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Title: Investigation of Psychosocial Biomarkers and Transplant Outcomes in Hematopoietic Stem Cell Transplantation Recipients

Hematopoietic stem cell transplantation (HCT) is a life-saving treatment for blood cancers such as Acute Myeloid Leukemia (AML). Forty percent of allogeneic transplants (from donors) occur in patients diagnosed with AML, with a 3-year survival rate of less than 50 percent. These patients face unique challenges due to the complexity and the duration of the transplant process and often report increased feelings of depression, anxiety and loneliness. These psychosocial factors are associated with an increased risk of in patients with cancer. Importance of understanding the underlying biology of these psychosocial constructs has been increasingly recognized to better support implementation of personalized interventions. Psychosocial factors are associated with biological epigenetic modifications such as DNA methylation (additional methyl groups are added to DNA). The “epigenetic clock” is a technology that allows calculation of cellular age (also known epigenetic age) based on a panel of DNA methylation measurements. Advanced epigenetic age (when the calculated cellular age exceeds chronological age) and differentially methylated DNA sites are measures that have not been studied in association with psychological factors, resilience and transplant outcomes in HCT recipients. This ACS-IRG proposal intends to examine DNA methylation profiles associated with adverse psychosocial factors, resilience and poor transplant outcomes. Therefore, the specific aims of this proposal are to explore associations between psychosocial factors (depression, anxiety, well-being and loneliness), resilience factors and transplant outcomes in HCT recipients (Aim 1) and to further investigate these associations with advanced epigenetic age and differentially methylated DNA sites (Aim 2). This will be of significance for guiding tailored interventions such pharmaceutical interventions, and mindfulness. This proposal will share key study findings with identified community champions and have thoughtful discussions about appropriate interventions that can be proposed in future studies.