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3994 Diagnostic Sensitivity and Specificity of Laser-Induced Fluorescence in Oral Premalignancy and Malignancy. P.E. WILDER-SMITH*1, A. EBIHARA1, L.-H. LIAW1, T.B. KRASIEVA1, and D. MESSADI2, 1 University of California, Irvine, USA, 2 University of California, Los Angeles, CA, USA

Previous studies have demonstrated that laser-induced fluorescence emissions after tissue exposure to the photosensitizer 5-Aminolevulinic acid (ALA) differ significantly between healthy, dysplastic and malignant oral tissues. Objective: To determine the sensitivity and specificity of this modality for diagnosing and differentiating between healthy tissues, various stages of oral premalignancy and malignancy. Methods: Standard DMBA carcinogenesis was applied to one cheek pouch in 300 Syrian golden hamsters for 0-20 weeks to induce all grades of dysplasia and carcinoma. Prior to sacrifice, 20% ALA was applied to the cheek tissues for 90 minutes. Excised cheek tissues were cryosectioned and imaged using fluorescence microscopy with excitation at 405nm, and detection at 635nm. After fluorescence microscopy and measurement, H&E staining was performed and areas of pathology were graded on a numerical scale. Results: Fluorescence intensity averaged 170-190 fluorescence units (f.u.) at the epithelial surface in healthy tissues; 700-1100 f.u. in dysplastic tissues in the epithelium and underlying basal area; 1400-1600 f.u. within squamous cell carcinoma and 8000-13000 f.u. in the overlying epithelium. Fluorescence intensity differed significantly (a) between healthy, dysplastic and malignant tissues ($p < 0.05$, one-end unpaired t-test) and (b) between mild, moderate and severe dysplasia ($p < 0.1$, one-end unpaired t-test). Technique sensitivity ranged from 100-84% and specificity from 100 - 67%. Conclusions: Laser-induced fluorescence after tissue exposure to ALA provides a novel, sensitive, specific non-invasive tool for the diagnosis of oral dysplasia and malignancy. Supported by the Culpeper foundation, TRDRP 71T-0192, NIH (LAMMP) RR01192, CRFA 27722 and DOE DE903-91ER 61227.