and efficient adaptation to public health and other crises. RESULTS/ANTICIPATED RESULTS: The E-scan approach helped identify challenges, successful practices, and evidence-based strategies for building adaptive capacity and preparedness of CTSAs across various scientific sectors of the translational science spectrum. Some of the findings include: - Roadmaps for the creation of new collaborative research resources (biobanks; data repositories, etc.); - Rapid clinical and research decision making during public health crises; - New community-based research strategies to facilitate communication, research dissemination, and participant recruitment based on existing trust-based networks; - Innovative resource allocation to guarantee continuity of training and research opportunities for trainees. DISCUSSION/SIGNIFICANCE: The Environmental Scan of the Adaptive Capacity of CTSA hubs provides useful knowledge and tools to diverse clinical research stakeholders for mitigating the impact of a disaster via adjusting programs, practices, and processes, and building capacity for effective, emergency-ready and responsive research, training, and community engagement.

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Dysfunctional leukocyte mitochondrial metabolism is associated with immune paralysis in critically ill septic patients

Lisa K Torres[1], Keith McConn[1], Luis Gomez-Escobar[1], Suzanne Cloonan[2] and Augustine MK Choi[1]
[1]Weill Cornell Medicine, New York, NY, USA and [2]Trinity College, Dublin, Ireland

OBJECTIVES/GOALS: The host immune response during sepsis is now recognized to have anti-inflammatory pathophysiology. We aim to determine whether mitochondrial dysfunction of leukocytes predicts which critically ill septic patients develop immune paralysis and to identify differences in cellular metabolites between patients with and without immune paralysis. METHODS/STUDY POPULATION: Critically ill septic and control adult patients were recruited from one of 6 ICUs in a single-center tertiary care academic hospital. After enrollment, peripheral blood mononuclear cells (PBMCs) were isolated from a tube of whole blood on day 0-1 after ICU admission. Flow cytometry to quantify monocyte HLA-DR was performed to determine whether patients were immune paralyzed or not. Mitochondrial functional assays of PBMCs were performed with inhibitors of the electron transport chain to assess for differences in oxidative phosphorylation and glycolysis utilization. Metabolic profiling of cell pellets was performed to evaluate for specific metabolites and pathways associated with immune paralyzed patients. RESULTS/ANTICIPATED RESULTS: A total of 101 patients were recruited, including 62 control and 39 septic patients. 81 patients had immune paralysis status available for analysis. 52% of all recruited subjects were immune paralyzed. Of these, 58% were controls and 75% were septic. Immune paralyzed septic and control patients showed features of reduced utilization of oxidative phosphorylation (ox phos) including reduced basal respiration, ATP production and maximal respiration compared with non-immune paralyzed septic and control patients. Immune paralyzed septic patients showed diminished glycolysis utilization compared with septic non-immune paralyzed patients. Finally, cellular kynurenine and quinolinate levels were low in both immune paralyzed control and septic patients compared with non-immune paralyzed patients. DISCUSSION/SIGNIFICANCE: The PBMCs of immune paralyzed septic patients show evidence of mitochondrial dysfunction, with reduced ox phos and glycolysis utilization. Low levels of kynurenine and quinolinate, metabolite precursors to NAD+, in immune paralyzed patients may signal key deficiencies and targetable therapeutic avenues for reversal of an immune paralyzed state.

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A Novel High Dose Rate Brachytherapy Device for Preventing Local Recurrence of Pancreatic Cancer Dosimetry Verification

Rohan Verma[1], Kelsey Detels[1], Mary Hoopes[1], Niam Mohseni[1], Dema Shumyeko[1] and Youseph Yazdi[1]
[1]Johns Hopkins University

OBJECTIVES/GOALS: To demonstrate safety and limit damage to off-target organs, we will be determining dosimetry parameters through experimentation and Monte Carlo simulations with our brachy therapy applicator designed to improve upon current designs to treat a 3-dimensional volume. METHODS/STUDY POPULATION: Low-cost materials were used to manufacture our High Dose Rate (HDR) applicator and a readily available after loading system was used to load our configuration with a radioactive source. The dosimetry of our device was analyzed using commercially available software and external beam therapy films to generate depth dose profiles and superficial dose distribution. Additionally, we attempt to confirm Task Group No. 43 (TG-43) dosimetry parameters using Monte Carlo simulations for our device. These data were compared with currently available applicators used for intraoperative radiotherapy. RESULTS/ANTICIPATED RESULTS: We anticipate that we will be able to validate dosimetry parameters for our device in preparation for clinical use. We aim to show our dose distributions align well with proposed target volumes while considering the composition and shape of our applicator. We hope to demonstrate that, unlike current applicators, our design is more effective at treating a 3-dimensional target volume. DISCUSSION/SIGNIFICANCE: By 2040, pancreatic cancer will be the second-largest cause of cancer-related deaths. Even with current brachytherapy applicators, 30-40% of pancreatic cancer seems to recur near the surgical site after surgery. By preventing local recurrence, we hope to improve patient outcomes.

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Convolutional Neural Networks and Machine Learning in the Identification of Ultrasonographic Features of Ovarian Morphology

Jeffrey Pea[1], Matthew Brendel[2], Jean Lee[3], Iman Hajirasouliha[2], Steven D. Spandorfer[4] and Marla E. Lujan[1]
[1]Division of Nutritional Sciences, Cornell University, Ithaca, NY, USA, [2]Institute of Computational Biomedicine, Weill Cornell Medicine, New York, NY, USA, [3]College of Arts & Sciences, Cornell University, Ithaca, NY, USA and [4]Center for Reproductive Medicine, Weill Cornell Medicine, New York, NY, USA

OBJECTIVES/GOALS: To develop a two-staged convolutional neural network to identify the ovary and antral follicles within ovarian ultrasound images and determine its reliability and feasibility compared to conventional techniques in 2D and 3D ultrasonography image analysis. METHODS/STUDY POPULATION: De-identified and archived ultrasonographic images of women across the reproductive spectrum (N=500) will be used in the study. These ultrasound images will be labeled by experienced raters to train a two-staged convolutional neural network (CU-Net). CU-Net will first separate the entire ovary from the background and subsequently identify all antral follicles within the ovary. Following

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