New Horizons in Cancer Immunotherapy: Blocking LAG-3/FGL1 Interactions

My goal is to develop new and affordable cancer therapies by creating small molecule inhibitors (SMIs) that target the interaction between the LAG-3 protein and fibrinogen-like protein 1 (FGL1), a recently discovered partner critical to suppressing the immune system's ability to fight cancer.

Recent advancements in immunotherapy, such as the FDA-approved combination of PD-1 and LAG-3-targeting antibodies, have dramatically improved outcomes for patients with advanced melanoma. However, these treatments are unfortunately expensive, with costs reaching hundreds of thousands of dollars per patient. Furthermore, they primarily focus on blocking LAG-3's interaction with the MHCII protein, leaving other potential pathways, like LAG-3/FGL1, underexplored, yet potentially even more perspective.

My research seeks to address this gap by developing SMIs that block the LAG-3/FGL1 interaction. This pathway is particularly promising because FGL1 is highly overexpressed by many cancer cells, making it an attractive therapeutic target. By combining computational modeling with experimental approaches, I aim to identify and refine inhibitors that can disrupt this interaction. Early-stage tests will assess their effectiveness in activating immune cells and inhibiting tumor growth, while the most promising candidates will undergo preclinical evaluation using advanced models such as humanized mice.

Cancer remains one of the leading causes of death globally, and existing therapies are inaccessible to many due to their high cost. By developing effective and affordable inhibitors, this research aims to make cancer treatments more widely available, improving outcomes for patients worldwide.