Thesis Defense Announcement

To: The George Mason University Community

Candidate: Jonathan Ontivero Sanchez

Program: M.S. in Biology

Date: Monday November 13, 2023

Time: 12:00 p.m. Eastern Time (US and Canada)

Title: "Analyzing Lineage Plasticity in Non-Small Cell Lung Carcinoma Following a Non-Oncogenic Respiratory Infection "

Committee Chair: Dr. Mariaelena Pierobon
Committee Members: Dr. Aarthi Narayanan, Dr. Farhang Alem

In Person Meeting:

Katherine Johnson Hall, Room 248
Science & Tech campus
Manassas, Va.

Join Zoom Meeting:

https://gmu.zoom.us/j/92704548140?pwd=SUh0VEtZSEpMaHMyYmxqSFhYYmV6UT09

All are invited to attend the defense.

ABSTRACT:
Every year in the United States, over 238 thousand individuals receive a lung cancer diagnosis, making it a significant contributor to cancer-related mortality, accounting for 21% of cancer-related deaths. The treatment landscape for lung cancer is complex, with modalities and responses varying based on factors such as the tumor's stage and grade. One persistent challenge in lung cancer treatment lies in a tumor's ability to adapt and acquire resistance to treatment. Lineage plasticity, a phenomenon where cells shift between developmental pathways, is emerging as a shared mechanism of resistance to treatment across tumor types and targeted treatments. Published data suggest that lineage changes in cancer are almost exclusively undertaken by pre-existing subpopulations of cancer cells in response to selective pressure in a "plasticity-permissive molecular environment". To expand on this work, we have started to look at stressors within the tumor microenvironment that ignite tumor progression by nurturing a "plasticity-permissive" ecosystem. Our preliminary data led us to hypothesize that

to escape harmful responses to viral infections in the local environment, cancer cells undergo lineage plasticity, which then protects them from anti-cancer treatments. To investigate this hypothesis, we conducted short-term and long-term infections with the 229E (HCoV-229E) coronavirus in commercially available non-small cell lung cancer (NSCLC) cell lines, including A549, H2228, and H1975. Throughout this study, we monitored the growth kinetics of cells exposed to HCoV-229E and employed reverse phase protein array (RPPA) to assess the expression of plasticity markers before and after cancer cells are exposed to this non-oncogenic virus. Our findings suggest that HCoV-229E infections may play a role in driving the shift towards mesenchymal and neuroendocrine phenotypes in NSCLC cells of epithelial origin, shedding new perspective on the tumor-virus response.

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