



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP150449

Project Title:
Noninvasive multiscale imaging for optical biopsy in epithelial cancers

Award Mechanism:
Individual Investigator Research Awards for Prevention and Early
Detection

Principal Investigator:
Vargas, Gracie

Entity:
The University of Texas Medical Branch at Galveston

Lay Summary:

The goal of this project is development of a novel optical imaging approach for identifying early cancer and treatable precancers having a high chance for malignancy in the oral cavity and oropharynx. Oral and Oropharyngeal cancer (OSCC) is a significant global health problem accounting for approximately 400,000 reported new cases per year worldwide. Approximately half of patients diagnosed with OSCC will die within 5 years. There is a rise in OSCC due to the human papillomavirus (HPV) and it is afflicting a younger age group. Early detection and treatment are paramount to patient survival and quality of life. The current clinical approach of visual inspection with palpation and biopsy fail to catch treatable lesions at the earliest stages when treatment outcomes are best, even in the half of OSCC patients in which recurrence is expected within two years following primary diagnosis. The multiscale optical imaging approach involves the combination of two promising imaging methods, the first based on large area surveillance of inherent fluorescence from the tissue to 'highlight' areas of suspicion for neoplasia (WF fluorescence) and the second a powerful microscopic method (NLOM/s) to visualize detailed subsurface microstructure and metabolic features. Our group has shown NLOM/s to be highly promising for detecting features of neoplasia but recognize the need for large area screening microscopy alone cannot provide. We believe the WF-NLOM/s approach will combine benefits of high sensitivity/low specificity large area fluorescence screening with highly specific microscopic examination to better identify high risk precancers and cancers. Metabolic assessment is an advantage given a hallmark of cancer is deregulated metabolism. The potential outcome of this research is development of methods to advance the current clinical paradigm of visual oral examination and biopsy, impacting biopsy and treatment decisions and improving patient outcomes.