effective radiomitigator in vivo when administered after exposure to lethal doses of total body irradiation. METHODS/STUDY POPULATION: Tocoflexol was designed using computational techniques to improve binding to ATTP, the key transporter that reduces the rate of elimination of tocols. In vitro studies compared the antioxidant and cell uptake properties to conventional tocotrienols. Next, we used a mouse model of lethal total body irradiation to evaluate its radioprotection efficacy (treating before radiation). To determine the optimal administration route for radiomitigation (treating after radiation), we will test oral and subcutaneous dosing. Mouse survival will be monitored for 30 days after irradiation. Sample tissues will be taken to evaluate the ability of tocoflexol to protect key organs from acute radiation syndrome. The bioavailability of tocoflexol will be evaluated in a rodent model. RESULTS/ANTICIPATED RESULTS: Known Results: Results show that tocoflexol has potent antioxidant properties and high cell uptake. When tocoflexol was administered 24 hours before exposure to lethal doses of radiation, tocoflexol-treated mice showed 100% survival. Anticipated Results: Because of its improved bioavailability and pharmacokinetic properties, we expect that tocoflexol will show radiomitigation efficacy when administered 24 hours after radiation, improving survival and protecting key organ systems from acute radiation syndrome. DISCUSSION/SIGNIFICANCE: There is an unmet need for safe and effective radiomitigators that can offer multi-organ protection and be rapidly administered in the event of nuclear emergencies. Demonstration of radiomitigation efficacy will position tocoflexol as a prime candidate to be developed into a nuclear medical countermeasure and stockpiled for emergencies.

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Electroencephalographic Correlate of Sensory Over-Responsivity in Adults with Chronic Tic Disorders

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OBJECTIVES/GOALS: To identify an electroencephalographic (EEG) signature of SOR in adults with TS METHODS/STUDY POPULATION: We will recruit 60 adults with CTD and 60 sex- and age-matched healthy controls to complete scales assessing severity of SOR (Sensory Gating Inventory, SGI), tics, and psychiatric symptoms. Subjects will then be monitored on dense-array scalp EEG during sequential auditory and tactile sensory gating paradigms, as such paradigms have been shown to correlate with self-report measures of SOR in other populations. Single-trial EEG data will be segmented into 100-ms epochs and spectrally deconvoluted into standard frequency bands (delta, theta, alpha, beta, gamma) for pre-defined regions of interest. We will conduct between-group contrasts (Wilcoxon rank-sum) of band-specific sensory gating indices and within-group correlations (Spearman rank correlations) between sensory gating indices and SGI scores. RESULTS/ANTICIPATED RESULTS: We hypothesize that, relative to controls, adults with CTD exhibit impaired sensory gating and that extent of impairment correlates with severity of SOR. 14 adults with CTD (9 men, 5 women) and 16 controls (10 men, 6 women) have completed the protocol to date. Within this sample, adults with CTD showed significantly reduced sensory gating compared to controls in frontal (CTD median 0.12 dB (interquartile range -0.15–0.70 dB); control -0.37 dB (-0.80–-0.13 dB); p = 0.01) and parietal (CTD 0.17 dB (-0.08–0.50 dB); control -0.20 dB (-0.43–0.10 dB); p = 0.01) gamma band during the 100-200 ms epoch in the tactile paradigm. No significant between-group differences were evident for the auditory paradigm. Among adults with CTD, multiple sensory gating indices significantly correlated with SGI scores. Enrollment continues. DISCUSSION/SIGNIFICANCE: Results aim to clarify the extent of sensory gating impairment in TS and identify a clinical correlate of neurophysiologic dysfunction in the disorder. Such knowledge has direct implications for identification of candidate neurophysiologic biomarkers, an express goal of the National Institutes of Health.

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Exploring gastrointestinal bacterial colonization in rosacea as a biomarker for systemic abnormalities in innate immunity

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OBJECTIVES/GOALS: To investigate the relationship between abnormal bacterial colonization of the gastrointestinal (GI) tract and systemic abnormalities in innate immunity as it contributes to the pathogenesis of rosacea. METHODS/STUDY POPULATION: This is a prospective observational study of patients with erythematotelangiectatic or papulopustular rosacea. The study participants will undergo urea breath testing for Helicobacter pylori (Hp) and hydrogen-methane breath testing for small intestinal bacterial overgrowth (SIBO). Colonic microbiome analysis will be performed using 16S rRNA sequencing of fecal samples. Further, key pro-inflammatory cytokines will be quantified from serum samples. Markers for rosacea subjects and subgroups will be compared by standard analysis of variance methods where appropriate, and Tukey studentized range tests will be done for specific comparisons. Chi-square tests will be used to assess group differences in categorical data. At least 42 subjects will be studied to provide 80% power atÎ±-0.05. RESULTS/ANTICIPATED RESULTS: We hypothesize that the results of this study will support an observed relationship between abnormal GI bacterial colonization and systemic innate immunity abnormalities in rosacea as determined by three primary endpoints: a significantly greater prevalence of Hp and SIBO in rosacea participants, presence of pro-inflammatory cytokines linked to rosacea pathogenesis including interleukin (IL)-1β, IL-6, IL-8, tumor necrosis factor (TNF)-Î±, and Granulocyte-macrophage colony-stimulating factor (GM-CSF), and observation of distinct, metabolically active colonic bacterial communities specific to rosacea participants. DISCUSSION/SIGNIFICANCE: By identifying rosacea as a cutaneous manifestation of a more systemic inflammatory disease, the results of this study will have implications for the development of important pharmacological interventions targeting key inflammatory pathways in rosacea pathogenesis.

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Exploring the Genetic Contribution to Oxidative Stress in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome

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OBJECTIVES/GOALS: Strong evidence has implicated oxidative stress (OS) as a disease mechanism in myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS). The study aim was to assess whether a C>T single nucleotide polymorphism (SNP) (rs1800668), which

https://doi.org/10.1017/cts.2023.487 Published online by Cambridge University Press