

3 months postTx. RESULTS/ANTICIPATED RESULTS: We hypothesize that those patients with protective immunity to live vaccines prior to cancer therapy will lose it at the end of therapy. DISCUSSION/SIGNIFICANCE OF IMPACT: Loss of protective immunity to live vaccines has been reported in patients with hematologic malignancies after cancer therapy. This lack of protective immunity, which puts patients at higher risk of acquiring vaccine preventable diseases, has been limited studied in patients with solid tumors. The Center for Diseases Control has been established that it is safe to immunize cancer survivors with live vaccines 3 months post Tx. However, no clear guidelines for revaccination have been provided for this population. Understanding the protective immunity variation against live vaccines in children with solid tumors will allow us to identify the need for revaccination with live vaccines in this vulnerable population.

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A pilot study: Using computational fluid dynamics to model physiologic airflow through an ovine tissue engineered tracheal graft

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OBJECTIVES/SPECIFIC AIMS: Tissue engineered tracheal grafts (TETG) could provide a life-saving cure for children with long segment airway defects. Computational fluid dynamics (CFD) is a novel and promising technique used to evaluate TETG performance. This pilot study examines the correlation of objective CFD simulations with subjective respiratory symptoms in a TETG large animal model. METHODS/STUDY POPULATION: Three-dimensional geometries of 1 TETG implanted sheep trachea were reconstructed from serial fluoroscopic images, allowing analysis with CFD simulations. Peak flow velocity (PFV) and peak wall shear stress (PWSS) across the graft as well as changes secondary to stenting were determined. CFD metrics were compared with respiratory symptoms seen on exam. RESULTS/ANTICIPATED RESULTS: Two weeks after implantation, the animal developed respiratory distress, which correlated with PFV and PWSS elevations. Although the intraluminal graft appearance changed minimally after dilation, PFV and PWSS decreased across the graft (4.5–0.8 m/s and 0.9–0.1 Pa, respectively). Long-term TETG stenting with dilation returned PFV and PWSS to baseline (0.8–0.3 m/s and 0.1–0.01 Pa, respectively), which correlated with immediate symptom resolution. DISCUSSION/SIGNIFICANCE OF IMPACT: CFD is a noninvasive modality, which allows the evaluation of airflow metrics of symptomatic TETG recipients. This diagnostic tool will permit planned interventions and graft design optimization.

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Alcohol reduces the ability to regulate emotion when exposed to evocative partner stimuli in individuals with a history of intimate partner violence

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OBJECTIVES/SPECIFIC AIMS: The objective of this research was to investigate the effect of alcohol and evocative stimuli on heart rate variability (HRV) in partners with a history of intimate partner violence in a placebo-controlled alcohol administration study with an emotion-regulation task. METHODS/STUDY POPULATION: In total, 17 partners (9 females, 8 males) with a history of partner violence participated in a placebo-controlled alcohol administration study with an emotion-regulation task during which HRV measures were collected. In the alcohol condition, participants were administered a mixture of 100 proof vodka and cranberry juice calculated to raise their blood alcohol concentration (BAC) to 0.08%. In the placebo condition, participants consumed a volume of juice equivalent to that consumed in the alcohol condition, but without alcohol. Alcohol and placebo conditions were counter-balanced across participants as were the presentation the blocks of evocative and neutral partner stimuli. RESULTS/ANTICIPATED RESULTS: Controlling for baseline HRV, there was a significant main effect of stimuli (evocative vs. neutral partner stimuli) on HRV in intoxicated partners, $F_{1,16} = 16.28$, $p = 0.004$. There was also a significant main effect of regulation on HRV under conditions acute alcohol intoxication, $F_{1,16} = 23.55$, $p = 0.001$. These effects tell us that intoxicated partners experienced reduced HRV when exposed to evocative stimuli from their partners. These effects also tell us that under acute alcohol intoxication, partners were less able to regulate their emotion when exposed to evocative

stimuli than when they consumed a placebo beverage. DISCUSSION/SIGNIFICANCE OF IMPACT: These results suggest that increases in intimate partner violence under acute alcohol intoxication may be the result of reduce HRV. This reduction in HRV would contribute to partners' inability to respond with adaptively in conflict when intoxicated. They also suggest that HRV may be an important target for intervention with partner with a history of intimate partner violence. One method may be Heart Rate Variability Biofeedback which has been shown to increase parasympathetic nervous system functioning, autonomic stability, and emotion regulation.

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Biofilms in wounds: Detection, individualizing treatment and monitoring response to therapy

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OBJECTIVES/SPECIFIC AIMS: The specific objectives of this project are (1) identify, test, and validate the parameters for a simplified NLOM imaging probe that will provide specific research and point-of-care information on biofilm presence, therapeutic need and response of individual wounds to treatment. (2) Identify specific proteomic and metabolomic biomarkers of (i) wound susceptibility to infection, (ii) wound response to the most commonly used antibacterial measures in wounds, and (iii) establish criteria for more effective interventions. METHODS/STUDY POPULATION: First, optimal use parameters for NLOM including illumination, field of view, focal length, linear Versus concentric image acquisition, detection and filter wavelengths were identified. Parameters for evaluation included ease and speed of imaging, ability to map diagnostic criteria. Next, using the optimised NLOM imaging modality in bacterial biofilm isolates and subsequently a rabbit ear model of biofilm wound infection, proteomic and metabolomic biomarkers of susceptibility to infection were identified. The effects of 2 standard debridement and anti-infective treatments, polyvidone-iodine solution or cetrimide 15%+ chlorhexidine gluconate 1.5% were mapped in situ for up to 10 days using the NLOM probe. RESULTS/ANTICIPATED RESULTS: Using the novel custom NLOM probe, high resolution mapping of wound biofilm infection, as well as the underlying tissue was performed throughout the onset, development, treatment, and resolution of wound biofilm infection. Specific microbiological, microstructural, oxygenation, and pH parameters were mapped at defined surface and subsurface locations and time-points. Findings included the determination that some standard antimicrobial formulations provide a supportive environment for wound infection, and that micro-channels within the biofilm and their interface with the tissues serve as an important predictor and indicator of wound infection establishment, progression, and response. DISCUSSION/SIGNIFICANCE OF IMPACT: The novel multimodality in vivo NLOM imaging approach establishes an important tool for earlier and more specific diagnosis of wound infection risk, virulence, and invasiveness along with markers of successful treatment, and a simple clinical imaging tool for improving wound infection prevention and treatment.

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ETV6 represses Pax5 in early B-cell development

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OBJECTIVES/SPECIFIC AIMS: The goal of this project is to determine the role of ETV6 in early B-cell development and define how germline ETV6 mutations result in predisposition to leukemia. METHODS/STUDY POPULATION: Gene expression commons were queried for expression levels of Etv6 and Pax5 at different stages of hematopoiesis. Mouse bone marrow was isolated and fractionated into cells committed to the B cell lineage via B220+ and CD43+ staining by flow cytometry and then separated into the following fractions: Fraction A (CD24low, CD19-), Fraction B (CD19+, CD24+, BPI-), and Fraction C (CD19+ CD24+ BPI+). Wild-type or germline mutant P214L ETV6 were cloned in an MiG vector and expressed in Ba/F3 cells. ChIP-PCR was performed by cross-linking proteins to DNA with 1% formaldehyde for 10 minute at room temperature, followed by cell lysis with RIPA buffer. Lysates were sonicated to shear DNA to a length of 200–1000 base pairs, then Protein A agarose beads were used to clean and immunoprecipitate chromatin. RESULTS/ANTICIPATED RESULTS: We observed that Etv6 is highly expressed in hematopoietic stem and lymphoid progenitor cells through the pre-pro-B stage (FrA), but its expression is significantly reduced in fraction B and