between 327 to 2,540 unique peptides for each of the 3 species. MABC proteomic analysis identified between 17-74 unique peptides for each of the 3 subspecies. Fifteen different mixed preparations of MAC and MABC were then subjected to LCMS analysis and compared against the proteome profiles already curated for the six strains. We accurately identified at least one NTM in the majority of the samples (10/15). In three samples (3/15), the NTM was not correctly identified; in two of the samples (2/15) we were unable to determine the identity of NTM within the preparation. Further database curation will be performed to hone these results. DISCUSSION/SIGNIFICANCE OF FINDINGS: Proteomic analysis of in vitro reference strains successfully demonstrated protein fingerprints specific to six common disease-causing strains of NTM. Such findings can be used to evaluate clinical samples enabling more efficient diagnostic specificity. Further research will focus on identification of NTM in sputum samples of infected patients.

Precision Medicine

42956

Patterns and impact of long-term glucocorticoid use on RA patients at risk for major adverse cardiac events

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ABSTRACT IMPACT: Glucocorticoid steroids are commonly used despite known dose-dependent cardiovascular toxicity, yet little is known about a) how patients with other cardiovascular risk factors use glucocorticoids, and b) how risks of glucocorticoid treatment might vary depending on a patient's baseline cardiovascular risk. OBJECTIVES/GOALS: Up to one-third of RA patients use long-term glucocorticoids (GCs) despite a known, dose-dependent association with increased risk of major adverse cardiovascular events (MACE). We aim to evaluate patterns of GC use among RA patients with other MACE risk factors (i.e. diabetes, smoking), and examine how GC use may potentiate these risk factors. METHODS/STUDY POPULATION: We used claims data from Veterans Health Administration to identify 6,090 RA patients with ≥1 rheumatology clinic visit during 2013-2017. We used logistic regression to evaluate associations between incident MACE between 2013-2018, recent long-term GC use, and 5 MACE risk factors: hypertension, diabetes, hyperlipidemia, smoking, and prior MACE. We included two-way interaction terms between GC use and each risk factor. We used a claims-based algorithm to define MACE as any of acute MI, ischemic stroke, TIA, sudden death, or coronary revascularization, between index date and 12/31/2018. We defined index date as first rheumatology visit after meeting RA diagnostic criteria, and recent long-term GC use as ≥90 days' supply dispensed over 2 years prior to index date. RESULTS/ANTICIPATED RESULTS: Among 2,884 eligible patients,1,553 (54%) had MACE risk factors, and 97 (3%) had prior MACE (Table 1). Overall, 16% of patients recently used long-term GC, compared to 17% of patients with MACE risk factors, and 22% of patients with prior MACE. Incident MACE occurred in 308 (11%) patients, 24% of whom had recent long-term GC use. Recent long-term GC use was independently associated with increased incident MACE (Table 2). While no interaction term was statistically significant overall, differences in odds of incident MACE were seen across levels of recent GC use for several risk factors, particularly diabetes (OR 2.10, 95% CI [0.93-4.77]), tobacco use (OR 2.88, 95% CI [1.16-7.14]) and prior MACE (OR 2.41, 95% CI [0.73-7.95]). DISCUSSION/SIGNIFICANCE OF FINDINGS: Long-term GC use is common among RA patients with MACE risk factors. In this cohort, 25% of patients with incident MACE had recently used long-term GC. Long-term GC use may potentiate effects of comorbidities like diabetes and smoking, disproportionately increasing MACE risk in certain patients.

57884

Fast strain-encoded cardiac magnetic resonance detects immune checkpoint inhibitor associated cardiotoxicity

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ABSTRACT IMPACT: Advanced cardiac magnetic resonance imaging techniques can help to protect cancer patients from cardiotoxicity from immunotherapy with a more sensitive assessment of cardiac function with strain imaging for detection of abnormal cardiac function in the setting of normal left ventricular ejection fraction. OBJECTIVES/GOALS: Immune checkpoint inhibitors (ICI) are associated with fatal cardiotoxicity. Cardiac magnetic resonance (CMR) imaging can assess ICI-associated cardiotoxicity, but the utility of CMR strain imaging is unknown. We present a study of patients with ICI-associated cardiotoxicity evaluated with fast strain-encoded (fast-SENC) CMR. METHODS/STUDY POPULATION: This prospective study was approved by the institutional IRB and informed consent was obtained from 15 patients (5 patients with ICI-associated cardiotoxicity, 10 controls patients) between August 2018 and January 2020. All patients with ICI-associated cardiotoxicity had abnormal troponin values and evidence of cardiotoxicity on T2-weighted and/or delayed enhancement CMR images. All patients underwent standard CMR assessment with steady state free precession cine images, T2-weighted imaging, and delayed gadolinium enhancement imaging. Additionally, free-breathing SENC images were obtained and then processed by a team of blinded cardiovascular imaging specialists using Myostrain software (Morrisville, USA). RESULTS/ANTICIPATED RESULTS: Left ventricular ejection fraction (LVEF) was normal in both groups (ï‚³53%). Global longitudinal LV strain was significantly depressed in the ICI cardiotoxicity group versus controls (-12.8 ±3.2% vs. -16.6 ±1.9%, p=0.028). The average global circumferential LV strain was mildly abnormal (defined as strain > -17) in the ICI cardiotoxicity group and trended towards a higher value compared with controls (-16.0 ±2.6% vs -17.8 ±1.7%, p=0.103). The average number of dysfunctional segments (defined as strain > -10) was significantly

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higher in the ICI cardiotoxicity group (6.8 ±4.2 vs. 1.0 ±1.7, p=0.017). The proportion of abnormal myocardium was higher in the ICI cardiotoxicity group (66 ±21% vs. 45 ±18%, p=0.050), as well as the proportion of myocardium found to be dysfunctional (26 ±22% vs. 3.0 ±6.0%, p=0.041). DISCUSSION/SIGNIFICANCE OF FINDINGS: Despite having preserved LVEF, patients who met criteria for ICI-associated cardiotoxicity had both global and regional abnormal LV strain. Fast-SENC imaging may provide a sensitive tool for detection of early cardiotoxicity in this population. This study is limited by its small cohort and a larger prospective study would be of value.

65993

Peptide Conjugated Hollow, Degradable Nanoparticles Bind to Exposed Hyaluronic Acid for the Prevention and Treatment of Osteoarthritis

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ABSTRACT IMPACT: Our research would be the first therapeutic to both prevent and treat osteoarthritis - helping 27 millions U.S. citizens alone immediately. OBJECTIVES/GOALS: Our objective is to conjugate hyaluronic acid binding peptides (HABP) to anionic hollow nanoparticle (hNP), and allowing the HABP-hNP complex to penetrate into osteoarthritic cartilage, bind to exposed HA, prevent further degradation, and restore the compressive strength of articular cartilage. METHODS/STUDY POPULATION: N-isopropyl acrylamide, 2-acrylamindo-2-methyl-1-propanesulfonic acid, N,N'-bis (acryoyl)cystamine, and Acrylic Acid, in fluorescent batches rhodamine b isothiocyanate (RBITC), were polymerized via precipitation reaction. HA binding peptide, GAHWQFNALTVRGSG-Hydrazide (GAH-Hyd), was covalently bonded to the hNP using DMTMM chemistry. The reaction was halted by diluting the solution 10:1 with milliQ water and purified using tangential flow filtration. The dynamic viscosity of the six treatments were analyzed in a 70 kDa HA. Using a rheometer (Discovery HR-3) with a 20 mm parallel plate geometry, TA Instruments, New Castle, DE), a frequency sweep (0.01 -1000 Hz, 2.512 Pa) was conducted to measure the storage modulus of each solution. RESULTS/ANTICIPATED RESULTS: GAH-Hyd was successfully conjugated to the surface of the hNP and zeta-potential shows a significant increase in surface charge from -21.41 mV for unconjugated hNP to -8.94 mV for 65 GAH conjugated hNP, confirming conjugation. The hNPs need 65 ±10 GAH per nanoparticle to significantly bind to HA, shown by increasing the dynamic viscosity of the solution. The minimum concentration of 65 GAH-hNP required to significantly bind to HA is 313 μM. These data from our study display the ability to functionalized the surface of polymeric hNPs with site specific peptides and their ability to bind to diseased tissue. We expect the GAH-hNP system will restore the compressive strength of OA cartilage and prevent further HA degradation in ex vivo aggrecan depleted cartilage plugs. DISCUSSION/SIGNIFICANCE OF FINDINGS: Binding to exposed HA within the ECM of cartilage protects the HA from further degradation, halting the progression of OA. 65 GAH-hNP binds to HA at a 313 μM. Our system can be translated and used to treat a multitude of conditions by conjugating tissue specific peptides to the surface of our hNPs and delivery site specific therapeutics to diseases tissue.

Regulatory Science

19751

Identifying Barriers to Diabetes Technology in Low-Income, Type 1 Patients

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ABSTRACT IMPACT: This research will aid clinical and policy solutions on lessening the vast health disparities and overall access issues for low-income, type 1 diabetes patients. OBJECTIVES/GOALS: Identify key barriers to accessing continuous glucose monitors (CGMS) and care options for low-socioeconomic status (SES) patients on public insurance. Low-SES patients with type 1 diabetes (T1D) have lower utilization rates of effective diabetes management technologies and worse clinical outcomes. METHODS/STUDY POPULATION: A literature review was conducted to understand the current research landscape for T1D and lead to the identification of potential barriers which included socioeconomic status, low-income, health literacy, and racial/ethnic minority. Clinicaltrials.gov was searched using the keyword 'type 1 diabetes' in conjunction with the identified barriers (as well as the keyword 'barrier'). A follow up review of each state's Medicaid programs was conducted to analyze cost and access options for CGMs and the overall financial burden of the disease on low-SES T1D patients. States that offered CGM coverage were further analyzed to determine reimbursement rates and actual out-of-pocket cost for patients. RESULTS/ANTICIPATED RESULTS: Of 285 trials identified from Clinicaltrial.gov searches, only seven relevant trials examined barriers and T1D for low-SES patients. Additionally, many of these studies, both in and outside of the clinical trial space, seldom distinguished between type 1 and type 2 diabetes‟ an important distinction given that T1D has a higher financial burden and a quicker onset of complications. Currently, 39 states offer various insurance coverage through their Medicaid programs, but have clinical restrictions and requirements such as pediatric coverage only or minimum blood glucose requirement checks. Additionally, there is vast variability in reimbursement rates between states ($0-$800). DISCUSSION/SIGNIFICANCE OF FINDINGS: Study results indicate less effective diabetes management for low-SES T1D patients and a need for more intersectional clinical trial research. Differences in state's Medicaid CGM coverage, expressed in disparate clinical outcomes for these T1D patients, belies financial incentives to health improvements, as annual US T1D costs are $14.4 billion.

67702

At-Home Screening Tool for Anosmia

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ABSTRACT IMPACT: By developing and validating a simple and cost-effective at-home screening tool for loss of smell, we can efficiently detect infection with COVID-19, neuropsychiatric disease such as Alzheimer's, and post-operative smell loss. OBJECTIVES/GOALS: To develop and validate a feasible and cost-effective screening tool for olfactory dysfunction (OD) using common household items. METHODS/STUDY POPULATION: The study has two phases. In the Development phase, 120 participants with

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