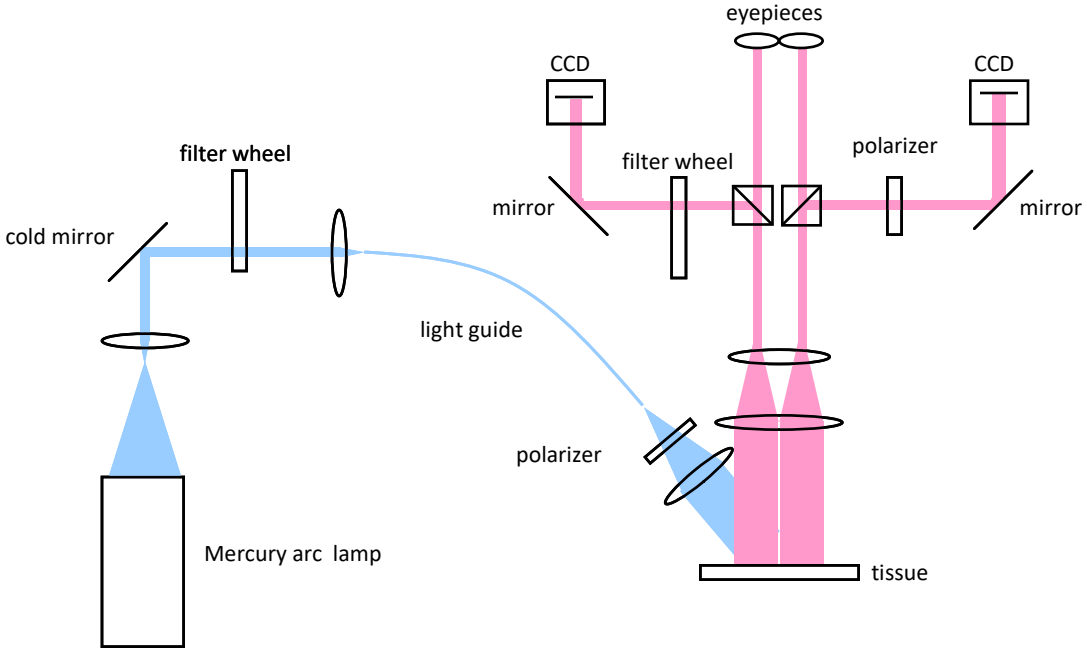
Técnicas de diagnóstico – Imagem de campo amplo de fluorescência

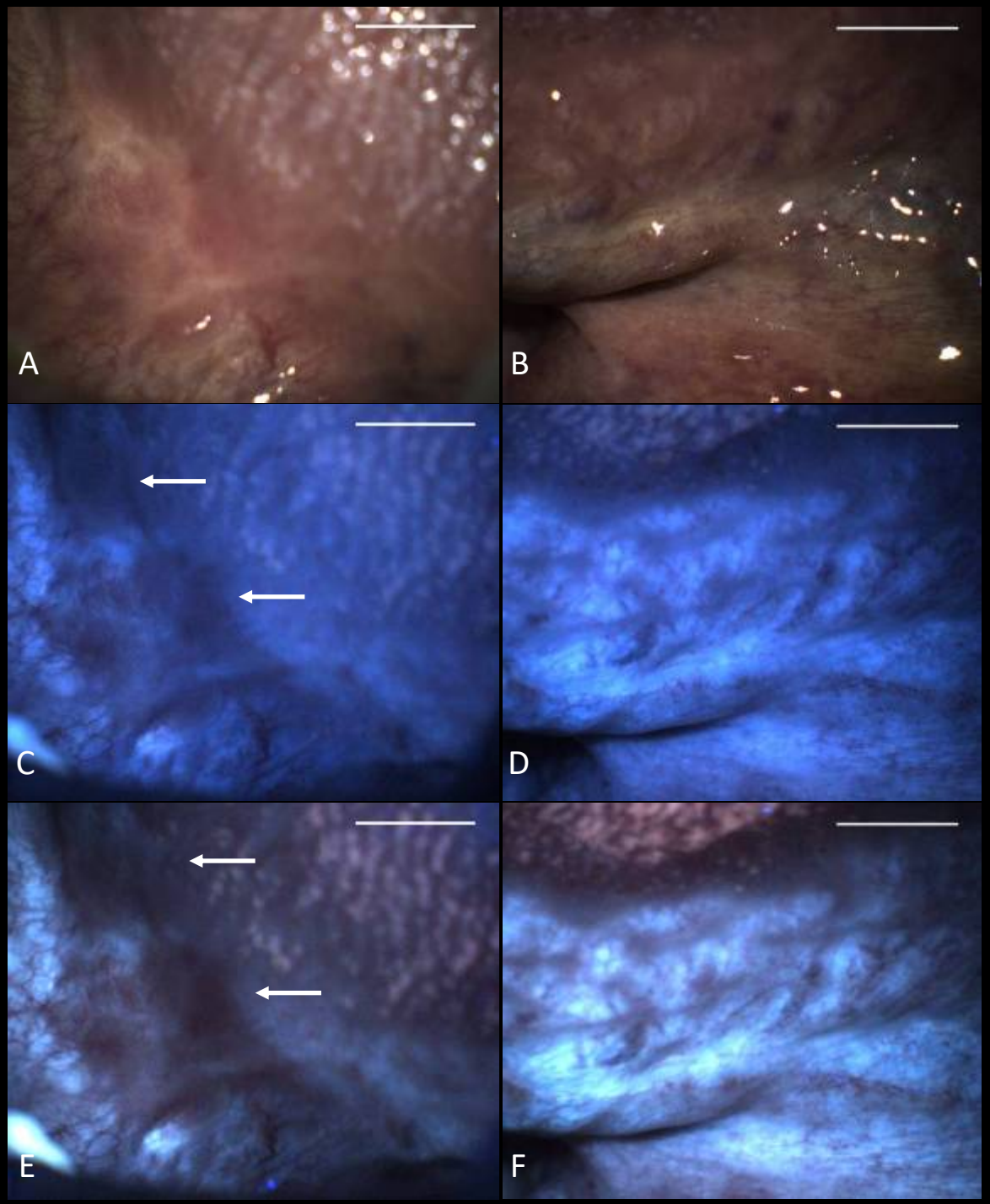
Widefield FL/RL Imaging

Rice University, MD Anderson Cancer Center

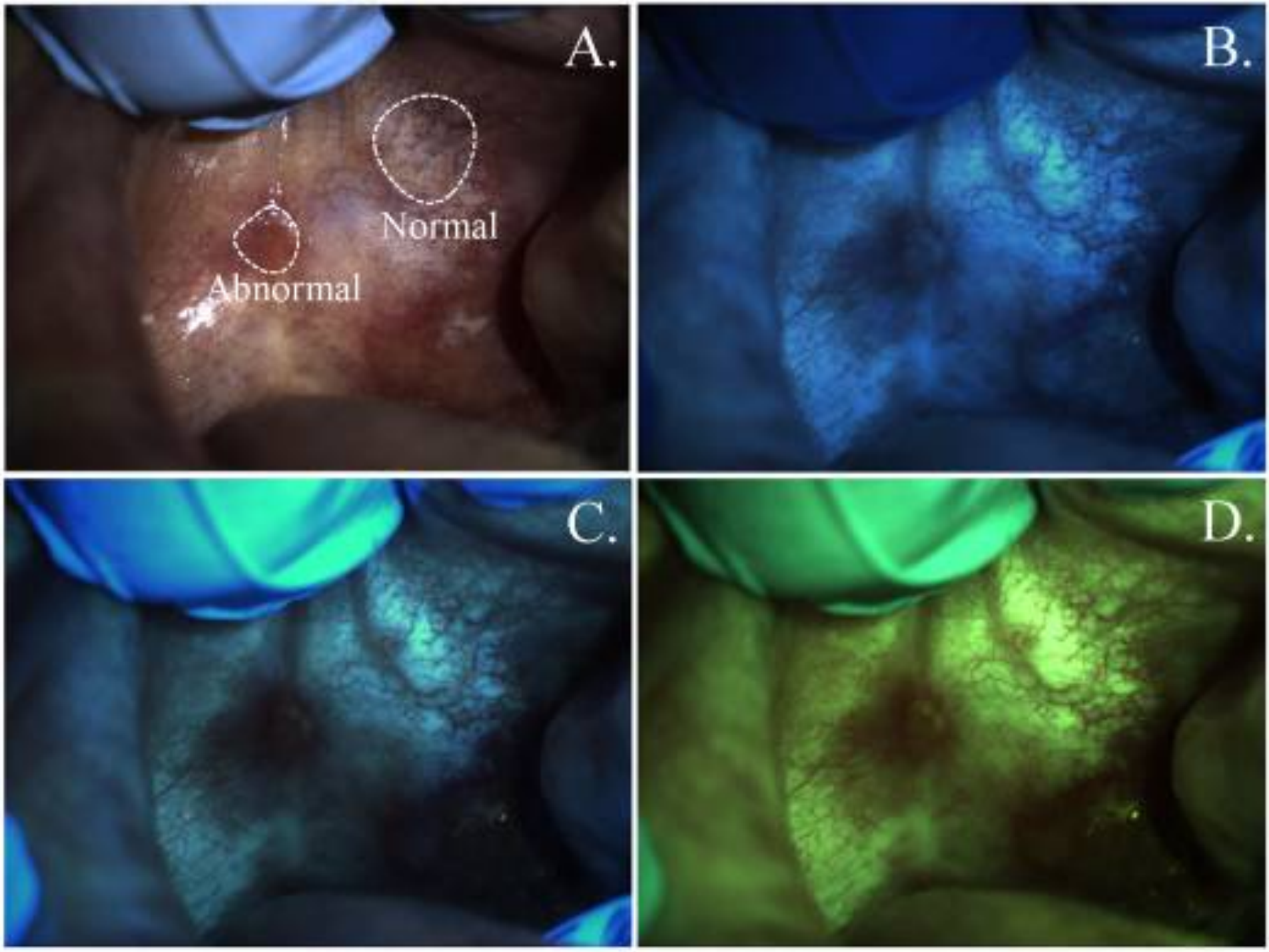
Excitation λ (nm)	Imaging Modality	Irradiance (mW/cm^2)	Typical Exposure Times (ms)
365	fluor.	11.15	100ms
380	fluor.	8.86	160ms
405	fluor.	7.00	400ms
450	fluor.	5.10	500ms
White	reflect.	12.02	16ms
420	reflect.	3.13	64ms
430	reflect.	9.62	13ms
530	reflect.	1.91	24ms
600	reflect.	4.17	64ms
orthogonal	polarized	3.47	100ms



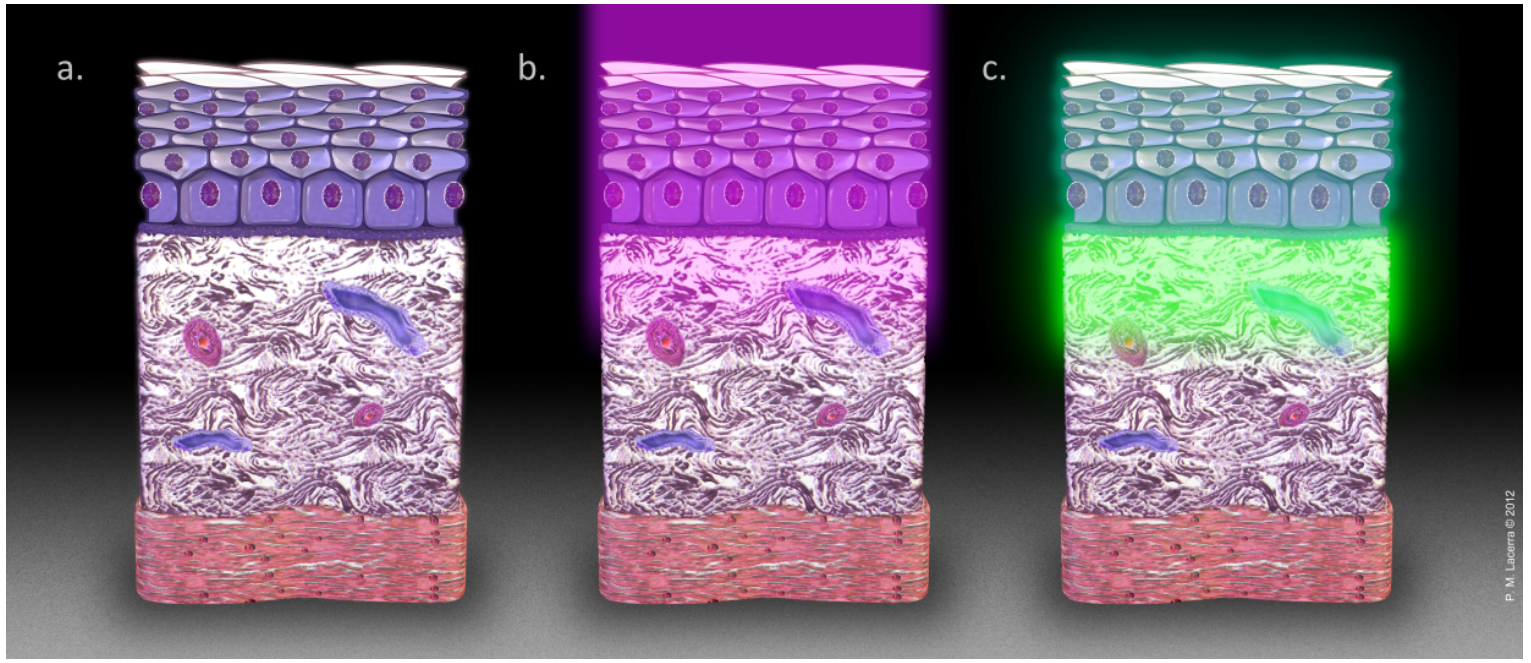
Latero-ventral tongue



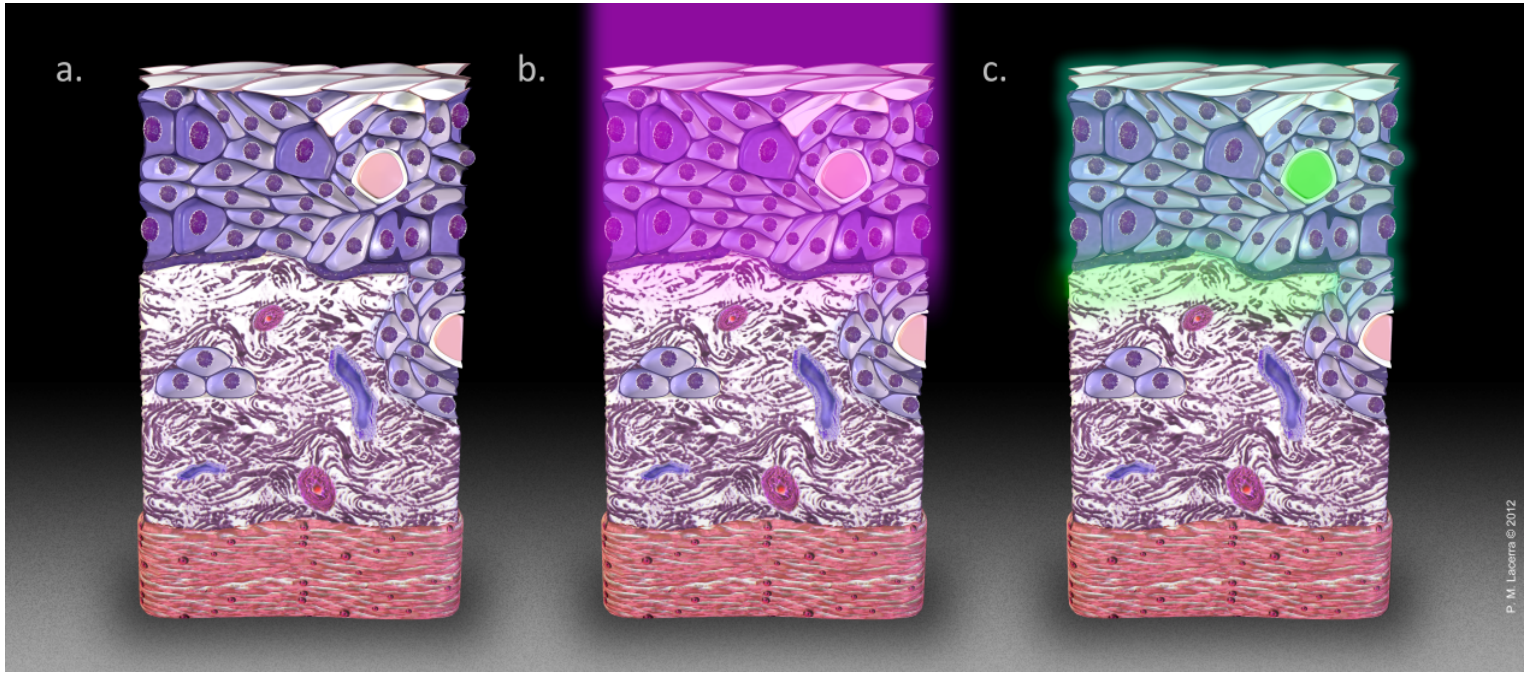
D Roblyer et al., J Biomed Opt 2008

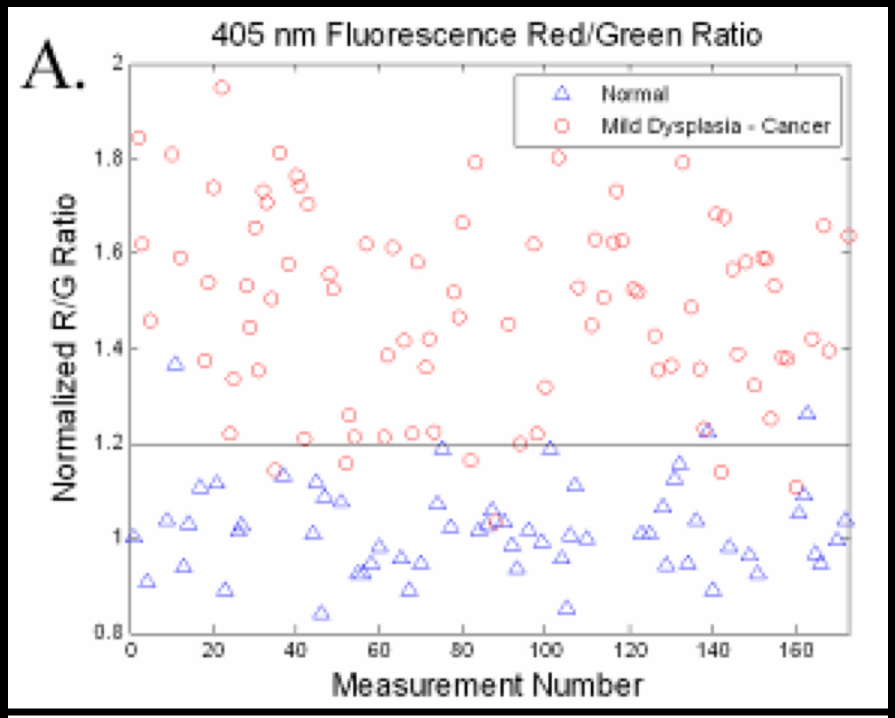

A.
Normal
Abnormal
B.
C.
D.

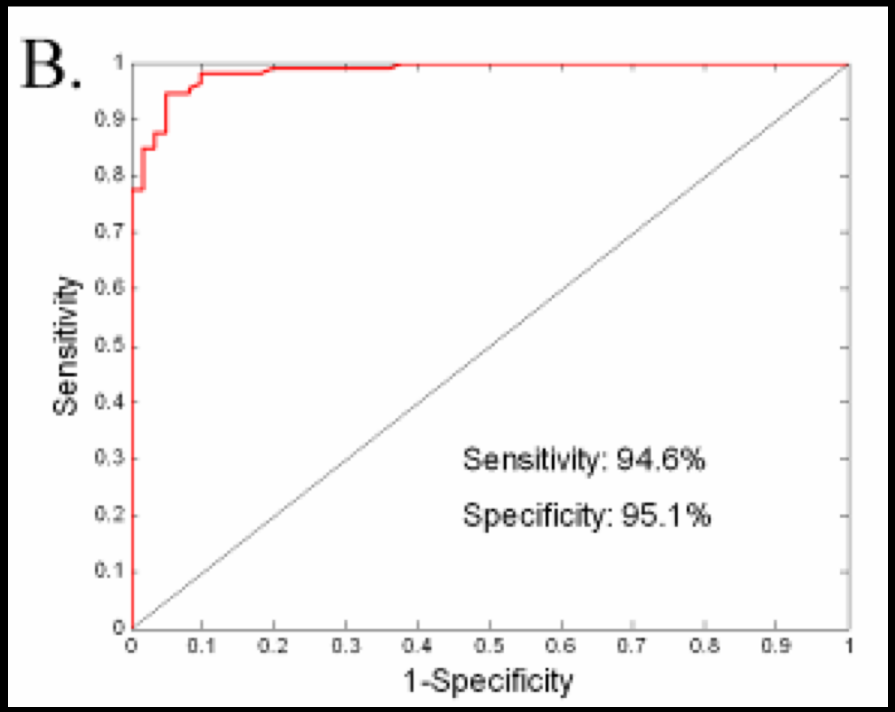
Mucosa normal

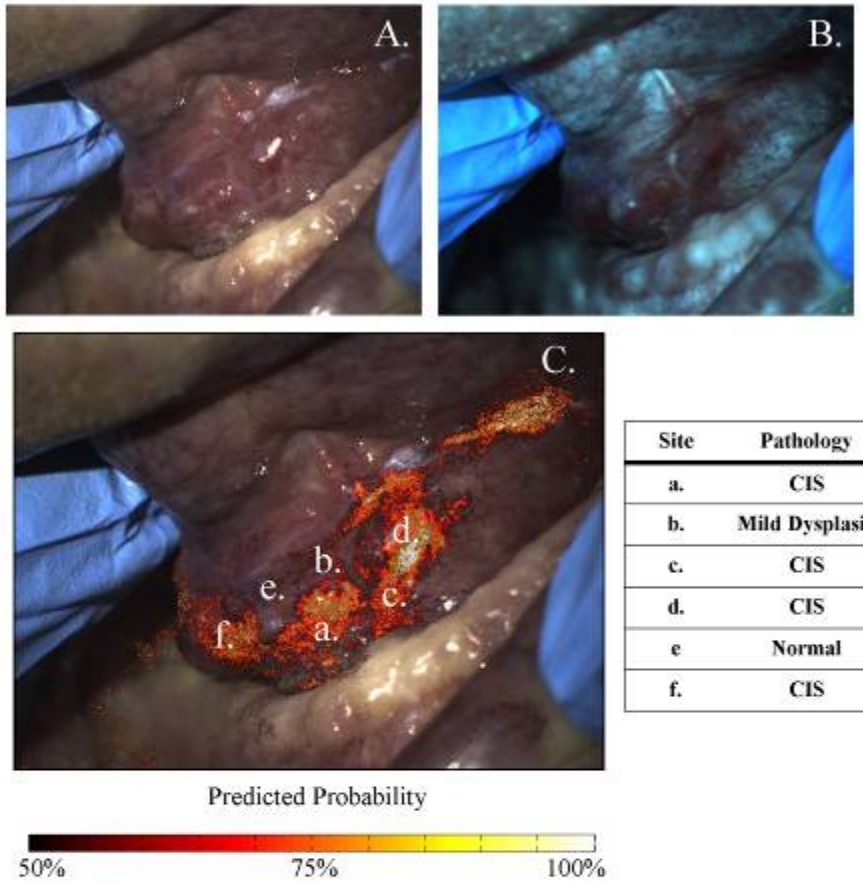


Carcinoma

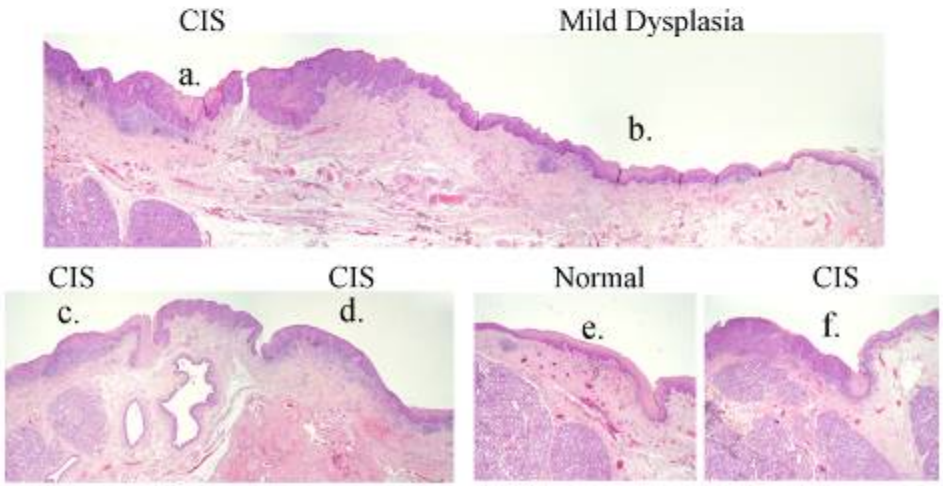


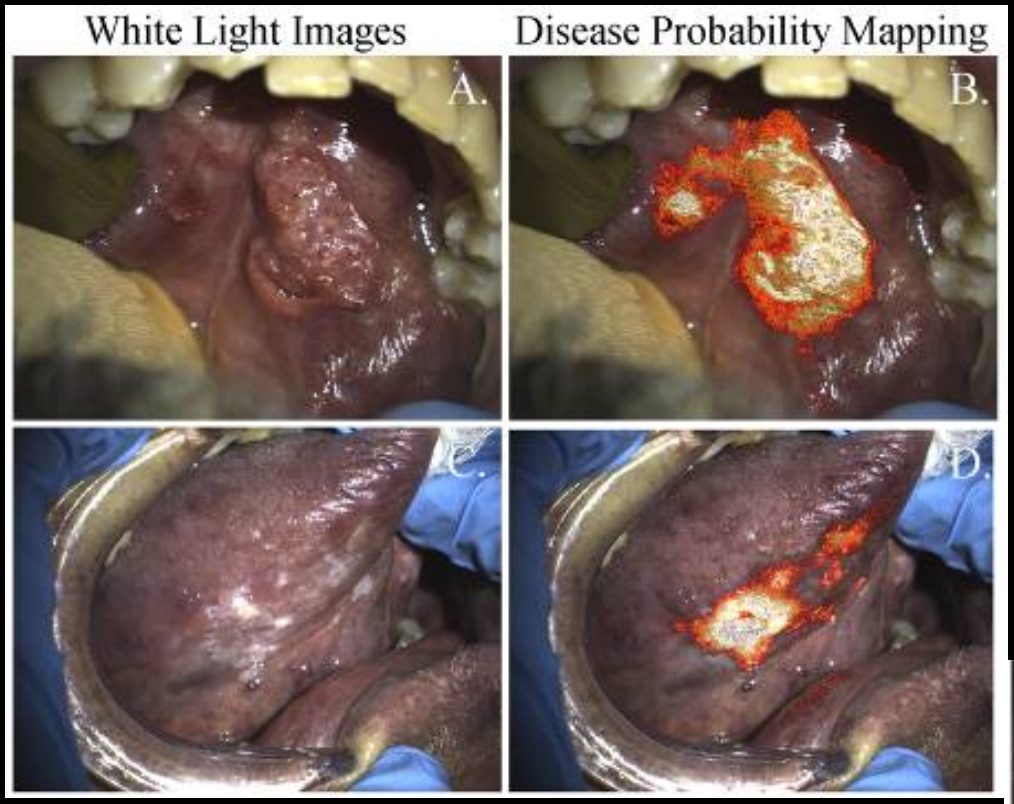


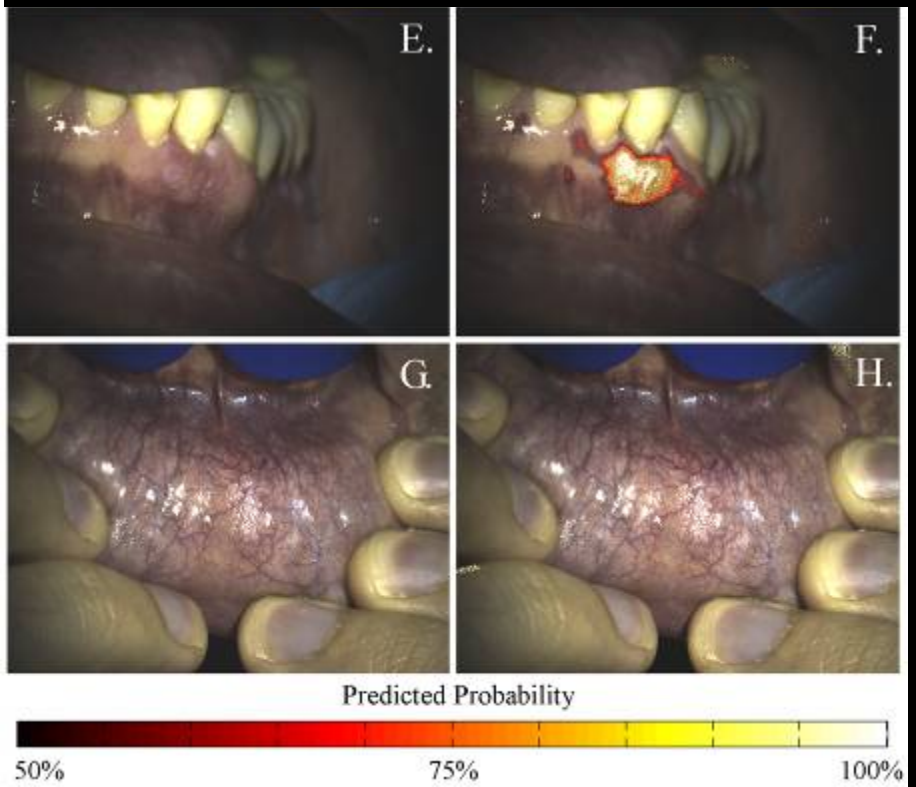




Site	Pathology
a.	CIS
b.	Mild Dysplasia
c.	CIS
d.	CIS
e	Normal
f.	CIS

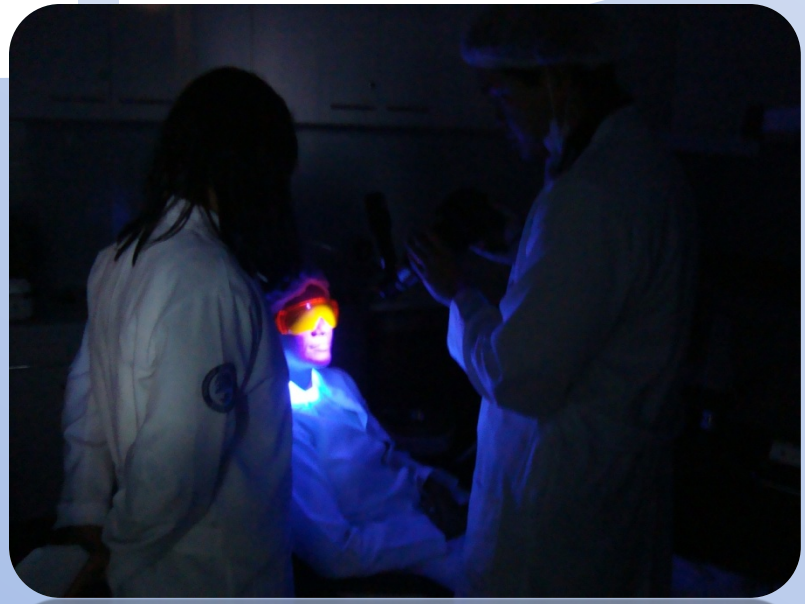


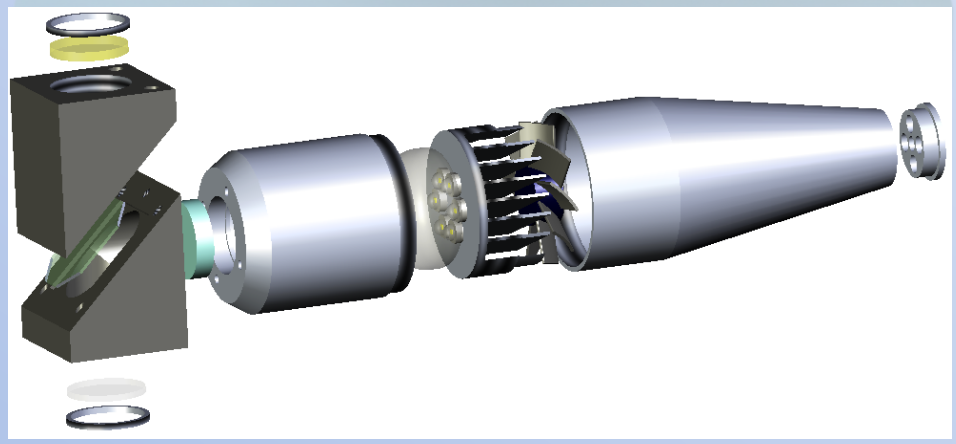




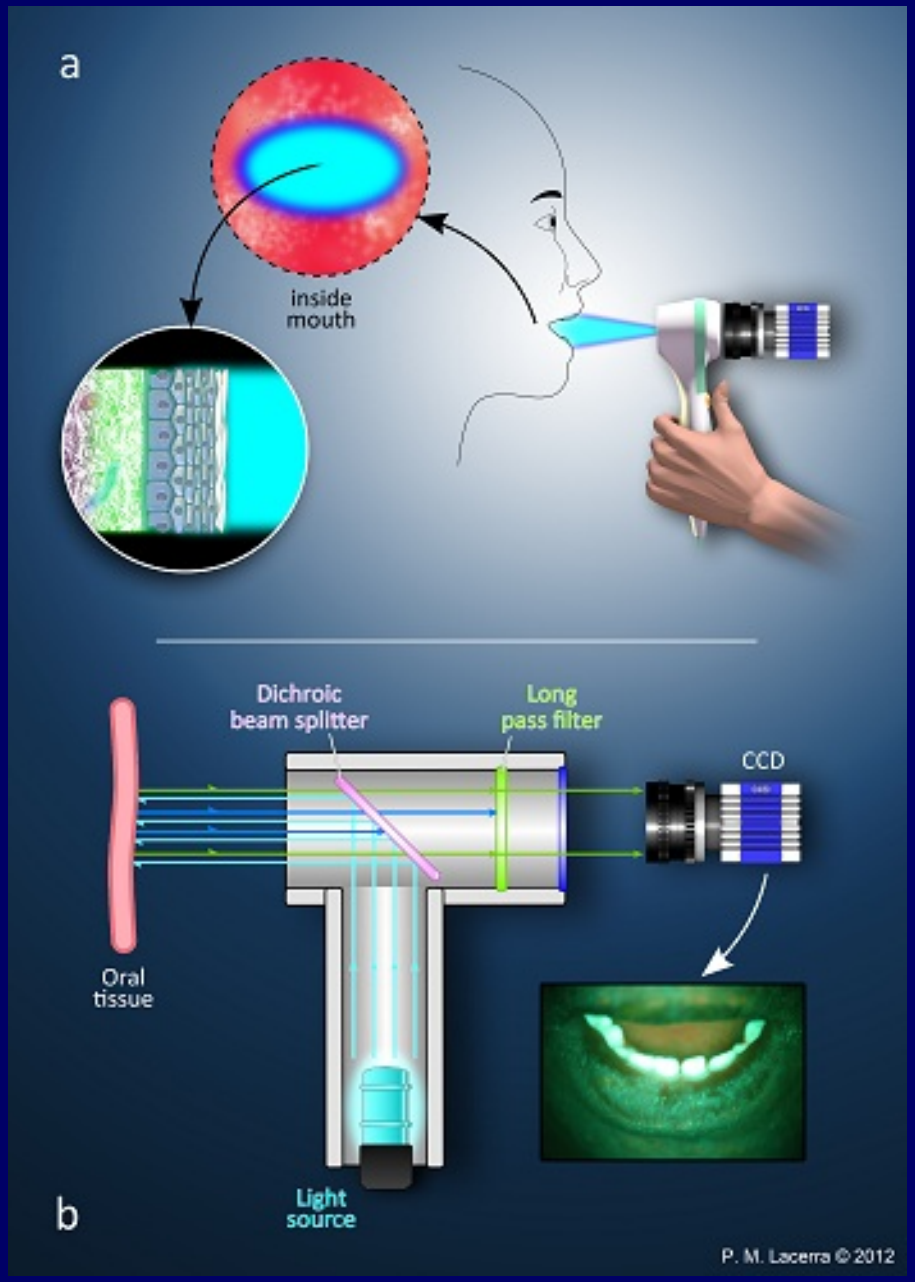
D Roblyer et al., Cancer Prev Res 2009

WIDEFIELD FLUORESCENCE



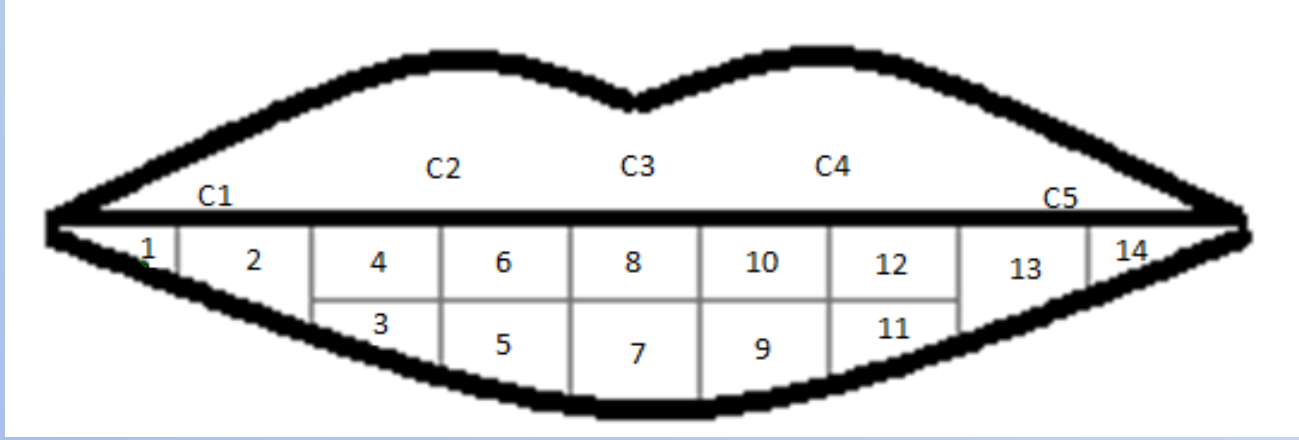


-LED excitation: 400 and 450 nm
- Optical components
- Digital camera

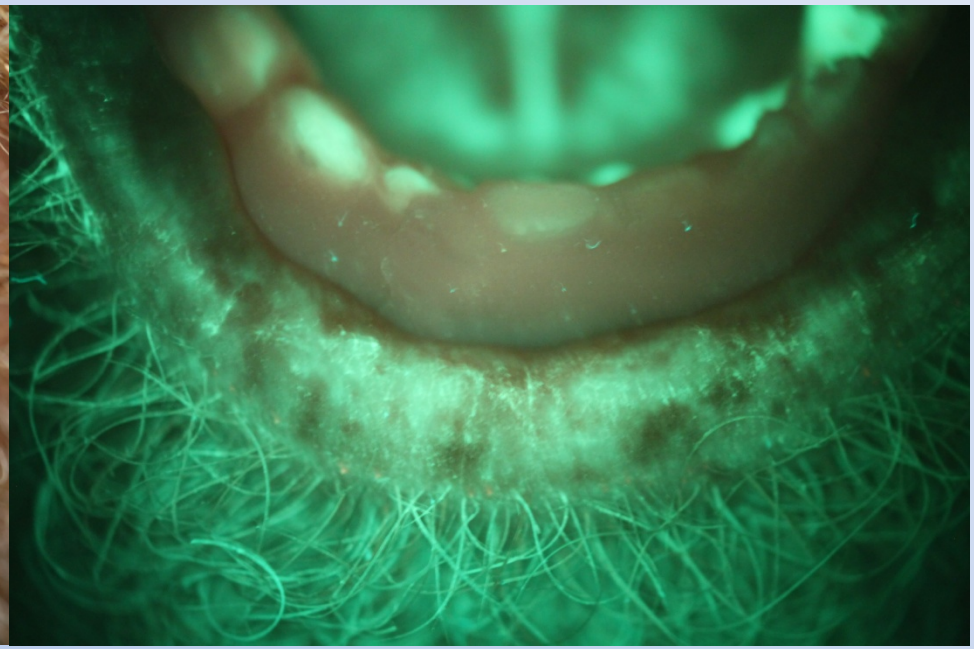

a
inside mouth
Dichroic beam splitter
Long pass filter
CCD
Oral tissue
Light source
b
P. M. Lacerra © 2012

CLINICAL PROTOCOL

-57 patients with clinically detected AC / 45 normal volunteers
- Clinical examination
- Optical interrogation
- Biopsy / histology (gold standard)



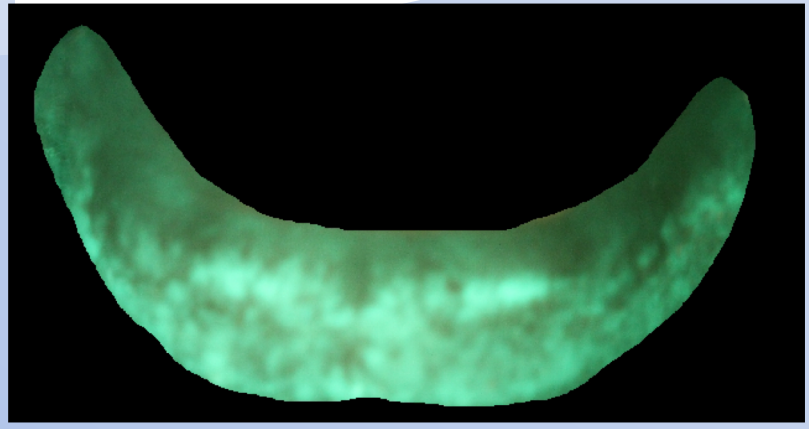
RESULTS



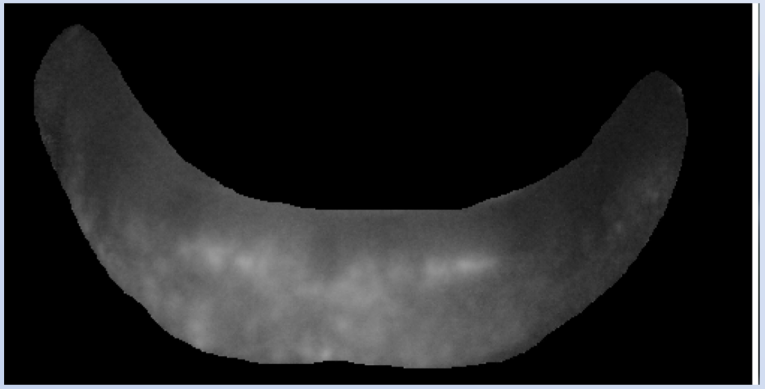
CEPOF
CENTRO DE PESQUISAS EM ÓPTICA E FOTÔNICA

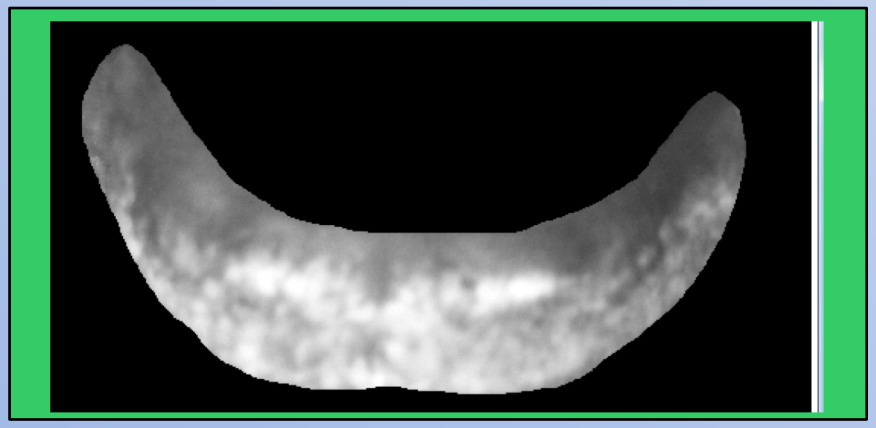
INOF
Instituto Nacional de Óptica e Fotônica

RGB

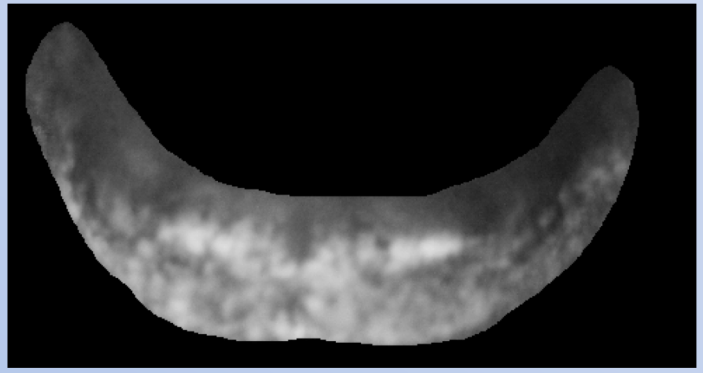


Red



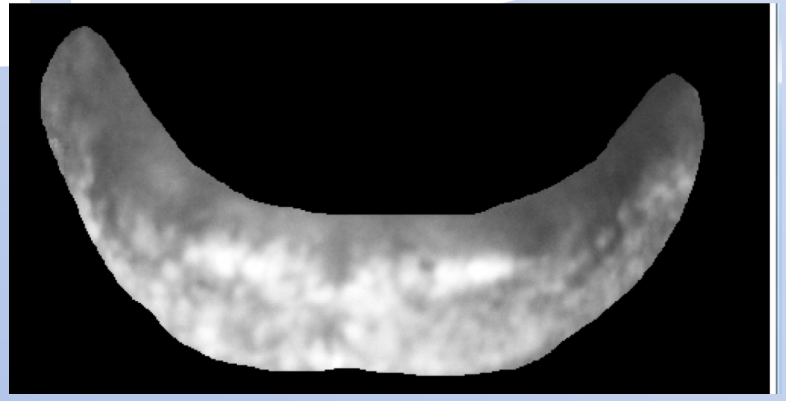


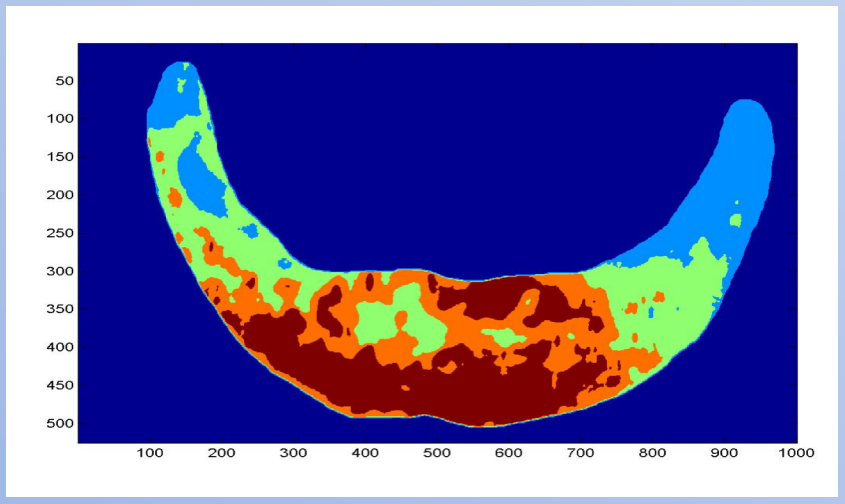
Green

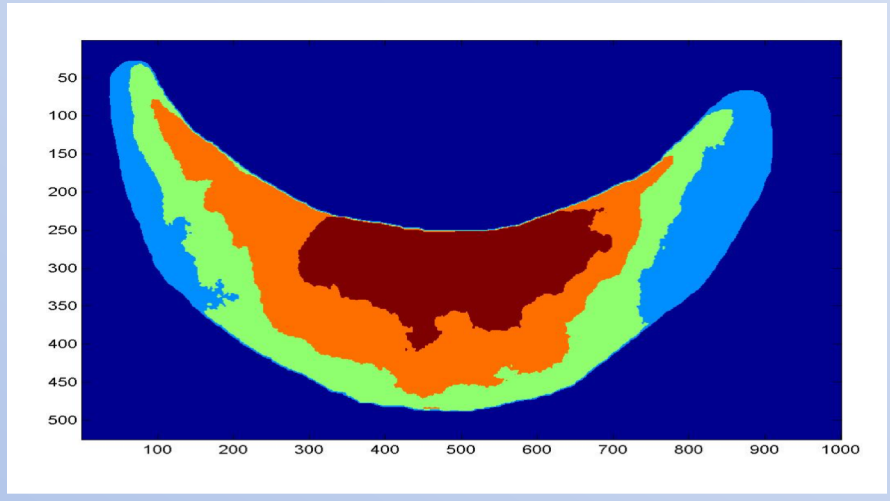


Blue

IMAGE ANALYSIS – Kmean clustering





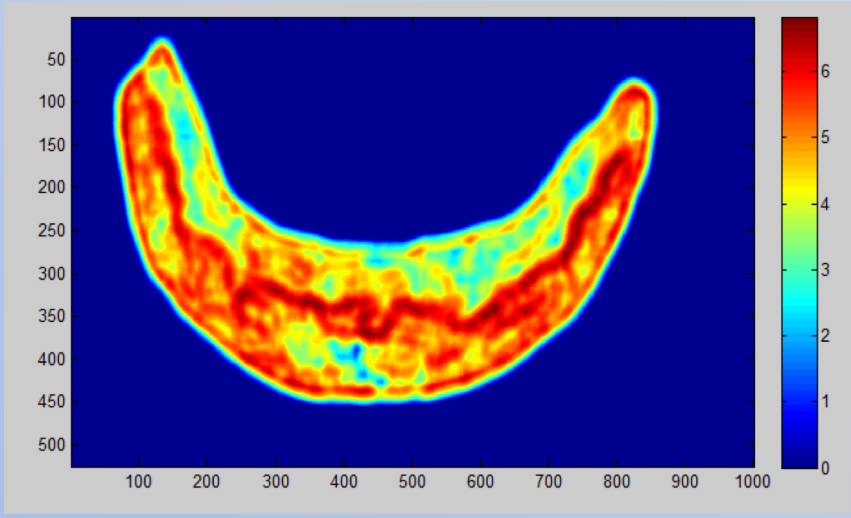


Actinic cheilitis

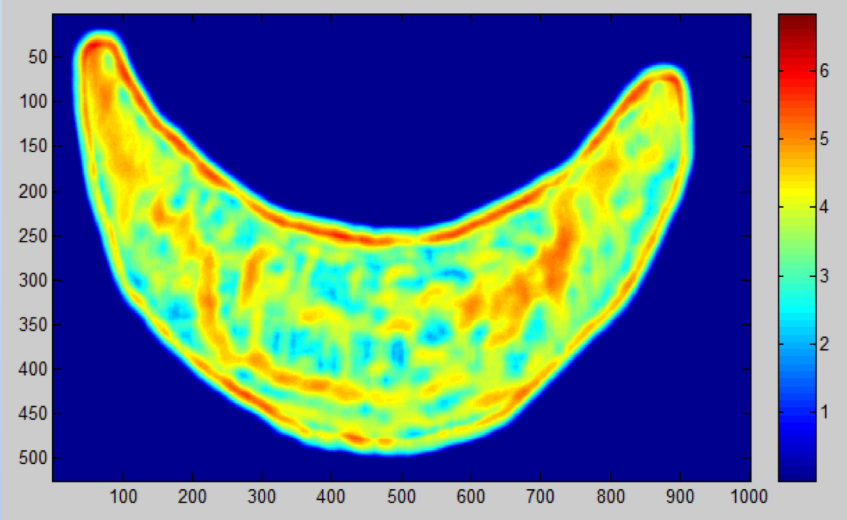
Normal

IMAGE ANALYSIS – Local entropy

Actinic cheilitis

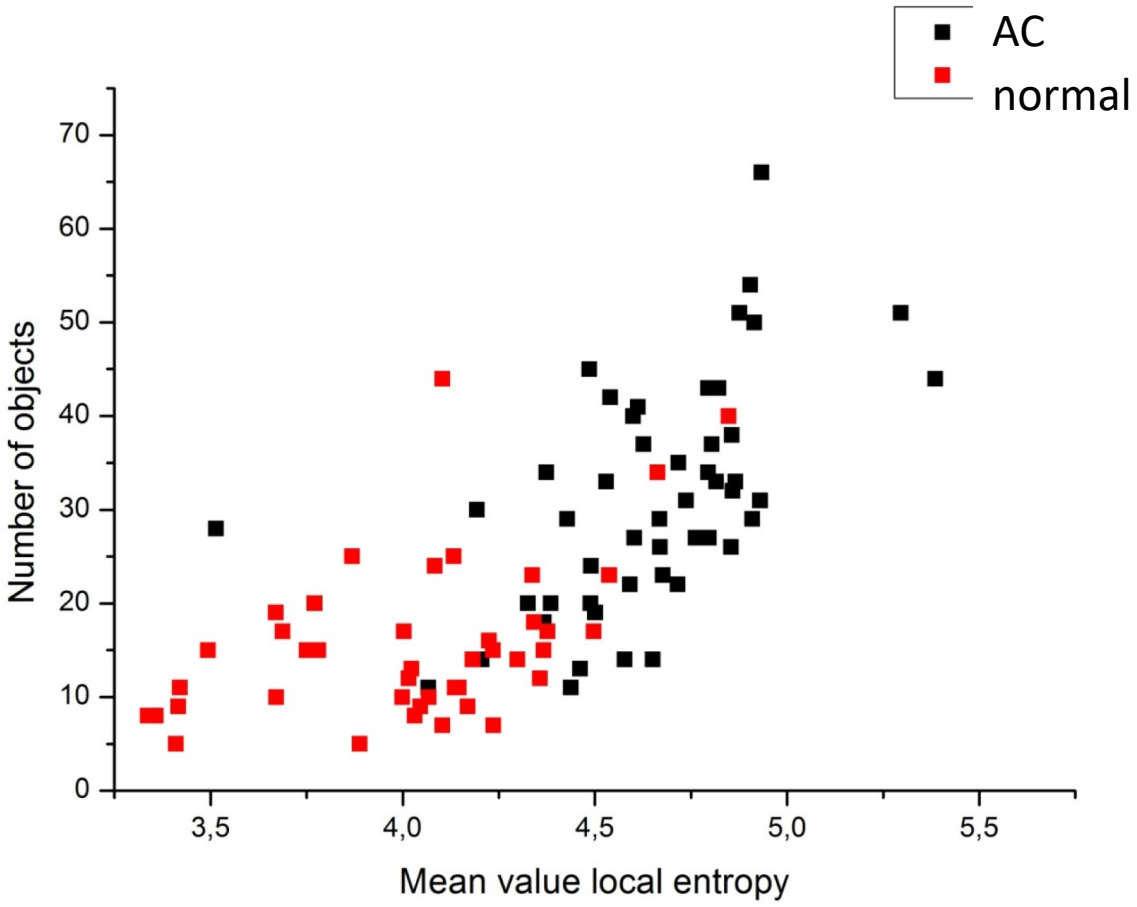


Normal



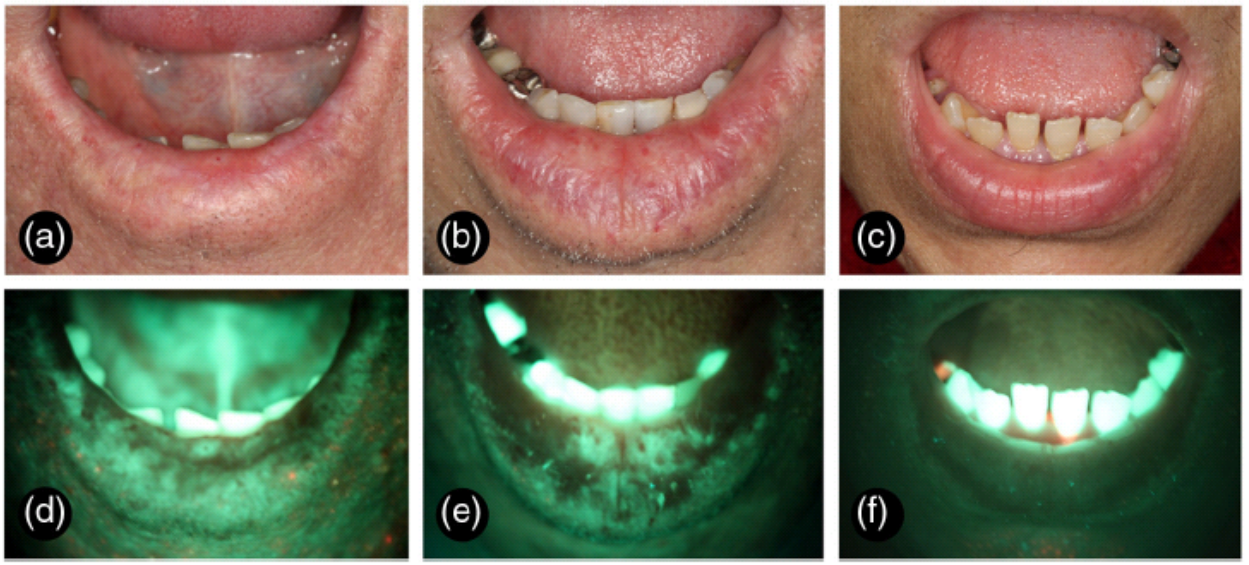
Entropy is a measurement of the homogeneity of the all pixel values

IMAGE ANALYSIS – Kmean x Entropy



KNN in cross validation
Sensitivity 84 %
True Positive 88.5%
False Positive 22%
Specificity 78.6 %

Actinic cheilitis – Dysplasia classification



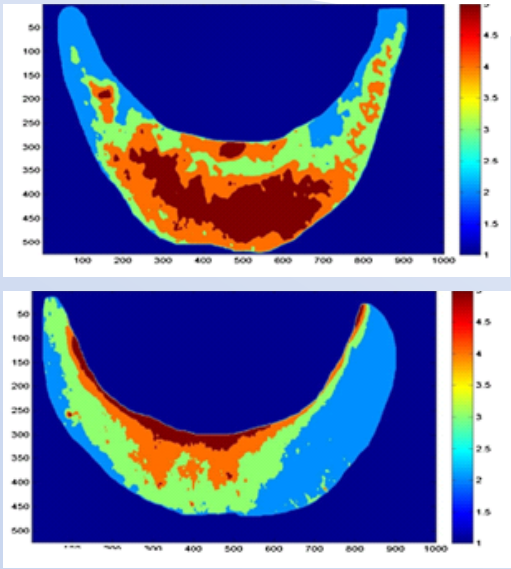


Table 3 Summary data of the diagnostic methods used to indicate 113 areas of biopsy from 57 cases of AC.

	Epithelial dysplasia				
Diagnostic methods	Absence *n* (%)	Mild *n* (%)	Moderate *n* (%)	Severe *n* (%)	Total *n* (%)
Clinical exam	1 (12.5)	10 (18.2)	8 (19.5)	3 (33.3)	22 (19.5)
Fluorescence visualization	4 (50.0)	20 (36.4)	16 (39.0)	5 (55.6)	45 (39.8)
Clinical exam and fluorescence visualization	3 (37.5)	25 (45.4)	17 (41.5)	1 (11.1)	46 (40.7)
Total	8 (7.0)	55 (48.7)	41 (36.3)	9 (8.0)	113 (100)

$p = 0.631$.

A.Takahama Jr et al., J Biomed Opt 2013

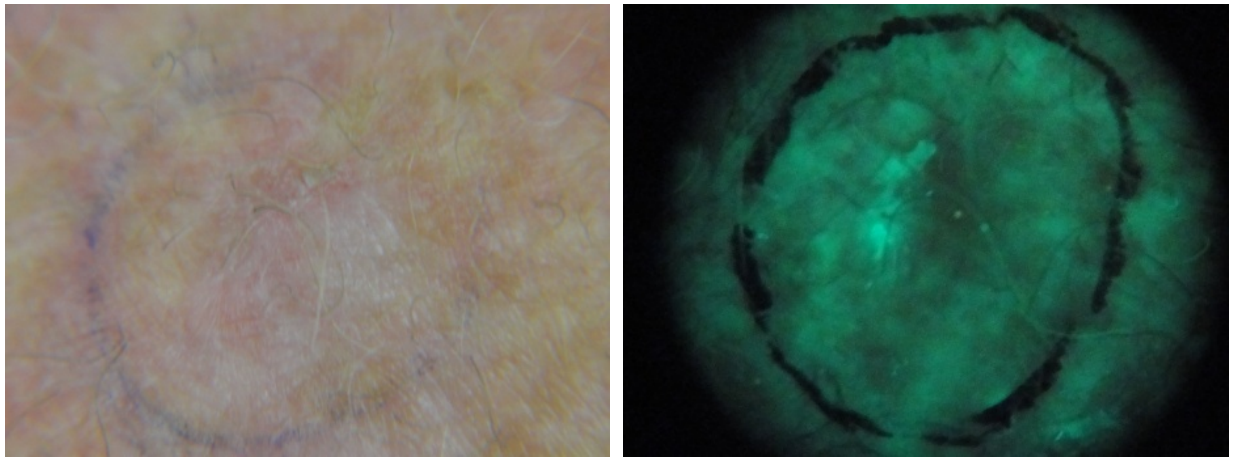
Oral cancer screening

One-day campaign:

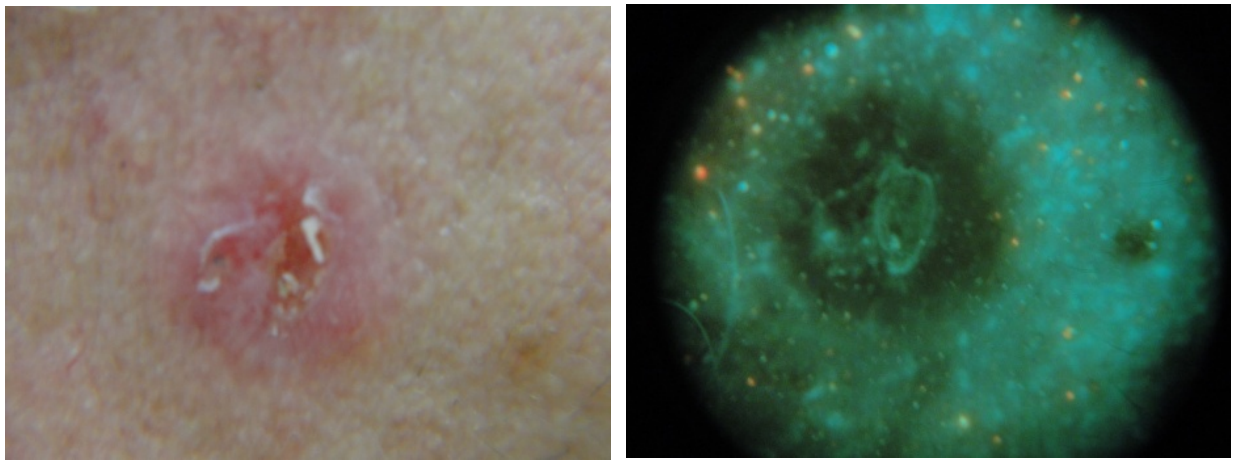
- 55 volunteers
- 14 pts scheduled
- 8 pts w/ MOD/SEV ED

Diagnóstico óptico – lesões em pele

IFSC e Hospital Amaral Carvalho



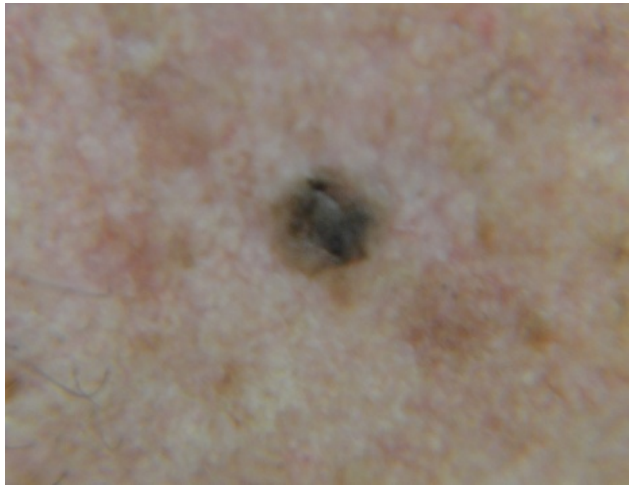
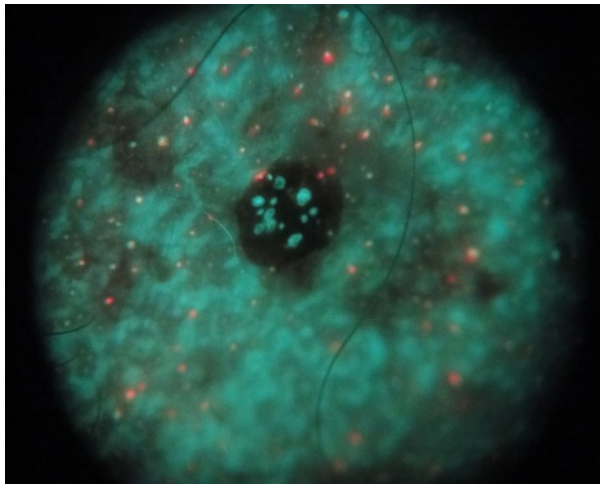
Ceratose actínica



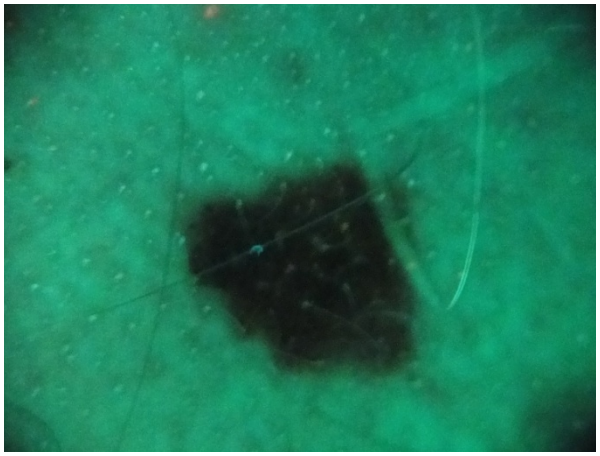
Carcinoma basocelular

Diagnóstico óptico – exclusão de melanoma?

IFSC - Hospital Amaral Carvalho

Queratose seborréica

Melanoma

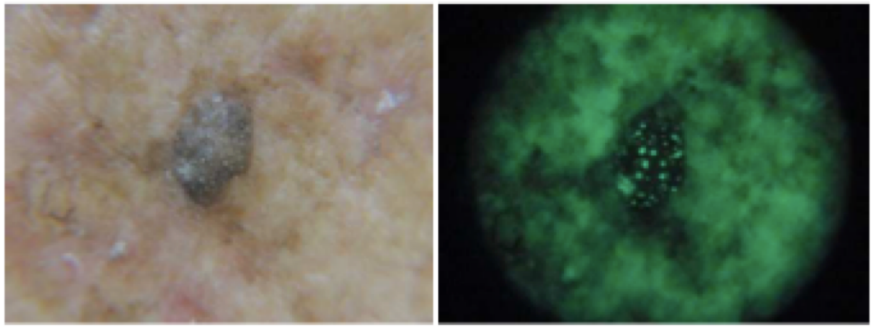


Fig. 6. Seborrheic keratosis under white light illumination (left hand picture) and at fluorescence imaging visualization (right hand picture).

¶(9pt)

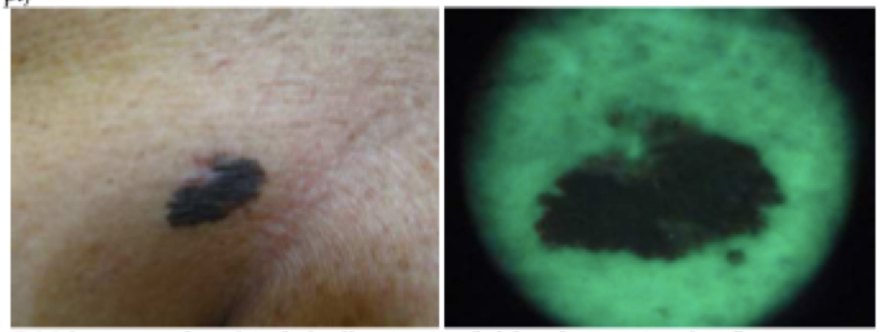


Fig. 7. Melanoma under white light illumination (left hand picture) and at fluorescence imaging visualization (right hand picture).

AG Salvio, NM Inada, VS Bagnato, C Kurachi. JAAD online (2019).

S. Pratavieira, C. T. Andrade, A. G. Salvio, V.S. Bagnato and C. Kurachi (2011). Optical Imaging as Auxiliary Tool in Skin Cancer Diagnosis, Skin Cancers - Risk Factors, Prevention and Therapy, Prof. Caterina La Porta (Ed.), ISBN: 978-953-307-722-2, InTech.