exemplify the therapeutic potential of modulating endothelial CD39 activity, as well as the potential for using SNPs within the gene coding for CD39 as a cardiovascular disease marker.

343

Development of osteoclast derived exosomes for vascular calcification therapy

Isabella Jennings[1], Hao Zhou[1], Suryo Kuncorojakti[2], Medania Purwaningrum[3], Marta Scatena[1] and Cecilia M. Giachelli[1]
[1]University of Washington, USA; [2]Universitas Airlangga, Indonesia and [3]Universitas Gadjah Mada, Indonesia

OBJECTIVES/GOALS: The global incidence of calcific aortic valve disease (CAVD) increased 3.5-fold since 1990. No preventative or therapeutic pharmaceutical therapies exist for CAVD. We will establish the therapeutic potential of osteoclast-derived exosomes though characterization of contents and mechanisms of action to protect against mineralization. METHODS/STUDY POPULATION: Exosomes were purified from conditioned media collected from murine myeloid precursor cells, RAW264.7 (control), and osteoclasts induced to differentiate from RAW264.7 cells (OD). Protein content of exosomes was determined using proteomic analyses. Nucleic acid contents will be identified by sequencing mRNA, miRNA, and DNA. The calcification prevention and reabsorption abilities of control and OD exosomes will be tested using human valvular interstitial cells (VIC) and smooth muscle cell calcification assays and acellular osteologic disc assays, respectively. Comparison between cellular and acellular systems will help identify mechanisms of action, and demonstrate potential therapeutic viability of OD exosomes in preventative vs resorptive treatments. RESULTS/ANTICIPATED RESULTS: OD exosomes, but not control exosomes, prevented calcification in VIC in vitro. OD exosomes contained osteoclast-specific proteins including TRAP, MMP6, cathepsin K, and bone reabsorption factors including V type proton pumps, ATPases, and integrins. These genes are also involved in resorptive activities, and were highly upregulated in OD compared to control exosomes. We anticipate miRNA signatures associated with mineral resorption will also be present. Increased knowledge of exosome cargo will illuminate their mechanism of action and allow future work to engineer increased efficacy. We also anticipate a therapeutic response when OD exosomes are applied after calcification has begun, showing exosomes promote calcium reabsorption. DISCUSSION/SIGNIFICANCE: Establishing therapeutic potential and examining mechanisms of action will pave the way for OD exosomes as a CAVD treatment. Analysis of exosome contents will determine active molecules to be enhanced in future studies. This work will lay a foundation for moving into aortic valve organoid models, which are accepted by the FDA for preclinical trials.

344

Understanding drivers of post-Ebola syndrome (PES) in pediatric survivors of Ebolavirus disease: characterization and the way forward.

Nell G Bond[1], Emily J. Engel[1], Lansana Kanneh[2], Robert J. Samuels[2], Donald S. Grant[2] and John S. Schieffelin[1]
[1]Tulane University School of Medicine, New Orleans, LA and [2]Kenema Government Hospital, Kenema, Sierra Leone

OBJECTIVES/GOALS: Ebolavirus disease survivors report persistent, debilitating health concerns dubbed Post-Ebola Syndrome (PES). Attention to PES in young survivors is lacking, we describe PES in pediatric EVD survivors in Eastern Sierra Leone. Additionally, we introduce our proposal investigating differential presentations of PES in pediatric survivors. METHODS/STUDY POPULATION: EVD survivors were enrolled a median of 2.5 years after resolution of disease. Survivors were eligible if listed in a national register maintained by the Sierra Leone Association of Ebola Survivors. Household contacts (HCs) were identified by survivors. Participants were assigned into three comparison groups: pediatric (7-11), adolescent (12-17) and young adult (18-25). A self-reported symptom questionnaire, and a physical exam were conducted. Variables were clustered within organ system and compared across groups. RESULTS/ANTICIPATED RESULTS: Pediatric survivors had lower levels of long-term sequelae compared to adolescents and young adults. Symptoms and abnormal physical exam signs increase with age. Musculoskeletal, psychiatric, ophthalmologic, and GI signs and symptoms were significantly different between groups. Pediatric survivors had significantly more persistent sequelae than age-matched HCs with no history of EVD; particularly within the cardiac/GI (p=.006) and psychiatric/neurological (p=.025) clusters. PES is heterogeneous with respect to age, calling for a deeper understanding of age-based differences. Even the youngest group of survivors experienced significantly more sequelae than HCs, highlighting the elevated symptom burden in these children over their peers. DISCUSSION/SIGNIFICANCE: Understanding mechanistic drivers will ultimately improve targeted treatments for PES. We will characterize symptom groups defining PES in children, determine the relationship between accelerated aging and PES in this population, and test how immune profiles associated with accelerated aging relate to the development of PES in children.

345

Fostering academic-community research teams to conduct community-engaged research in environmental justice communities: The RISE Communities R25 program

Jacqueline Knapke[1], Daniel Hargraves[1] and Patrick Ryan[2]
[1]University of Cincinnati and [2]Cincinnati Children's Hospital Medical Center

OBJECTIVES/GOALS: Residents of environmental justice (EJ) communities experience significantly higher rates of negative health outcomes associated with poor air quality. Low-cost air sensors may supplement regulatory monitoring to better measure air pollution at local scales, but widespread application of this technology remains limited due to many challenges. METHODS/STUDY POPULATION: To address these obstacles, we designed a training program to equip community and academic research partners with the skills and knowledge to successfully apply low-cost sensors in community-engaged environmental health research. The R esearch Innovations using Sensor Technology in Environmental Justice Communities (RISE Communities) program was established through an NIEHS R25 award in 2022 and has three specific aims: 1) Foster community-academic partnerships through research education, training, and team development activities, 2) Provide technical training in the application of low-cost sensors for indoor, outdoor, and personal air monitoring in EJ communities, and 3) Establish a community of practice to address air quality in communities nationwide. RESULTS/ANTICIPATED RESULTS: We hosted our first cohort in August 2023, training five community-academic research teams in team collaboration, community-engaged research, and technical skills for collecting and analyzing data from PurpleAir sensors. Each team received 12 sensors to take to their home EJ

https://doi.org/10.1017/cts.2024.305