



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP120372

Project Title:
A next-generation sequencing strategy to identify chromosomal translocations targeting the immunoglobulin loci in B-cell malignancies

Award Mechanism:
High Impact/High Risk

Principal Investigator:
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Entity:
The University of Texas Health Science Center at San Antonio

Lay Summary:

Lymphomas are common and often incurable tumors that originate from mature B-lymphocytes, a specialized type of cell that resides primarily in the blood and lymph nodes. Most of the lymphomas display an aberrant exchange of DNA material, a chromosomal translocation, involving the immunoglobulin (IG) gene region. These defects activate cancer-inducing genes, and are important in tumor development and progression. The type of chromosomal translocation found in a patient helps in the diagnosis, informs on prognosis, and instruct on the best treatment options. The identity of the translocation also aids in the design of trials for experimental drugs, enhancing the likelihood that these new therapies are effectively developed. Unfortunately, the assays currently used for the identification of chromosomal translocations are laborious, time-consuming, and of low sensitivity (incapable of detecting small tumor burden). Further, these assays are of limited value in uncovering new defects in the IG region. In this study, we will test if a new technology, termed next-generation sequencing (NGS), can be used to identify known and discover novel IG-containing chromosomal translocations. NGS is based on the concurrent detection of large amounts of DNA (billions of molecules in a single assay) at relatively low cost. If successful, our study will establish a novel, highly sensitive, state-of-the-art methodology for the detection and discovery of chromosomal translocations targeting the IG region; we anticipate that in the future this assay will become an integral part of the diagnosis of lymphoma patients. As IG-based chromosomal translocations guide diagnosis, define prognosis and instruct on treatment, our study may significantly influence the clinical practice, and improve the outcome of patients diagnosed with lymphomas, and other lymphoid tumors (multiple myeloma, chronic lymphoid leukemia) that also carry chromosomal translocations involving these regions.