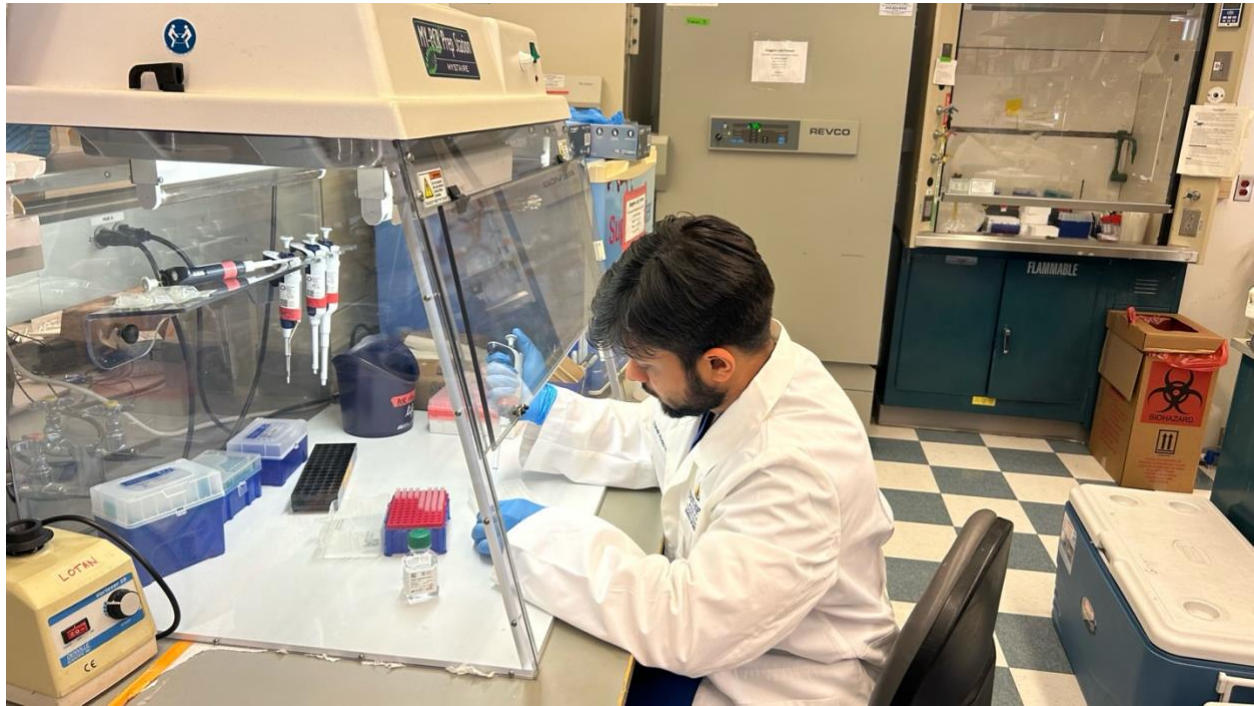# Report

Khorana Program for Scholars

The Pancreatic Cancer Early Detection Laboratory at Johns Hopkins University, led by Dr. Michael G. Goggins, is renowned for its innovative research in the early detection and prevention of pancreatic cancer. Under Dr. Goggins' guidance, the lab focuses on identifying novel biomarkers, exploring genetic and epigenetic mechanisms, and refining surveillance protocols for individuals with a familial and genetic predisposition to pancreatic cancer. During my Khorana Program Internship, I had the privilege of contributing to several pivotal projects, enhancing my expertise in oncology research, and gaining hands-on experience with cutting-edge molecular biology techniques. One of the major projects I contributed to involved investigating the impact of fucosyltransferase genetic variants in FUT3 and FUT2 on pancreatic cancer biomarkers CA19-9 and DUPAN-2. This study aimed to refine the diagnostic accuracy of these biomarkers by stratifying patients based on their FUT3/FUT2 genotype. CA19-9, a commonly used tumor marker for pancreatic cancer, has limited utility in individuals with null variants in FUT3. To address this, DUPAN-2, a related glycan, was explored as an alternative marker. My role included assisting in the genotyping of patients using Next Generation Sequencing (NGS) and other advanced techniques and analyzing the correlation between genetic profiles and biomarker levels. This work has the potential to revolutionize the use of CA19-9 and DUPAN-2 by creating personalized reference ranges, improving early-stage detection in high-risk individuals. Simultaneously, I worked on a project examining the effect of proton pump inhibitor (PPI) use on the microbiome of pancreatic and duodenal tissues. PPI use has been linked to significant shifts in the gut microbiome, which may influence pancreatic cancer risk. This project provided novel insights into how PPI-induced microbiome alterations may affect pancreatic disease progression or tissue homeostasis. Additionally, I participated in a confidential clinical project focused on identifying early predictors of pancreatic cancer progression. This project, which integrates genomic and proteomic data, aims to identify biomarkers signaling the transition from precursor lesions to invasive disease. Although I cannot disclose specific methodologies due to confidentiality, this project represents a novel approach in improving prognostication for pancreatic cancer. Throughout my internship, I gained hands-on experience with advanced research instruments and techniques, including NGS, quantitative PCR, and high-throughput genotyping. I also contributed to patient recruitment and consent processes for the Cancer of the Pancreas Screening (CAPS 5) study and the Clinical Correlates study, gaining valuable insights into patient-based research. It is my pleasure to share that I was graded with "Honors" grade, which is the highest grade in the evaluation process, after the completion of my tenure at Prof. Goggins Lab.

Inspired by the groundbreaking work at Johns Hopkins, I also became a part of a component network analysis on the efficacy of different therapeutics in AML, during my internship. This work was selected for presentation at the Society of Hematology Oncology (SOHO) Annual Meeting

2024(4th-7th September at Houston, Texas), where my study was selected for the coveted poster walk. This recognition has further motivated me to continue exploring oncology research.

Acknowledgments

In conclusion, my internship, (Johns Hopkins, 23rd June – 24th August, SOHO 4th-7th September) has been a transformative experience, providing me with a robust foundation in molecular oncology research. I look forward to applying the knowledge and skills acquired to advance the field of cancer detection and precision medicine.

Archit Goel