Project abstract

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PROJECT PROPOSAL

The progression and clinical outcome of human cancer are intricately influenced by cellular interactions within the tissue microenvironment. Understanding the spatial distribution and interaction of different cell types, particularly the immune cells, emerges as a key determinant in the success of cancer therapy. Our lab, a pioneering force in the field, is dedicated to unraveling these complexities and believes that metabolic inhibition plays a pivotal role in the tumor microenvironment, resulting in immune cell dysfunction.

To unveil these mechanisms, we employ the cutting-edge proteomic imaging technology known as multiplexed ion beam imaging (MIBI). Being the first to establish MIBI technology in Europe, our lab is now leveraging this approach to analyze the composition and functional states of tumor and immune cell subsets in clinical samples obtained from esteemed clinical partners (Fremd, Bärtsch, Hassel, Wiemann).

In this project, we seek a motivated clinician to harness the potential of our MIBI multiplexed pathology platform, aiming to image a cohort of human tumor tissues. Our specific objectives include quantifying the spatial distribution of the tumor microenvironment, encompassing immune, tumor, and stromal cell types, and characterizing their phenotypic and metabolic states. Furthermore, we aspire to correlate features derived from this imaging analysis with crucial clinical parameters such as tumor stage, overall survival, and response to immunotherapy.

This collaborative effort is poised to contribute significantly to uncovering generalizable concepts regarding how different tumor entities influence the cellular metabolism of immune cells, thereby modulating their function. The resulting data holds the promise of integration into molecular tumor boards and serving as potential biomarkers for treatment response, thereby paving the way for improved treatment options for human cancer in the near future.