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Project Title: *T-cell receptor (TCR) clonotype repertoire in Inflammatory Breast Cancer (IBC) and association with clinical outcomes*

Project Summary and Updates:

Inflammatory breast cancer (IBC) is a rare and aggressive form of breast cancer associated with worse outcomes than other breast cancers. Despite decades of research, the biological factors that drive its aggressive behavior remain poorly understood. Growing evidence suggests that differences in patients' immune systems may play an important role in the development of IBC.

T cells are a critical part of the body's immune defense against cancer. Each T cell carries a unique receptor that helps it recognize abnormal cells or pathogens (like virus/bacteria). Together, these receptors form a diverse repertoire that reflects the immune system's ability to identify and respond to a wide range of threats, including cancer.

In this study, and with support from the IBC Network Foundation, we analyzed blood samples from 41 patients with stage III IBC and compared them with samples from 41 age-matched patients with stage III non-IBC. Using advanced sequencing technologies, we characterized the diversity and composition of T-cell receptors in each patient. We found that patients with IBC had a less diverse T-cell receptor repertoire than patients with non-inflammatory breast cancer. This suggests that the immune response in IBC may be more limited, potentially reducing the body's ability to recognize and attack cancer cells. These differences were observed even before treatment began.

Our findings provide new insight into the interaction between inflammatory breast cancer and the immune system. A better understanding of these immune differences may help explain why IBC behaves more aggressively and could identify new opportunities to develop immune-based treatment strategies for patients with this challenging disease. We are now expanding this cohort and working on studying the immune differences in patients' tumors.

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