

**IMMUNE ENVIRONMENT CORRELATES WITH NSCLC AND CRC PATIENT SURVIVAL**

Dannah Miller\*, Huong Nguyen, Kate Hieber, Charles Caldwell, Roberto Gianani. *Flagship Biosciences, Broomfield, CO, USA*

**Background** Immune cells within the tumor microenvironment (TME) play a vital role in regulating tumor progression. Therefore, immunotherapies that stimulate anti-tumor responses are of great interest for the treatment of various cancers. PD-L1 expression on immune cells is positively correlated with increased patient survival. Our hypothesis is that non-small cell lung carcinoma (NSCLC) and colorectal cancer (CRC) patients with high immune infiltration and greater amounts of anti-tumor immune cells within the tumor compartment have an increased time of survival compared to cancers with immune excluded or immune desert environments.

**Methods** One NSCLC and one CRC tumor microarray (TMA) containing primary tumors, metastases, and normal tissue were stained via multiplex immunofluorescence (mIF) for 6 different immune markers: CD3, CD8, CD56, CD68, CD163, and PD-L1. This multiplex panel was designed to evaluate the immune cell population as well as tumor and immune cell PD-L1 status to aid in research for immunotherapies, specifically anti-PD-L1 therapies. The stained TMAs were analyzed utilizing Flagship Biosciences' proprietary image analysis platform. Machine learning algorithms stratified cells as belonging to the tumoral or stromal space based on their cellular features. Core level expression data was pulled and represented on a whole-cohort basis. All staining and image analysis outputs were reviewed by a board-certified, MD pathologist. Kaplan-meier curves were generated based on survival data in relation to the levels of immune cells present within the tumor cores as well as the percentage of immune cells infiltrating into the tumor.

**Results** There is a clear correlation between patient survival and the presence or absence of various types of immune cells, including helper T cells, cytotoxic T cells, M1 macrophages, M2, macrophages, NK cells, as well as PDL1 expression on tumor and immune cells. Specifically, the increased presence of anti-tumor immune cells as well as increased expression of PD-L1 on immune cells within the tumor compartment correlates with an increase in patient survival.

**Conclusions** Data generated through Flagship Biosciences' image analysis platform showed a strong relationship between immune cell presence and localization and NSCLC and CRC patient survival. Altering the immune cells within the tumor to an anti-tumor immune environment could increase patient survival times. Combining immune checkpoint inhibitors with current FDA approved therapies for NSCLC and CRC are of interest to further extend patient survival. Further, utilizing Flagship Biosciences' image analysis software to understand cancer immune microenvironments should be further utilized to aid in diagnosis and treatment decisions.

<http://dx.doi.org/10.1136/jitc-2021-SITC2021.048>