MULTISPECTRAL IMAGING TO DETECT IMMUNE PHENOTYPES IN PRE AND POST THERAPY BREAST CANCER PATIENT SPECIMENS

Bhavika Patel*, Stephanie Allen, Brenna Dennison, Jacob Stapleton, Roni Archuleta, Mary Lou Rath, Sameer Talwalkar. Lanterne Dx, Boulder, CO, USA

Background The immune microenvironment is an important component in cancer therapy. Immune cells can modulate tumor growth and could lead to disease progression. A high number of immune cells may also be predictive of disease prognosis and response to therapies. Therefore, understanding the immune cell phenotypes present within cancerous tissue can be valuable in developing strategies that aid in the treatment of cancer. In this study, we analyzed pre- and post-therapy samples from breast cancer patients treated with neoadjuvant chemotherapy, using a 6-plex immunofluorescence assay with clinically relevant immuno-oncology biomarkers (FoxP3, PD-L1, PanCK, CD4, CD8 and CD163).

Methods This assay was developed and optimized in-house prior to testing the cohort. Endpoints for the analysis were characterization of the tumor microenvironment and evaluation of the individual immune cell subsets pre- and post-treatment. Staining was completed on the Leica Bond RX autostainer (Leica Biosystems) and slides were scanned using the PhenoImager™ Fusion (Akoya Biosciences). The Visiopharm® software multiplex phenotyping module was used to analyze the high dimensional human tissue, and artificial intelligence was used to detect cell phenotypes.

Results Qualitative and quantitative results revealed a change in immune cell phenotypes between pre- and post-therapy samples. These included an increase in intra-tumoral and stromal T cells, an increase in the FOXP3 positive T cells in post-treatment samples, and no significant difference in PD-L1 positive cells.

Conclusions Our data provides insights into the development and application of multispectral imaging for characterization of tumor microenvironment and its dynamics before and after treatment in breast cancer. This can be applied to other cancer types and can aid in making treatment decisions.

http://dx.doi.org/10.1136/jitc-2023-SITC2023.1489