

with X-rays, process the data, and determine the structure of protein and AI. **RESULTS/ANTICIPATED RESULTS:** We anticipate finding the structure of the CqsR CACHE domain to a high resolution in addition to the identity of its autoinducer. Previous results found that the structure is homologous to another *V. cholerae* chemoreceptor, Mlp37, and we expect the results from this project to confirm this. In addition, we know that the autoinducer weighs approximately 62 daltons, the same as the known ligand, ethanolamine. Given that CACHE domains bind specifically to their ligands, we anticipate that the autoinducer will be structurally similar to ethanolamine. **DISCUSSION/SIGNIFICANCE:** The results will reveal the structure of the CqsR CACHE domain and its autoinducer. This knowledge will better allow researchers to treat cholera, as both autoinducer identity and receptor conformational changes will be uncovered, allowing for drug development to inhibit cell growth.

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### **The Aging Exposome: Characterizing Bidirectional Effects of Exposures and Aging**

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**OBJECTIVES/GOALS:** The objective of this study is to synthetically generate and use records of exposure, and so that we can understand the effects of exposure on aging and vice-versa. **METHODS/STUDY POPULATION:** Quantifying bidirectional effects of environment and aging requires time series of data from all contributing exposures which can span endogenous processes within the body, biological responses of adaptation to environment, and socio-behavioral factors. Gaps in measured data may need to be filled with computationally modeled data. Essentially, the challenge in generating aging exposome is the absence of readily available records for individuals over the course of their life. Instead, these would need to be assimilated from historic person reported data (e.g. residential location, durations, behaviors) along with publically available data. This could lead to potential gaps and uncertainties that would need inform on how the exposomic records can be used for aging research. **RESULTS/ANTICIPATED RESULTS:** We present a pragmatic approach to generation of longitudinal exposomic and aging records as required for different study archetypes. Such records can then be used to understand the bidirectional effects of exposures and aging. **DISCUSSION/SIGNIFICANCE:** Effects of a lifetime of environmental and lifestyle exposures on aging or age-associated diseases are not well understood. Characterizing differential, additive and intense sporadic multi-agent exposures require advanced big data and artificial intelligence methods.

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### **The Prospective Geriatric Patient Reported Outcomes (GERI-PRO) Study: Understanding Post-Traumatic Injury Recovery from the Patient's Perspective**

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**OBJECTIVES/GOALS:** Patient reported outcomes (PROs) provide unique insight to the patients experience with their healthcare related quality of life QoL. This study aims to 1. Characterize geriatric

trauma patients'(GTPs) perceived QoL, at time of injury vs. 3- and 6-months post-injury. 2. Introduce and validate a PROs tool, known as the Five Favorite Activities. **METHODS/STUDY POPULATION:** This is a prospective cohort study of older adults ( $\geq 65$ ) presenting to our trauma center with mild traumatic brain injury and/or mild spine, thoracic or extremity fractures. Participants will be asked to complete the NIH-validated Patient-Reported Outcome Measure Information System (PROMIS)-29, PROMIS Cognitive and Functional Abilities, Life-Space Levels and Five Favorite Activities assessment (a list of the five favorite overall and daily activities) tools. Cognitive function will be measured using Montreal Cognitive Assessment tool. Physical function will be evaluated using the Activity Measure for Post-Acute Care 6-click tool. Patients will be contacted at 3- and 6- months post discharge and asked to complete the assessment tools listed above to evaluate changes in QoL during the recovery process. **RESULTS/ANTICIPATED RESULTS:** We hypothesize that geriatric trauma patients will experience a decline in QoL, physical and cognitive function post-injury. This decline will be associated with a decrease in return to the ability to participate in their pre-injury Five Favorite Activities. **DISCUSSION/SIGNIFICANCE:** First, this study is one of the first to evaluate PROMs in GTPs. Second, the Five Favorite Activities PROM, will provide a unique, direct and individualized characterization of what GTPs find important to their recovery post injury compared to the current generic PROMs. This information can be utilized in the future to align goal of care with expectations

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### **Topical adenosine treatment inhibits inflammation and mucus production in viral acute rhinosinusitis**

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**OBJECTIVES/GOALS:** Viral acute rhinosinusitis (ARS), a.k.a, the common cold, affects millions every year. The symptoms caused by viral ARS dramatically affect the general well-being and functional levels of patients, causing work and school absence, and antibiotic abuse. In this study, we examined the therapeutic potential of topical adenosine in viral ARS **METHODS/STUDY POPULATION:** Rhinosinusitis was induced in WT and adenosine receptor (AR) knockout mice by respiratory syncytial virus (RSV) infection in the upper airways. Mice were subjected to adenosine or vehicle control within the sinuses. Adenosine receptor expression, inflammatory cytokine expression, and histologic mucus and inflammation score was assessed. The effect of endogenous adenosine accumulation within the sino-nasal tract was assessed in adenosine deaminase knockout (ADA<sup>-/-</sup>) mice. **RESULTS/ANTICIPATED RESULTS:** Topical administration of adenosine significantly inhibited the expression of pro-inflammatory cytokines, mucus production, and cell damage in the nose of mice with viral ARS, without prolonging virus clearance. This inhibitory effect was primarily mediated by the A2A adenosine receptor (AR). We also examined and compared the