maturing network of enteric glia regulates the epithelial barrier, so we aim to show rescue is due to replacement of glial factors. METHODS/STUDY POPULATION: Jejunal tissues from suckling or weaned pigs were assessed by RNAseq and processed for immunofluorescent histology and 3-D volume imaging. Jejunal ischemia was surgically induced in weaned pigs and injured mucosa was recovered ex vivo with or without the glial inhibitor fluoroacetate (FA) while monitoring transepithelial electrical resistance (TER). RESULTS/ANTICIPATED RESULTS: Ingenuity Pathways Analysis of RNAseq data revealed significant suppression of numerous pathways critical for epithelial wound healing in suckling pigs (Z-score <−2 for of nine key pathways). Volume imaging studies confirmed lower density ($P \leq 0.05$) and complexity of the subepithelial glial network in suckling pigs. Treatment with FA inhibited TER recovery ($P < 0.0001$) and restitution ($P < 0.05$) in weaned pigs, mimicking the suckling pig phenotype and supporting glia as an important regulator of restitution in our model. DISCUSSION/SIGNIFICANCE OF IMPACT: These findings provide important evidence that a developing glial network may be critical to the postnatal development of intestinal barrier repair mechanisms. Ongoing work will explore glial-epithelial interactions *in vitro* to further define postnatal development of barrier repair.

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Autonomic Dysfunction as a Marker of Depression and Coronary Artery Disease

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OBJECTIVES/GOALS: Dysfunction of the autonomic nervous system (ANS) may be important in both depression and coronary artery disease (CAD). A novel heart rate variability (HRV) metric, *Dyx*, may be a be a potentially useful tool to study ANS dysfunction in these diseases. We propose that ANS dysfunction, measured by decreased *Dyx*, will associate with both depression and obstructive CAD. METHODS/STUDY POPULATION: We included participants undergoing coronary angiography for suspected CAD. Depressive symptoms were assessed with the Patient Health Questionnaire-9 (PHQ-9). HRV data were collected continuously on participants before catheterization using a new ECG patch (VivaLNK). We assessed HRV by *Dyx* (primary) and high and low frequency power, multiscale entropy, and deceleration capacity. Two-sample t-tests and logistic regressions (with adjustment for age and sex) were used to study the difference in HRV (before cardiac catheterization) between those with high versus low depressive burden (PHQ-9 $\geq$ 10), and in those with versus without obstructive CAD (>70% stenosis). RESULTS/ANTICIPATED RESULTS: We assessed 30 individuals with mean (SD) age 62.4 (13.2); 7.1% were female and 15.4% were black. Mean *Dyx* in high depressive symptoms (N = 21, 70%) was 1.8 (0.2) and in none-low depressive symptoms (N = 7, 23%) was 2.2 (0.2). Differences were also observed for high frequency (HF) (4.4 (1.1) vs. 6.0 (1.4)) and deceleration capacity (−4.2 (2.1) vs. −10.7 (8.5)). Mean *Dyx* in obstructive CAD (N = 17, 57%) and non-obstructive CAD (N = 10, 33%) was 1.7 (0.6) and 2.6 (1.2) respectively. Differences were seen with sample entropy (1.2 (0.2) vs. 1.5 (0.2)). Every 1 unit of log(HF) had an odds ratio = 0.14 (95% CI 0.06 – 0.36) for depression. DISCUSSION/SIGNIFICANCE OF IMPACT: ANS dysfunction, measured by HRV, associates with both depression and obstructive CAD. Autonomic ECG markers may play an important role in assessing brain-heart pathology, and may be useful to study the interaction between depression and CAD.

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Bio-Compatible Implantable Oxygen Sensor Technology with Real-Time Monitoring of Surgical Flaps and Reimplantation

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OBJECTIVES/GOALS: Current surgical flap and replantation monitoring techniques have limitations in detecting the pathologic state, calibration and cost-to-patient issues. Our hypothesis is that novel implantable oxygen sensors can provide a more efficient, accurate, and reliable monitoring of tissue oxygenation. METHODS/STUDY POPULATION: Experimental sensors were used with an exogenous remote used as a reader once implanted (Fig. 1) A rat tissue perfusion model with three regions of an SIEA flap as well as into adjacent control sites was made (Tip, Middle, and Base) Blood flow was greatest at the base, diminishing towards the Tip, thus creating a perfusion gradient. Changes in tissue oxygen tension PO2 were estimated by the steady-state fluorescence of the optical sensors using an IVIS imaging system. The sensors were used to collect data from days 0, 3, and 7 as a reading of Tissue Oxygen Tension (TOT) with ANOVA used to assess for statistical significance in blood oxygen data with respect to relative perfusion status. RESULTS/ANTICIPATED RESULTS: Inspired FiO2 was decreased from 100% to 12% with a corresponding change in the TOT readings from all sensors. (Fig. 2) The tip portion of the flap demonstrated the most profound detection of tissue necrosis, with the middle demonstrating the second most necrosis and the base demonstrating the least with correlating TOT sensor readings. (Fig. 3) Acute vascular compromise of the feeding blood vessels in the pedicle was immediately detected within 70 seconds (*$p < 0.05$). (Fig. 4) DISCUSSION/SIGNIFICANCE OF IMPACT: This study introduces and validates a recent technique to monitor acute vascular occlusion, flap viability, and necrosis in the immediate postoperative period in a validated rodent model. Future directions of this novel technology will aim to reproduce these findings in clinical feasibility studies.

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Cholecystokinin (CCK) Receptor Antagonist Reverses Nonalcoholic Steatohepatitis (NASH) by Reducing Hepatic Macrophages and Inflammatory Cytokines†

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OBJECTIVES/GOALS: NASH increases the risk of cirrhosis and liver cancer. High-fat diets increase CCK levels and CCK receptors have been identified on fibroblasts and immune cells. We hypothesized that CCK receptor blockade could prevent NASH by altering the hepatic microenvironment and macrophage activation. METHODS/STUDY POPULATION: Female mice were fed a Choline Deficient Ethionine supplemented (CDE) saturated fat diet or control high-fat diet for 18 weeks. Mice in each group were treated with a CCK receptor antagonist, proglumide (0.1 mg/ml) in the

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