



## CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:  
RP150079

Project Title:  
Elucidating the evolution of the premalignant airway genome in space and time

Award Mechanism:  
Individual Investigator

Principal Investigator:  
Kadara, Humam

Entity:  
The University of Texas M.D. Anderson Cancer Center

### Lay Summary:

Lung cancer is the leading cause of cancer death worldwide. Lung adenocarcinoma represents the majority of lung cancers found in patients and the cure rate for this disease has not improved. There are over 90 million former and current smokers in the United States at elevated risk for lung adenocarcinoma and the epidemic of this fatal disease will remain long after smoking incidence has dropped. We still do not know how to choose the appropriate drugs to prevent the onset of lung adenocarcinomas in this high-risk population. It is widely appreciated that genetic changes in DNA provide tumors with the ability to grow and expand. Yet, very little is known about genomic changes that lead to the onset of lung adenocarcinomas in smokers. Understanding these alterations allows us to find ideal "targets" for the design of therapeutic strategies to prevent lung adenocarcinomas in smokers. Our earlier work revealed that seemingly "normal" (to the "eye") airway cells close to lung tumors carry genomic alterations (e.g. mutations) that are characteristic of the tumor itself, an effect we refer to as "field cancerization", in which there is a premalignant field around the tumor that is enriched with malignant properties. The overall goal of this research proposal is to understand in unprecedented detail and using cutting-edge technology how the premalignant airway genome evolves in space and time and to use this knowledge to identify combinations of "targets" and drugs to prevent lung adenocarcinoma development. This multidisciplinary work is being done as collaboration between multiple investigators at MD Anderson Cancer Center. At the conclusion of our study, we will have fashioned answers to how lung adenocarcinomas evolve and to how we can stop or at least delay this morbid process. In the future, these answers will allow selection of the right drugs to reduce the incidence of lung adenocarcinoma and its burden on former and current smokers and their families.