Immune control of plasma cell disorders – in-depth analysis of Sox2 immunity in MGUS
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OBJECTIVES/GOALS: We aim to identify and characterize anti-Sox2-specific CD8+ T cell responses in stable MUGS patients expressing HLA class I alleles-A*02:01 and /or -B*07:02.

METHODS/STUDY POPULATION: Cross sectional study of patients with stable MGUS defined as stable serum paraprotein for ≥ 12 months from the MM Research Clinic at the Abramson Cancer Institute. Sox2 T cell reactivity will be assessed by IFN-γ ELISPOT assays. Rested PBMC will be pulsed with candidate Sox2-derived peptides predicted to display high affinity to HLA class I alleles and known to be processed and presented as determined by “targeted MS/MS” (mass spectrometry). The presence of anti-Sox2-specific CD8+ T cells will be confirmed in peptide/HLA multimer assays using flow cytometry. Anti-Sox2-specific CD8+ T cells will be characterized for HLA restriction and TCR αβ composition.

RESULTS/ANTICIPATED RESULTS: Our work is still in progress. From Aug to Dec 2019, 22 MGUS subjects have been analyzed, 11 of which were found to have the HLA of interest. Positive Sox-2 reactivity by ELISpot was found in 3 subjects. DISCUSSION/SIGNIFICANCE OF IMPACT: Anti-Sox2 immune responses may maintain MGUS in a clinical indolent state by eliminating Sox2-expressing clonogenic MM cells. A detailed characterization of anti-Sox2 T cells followed by in-vivo assessment of their anti-myeloma activity could provide the foundation for a Sox2 based immunotherapy approach in MM.

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Immunoglobulin administration and hypogammaglobulinemia during pediatric acute leukemia therapy
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OBJECTIVES/GOALS: Intravenous immunoglobulin (IVIG) is used for infection prevention in pediatric B-cell acute lymphoblastic leukemia (B-ALL), but evidence for this is lacking. We describe the prevalence of hypogammaglobulinemia in pediatric B-ALL, predictors of IVIG use and its efficacy for infection prevention.

METHODS/STUDY POPULATION: We will conduct a retrospective review of children age 1-21 years with B-ALL treated at Aflac Cancer and Blood Disorders Center from 2010 to 2017. The cohort was identified through the cancer registry. Demographics, disease factors, laboratory values, medications and infection outcomes were linked between the electronic medical record and an institutional database. Outcomes of interest include emergency department (ED) visits, hospitalization days, and episodes of infection. Descriptive statistics will be performed. Outcomes will be compared between IVIG recipients and non-recipients. Univariate and multivariate logistic regression models will assess predictors of IVIG administration. RESULTS/ANTICIPATED RESULTS: We identified 443 patients with B-ALL during the study period who met inclusion criteria. Exclusion criteria included receipt of IVIG or hematopoietic stem cell transplant prior to diagnosis. The average age at diagnosis is 6.5 years (standard deviation 4.8 years); 52.6% are male; 61.6% are white; 61.0% are standard risk per National Cancer Institute criteria. Among eligible patients, 137 (31.1%) received IVIG. We hypothesize that IVIG initiation is associated with hypogammaglobulinemia and history of severe infection. We also anticipate that frequency of emergency department visits, hospitalization days, and episodes of infection will decrease after IVIG.
Impact of Demographic & Racial Differences on DNA Repair Capacity in Lung Cancer
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OBJECTIVES/GOALS: Lung cancer is the leading cause of cancer-related mortality in the United States for both men and women. African Americans are disproportionately affected with lung cancer, having higher incidence and mortality rates compared to Caucasian men and women. African American smokers are diagnosed with lung cancer at a lower age with lower cumulative smoking history. Differences in socioeconomic and environmental factors likely contribute to lung cancer disparities, but less is known about acquired biologic alterations that can promote initiation and progression of lung cancer, particularly in African Americans. This is of interest because there may be other biological, genetic, or environmental factors contributing to lung cancer outcomes as it relates to differences in gender and race. One potential biologic variable may be in the DNA repair capacity (DRC), which describes a cell’s ability to repair damage to DNA caused by carcinogens, oxidants, and radiation. Altered DNA repair is a hallmark of cancer, leading to mutations and malignant transformation. We hypothesize that DRC is decreased in African Americans with lung cancer compared to Caucasian Americans with lung cancer, contributing to the disparity that exists in this racial group. We will 1) perform a retrospective chart review to determine demographic differences between African Americans and Caucasians at three central Indiana hospitals and 2) determine the impact of race and lung cancer on DRC amongst African Americans and Caucasians with and without lung cancer. METHODS/STUDY POPULATION: Lung cancer patients are identified in 3 central Indiana hospitals with different payer sources and patient populations using ICD codes. Collected demographics include age, gender, pack-years, lung cancer histology, treatment, and mortality. DRC is measured by host-cell reactivation (non-homologous end-joining and nucleotide excision repair pathways) by flow-cytometry. Measurement of DRC is performed on PBMCs obtained from 120 patients (male and female, African Americans and Caucasians with and without lung cancer). Correlation of DRC and lung cancer will be determined by comparing lung cancer diagnosis to quartile DRC, and adjusted for founders (measured demographics). Correlative measures will include measures of DNA damage and genomic instability. RESULTS/ANTICIPATED RESULTS: Three specific hypotheses are proposed in this study. H1: GI patients’ health literacy levels will be negatively associated with their lengths of stay H2: GI patients’ health literacy levels will be negatively associated with their complication status to the hospital DISCUSSION/SIGNIFICANCE OF IMPACT: This study allows us to further our understanding of patients’ health literacy level and its relationship with important health outcomes. By looking at a variety of diverse health outcomes, the impact of a patients’ health literacy level on that patients’ health outcomes will be observed more clearly.