will be tested using disc-diffusion for sensitivity against a panel that represented other common antibiotic treatments for enterobacteriaceae on Mueller-Hinton agar and species-identified using a API 20E kit. This study will provide a reference point for future researchers looking to investigate the presence of CRE organisms or other resistant bacteria in the Possession Sound.