illnesses. The small number of mentally ill patients undergoing TAVR may point to provider bias as a contributor to this high selectivity, and further evaluation would be of clinical use.

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Metabolomics Approach to Cellular Senescence: Characterizing the Secretory Phenotype and Metabolism of Irradiation-Induced Senescent Human Pre- Adipocytes

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OBJECTIVES/GOALS: The study aims to identify and measure metabolites in irradiation-induced senescent pre-adipocytes induced by the increased secretion of pro-inflammatory cytokines. Through untargeted metabolomics, we seek to understand the alterations to metabolism and mitochondrial activity that occur during irradiation-induced senescence. METHODS/STUDY POPULATION: First, commercially available human primary subcutaneous pre-adipocytes were cultured in vitro, and irradiated to induce senescence. To confirm senescence, cells were stained for beta-galactosidase, which was positive in senescent pre-adipocytes. The cells and their conditioned cultured media were then collected and frozen for untargeted metabolomics to profile metabolites. The sample analysis is currently underway and will be conducted using central carbon isotope tracing and chromatograph mass spectrometry. Principal Component Analysis, fold change analysis, and heat maps will be used to detect and report the changes in metabolite signals. Oxygen consumption rate and extracellular acidification rate measurements are in progress at present using the Agilent Seahorse XF Cell Mito Stress Test. RESULTS/ANTICIPATED RESULTS: We expect that metabolites of central carbon metabolism and oxidative phosphorylation will be upregulated. The concentrations of metabolites of pathways altered by the pro-inflammatory cytokines that have been identified to be secreted by senescent cells are expected to be altered. The metabolites measured in conditioned culture media will provide insight into the changes to the cellular microenvironment caused by senescence. Finally, we anticipate that mitochondrial function, and both aerobic and anaerobic metabolism will be altered in senescent pre-adipocytes compared to controls. Through the present study, we will achieve a better understanding the metabolic alterations that occur as part of cell senescence in pre-adipocytes. DISCUSSION/SIGNIFICANCE: Adipose tissue dysfunction due to the accumulation of senescent cells has been linked to chronic diseases such as diabetes and insulin resistance, and inflammaging. Through this study, we expect to provide new insight into the metabolic alterations of senescence and offer a backbone for prospective translational human studies and clinical trials.

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Microstructural changes in the brainstem regions of the auditory pathway among children with hearing loss

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OBJECTIVES/GOALS: Diffusion MRI can identify microstructural brain changes and can provide insight into neural development and to potentially prognosticate speech and language outcomes in children with SNHL. The goal of our study was to investigate MRI-based microstructural changes along the brainstem regions of the auditory pathway in pediatric patients with SNHL. METHODS/STUDY POPULATION: We reviewed cohort of pediatric patients with SNHL who obtained MRI at 3T between 2011 and 2019. We identified 16 pediatric patients (age RESULTS/ANTICIPATED RESULTS: We identified significant differences in FA values of the SON between the SNHL cohort and controls (0.377 ± 0.056 vs 0.422 ± 0.052; p=0.009). No other FA or MD values were significantly different between the two groups. Among younger children (ï‚£5 years), MD was significantly decreased in the SNHL cohort compared to controls in the IC (0.918 ± 0.051 vs 1.120 ± 0.142; p5 years), there were no significant differences in MD (1.124 ± 0.198 vs 0.997 ± 0.103; p = 0.119). There were no significant differences in MD or FA in the white matter fibers of the IC-SON tract. DISCUSSION/SIGNIFICANCE: This study is the first to assess microstructural changes in brainstem auditory pathway regions among children with SNHL. Longitudinal studies are warranted to assess the predictive value of these MRI-based findings for long-term outcomes and the efficacy of intervention.

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Non-invasive and quantitative surgical outcome evaluation of patients with sagittal craniosynostosis undergoing sagittal craniectomy*

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OBJECTIVES/GOALS: Craniosynostosis is the premature fusion of one or more cranial sutures that produces brain growth constraints and typically requires surgical treatment. We present an age- and sex-specific method to evaluate surgical outcomes using non-invasive 3D photogrammetry that brings objectivity to the current approach for clinical assessment. METHODS/STUDY POPULATION: First, we created standardized head anatomy representations for 2,020 patients (1,081 males, 939 females, age 3.14 ± 3.05 years) without cranial pathology from their computed tomography (CT) images based on our previous methods. We used principal component regression stratified by sex to establish age-specific normative ranges of anatomical variability and we designed a new metric called cranial shape abnormality (CSA) index that calculates the number of standard deviations from normality of a given patient's head anatomy. We calculated our CSA index in a group of 56 patients (44 male, 12 female) with sagittal craniosynostosis who underwent sagittal craniectomy from their pre- (22 ± 30 days before surgery) and post-surgical (267 ± 63 days after surgery) 3D photograms to evaluate surgical outcomes. RESULTS/ANTICIPATED RESULTS: We observed a reduction in the CSA index from 1.28 ± 0.26 before surgery to 0.87 ± 0.22 after surgery ($p < 0.001$ with a paired Wilcoxon test). The CSA index decreased in 53 of 56 patients (94.6%), who consistently

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