normal or doxycycline chow for nuclear sAC induction, then subdivided to receive vehicle or vemurafenib to examine the effect of nuclear sAC activity on treatment response in vivo. We will also compare melanoma biopsies collected before and after treatment with BRAF inhibitors to assess how nuclear sAC staining affects tumor morphology in vivo. RESULTS/ANTICIPATED RESULTS: So far, nuclear sAC activity has rendered SkMel178 and M263 cell lines more susceptible to vemurafenib. Cell viability was inversely correlated both with vemurafenib and with doxycycline concentration. Cell viability after vemurafenib treatment was dramatically reduced when nuclear sAC was activated. It appears that nuclear sAC enhances the sensitivity of BRAF mutant melanomas to vemurafenib in vitro. We anticipate that xenografts of these cells in mice will be more susceptible to vemurafenib when nuclear sAC is activated. We also anticipate that positive nuclear sAC staining will correlate with a favorable response to therapy. DISCUSSION/SIGNIFICANCE OF FINDINGS: Targeted therapy with BRAF inhibitors is used in late-stage melanomas, but its use is limited as patients invariably acquire resistance. Here, we identified nuclear sAC activation as a novel candidate for combination strategy. Our data will also inform clinicians how best to integrate this biomarker into their decision-making regarding therapy.

### Contribution of Auditory Function to Falls Risk in Adults with Vestibulopathy

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ABSTRACT IMPACT: Findings from this study will better characterize the role of hearing loss in falls risk among patients with vestibulopathy and identify groups that are most at risk for falls. OBJECTIVES/GOALS: Vestibular dysfunction and hearing loss are independent risk factors for experiencing falls. The purpose of this study is to determine the extent, if any, to which hearing loss contributes to falls in patients with concomitant vestibular dysfunction presenting to a specialty vestibular clinic. METHODS/STUDY POPULATION: A retrospective chart review of patients ≥18 years who underwent vestibular evaluation at our institution from June 1, 2015 to October 7, 2020 will be conducted. Patients who underwent vestibular evaluation also received audiologic evaluation and degree of hearing loss will be characterized by the 4-frequency pure-tone average (0.5, 1, 2, and 4 kHz) of the better hearing ear. Falls status will be determined by the response to the following question administered at clinic-check in, 'Have you fallen in the last 90 days?' Demographics, comorbidities, and falls-associated medications will also be collected. RESULTS/ANTICIPATED RESULTS: A total of 3,265 unique patients who underwent vestibular evaluation in the study time period were identified. Patients will be categorized into discrete groups (benign paroxysmal positional vertigo, unilateral hypofunction, bilateral hypofunction, central dysfunction, and normal) based on laboratory results. Regression models will be developed to evaluate the potential association between degree of hearing loss and falls in patients with different types of vestibular dysfunction, while adjusting for demographics, comorbidities, and falls-associated medications. DISCUSSION/SIGNIFICANCE OF FINDINGS: Findings from this study will better characterize the role of hearing loss in falls risk among patients with vestibulopathy and identify groups that are most at risk for falls. This study may potentially indicate the importance of hearing evaluation in the work-up of patients with vestibulopathy.

### Body Composition and Metabolic Profiles in Infants of Diabetic Mothers (IDM) as Predictors of Hunger Signaling Gene Expression

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ABSTRACT IMPACT: This study aims to advance the understanding of the biological mechanisms associated with feeding disturbances in infants born to diabetic mothers through non-invasive salivary gene expression analyses and body composition measurements at birth. OBJECTIVES/GOALS: To determine if non-invasive salivary gene expression analyses and body composition measurements at birth could elucidate biological mechanisms associated with aberrant feeding behaviors and disrupted metabolic profiles commonly seen in infants born to diabetic mothers. METHODS/STUDY POPULATION: This prospective cohort study enrolls subjects born at ≥35 weeks' gestation without a history of intrauterine growth restriction or major congenital anomalies. The diabetic cohort is defined as infants born to mothers with gestational diabetes or type 2 diabetes. The primary outcome is salivary expression of the hunger signaling genes, AMPK and NPY2R. Secondary outcomes include infant body composition measurements, obtained by skinfold measurement and/or air displacement plethysmography, and salivary expression of the adipokines, leptin, ghrelin, and adiponectin. Multiple logistic regression will be used to determine which factors are associated with AMPK and NPY2R expression. RESULTS/ANTICIPATED RESULTS: We propose that poor oral intake seen in infants of diabetic mothers may be due to alterations in the expression of hunger signaling genes (decreased expression of AMPK; increased expression of NPY2R) resulting in a diminished feeding drive in these large for gestational age infants. In addition, infant adiposity and the expression of genes involved in the adipoinsular axis will be inversely proportional to feeding volume intake. Namely, increased neonatal fat mass will be associated with increased expression of leptin and decreased expression of ghrelin and adiponectin. DISCUSSION/SIGNIFICANCE OF FINDINGS: Infants of diabetic mothers are at higher risk of poor oral feeding in the newborn period. This study aims to elucidate the link between neonatal body composition, adipoinsular axis, and hunger signaling to explain this unique feeding phenotype.

### Non-Suicidal Self Injury in Military Veterans with PTSD: An Ecological Momentary Assessment Study

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ABSTRACT IMPACT: This study will help determine whether ecological momentary assessment is feasible in assessing changes in negative affect and the occurrence of non-suicidal self-injury (NSSI) in military Veterans with post-traumatic stress disorder; if so it will allow for further examination of correlates of NSSI which will inform