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COMPARING AN IMAGING-BASED VERSUS SALIVA-BASED APPROACH TO DETERMINING ORAL CANCER RISK

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Background: Objective of this study was to investigate and compare the ability of imaging-based biomarkers versus salivary transcriptomic biomarkers to identify oral cancer risk in oral red and white lesions. Long-term goal is to develop a non-invasive means of identifying and monitoring oral cancer risk in potentially premalignant lesions of the oral mucosa. Current techniques that rely on sequential

surgical biopsy suffer from poor compliance, sampling error, and the inability to identify appropriate sampling sites and timepoints.

Study Design/Materials and Method: This study was performed in full compliance with UCI IRB 2002–2805. In patients with oral leukoplakia and/or erythroplakia, lesions were imaged with Optical Coherence Tomography techniques (OCT) and photographed at 0, 1 and 3 months. Additionally, stimulated and unstimulated saliva was collected at these time-points using standard techniques. q-PCR was performed to validate 4 mRNA's. Additionally, isolated RNA was reverse transcribed into cDNA using RNA-directed DNA polymerase. The resulting cDNA was used for PCR amplification for each biomarker. A blinded pre-standardized examiner scored OCT images on a semi-quantitative scale of 0–3 for level of pathology. Data were compared with the existing gold standard: histopathology by a standard external oral pathology laboratory. All subjects were monitored and treated according to the existing standard of care.

Results: Eight subjects with leuko- and or erythroplakia were enrolled, of whom 5 completed this pilot study. Over the study duration, the lesions appeared clinically unaltered. However, changes to mRNA markers IL1B and IL8 were observed over time. In the 1 patient who progressed to oral squamous cell carcinoma, significantly raised levels of miR181c and miR181b were identified. Using a previously developed segmentation approach to the OCT data, imaging-based diagnoses were in agreement with histopathological diagnosis in 13/15 evaluations (kappa value: 5 subjects, 3 timepoints each).

Conclusion: OCT-based diagnosis showed good agreement with histopathology, but little predictive value. Salivary biomarkers showed potential as indicators of Oral Cancer Risk. This research was supported by the National Institutes of Health under grants No. 1R03EB014852, UH2 EB022623, P41EB015890 and UL1 TR000153, as well as the Beckman Foundation.