RARRES1-depleted epithelial cells. Extracellular flux assays were used to assess the phenotype of RARRES1-depleted epithelial cells treated with or without metformin. RESULTS/ANTICIPATED RESULTS: RARRES1 is a major regulator of mitochondrial function. Its depletion in tumors induces an oxidative phosphorylation dependent phenotype and subsequently increases ATP abundance in the cell, enhances anabolic pathways and increases survival. Treatment with FDA approved mitochondrial respiration inhibitor, metformin, reversed the metabolic phenotype of RARRES1 depleted-epithelial cells. Metformin could be the ideal therapeutics to reduce tumor burden in cancers with loss of or low expression of RARRES1. DISCUSSION/SIGNIFICANCE OF IMPACT: Bioenergetic dynamics are emerging as a basis for understanding the pathology of cancer. The malignancy progresses as its metabolic pattern and mitochondrial respiration become more dysfunctional. The regulatory pathways of bioenergetic dynamics are currently poorly understood, and the characterization of proteins implicated in those processes must be assessed. One understudied protein and tumor suppressor is RARRES1. RARRES1 is induced by retinoic acid (a major metabolic regulator) and functions as a putative carboxypeptidase inhibitor. Understanding the connection between this carboxypeptidase inhibitor and intermediary metabolism will enlighten our understanding of the bioenergetic profile of cells and facilitate the discovery of personalized metabo-therapeutics in the context of cancer.

2436

Disagreement in middle ear volume values between tympanometry and 3-dimensional volume reconstruction

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OBJECTIVES/SPECIFIC AIMS: Middle ear volume (MEV) is a clinically relevant parameter in the treatment of many common conditions including otitis media, tinnitus, and conductive hearing loss. A growing number of studies have shifted from using tympanometry to 3-dimensional volume reconstruction (3DVR) to calculate MEV; however, MEV values between these methodologies have never before been directly compared. Here, our objective is to characterize agreement between MEV measurement methods across disease states and middle ear sizes. METHODS/STUDY POPULATION: Middle ears were identified from 36 patients ranging 18–89 years of age who underwent tympanometry testing during preoperative workup for tympanic membrane (TM) perforation, up to 1 month prior to a standard-of-care temporal bone computed tomography (CT) between October 15, 2005 and October 15, 2015. MEV values calculated by both tympanometry and 3DVR were analyzed for agreement using Bland and Altman plots. A correction factor was calculated where ear canal volumes were available for contralateral middle ears without TM perforation (n = 12), and was applied to a second Bland and Altman plot in the corresponding patient subgroup. MEV agreement was characterized across MEV quartiles (1 = smallest; 4 = largest) and across increasing states of middle ear disease using Kruskal-Wallis and Wilcoxon testing with Bonferonni correction. RESULTS/ANTICIPATED RESULTS: A Bland Altman plot demonstrated significant disagreement of MEV differences as compared to a priori clinical thresholds. Absolute MEV difference was significantly greater in the average MEV fourth to first quartile ($p = 0.0024$), fourth to second quartile ($p = 0.0024$), third to first quartile ($p = 0.0048$), and third to second quartile ($p = 0.048$). Absolute MEV difference was not significantly different across varying states of middle ear disease ($p = 0.44$). DISCUSSION/SIGNIFICANCE OF IMPACT: Statistically evident and clinically significant disagreement was demonstrated across tympanometric and 3DVR MEV estimates. This lack of agreement was most pronounced at higher average MEV and was persistent yet not appreciably different across varying severities of middle ear disease. These findings may limit the generalizability of studies of the middle ear that differ in MEV estimation methodology, particularly in pathophysiological states where MEV is increased.

2504

Defining peripheral B cell tolerance in pemphigus vulgaris

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OBJECTIVES/SPECIFIC AIMS: Pemphigus vulgaris (PV) is a potentially fatal blistering disease caused by autoantibodies to the keratinocyte adhesion protein desmoglein 3. Several other autoimmune diseases have defective B cell tolerance checkpoints, resulting in the accumulation of self-reactive and polyreactive B cells. METHODS/STUDY POPULATION: The present work aims to determine whether PV patients develop normal tolerance to self-antigens other than desmoglein 3, as a potential "first hit" in the development of autoimmunity. We use FACS to isolate single B cells at 4 developmental stages from 8 PV patients. We perform single-cell RT-PCR to amplify each B cell receptor, produce monoclonal antibodies, and screen these for autoreactivity using ELISA/IF to several self-antigens. At each B cell stage, we compare the frequencies of self-reactive and polyreactive B cells to those found in healthy controls. RESULTS/ANTICIPATED RESULTS: We anticipate similar frequencies between PV patients and controls, suggesting that the B cell repertoire in PV patients develops normally at early checkpoints. DISCUSSION/SIGNIFICANCE OF IMPACT: The absence of generalized reactivity would distinguish PV from other autoimmune diseases and would show that PV arises from a specific break in tolerance to a single self-antigen (desmoglein 3) during late B cell maturation. Such a result would further support PV as an ideal candidate for targeted immunotherapy.

2508

The role of platelet factor-4 (PF4 or CXCL4) in B cell differentiation

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OBJECTIVES/SPECIFIC AIMS: To investigate the role of platelet factor-4 (PF4) in B cell differentiation and develop strategies to better modulate B cell differentiation in vitro and in vivo. METHODS/STUDY POPULATION: We use tissue culture and flow cytometry to examine the role of PF4 in B cell differentiation. We use wild type (WT) and $PF4^{-/-}$ mice on a C57Bl6/J background. $PF4^{-/-}$ mice have reduced in vivo B cell differentiation responses. RESULTS/ANTICIPATED RESULTS: We anticipate that our studies will demonstrate that PF4 promotes B cell differentiation in the bone marrow microenvironment. DISCUSSION/SIGNIFICANCE OF IMPACT: The significance of this project may be valuable in developing efficient methods and strategies to increase or limit B cell numbers in vitro and in human disease.

2509

Estimation of HIV viral load using quantitative measurement of HIV-p24 on lateral flow immunoassays

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OBJECTIVES/SPECIFIC AIMS: High-sensitivity diagnostics for early infant diagnosis (EID) of HIV at the point of care (POC) are not widely available. Lateral flow immunoassays (LFA) can detect HIV-p24, but are not sensitive enough in practice. With improvements, LFA are a compelling platform for POC in EID. We used functionalized magnetic beads and immunocomplex dissociation to improve sensitivity of HIV-p24 LFA. Here, we evaluate the utility for LFA to quantitatively report HIV-p24 concentration and estimate HIV viral load. Using purified p24 protein and virion constructs, we determined the limits of detection for HIV-p24 using LFA rapid tests. Using measurements from HIV-p24 ELISA, laboratory-developed RT-qPCR, droplet digital PCR, and gold standard clinical viral load, we further characterized the relationship between HIV-p24 concentration, HIV genomic RNA, and LFA test line signal. METHODS/STUDY POPULATION: We measured HIV-p24 concentration by ELISA (R&D Systems) and LFA (Alere Determine HIV-1/2 Ab/Ag Combo). An LFA reader instrument was used to image test lines and measure test line signal on the LFA. HIV viral loads were measured using RT-qPCR and droplet digital RT-PCR protocols adapted in our lab. We obtained gold standard viral load measurements using the Roche Cobas TaqMan system at Vanderbilt University Medical Center. Data analysis was performed using Prism 7 and Stata 14. RESULTS/ANTICIPATED RESULTS: LFA test line signal increases in a predictable, dose-dependent manner and correlates with concentration of purified HIV-p24 with a linear range between 50 and 1000 pg/mL (Spearman $r = 1$; $p = 0.0004$). We compared p24 concentration (ELISA). We evaluated the utility of LFA to quantify HIV-p24 from virions suspended in human plasma, which increased the limit of detection for HIV-p24 to 100 pg/mL and shifted the linear range 100–10,000 pg/mL (Spearman $r = 0.77$; $p < 0.001$). To evaluate the relationship between HIV-p24 concentration and concentration of HIV RNA, we employed 3 molecular techniques. The LFA is capable of detecting HIV-p24 concentrations that correspond to a range of viral loads between 653,000 and

https://doi.org/10.1017/cts.2017.53 Published online by Cambridge University Press

1655 copies of viral RNA/mL. DISCUSSION/SIGNIFICANCE OF IMPACT: Our preliminary results are very promising, indicating that commercially available LFA can quantitatively measure HIV-p24 concentration to low levels. When coupled with our analysis of the relationship between HIV-p24 concentration and HIV RNA concentration, LFA may be a potential platform allowing us to estimate HIV viral burden at clinically relevant levels. Our next steps will be to evaluate this relationship in primary, clinical specimens in collaboration with the Tennessee Center for AIDS Research. We will incorporate technologies to improve the sensitivity of these LFA and evaluate their performance in field settings in Zambia. Our findings are broadly applicable for use in HIV care and treatment programs and early infant diagnosis programs around the world.

2536

The effect of skeletal muscle lipoprotein lipase overexpression on energy expenditure during weight loss maintenance and weight regain

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OBJECTIVES/SPECIFIC AIMS: Obesity is a rapidly growing epidemic and long-term interventions aimed to reduce body weight are largely unsuccessful due to an increased drive to eat and a reduced metabolic rate established during weight loss. Previously, our lab demonstrated that exercise has beneficial effects on weight loss maintenance by increasing total energy expenditure above and beyond the cost of an exercise bout and reducing the drive to eat when allowed to eat ad libitum (relapse). We hypothesized that exercise's ability to counter these obesogenic-impetuses are mediated via improvements in skeletal muscle oxidative capacity, and tested this using a mouse model with augmented oxidative capacity in skeletal muscle. METHODS/STUDY POPULATION: We recapitulated the exercise-induced improvements in oxidative capacity using FVB mice that overexpress lipoprotein lipase in skeletal muscle (mLPL). mLPL and wild type (WT) mice were put through a weight-loss-weight-regain paradigm consisting of a high fat diet challenge for 13 weeks, with a subsequent 1-week calorie-restricted medium fat diet to induce a ~15% weight loss. This newly established weight was maintained for 2 weeks and followed with a 24-hour relapse. Metabolic phenotype was characterized by indirect calorimetry during each phase. At the conclusion of the relapse day, mice were sacrificed and tissues were harvested for molecular analysis. RESULTS/ANTICIPATED RESULTS: During weight loss maintenance, mLPL mice had a higher metabolic rate ($p = 0.0256$) that was predominantly evident in the dark cycle ($p = 0.0015$). Furthermore, this increased metabolic rate was not due to differences in activity ($p = 0.2877$) or resting metabolic rate ($p = 0.4881$). During relapse, mLPL mice ingested less calories and were protected from rapid weight regain ($p = 0.0235$), despite WT mice exhibiting higher metabolic rates during the light cycle ($p = 0.0421$). DISCUSSION/SIGNIFICANCE OF IMPACT: These results highlight the importance of muscular oxidative capacity in preventing a depression in total energy expenditure during weight loss maintenance, and in curbing overfeeding and weight regain during a relapse. Moreover, our data suggest that the thermic effect of food is responsible for the differences in metabolic rate, because no differences were found in activity or resting metabolic rate. Additional studies are warranted to determine the molecular mechanisms driving the ability of oxidative capacity to assist with weight loss maintenance.

BIOMEDICAL INFORMATICS/HEALTH INFORMATICS

2048

Two EMR query strategies to assess prevalence of adrenal incidentaloma

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OBJECTIVES/SPECIFIC AIMS: To compare methods of ascertaining prevalence for adrenal incidentalomas METHODS/STUDY POPULATION: Retrospective electronic medical record study using Looking Glass Clinical Analytics (Streamline Health, Atlanta, GA, USA) at an urban university medical center. All patients with CT or MR imaging of the abdomen between 1997 and 2014 were identified. Patients with a documented diagnosis (ICD-9 code or problem list) for any history of adrenal disease were excluded. The prevalence of adrenal incidentalomas was ascertained by 2 different detection strategies: (1) documented diagnosis of adrenal incidentaloma or (2) imaging reports containing in the same sentence "adrenal" and "nodule*," "adenoma*," or "mass*," and not containing "no" and "adrenal" in the same sentence. Adrenal pathology surprise was further established in the second approach by excluding patients having previously undergone adrenal lab testing (cortisol, aldosterone, catecholamines, adrenocorticotropic hormone, renin) or having been registered in the cancer registry for any cancer excluding superficial skin cancers. RESULTS/ANTICIPATED RESULTS: In total, 194,624 individuals were identified in our initial search, from which 1056 were excluded for past adrenal disease (Table 1). Detection by the documented diagnosis method yielded 1578 cases (0.8%), compared with 13,697 cases (7.1%) by the imaging report method (Figure 1). Further restricting detection to true "Adrenal Surprise" by excluding those with any past adrenal lab testing and cancer history yielded 10,568 cases (6.1%). Validation studies for the 7.1% prevalence with 100 records revealed an adrenal incidentaloma positive predictive value (PPV) of 98%. When restricted to size ≥1 cm the PPV was 84%. DISCUSSION/SIGNIFICANCE OF IMPACT: Comparing our first strategy using documented diagnoses as criterion for incidentaloma as used in a recent paper by Lopez D (*Annals of Internal Medicine* 2016; 165: 533–542), we found a prevalence of 0.8% in our population similar to her 0.6%. However, when searching at the level of radiology report text, we found a prevalence ten-fold greater at 7.1%. Therefore, adrenal incidentalomas are more robustly identified by searching radiologic reports.

2085

MyResearchHome@Duke—launch and adoption of a portal for the research community

Rebecca Namenek Brouwer, Rebbecca Moen, Iain Sanderson, Ebony Boulware, Johanna O'Dell and Kellie Morris Browning

OBJECTIVES/SPECIFIC AIMS: Describe (1) the features of the first release of Duke's myRESEARCHhome portal for researchers, and 2) the methods and results of adoption strategies METHODS/STUDY POPULATION: Through methods described previously (cite ACTS poster, 2016), the myRESEARCHhome portal team conducted a needs assessment to determine priorities for inclusion in the tool. Based on results of that assessment, the "minimal viable product" launched in June 2016 included the following features, organized into 9 distinct widgets: Access to all web-based research applications; ability to find and request research services; at-a-glance view of financial, protocol, and salary distribution information; access to financial and personnel reports; access to status of agreements and patents; access to CTSA-supported navigation services; visibility into required training and expiration dates; listing of announcements relevant to researchers; customized links area; ability to customize portal. The portal was developed using Ruby on Rails™, with a REACT grid framework. The development team, internal to Duke University, followed industry-standard best practices for development. After the initial release, the team employed several strategies to ensure awareness and adoption. Although written communications were an important factor for awareness, the presentations and hands-on studios proved most important. RESULTS/ANTICIPATED RESULTS: Use of the portal was directly related to in-person outreach efforts. There were small spikes after written communications, but strategies such as presentations, hands-on demonstrations, training sessions, and faculty meetings garnered the steadiest adoption rates. As of early January, 2017, almost 3000 users have interacted with the portal, with numbers rising steadily. There are an estimated 10,000 + faculty, staff, and trainees engaged in research at Duke. DISCUSSION/SIGNIFICANCE OF IMPACT: To maintain high adoption rates with the research community, engagement strategies must be ongoing. In addition to frequent in-person demonstrations, updates via written communications, and attendance at events, the portal team will employ a key adopt strategy—engaging the researchers in ongoing needs assessments. By maintaining the portal's relevance to the needs of the research community, the tool can better improve the efficiency of research at a large academic medical center.

2101

Addressing African American glaucoma through genetics and electronic health records

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OBJECTIVES/SPECIFIC AIMS: The overall goal of this project is to understand the genetic and clinical differences in POAG that specifically increase risk in

https://doi.org/10.1017/cts.2017.53 Published online by Cambridge University Press