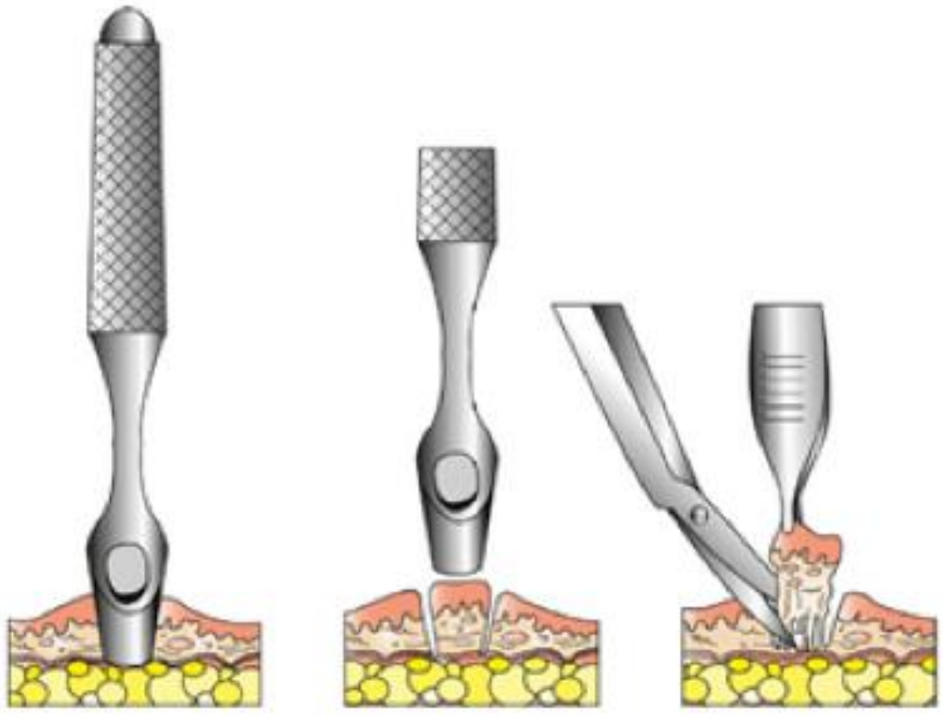
12 aprile 2016 ore 12.10-13.00

"Tecnologie di Avanguardia e Cute: Istologia senza Biopsia"

CATERINA LONGO

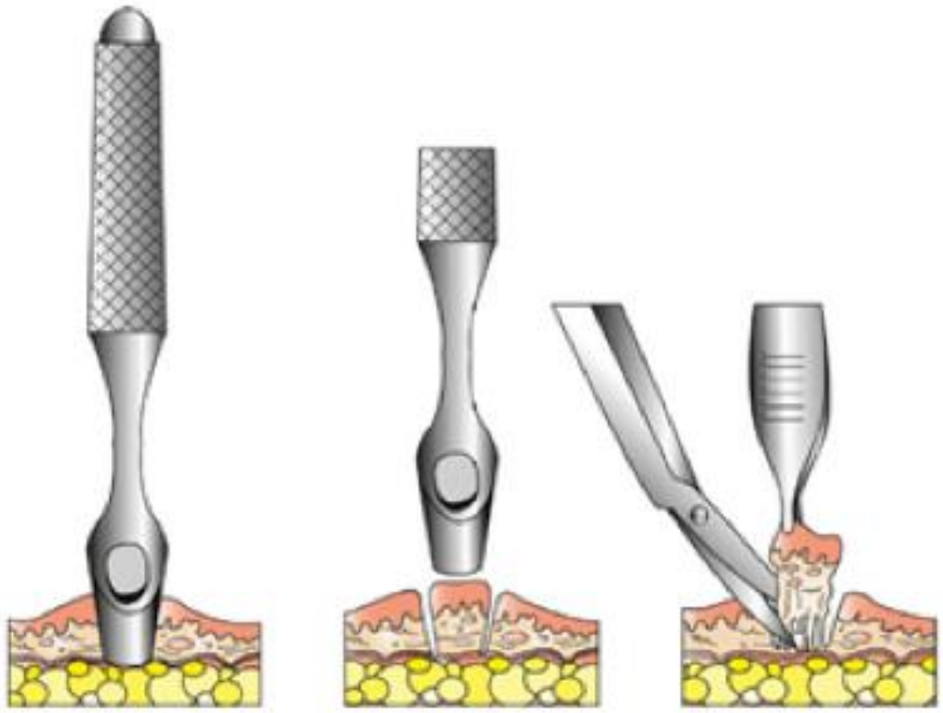
SKIN CANCER UNIT

IRCCS - Santa Maria Nuova, Reggio Emilia, Italy

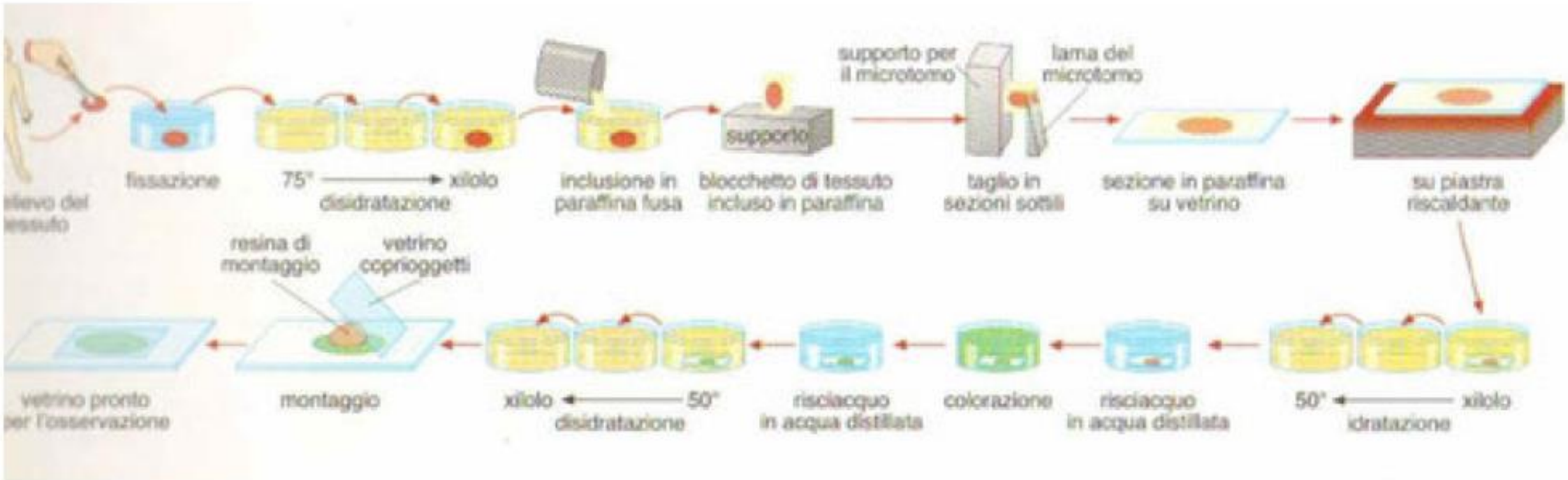


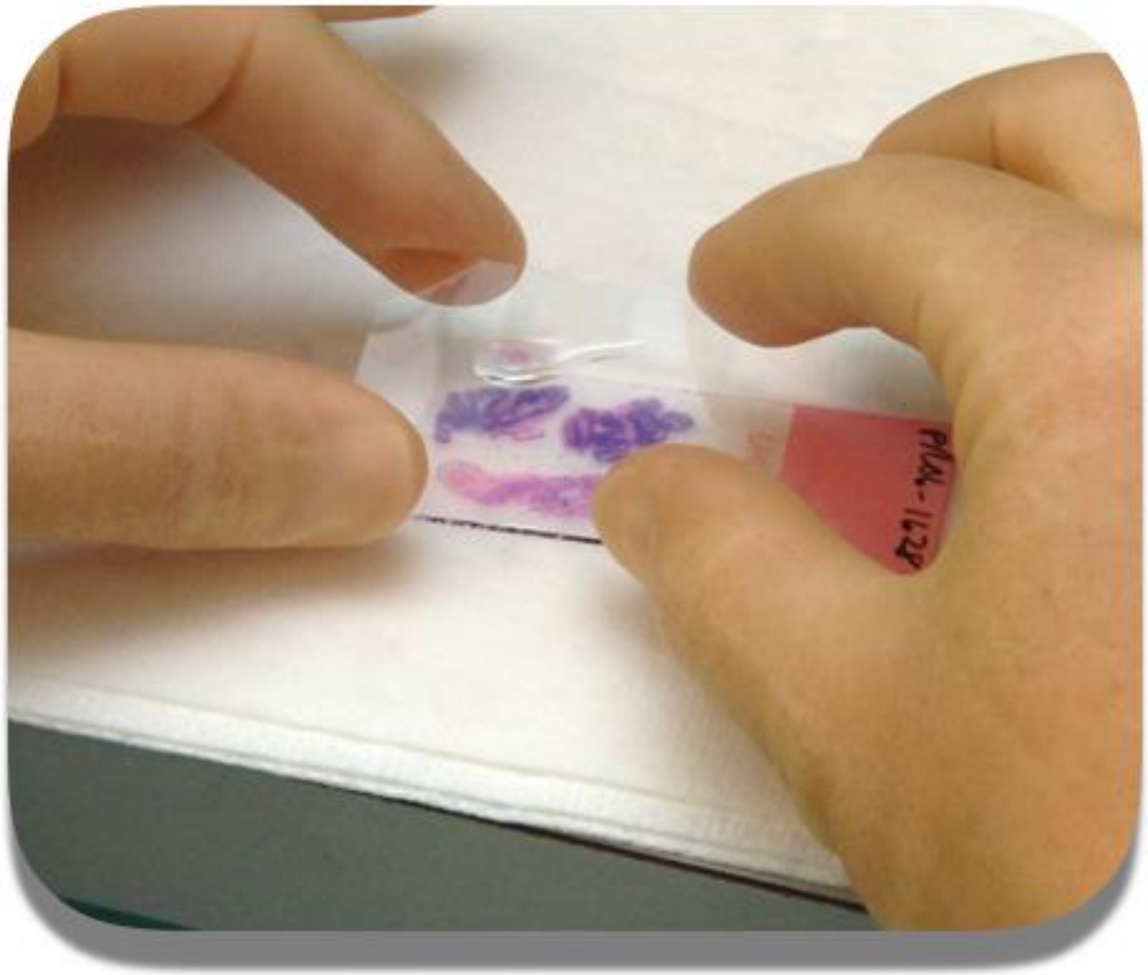
Punch biopsy

Punch biopsy

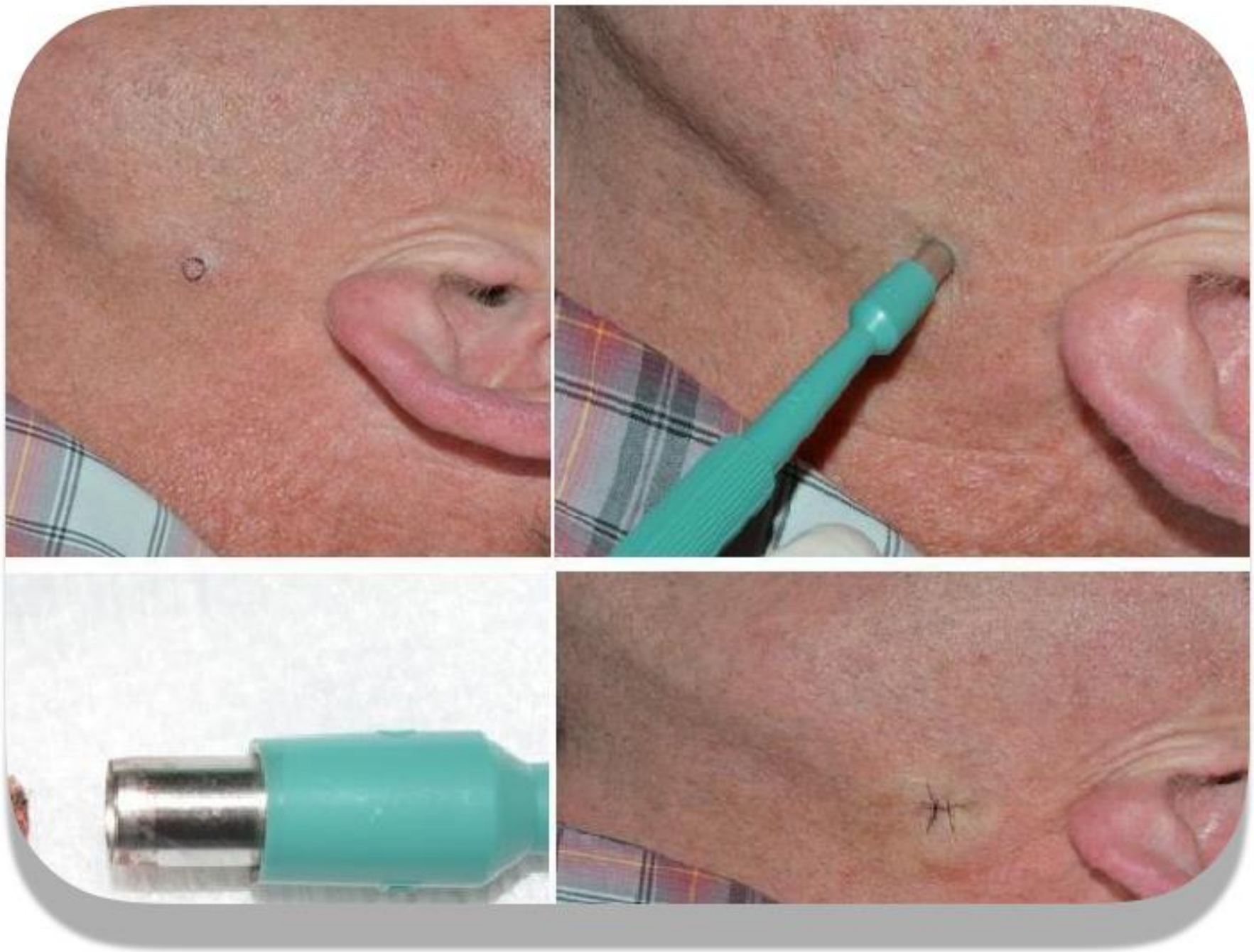


Staining and processing of the tissue





Histologic examination



Scarring

30 minutes

Punch biopsy

30 minutes

7 days

Punch biopsy

Staining

30 minutes

7 days

21 days

Punch biopsy

Staining

Histology exam.

30 minutes

7 days

21 days

30 days

Punch biopsy

Staining

Histology exam.

Diagnosis

30 minutes

7 days

21 days

30 days

40 days

Punch biopsy

Staining

Histology exam.

Diagnosis

Patient's treatment

SKIN is an external organ...

SKIN is an external organ...

VISIBLE

SKIN is an external organ...

VISIBLE

EXPLORABLE!!!

Clínical examínatíon

SEMEIOLOGY

CLEAR CUT CLINICAL DIAGNOSIS

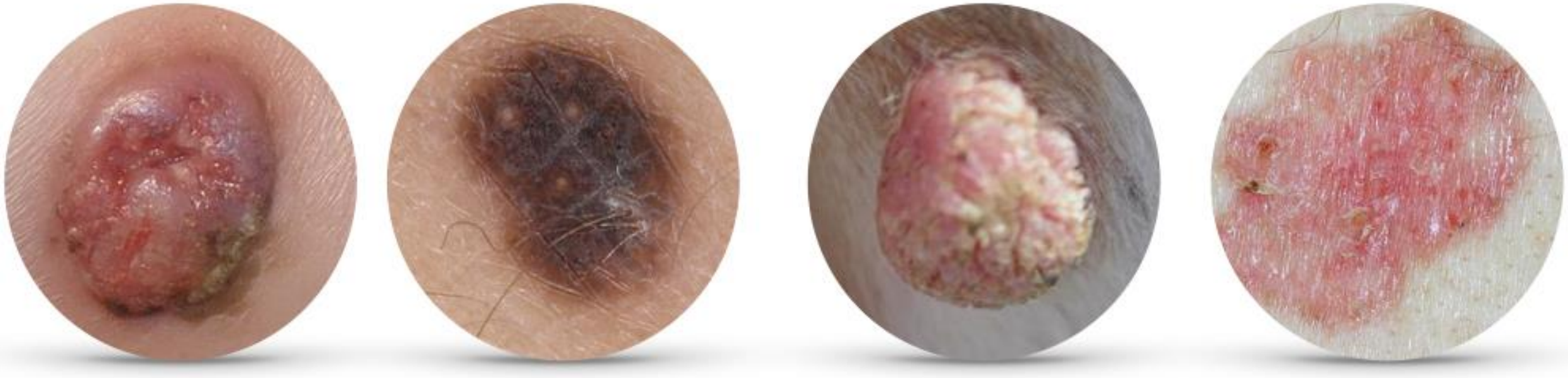
different devices

to have

a "virtual" skin biopsy

"virtual" skin biopsy

skin CANCER



J Am Acad Dermatol
October 2014

Screening, early detection, education, and trends for melanoma: Current status (2007-2013) and future directions

Part I. Epidemiology, high-risk groups, clinical strategies, and diagnostic technology

Jonathan E. Mayer, BA,[a,b] Susan M. Swetter, MD,[c,d] Teresa Fu, MD,[c] and Alan C. Geller, MPH, RN[a]
Boston, Massachusetts; New York, New York; and Redwood City and Palo Alto, California

Table I. Summary of new technologies for the detection of melanoma

Technology	Definition	Pros	Cons	Sensitivity	Specificity
Dermatoscopy	Examination of skin with dermatoscope	Fewer biopsy specimens and removal of benign lesions	Increases examination time and requires clinician training	90%	90%
Total body photography	Series of photographs of all skin on body	Can detect thinner tumors than the naked eye and lower biopsy rates than serial dermatoscopy	Expensive	75%	74%
Confocal microscopy	Low power laser that creates 3-dimensional image with resolution comparable to standard histology	Able to detect subclinical disease in an area wider than that of dermatoscopy	Limited by expense and the need for specialized training	90%	86%
MelaFind	Multispectral device that uses automated software for image analysis	High sensitivity	Expensive and low specificity	96-98%	0-10%
Electrical impedance spectroscopy	Device that measures changes in tissue impedance to low voltage current flow	High sensitivity	Expensive, low specificity, requires presoaking of the lesion in saline, increases examination time	98%	25-49%
Smartphone apps	Cell phone programs that analyze self-taken photographs of suspicious lesions	Widely available, and some apps send photos to Board-certified dermatologists	Experimental and highly variable quality	7-98%	30-94%

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CONTINUING MEDICAL EDUCATION

J AM ACAD DERMATOL
OCTOBER 2014

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- **Dermatoscopy** increases the sensitivity of clinical evaluation for MM and has been shown to decrease the number of excised benign lesions
- **Total Body Photography** helps to detect new/thinner tumors especially in patients with numerous moles
- **Confocal microscopy** requires specialized training and may be superior to dermatoscopy for the detection of subclinical MM

DERMOSCOPY

Dermatoscope

Dermatoscope

Stethoscope

Why method of the millennium

- Cheap (average costs between 500-1000$)
- Handy (can be easy carried all day)
- Fast (allows examination of all lesions in few minutes)
- High diagnostic accuracy
- High image quality
- Allows documentation via digital photography

More than 35 different indications

Dermoscopy in General Dermatology

Epiluminescence Microscopy

A New Approach to In Vivo Detection of Sarcoptes scabiei

Follicular Red Dots

A Novel Dermoscopic Pattern Observed in Scalp Discoid Lupus Erythematosus

Dermoscopy and entomology (entomodermoscopy)

Epiluminescence Microscopy for Port-Wine Stains: Pretreatment Evaluation

Dermoscopy in Epidermodysplasia Verruciformis

Dermoscopy Subpatterns of Inflammatory Skin Disorders

Entodermoscopy: A New Tool for Diagnosing Skin Infections and Infestations

Lupus Vulgaris: A New Look at an Old Symptom – The Lupoma Observed with Dermoscopy

Dermoscopic semiology: further insights into vascular features by screening a large spectrum of nontumoral skin lesions

Clinical significance of dermoscopy in alopecia areata: analysis of 300 cases

Accuracy of standard dermoscopy for diagnosing scabies

The Utility of Dermatoscopy in the Evaluation of Xanthogranulomas

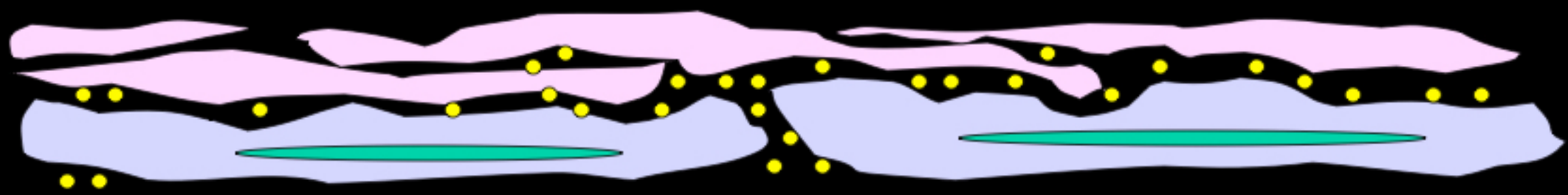
The role of scalp dermoscopy in the diagnosis of alopecia areata incognita

Dermoscopy for the diagnosis of porokeratosis

ypical clinical presentation of pigmented purpuric dermatosis

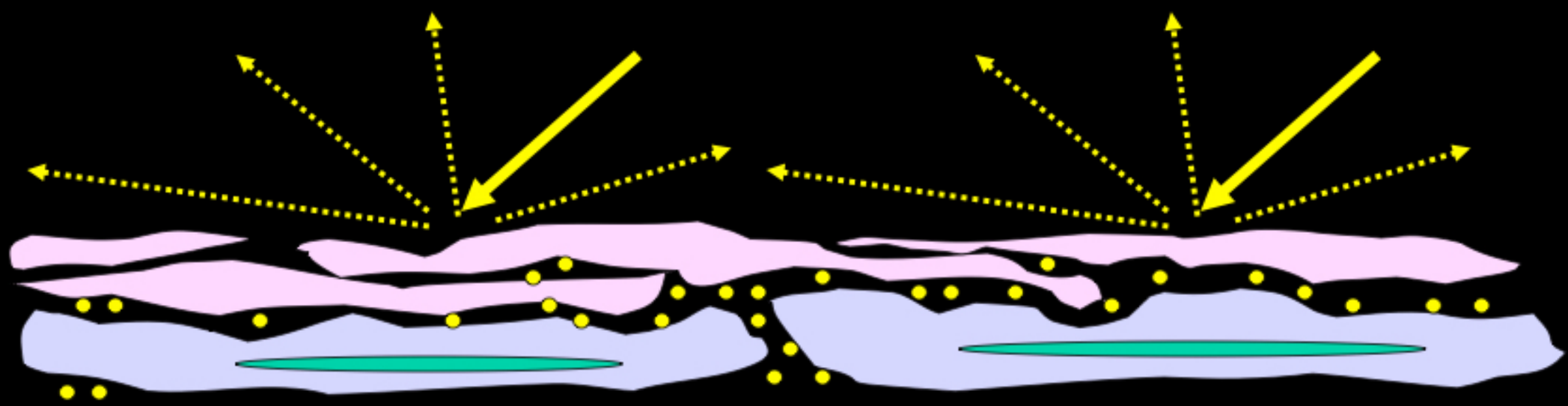
DERMOSCOPY

Incident light



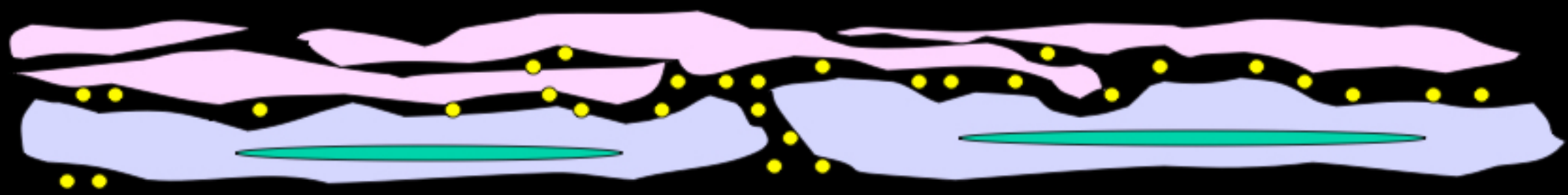
DERMOSCOPY

Incident light



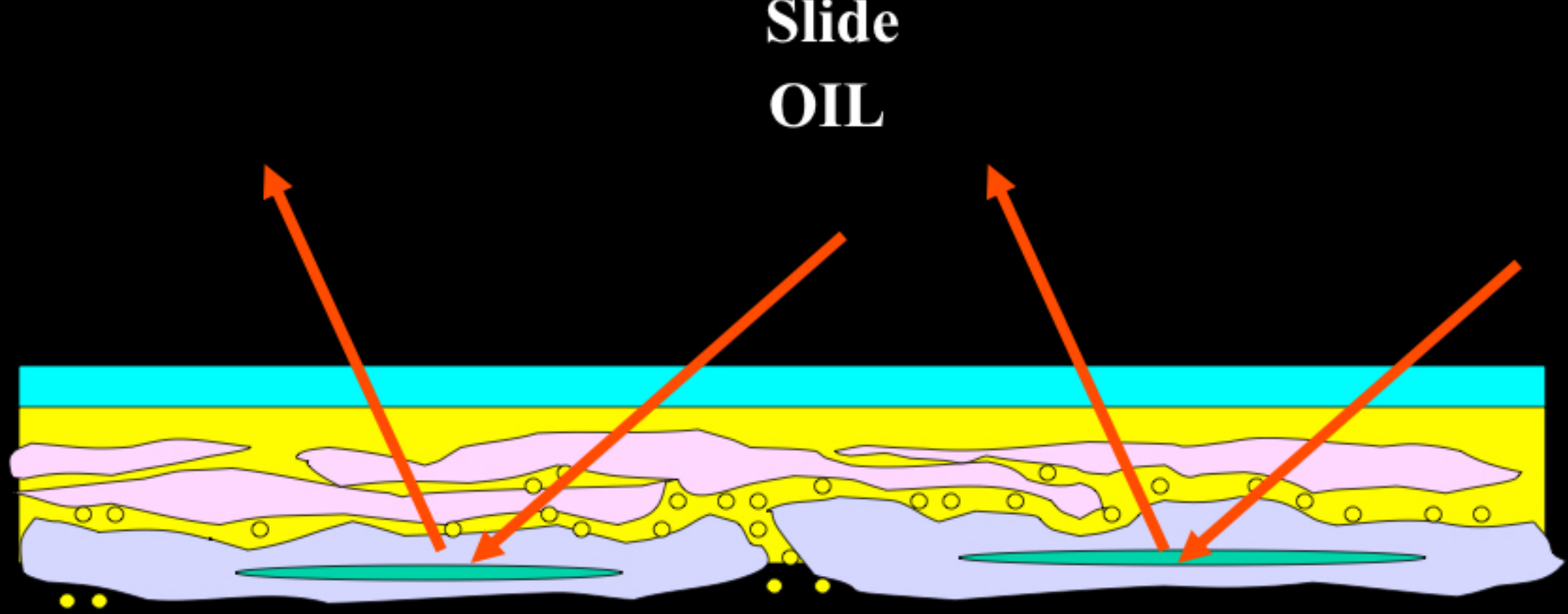
DERMOSCOPY

immersion-mode



DERMOSCOPY

immersion-mode



DERMOSCOPY

Pehamberger H, Steiner A, Wolff K. In vivo epiluminescence microscopy of pigmented skin lesions. I. Pattern analysis of pigmented skin lesions. J Am Acad Dermatol. 1987;17:571-83

DERMOSCOPY

EVIDENCE-BASED DERMATOLOGY: ORIGINAL CONTRIBUTION

Is Dermoscopy (Epiluminescence Microscopy) Useful for the Diagnosis of Melanoma?

Results of a Meta-analysis Using Techniques Adapted to the Evaluation of Diagnostic Tests

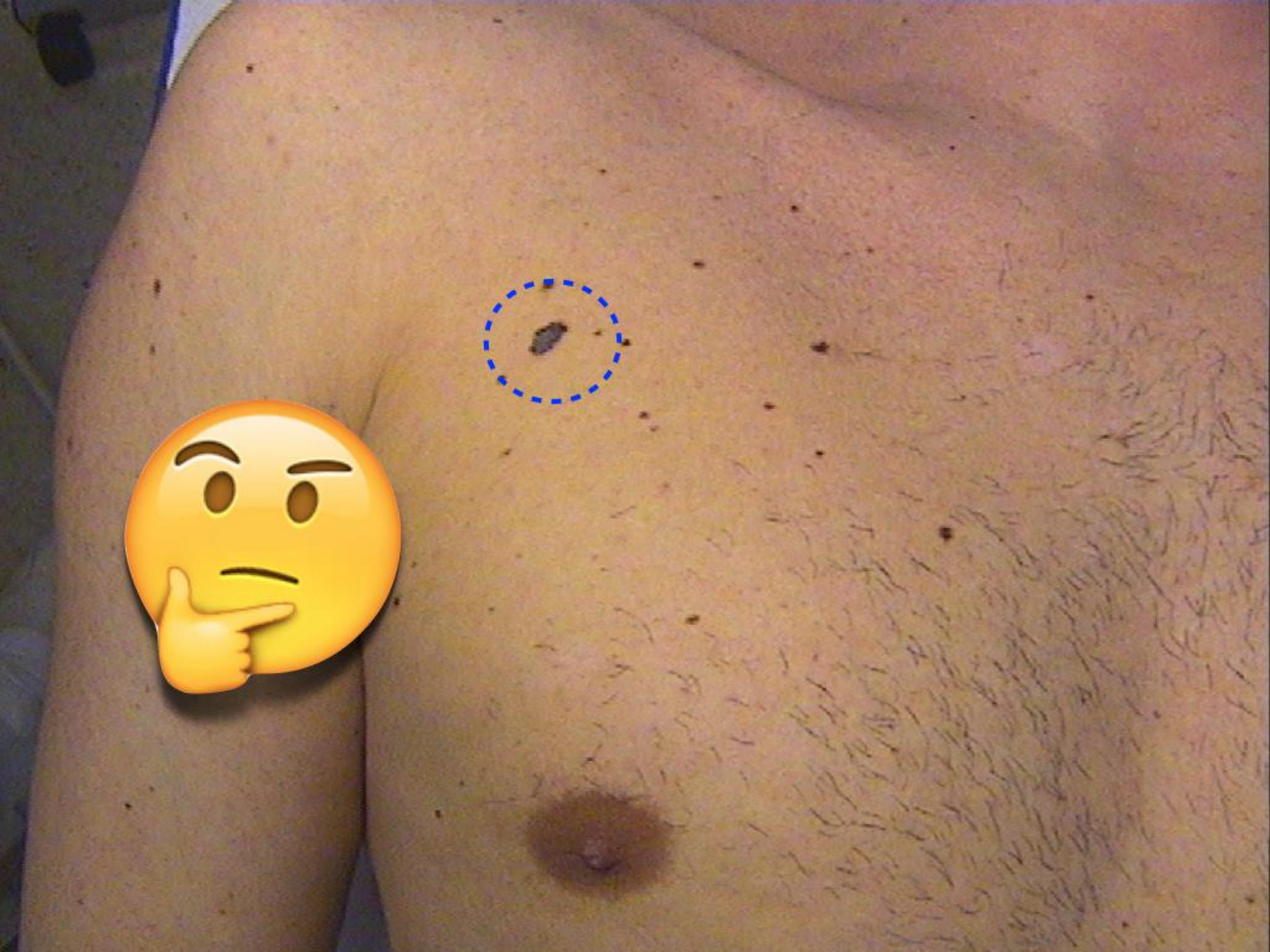
Marie-Lise Bafounta, MD; Alain Beauchet, MD, PhD; Philippe Aegerter, MD, PhD; Philippe Saiag, MD

Dermoscopy Review

Diagnostic accuracy of dermoscopy

H Kittler, H Pehamberger, K Wolff, and M Binder

In the hands of experts, diagnostic accuracy improved from 15 to 35% with dermoscopy



melanoma?

melanoma?

nevo comune?

melanoma?

nevo comune?

nevo congenito?

melanoma?

nevo comune?

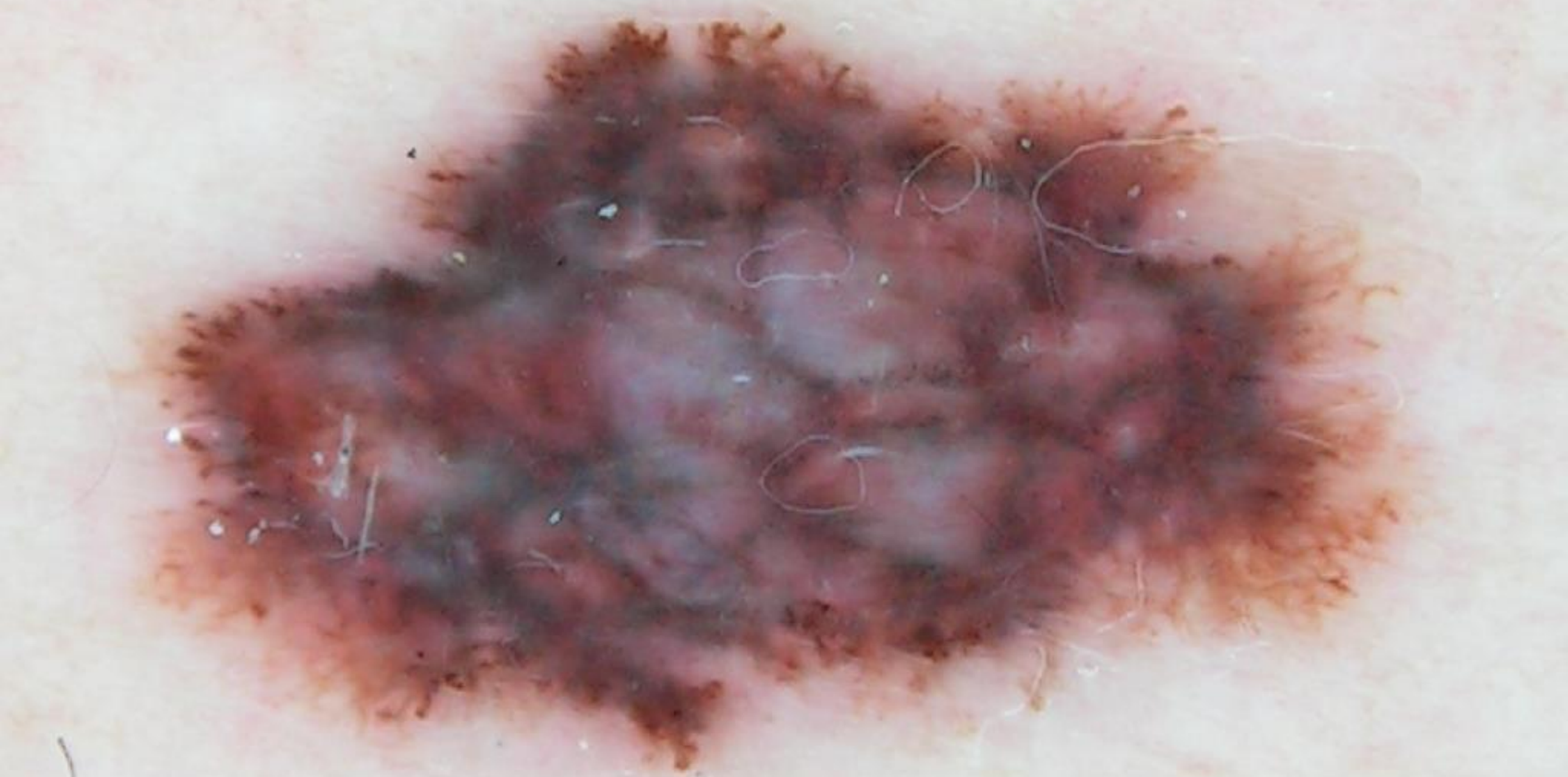
nevo congenito?

cheratosi?


CONFIDENCE

CONFIDENCE

melanoma!



SENSITIVITY

J Am Acad Dermatol 2011 ORIGINAL ARTICLE

Accuracy in melanoma detection: A 10-year multicenter survey

Giuseppe Argenziano, MD, Lorenzo Cerroni, MD, Iris Zalaudek, MD, Stefania Staibano, MD, Rainer Hofmann-Wellenhof, MD, Nicola Arpaia, MD, Renato Marchiori Bakos, MD, MSc, Brigitte Balme, MD, Jadran Bandic, MD, Roberto Bandelloni, MD, Alexandra M. G. Brunasso, MD, Horacio Cabo, MD, David A. Calcara, BS, Blanca Carlos-Ortega, MD, Ana Carolina Carvalho, MD, Gabriel Casas, MD, Huiting Dong, MD, Gerardo Ferrara, MD, Raffaele Filotico, MD, Guillermo Gómez, MD, Allan Halpern, MD, Gennaro Ilardi, MD, Akira Ishiko, MD, PhD, Gulsen Kandiloglu, MD, Hiroshi Kawasaki, MD, Ken Kobayashi, MD, Hiroshi Koga, MD, Ivanka Kovalyshyn, MD, David Langford, MB, ChB, Xin Liu, MD, Ashfaq Marghoob, MD, Massimo Mascolo, MD, Cesare Massone, MD, Laura Mazzoni, MD, Scott Menzies, MBBS, PhD, Akane Minagawa, MD, Loredana Nugnes, MD, Fezal Ozdemir, MD, Giovanni Pellacani, MD, Stefania Seidenari, MD, Katherine Siamas, MD, Ignazio Stanganelli, MD, William V. Stoecker, MD, Masaru Tanaka, MD, Luc Thomas, MD, Philipp Tschandl, MD, and Harald Kittler, MD

A large number of BENIGN lesions, with equivocal dermoscopic aspects or history of change, are excised to rule out a MELANOMA

NNE in Specialized Centers: 8.7

NNE in Non-Specialized Centers: 29.4

DIGITAL DERMOSCOPY MONITORING

ELSEVIER

Clinics in Dermatology • 2002;20:297–304

Follow-up of Melanocytic Skin Lesions with Digital Total-Body Photography and Digital Dermoscopy: A Two-Step Method

JOSEP MALVEHY, MD
SUSANA PUIG, MD

The increase of the treatment threshold is accompanied by a **loss of sensitivity** and a **gain in specificity**.

The utility of this technique depends on the experience in the interpretation of follow-up images and on the **patient's compliance** with follow-up.

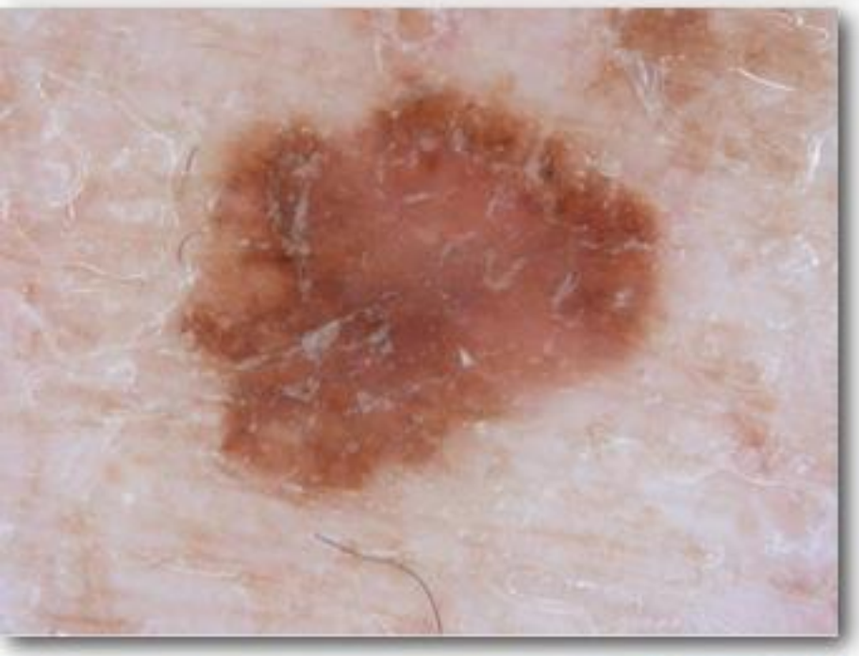
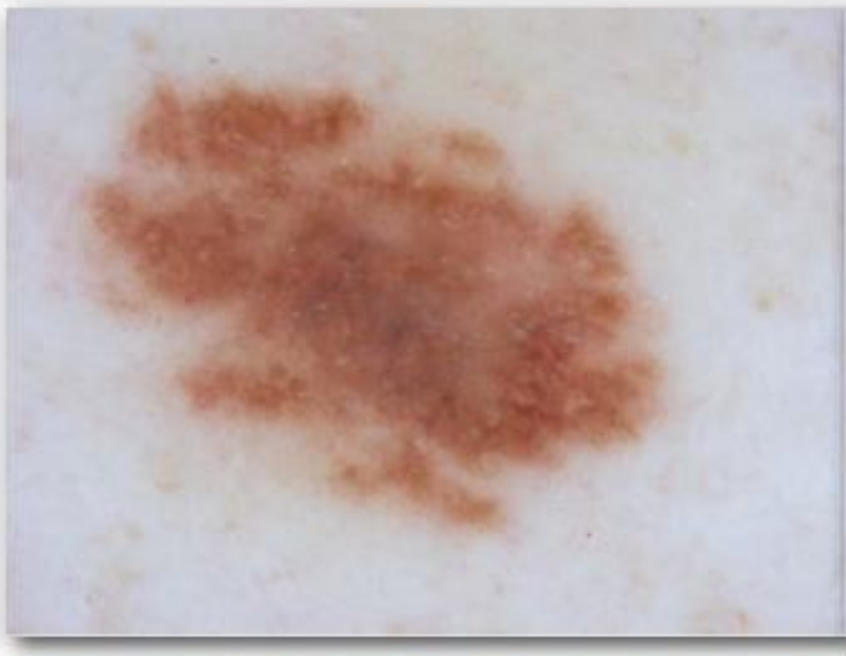
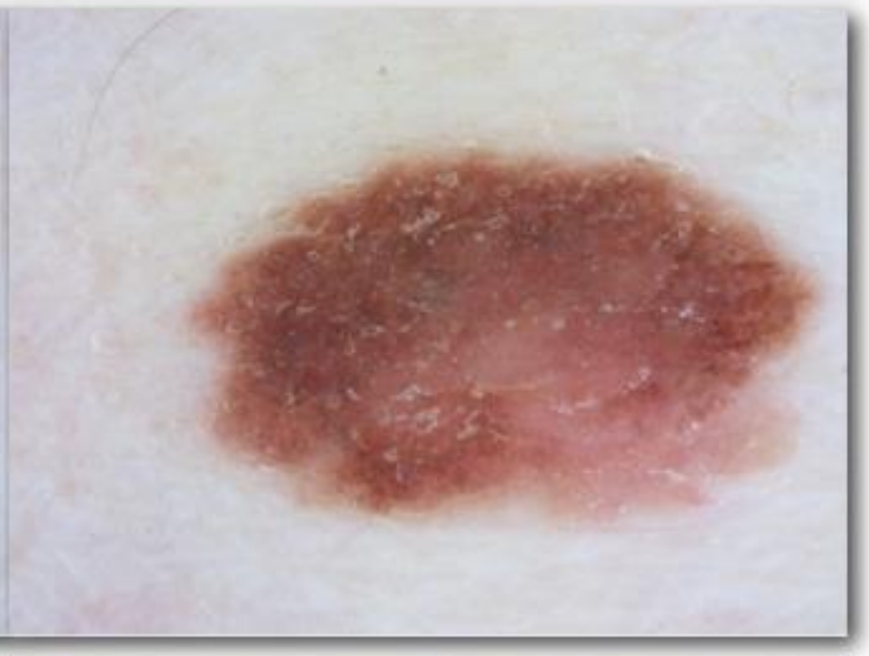
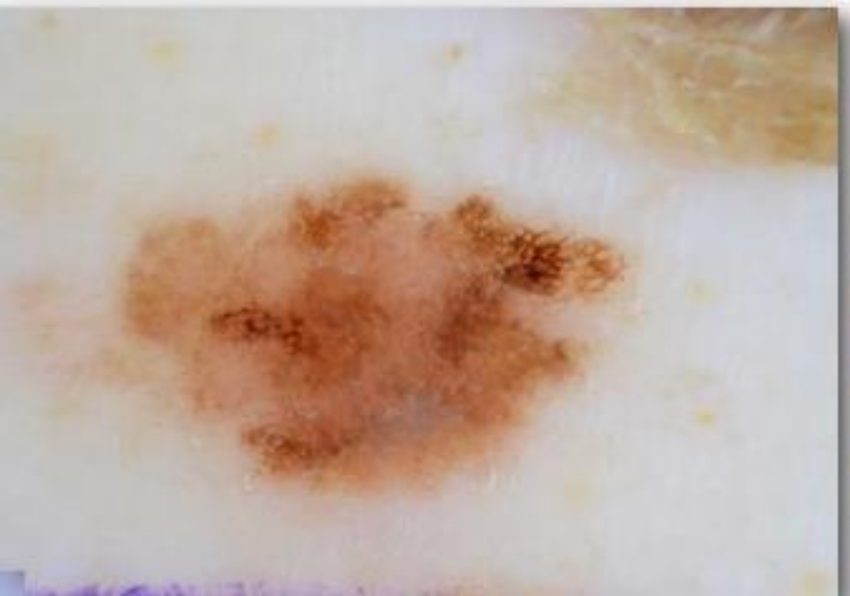
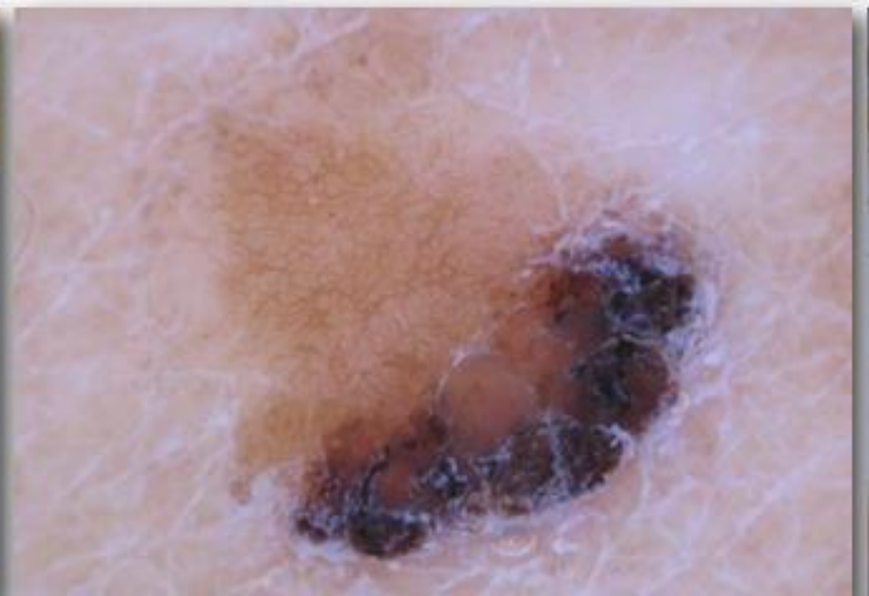
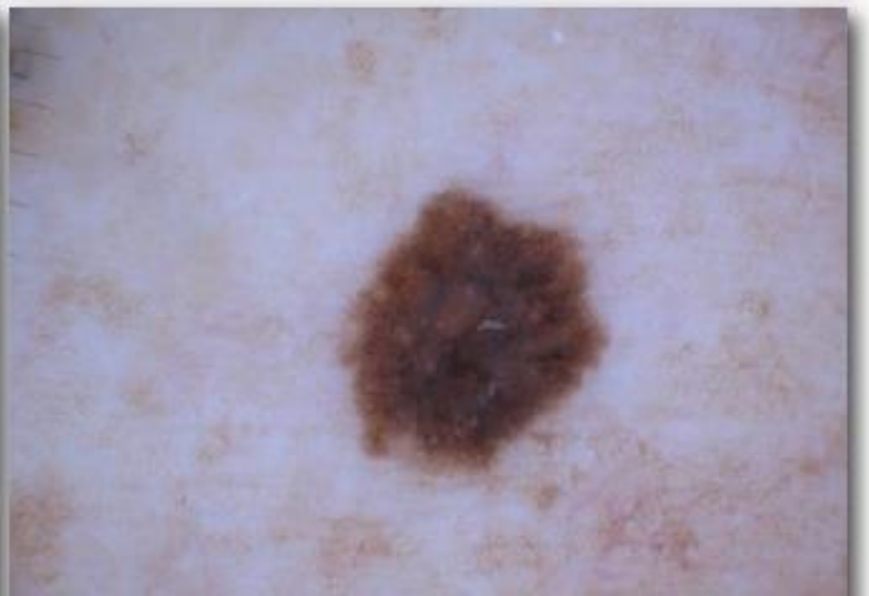
Clinics in Dermatology • 2002;20:297–304

Follow-up of Melanocytic Skin Lesions with Digital Total-Body Photography and Digital Dermoscopy: A Two-Step Method

JOSEP MALVEHY, MD
SUSANA PUIG, MD

Digital Dermoscopy



MONITOR

2011

2014

DOI: 10.1111/jdv.12032

JEADV

2012

REVIEW ARTICLE

Meta-analysis of digital dermoscopy follow-up of melanocytic skin lesions: a study on behalf of the International Dermoscopy Society

G. Salerni,[1,*] T. Terán,[2] S. Puig,[3,4] J. Malvehy,[3,4] I. Zalaudek,[5,6] G. Argenziano,[6] H. Kittler[7]

	FU strategy	
	Short-term FU	Medium/long-term FU
No. of studies	2	14
Mean patients per study (range)	1052 (245, 1859)	334.8 (100–688)
Mean lesions per study (range)	1460 (318, 2602)	4529 (272–11 396)
Mean lesions per patient (range)	1	14 (2–35)
Mean No. of melanoma detected per study (range)	44 (7, 81)	27 (0–98)

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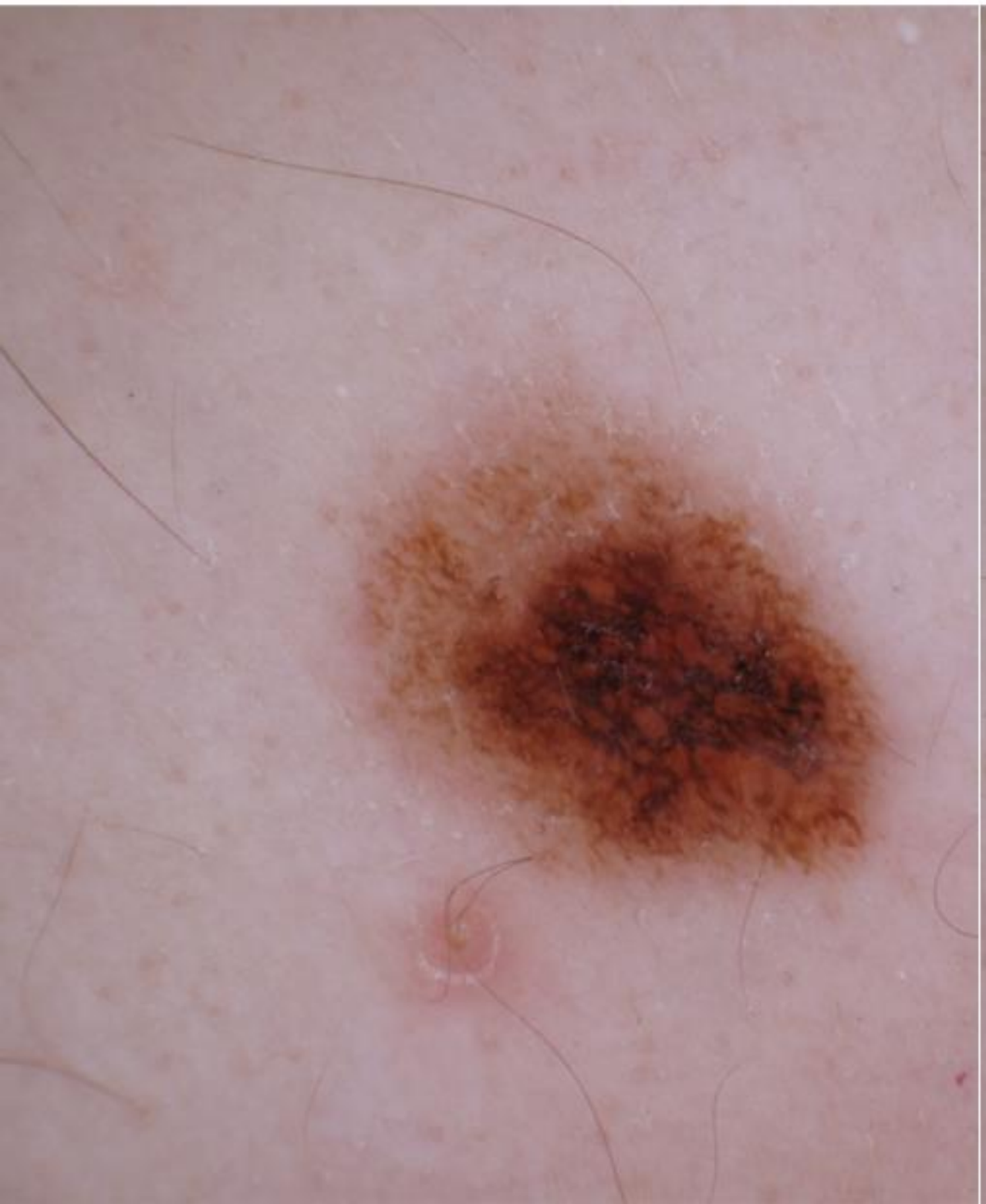
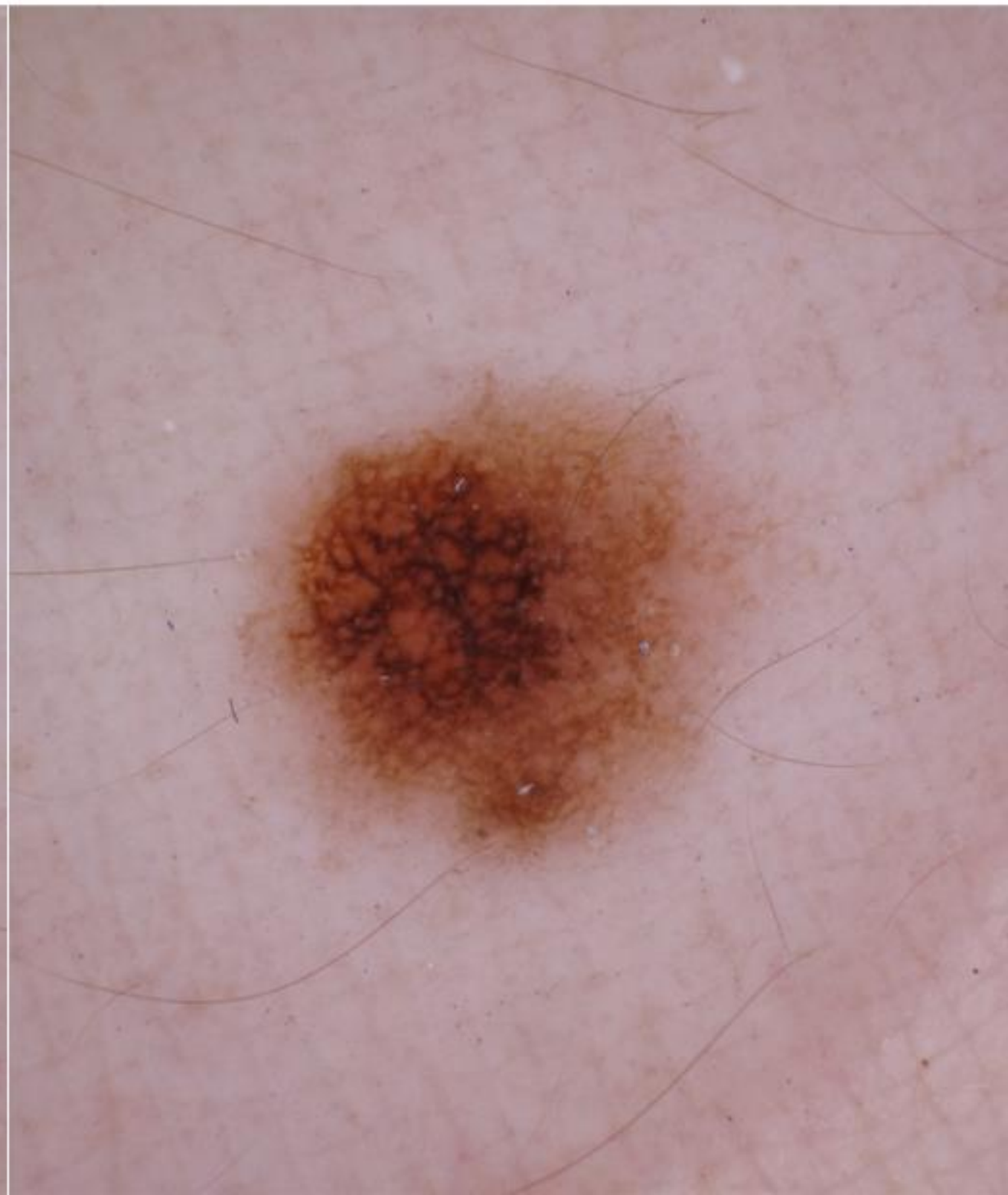
4.1% of patients (1.1% of lesions) will be diagnosed MELANOMA during the FOLLOW-UP

DERMOSCOPY

1992——————————————-2004

"FALSE TWINS"





"FALSE TWINS"

WHAT DOES WE NEED TO GO FURTHER?

EXPLORE THE SKIN IN DEPTH AND AT CELLULAR RESOLUTION

WHAT DOES WE NEED TO GO FURTHER?

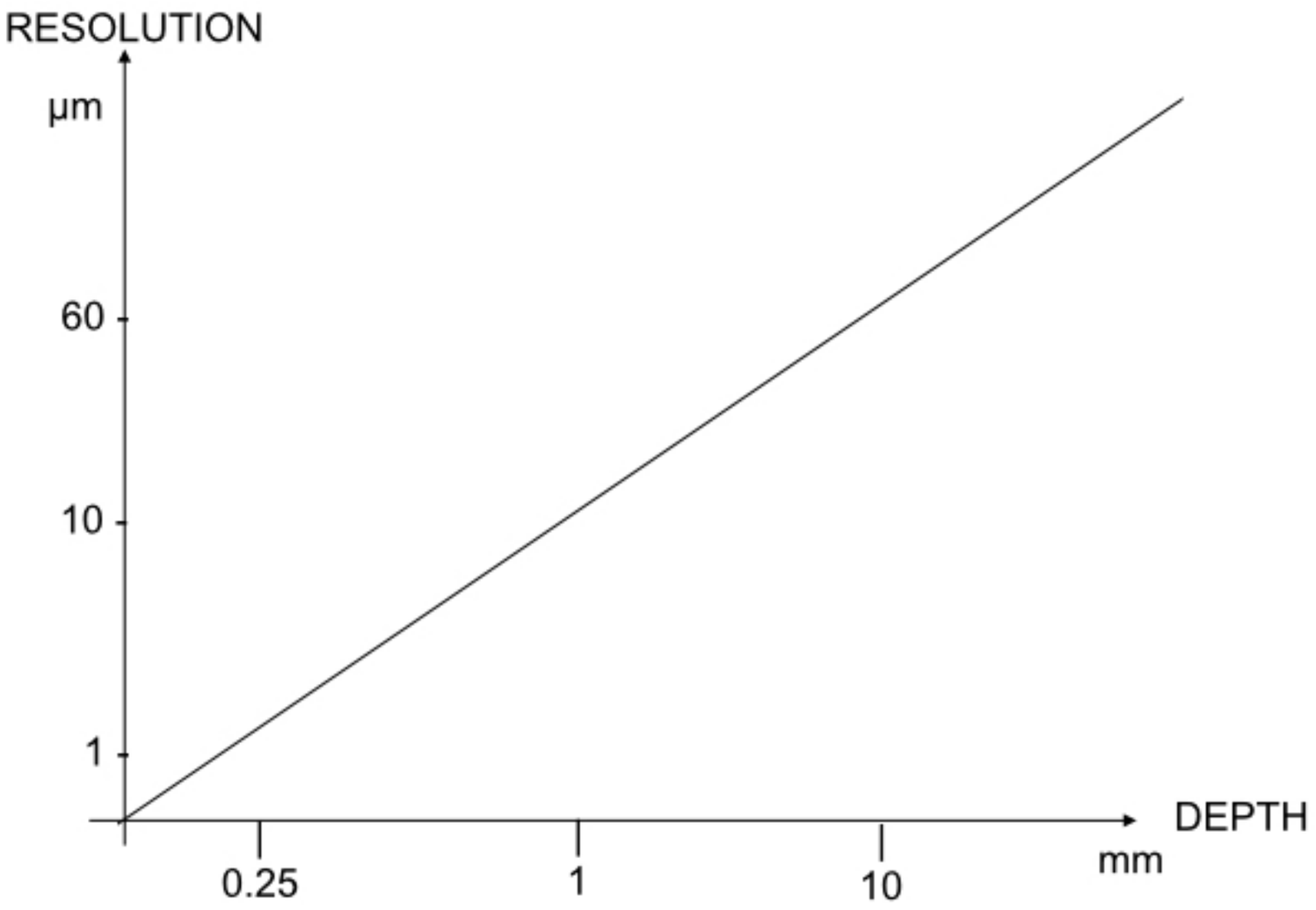
EXPLORE THE SKIN IN DEPTH AND AT CELLULAR RESOLUTION

IN VIVO CONFOCAL MICROSCOPY

MULTIPHOTON MICROSCOPY

OPTICAL COHERENCE TOMOGRAPHY

HIGH FREQUENCY ULTRASOUND


RESOLUTION
µm
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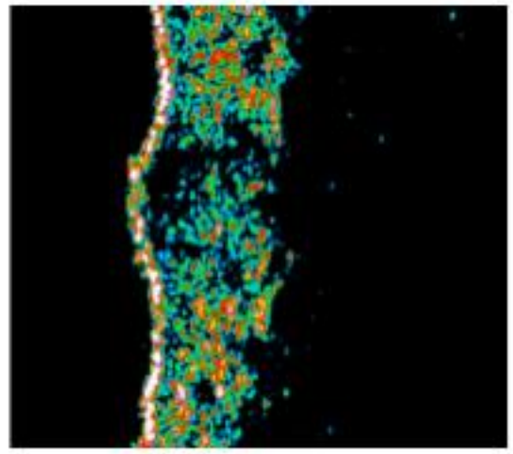
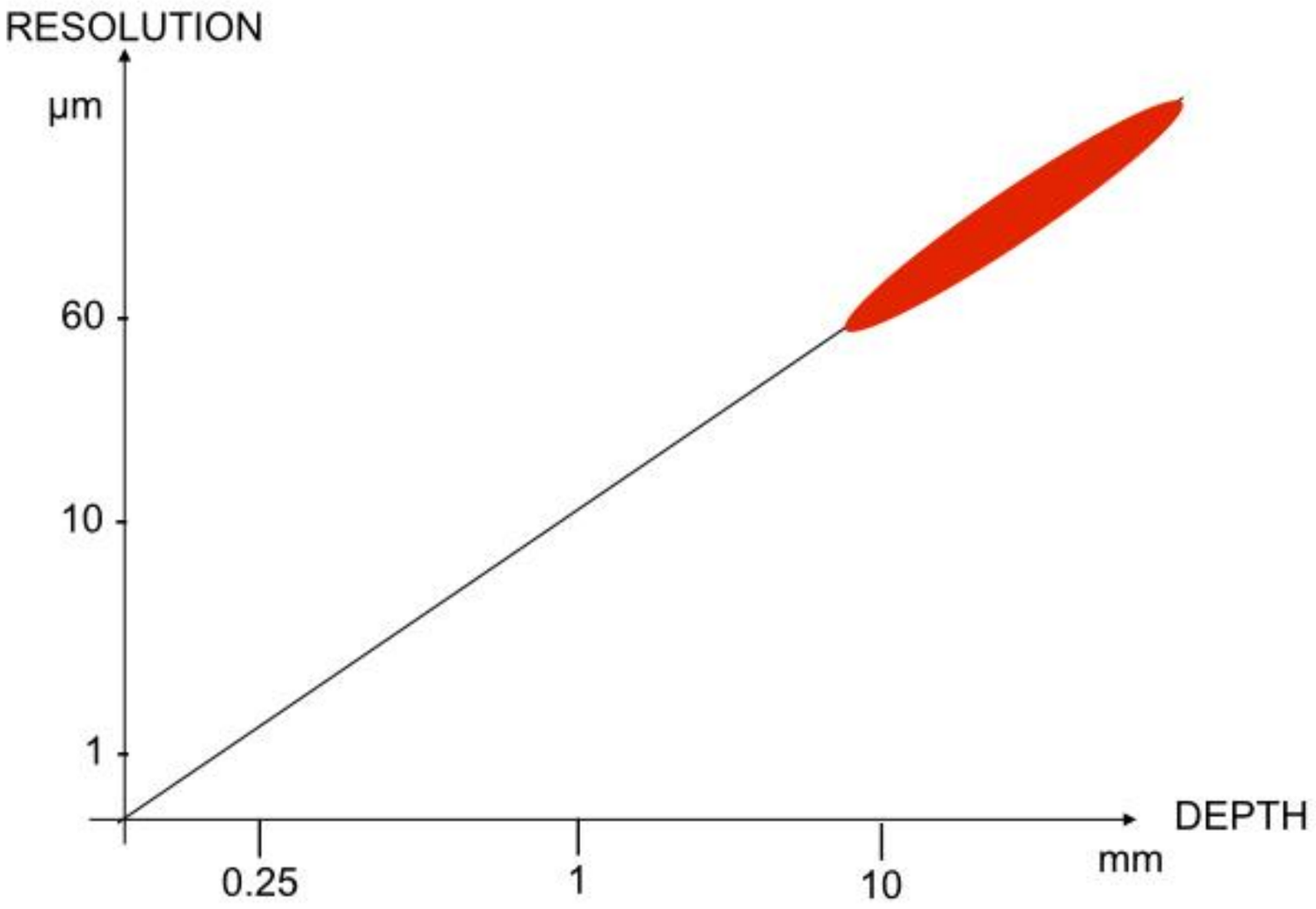
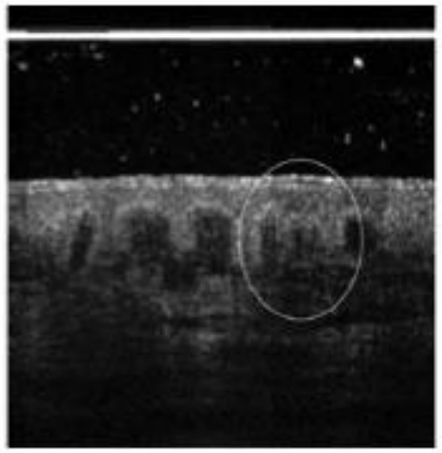
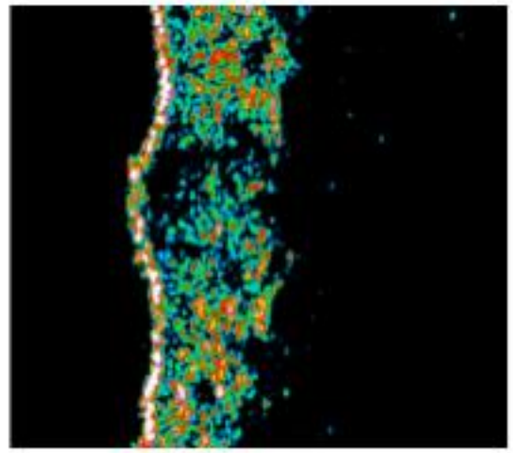
DEPTH
mm
0.25
1
10

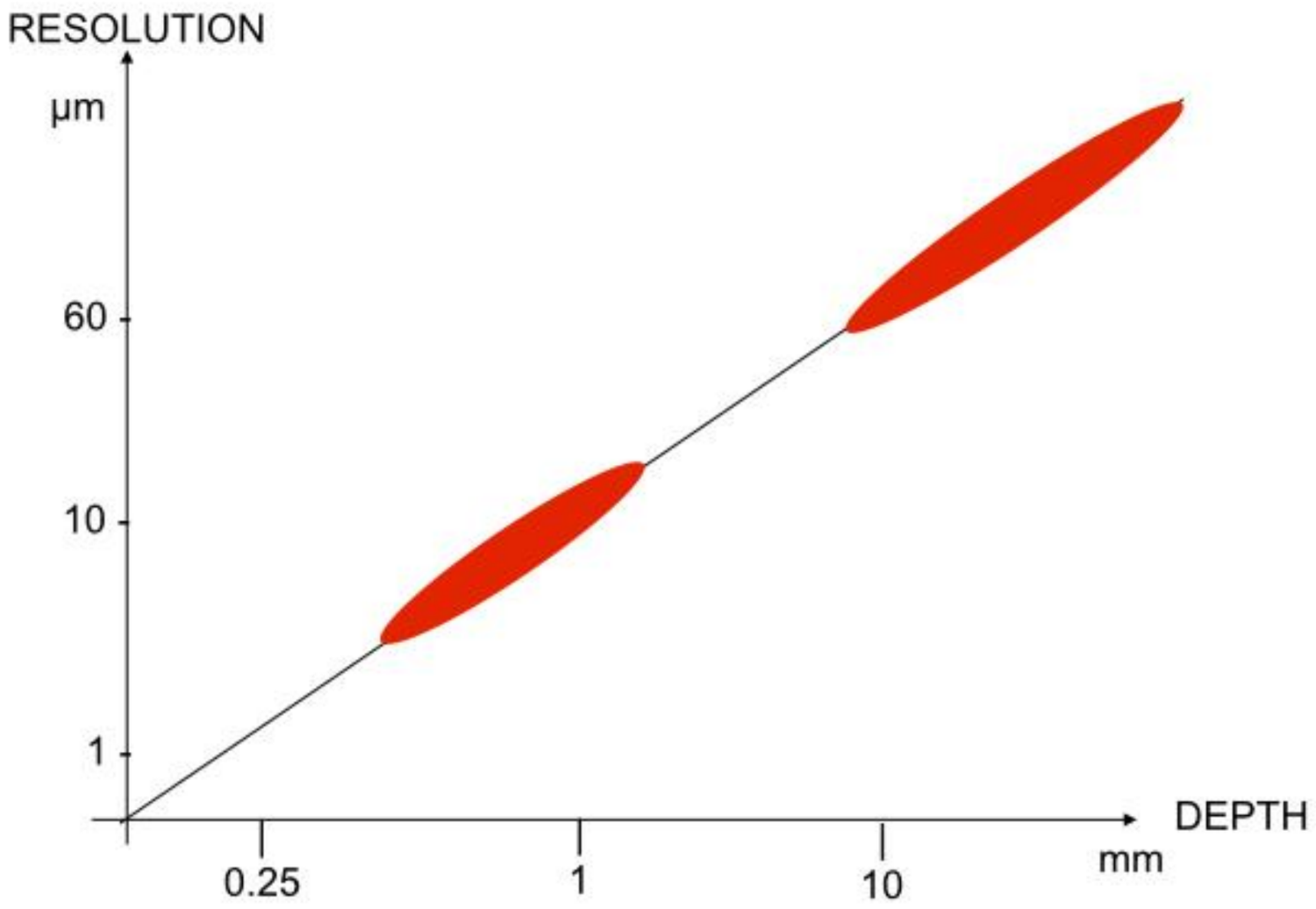




HIGH FREQUENCY ULTRASOUND

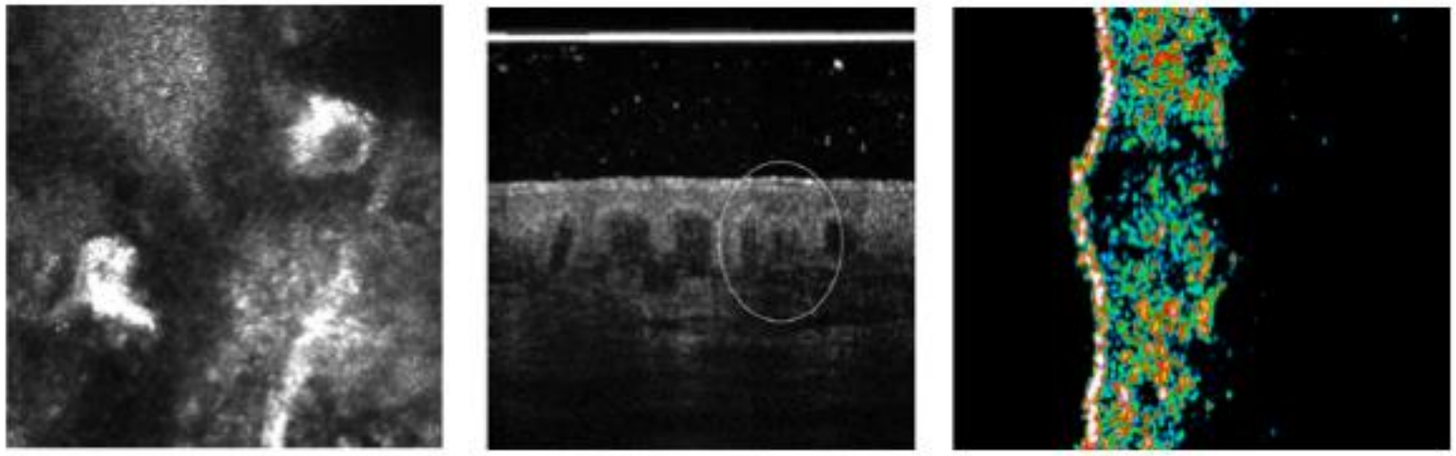


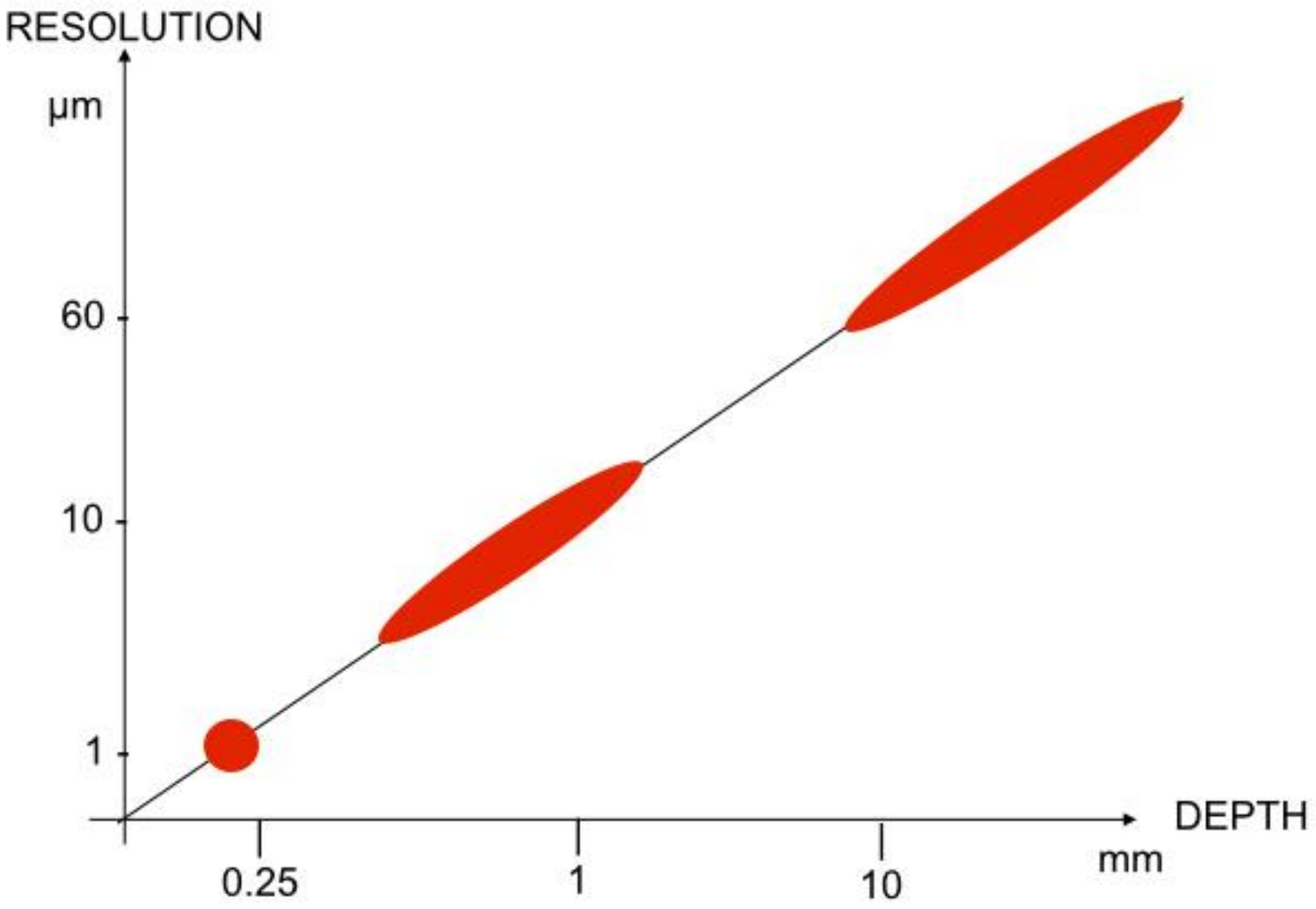




HIGH FREQUENCY ULTRASOUND

OPTICAL COHERENCE TOMOGRAPHY

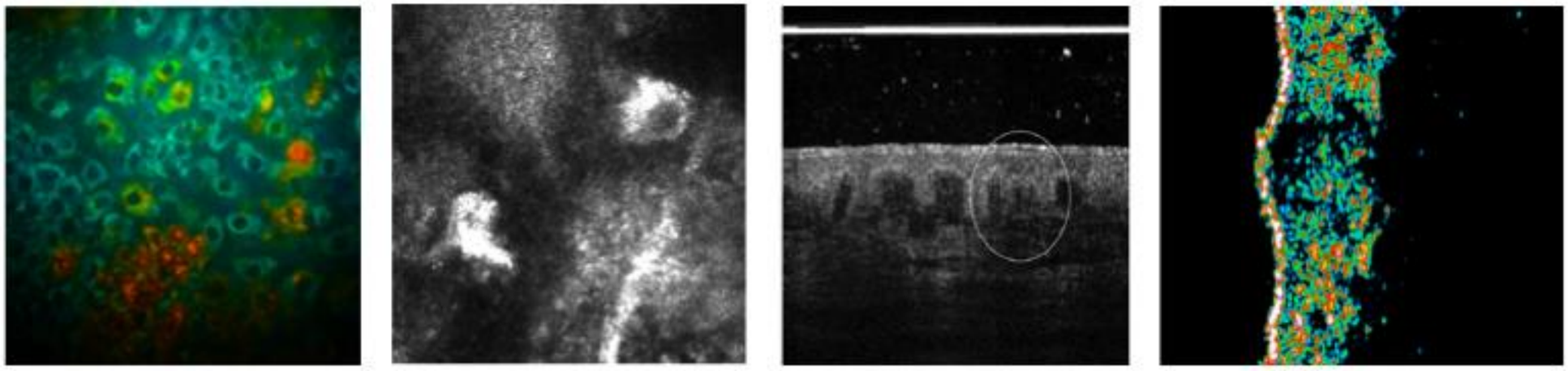


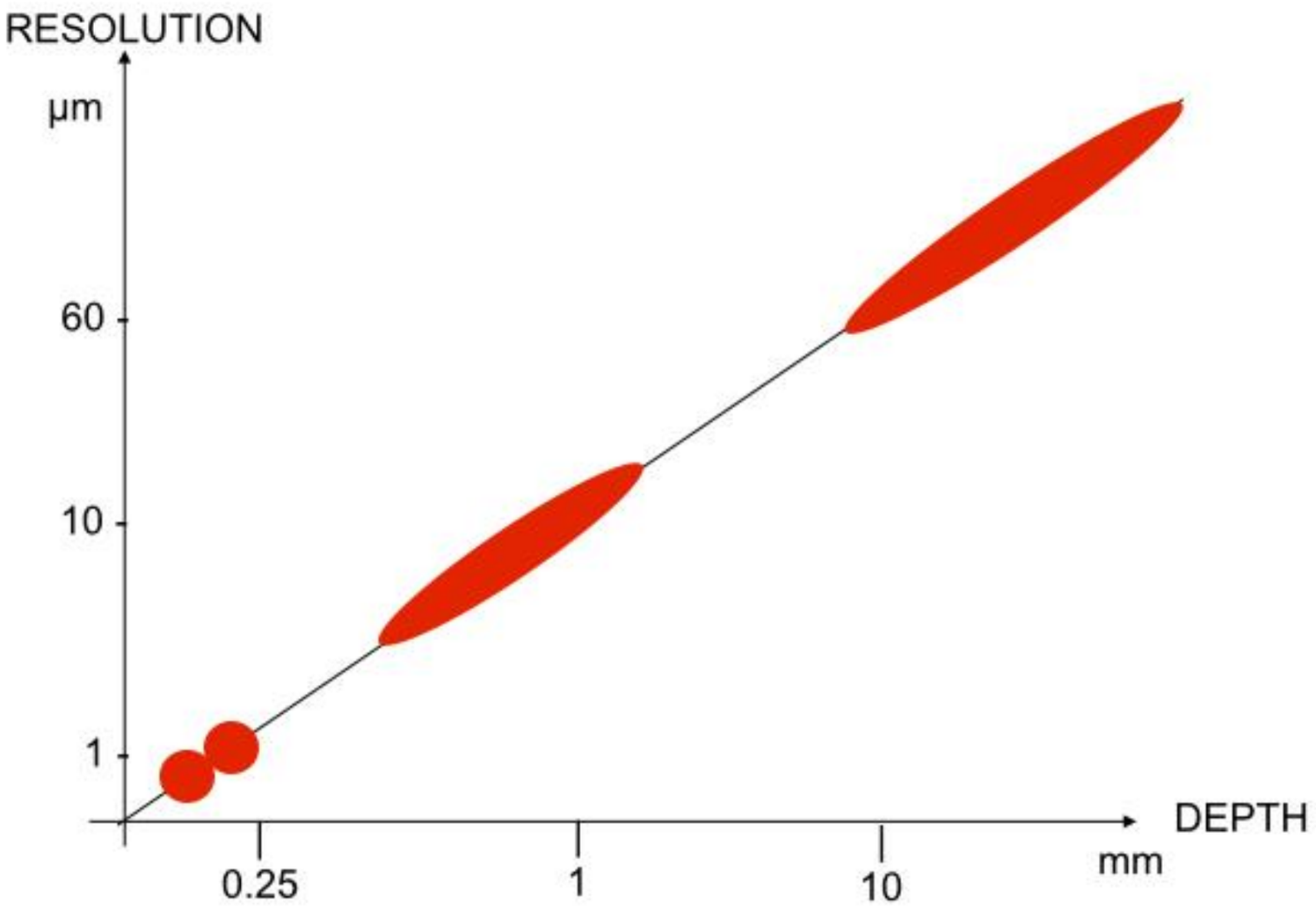


HIGH FREQUENCY ULTRASOUND

OPTICAL COHERENCE TOMOGRAPHY

CONFOCAL MICROSCOPY





HIGH FREQUENCY ULTRASOUND

OPTICAL COHERENCE TOMOGRAPHY

CONFOCAL MICROSCOPY

MULTIPHOTON MICROSCOPY

REFLECTANCE CONFOCAL MICROSCOPY

2004——————————————-2016

Reflectance Confocal Microscopy

1500®

Light: Diode Laser 830 nm
max power 35 mW
Resolution: Lateral (X-Y) 0.5-1 μm
Axial (Z) 3-4 μm
Max depth: 300 μm

***in vivo* imaging of the skin at cellular level resolution**
horizontal sections of the skin

10 minutes

"virtual" biopsy

10 minutes

10 minutes

"virtual" biopsy

Diagnosis

10 minutes

10 minutes

Immediately

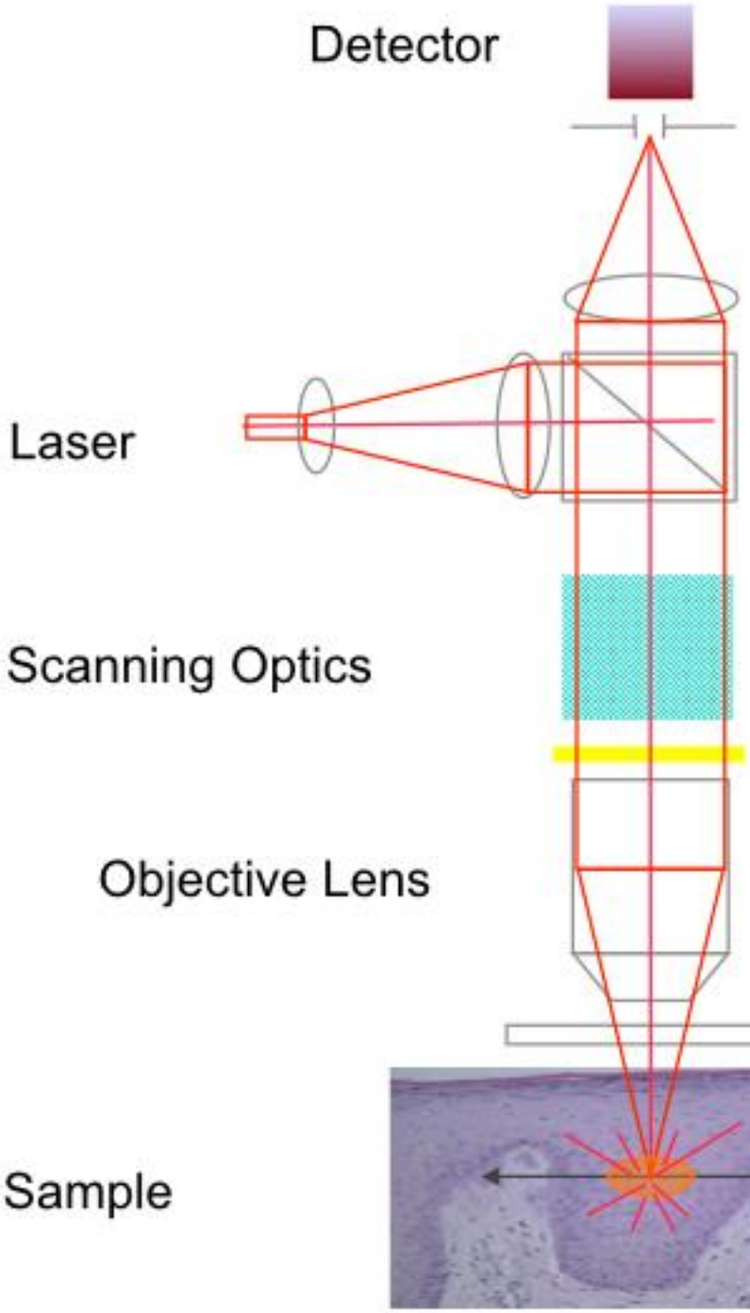
"virtual" biopsy

Diagnosis

Patient's treatment

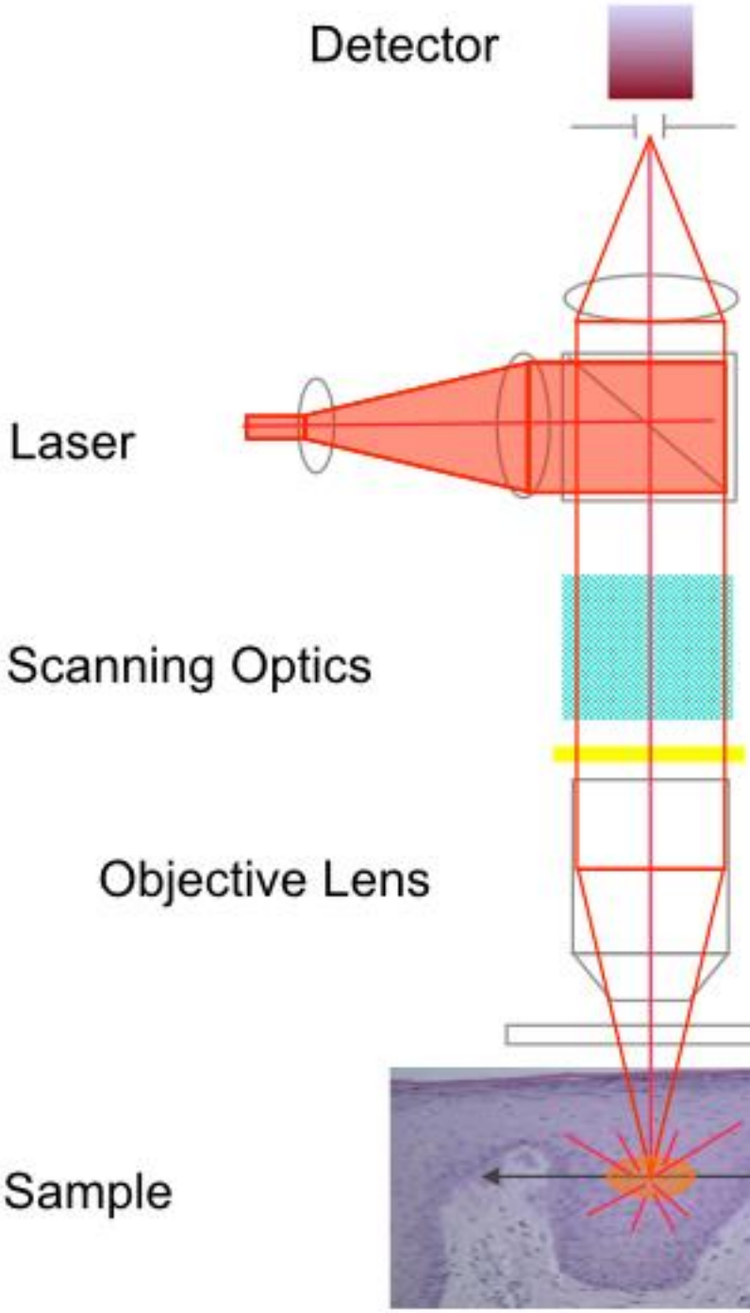
Confocal Technology

(Reflectance Model)



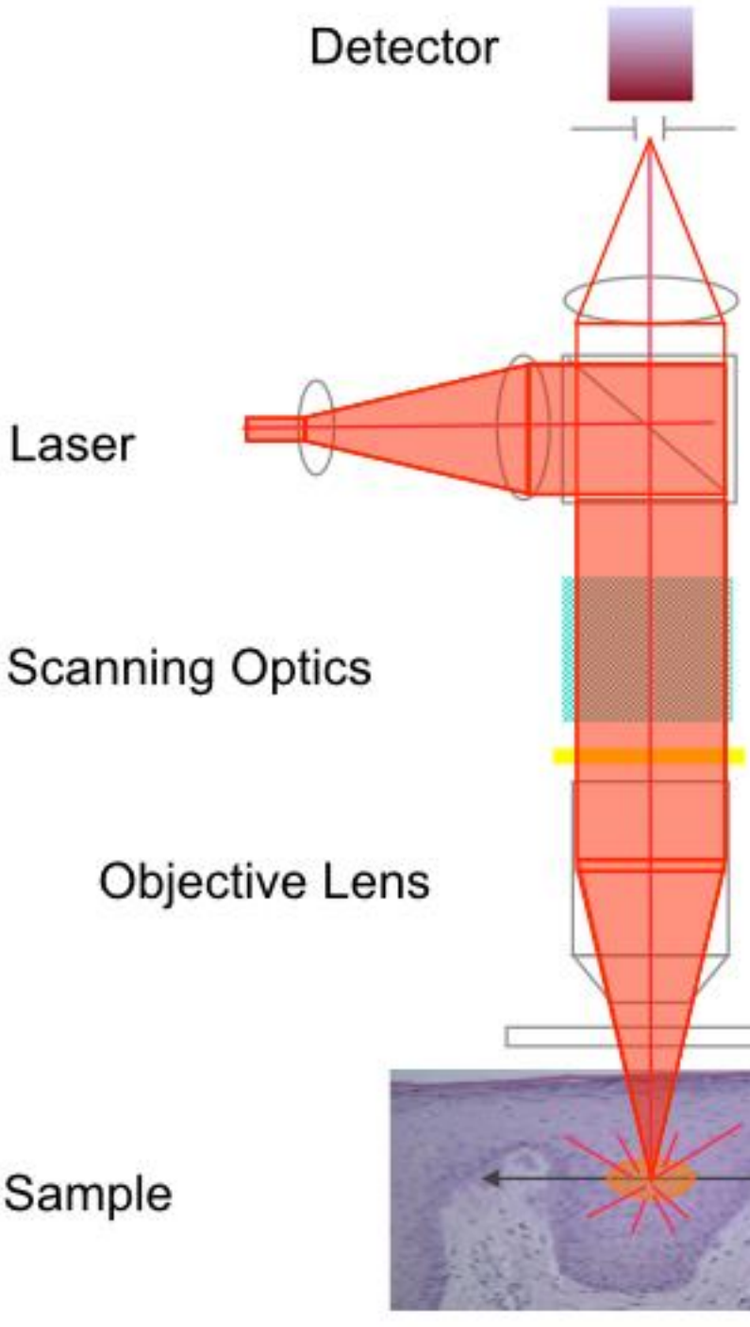
Confocal Technology

(Reflectance Model)



Confocal Technology

(Reflectance Model)



Pinhole

Focusing Lens

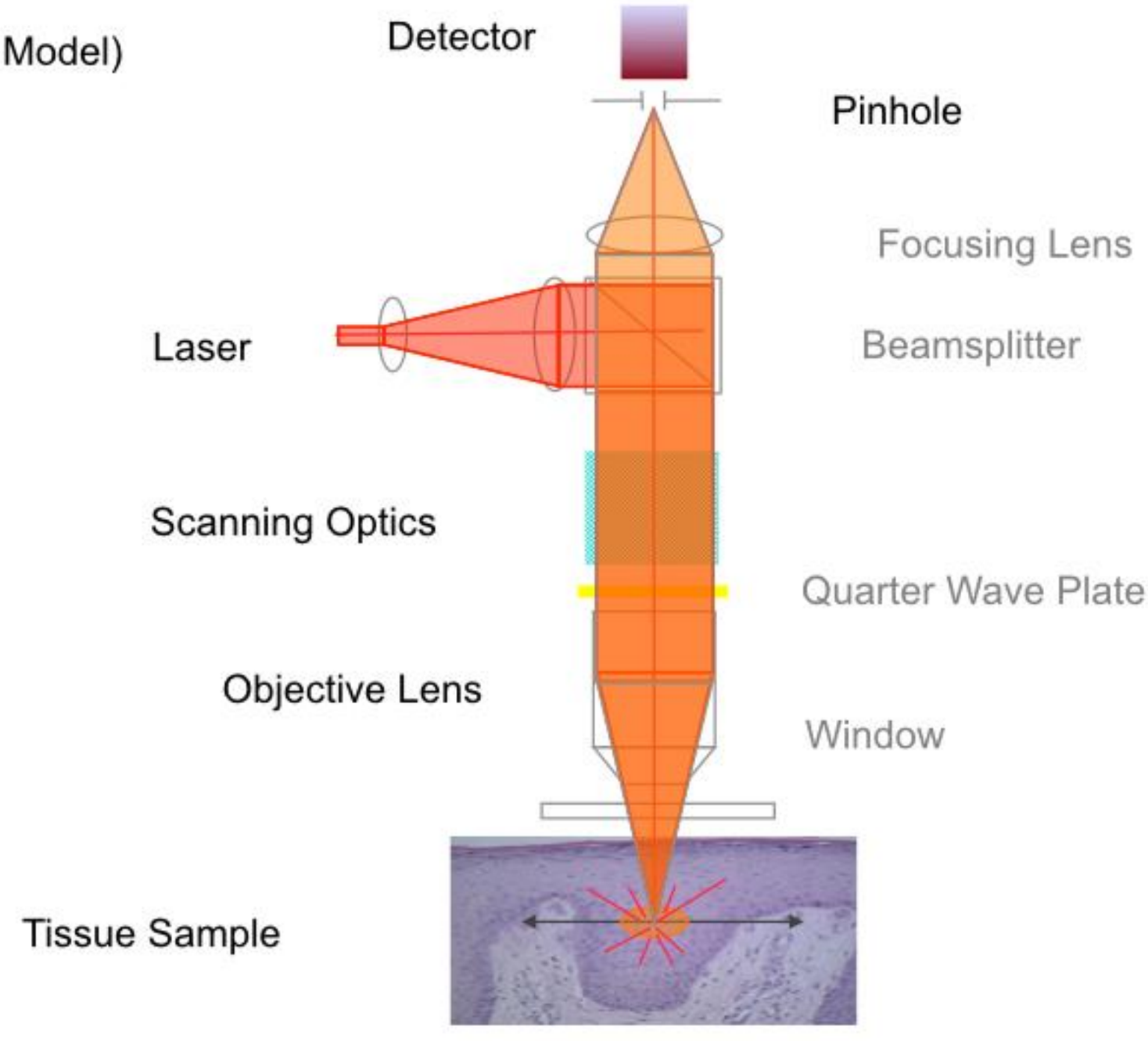
Beamsplitter

Quarter Wave Plate

Window

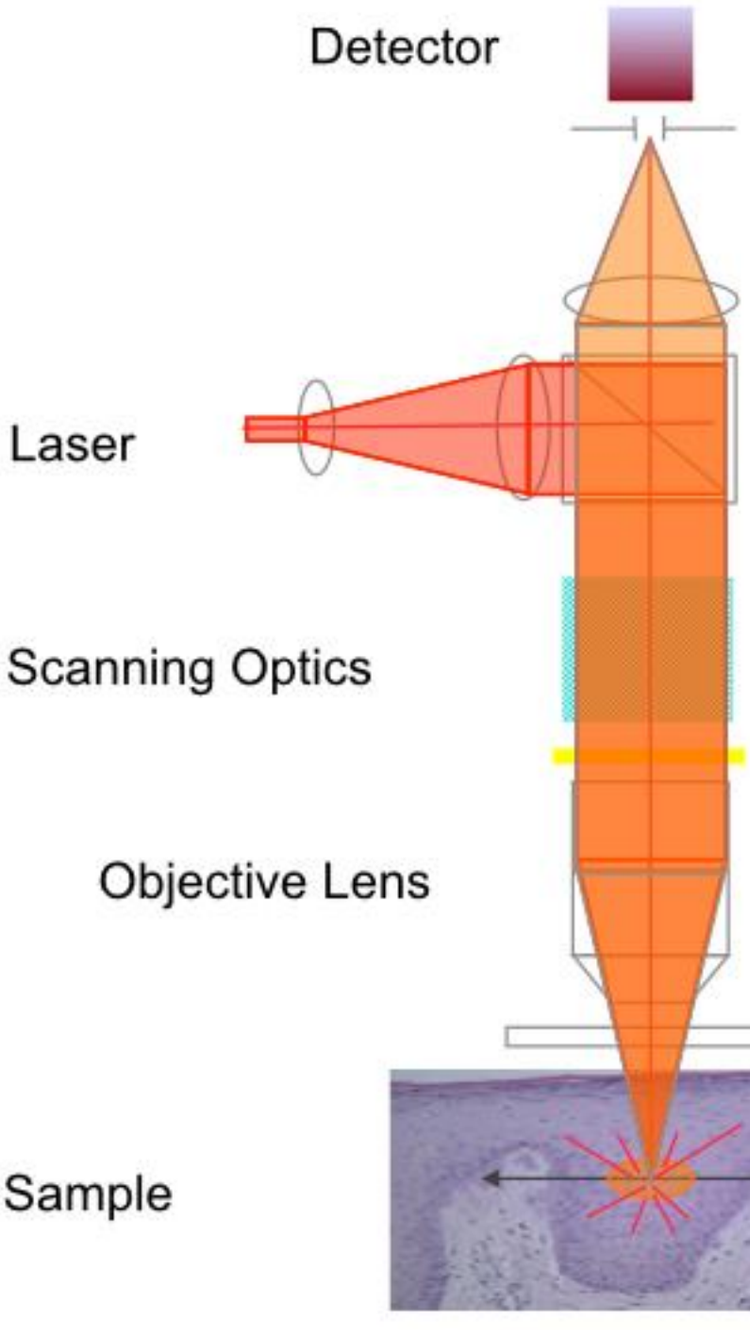
Confocal Technology

(Reflectance Model)



Confocal Technology

(Reflectance Model)



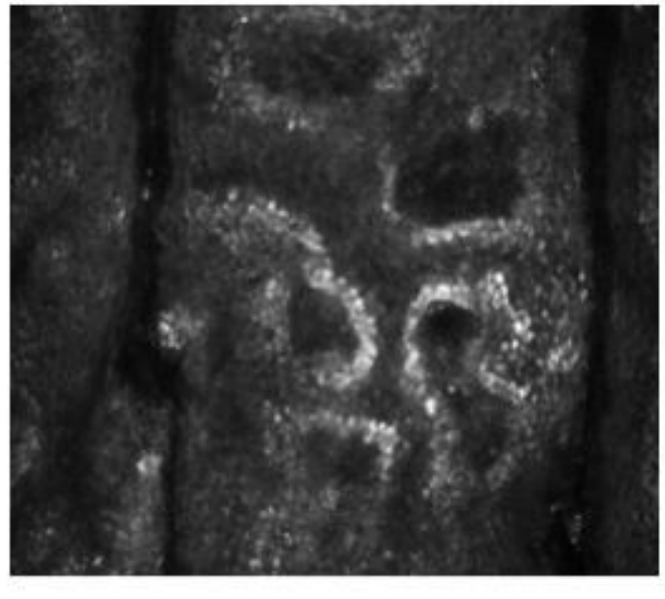
Pinhole

Focusing Lens

Beamsplitter

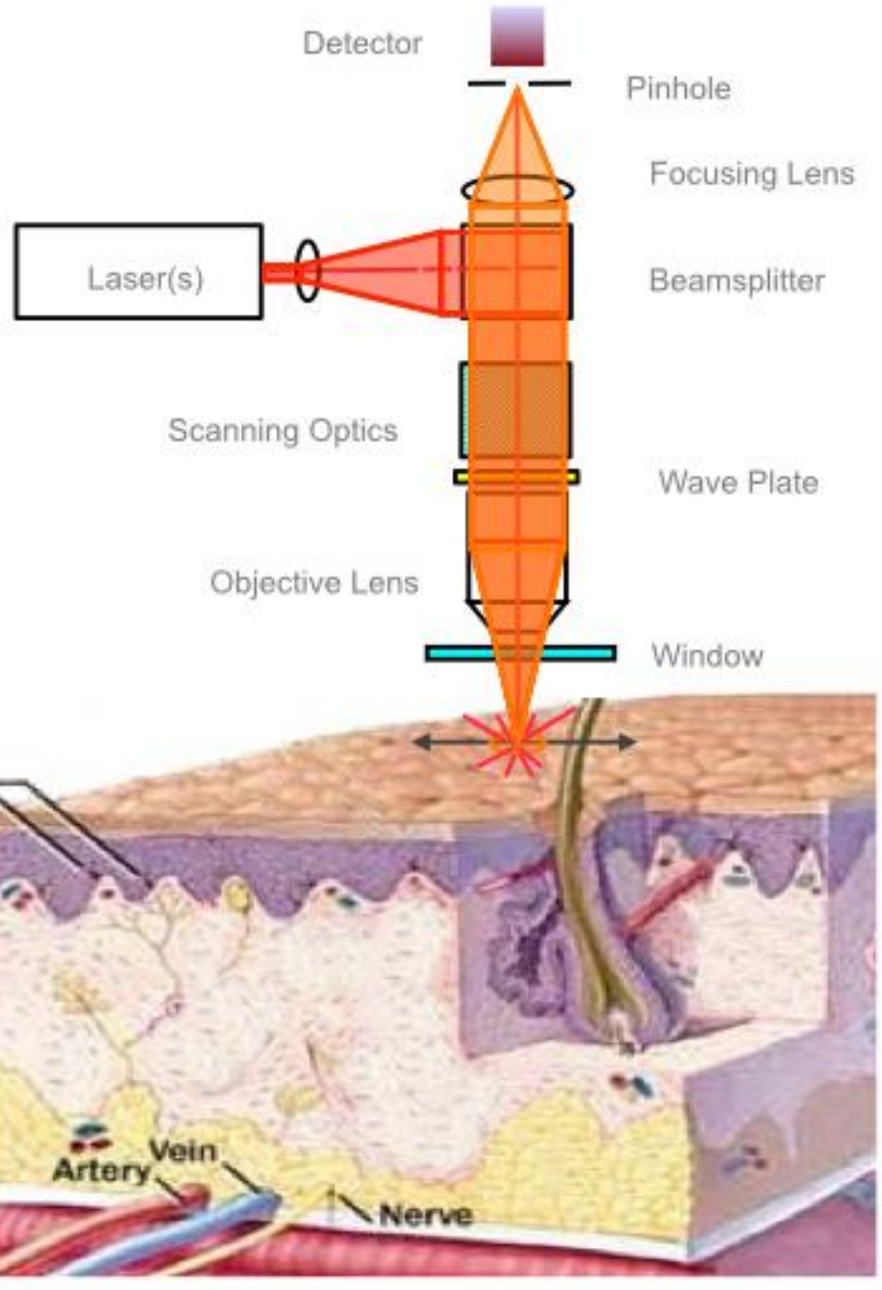
Quarter Wave Plate

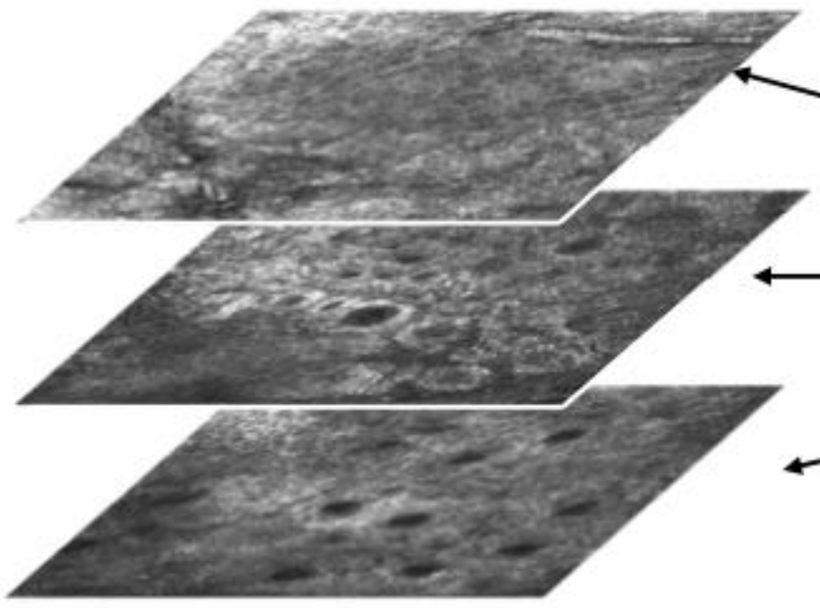
Window

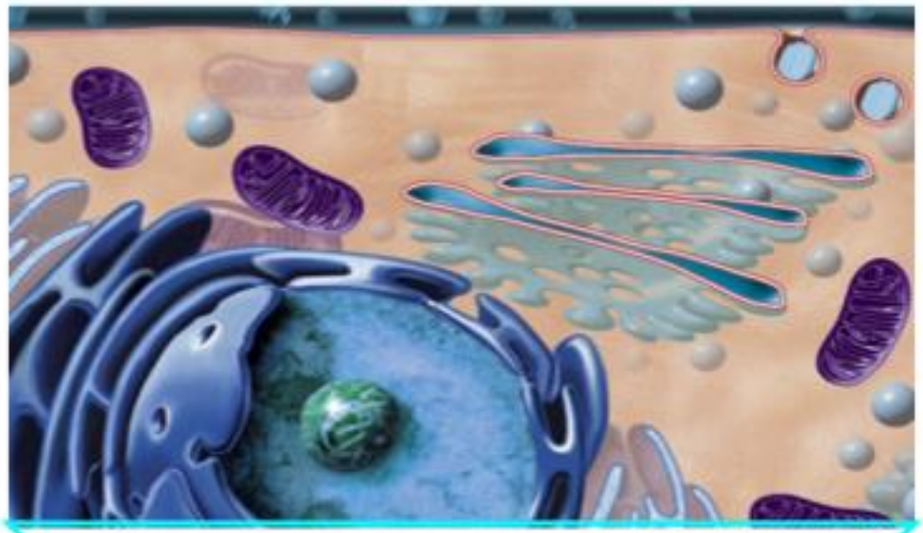


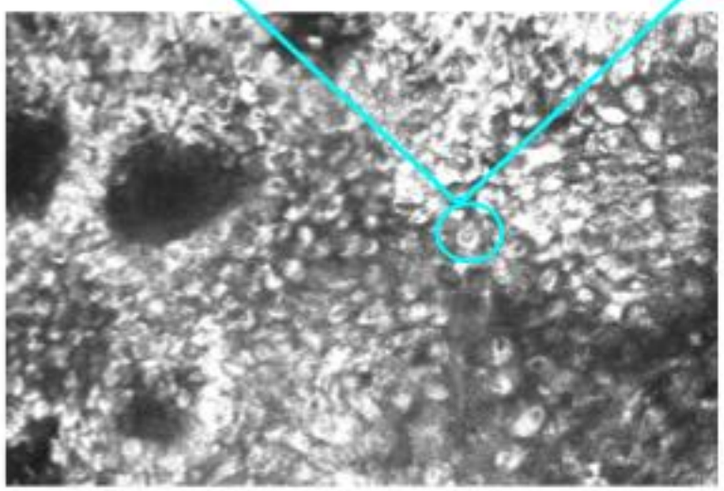
Confocal Technology

Diagnostic images are captured at relevant depths in the skin up to the superficial dermis (~200 µm)









The contrast is provided by differences in refraction index of **organelles** and **other microstructures**, that are bright, contrasting with the background. **Melanin and melanosomes** are a strong source of contrast, rendering melanocytic cells particularly evident by means of this technique.

Rajadhyaksha M, Grossman M, Esterowitz D, Webb RH, Anderson RR. In vivo confocal scanning laser microscopy of human skin: melanin provides strong contrast. J Invest Dermatol 1995;104:946-52

Refractile Structures

High Refractility

Keratin containing structures
- Stratum corneum
- Hair shaft
- Acrosyringium

Melanin containing cells
- Melanocytes
- Pigmented keratinocytes
- Reactive Langerhans cell cytoplasm

Medium Refractility

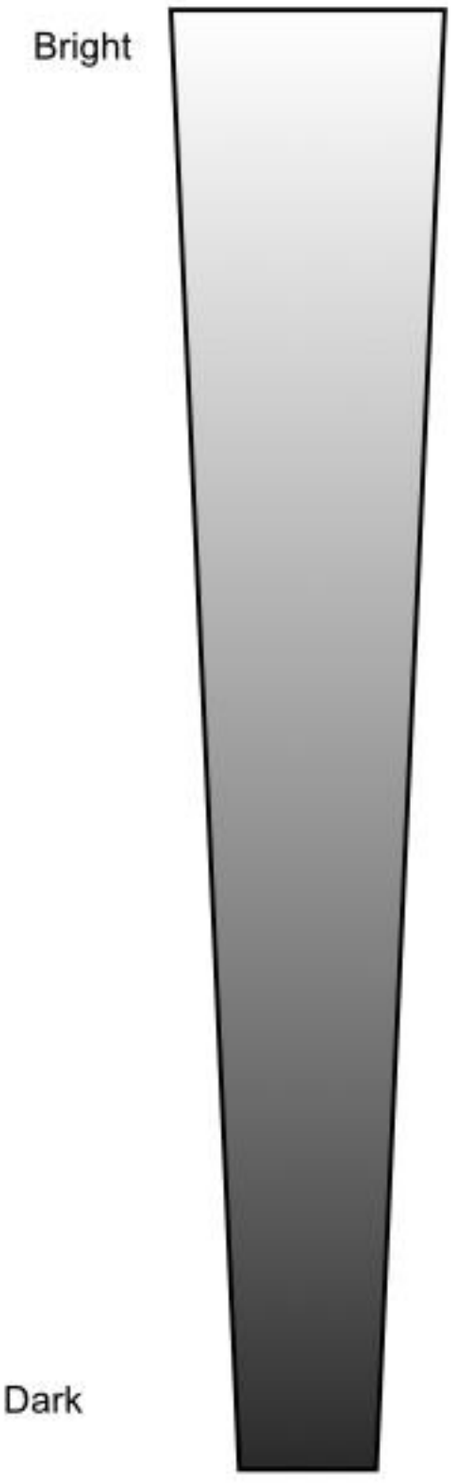
- Keratohyaline granules
- Spinous keratinocyte cytoplasm
- Granulocyte (WBC) cytoplasm
- Nucleoli

Low Refractility

- Collagen
- Red Blood Cells
- Lymphocytes
- Skin folds

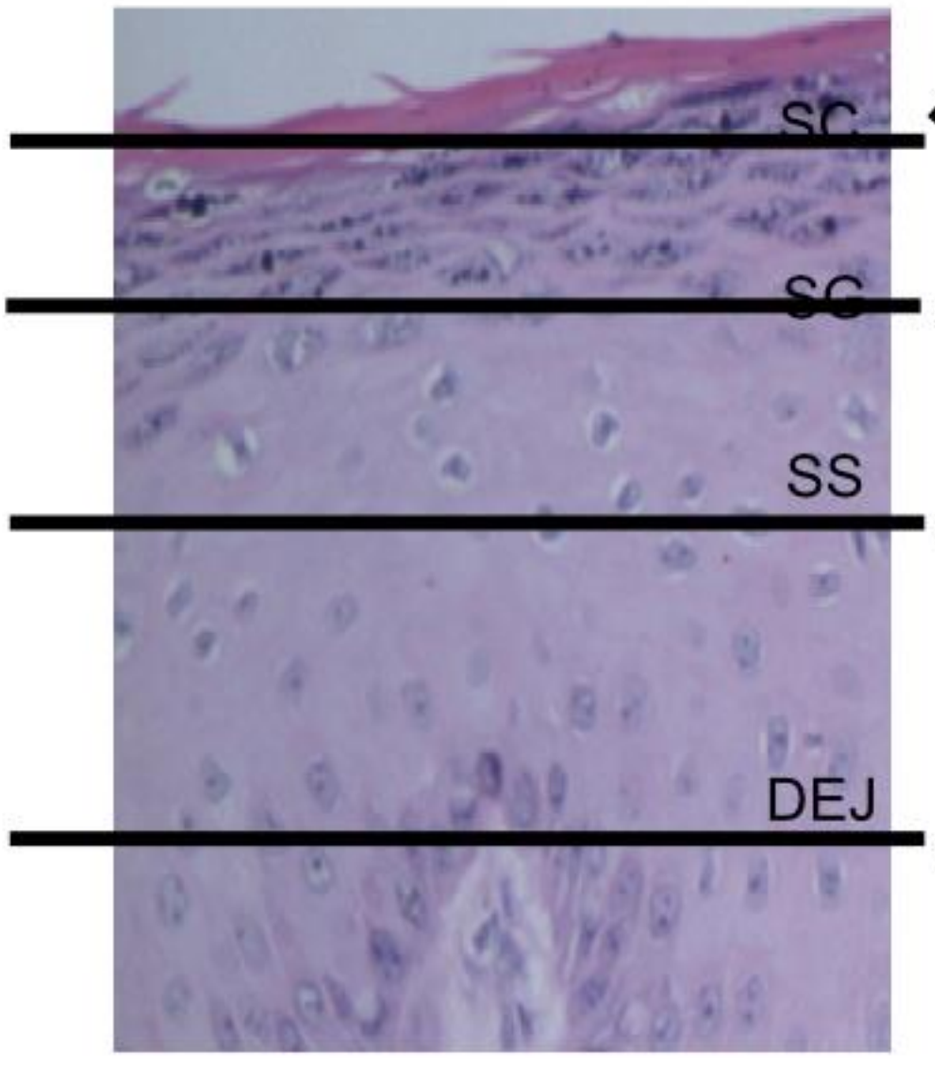
No Refractility

- Air
- Nuclei
- Serum

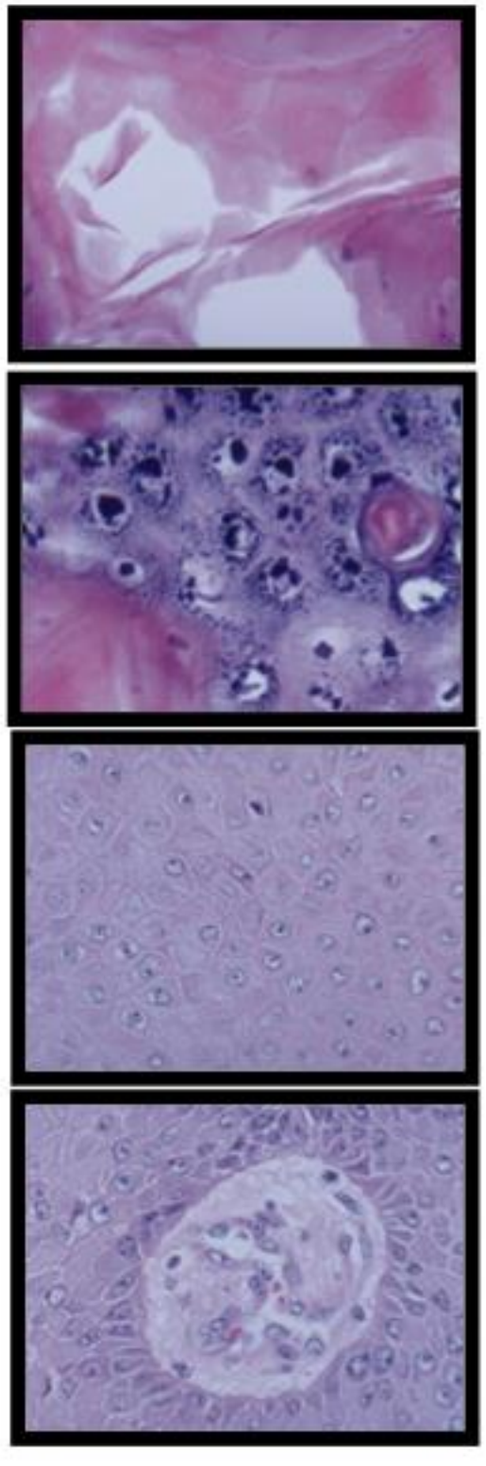


Confocal Technology

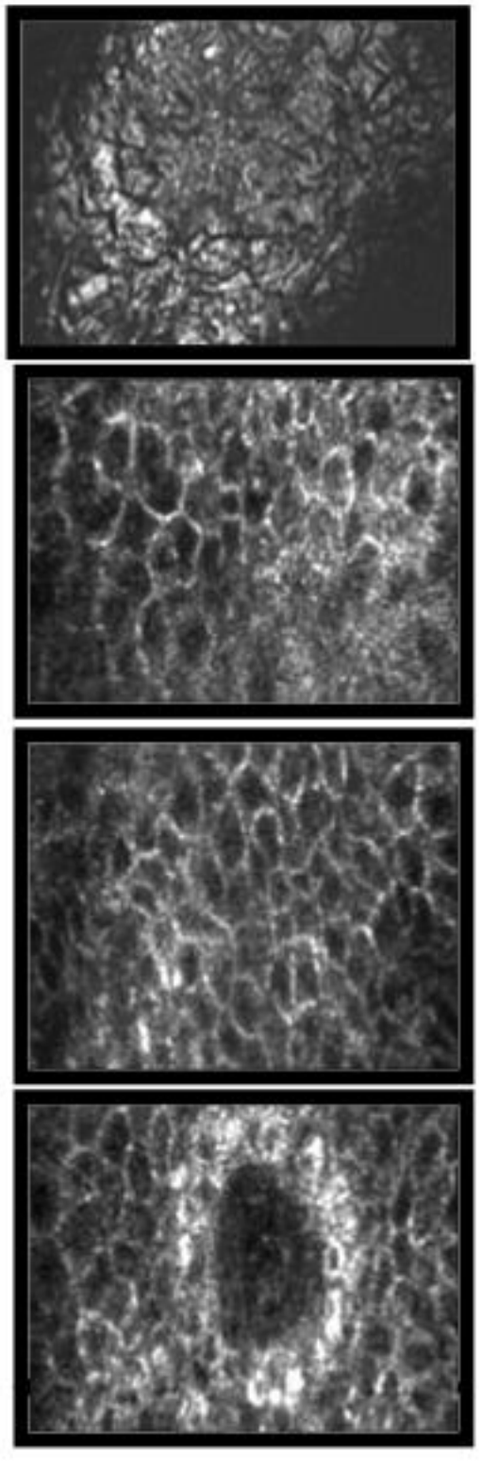
Reflectance Confocal Microscopy
Live Normal Skin



H&E



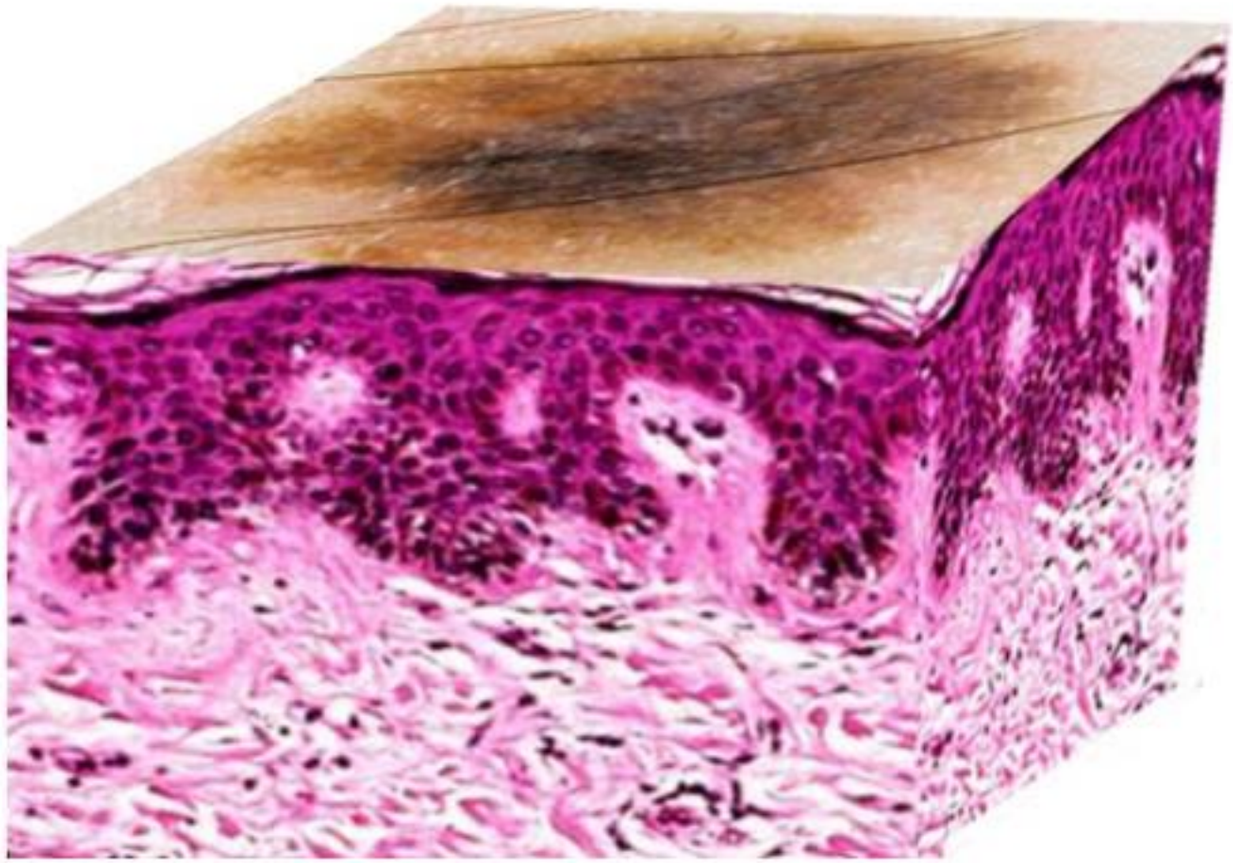
Confocal *in vivo*



Rajadhyaksha M, González S, *et al*.
J Invest Dermatol 1999;113;293-303.

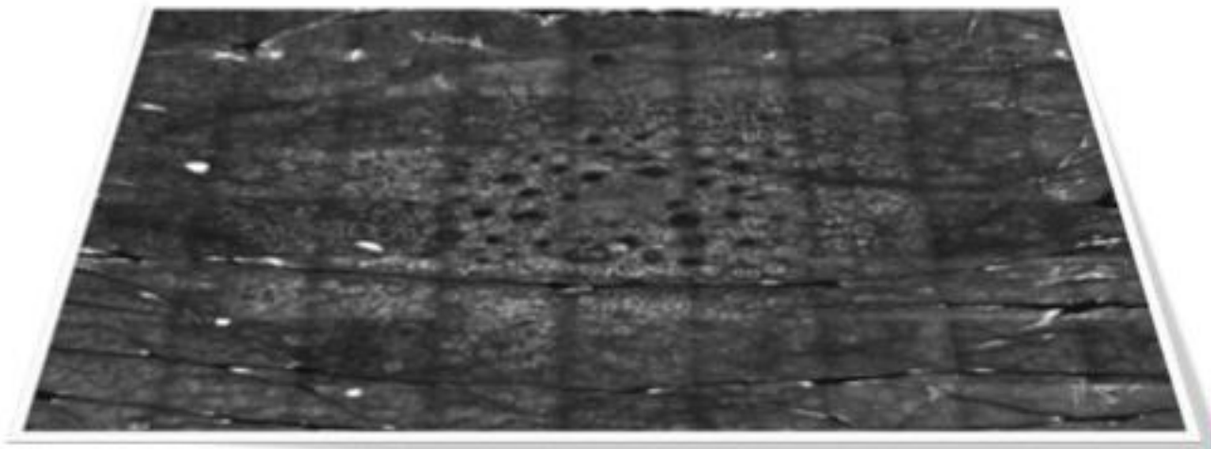
Confocal Technology

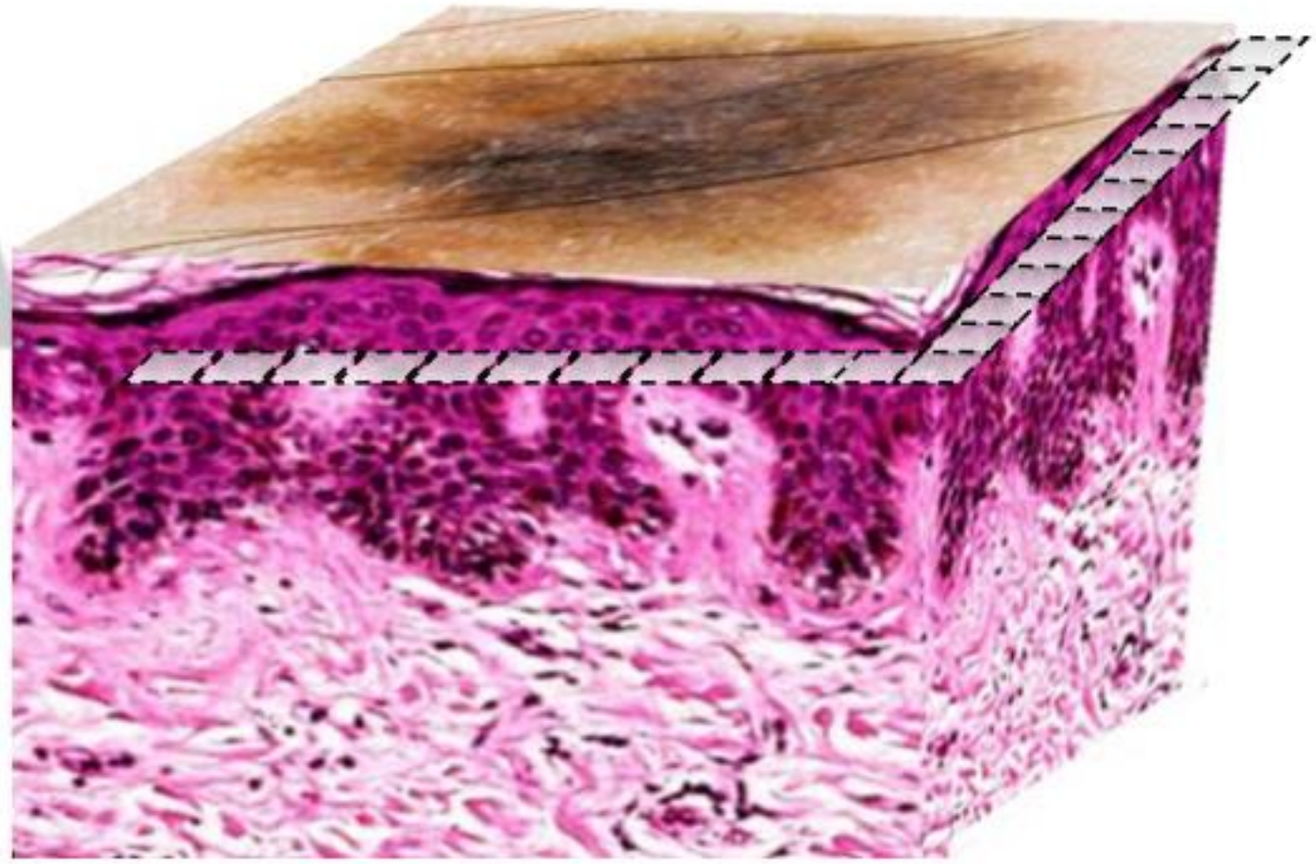
MOSAIC: composite image formed by consecutive confocal frames and mounted together in order to form a horizontal section of an area up to 8 by 8 mm



Confocal Technology

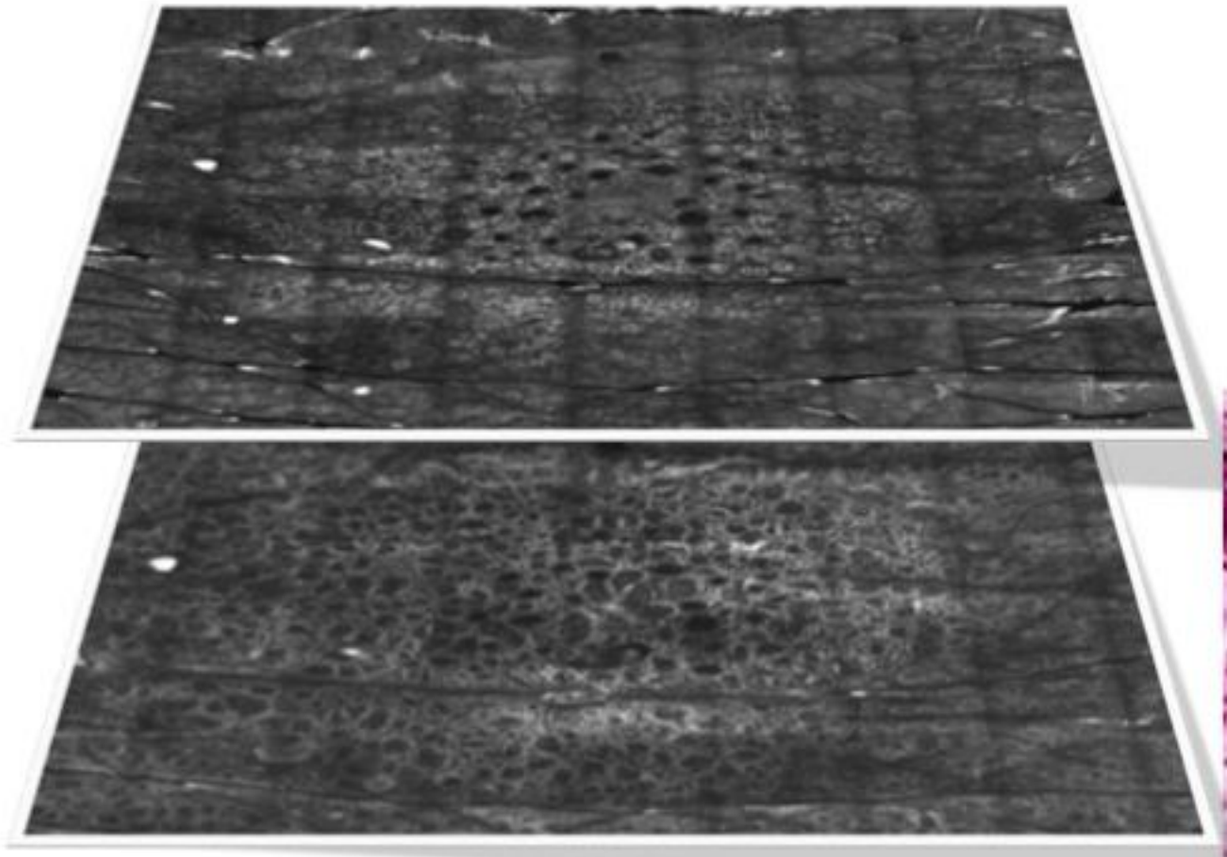
MOSAIC: composite image formed by consecutive confocal frames and mounted together in order to form a horizontal section of an area up to 8 by 8 mm

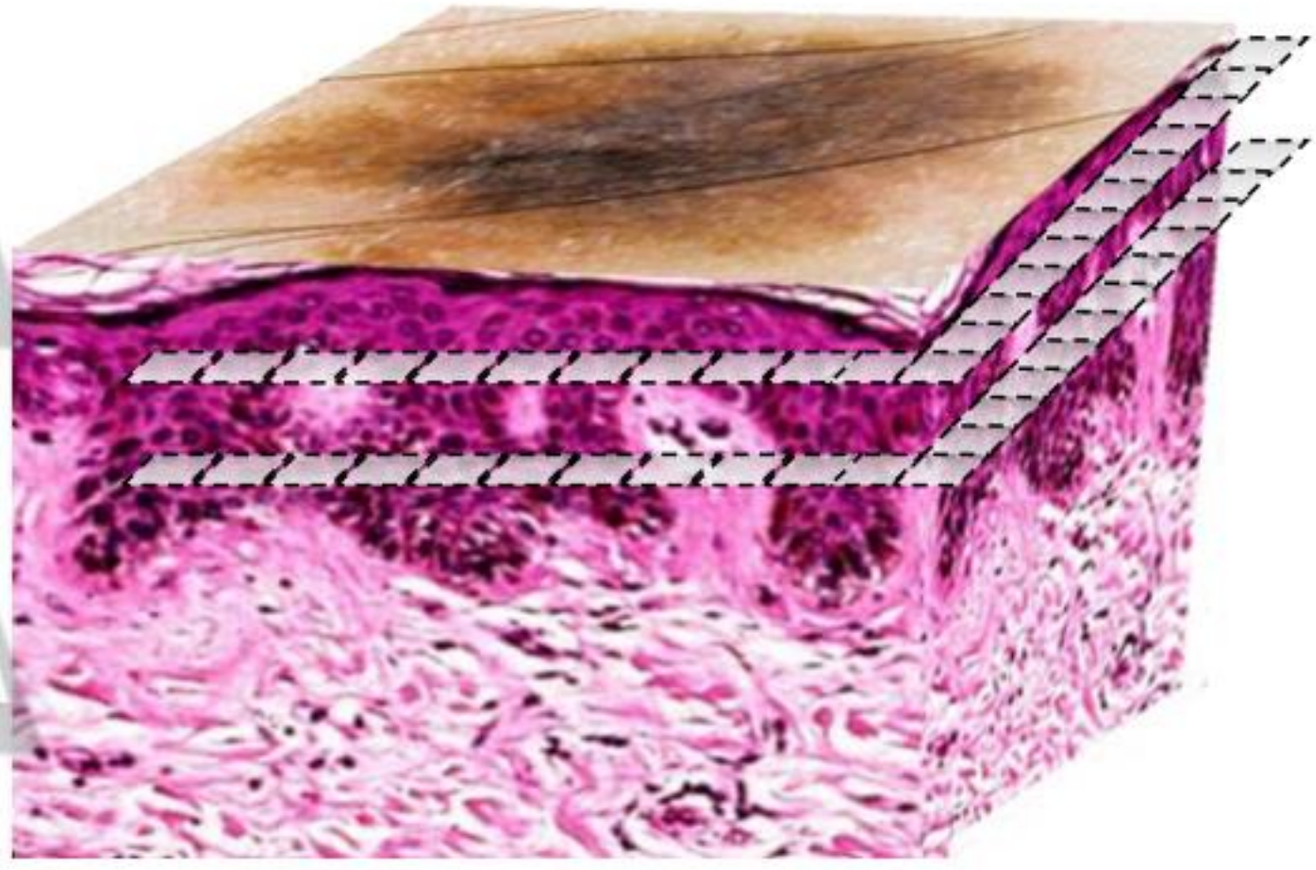




Confocal Technology

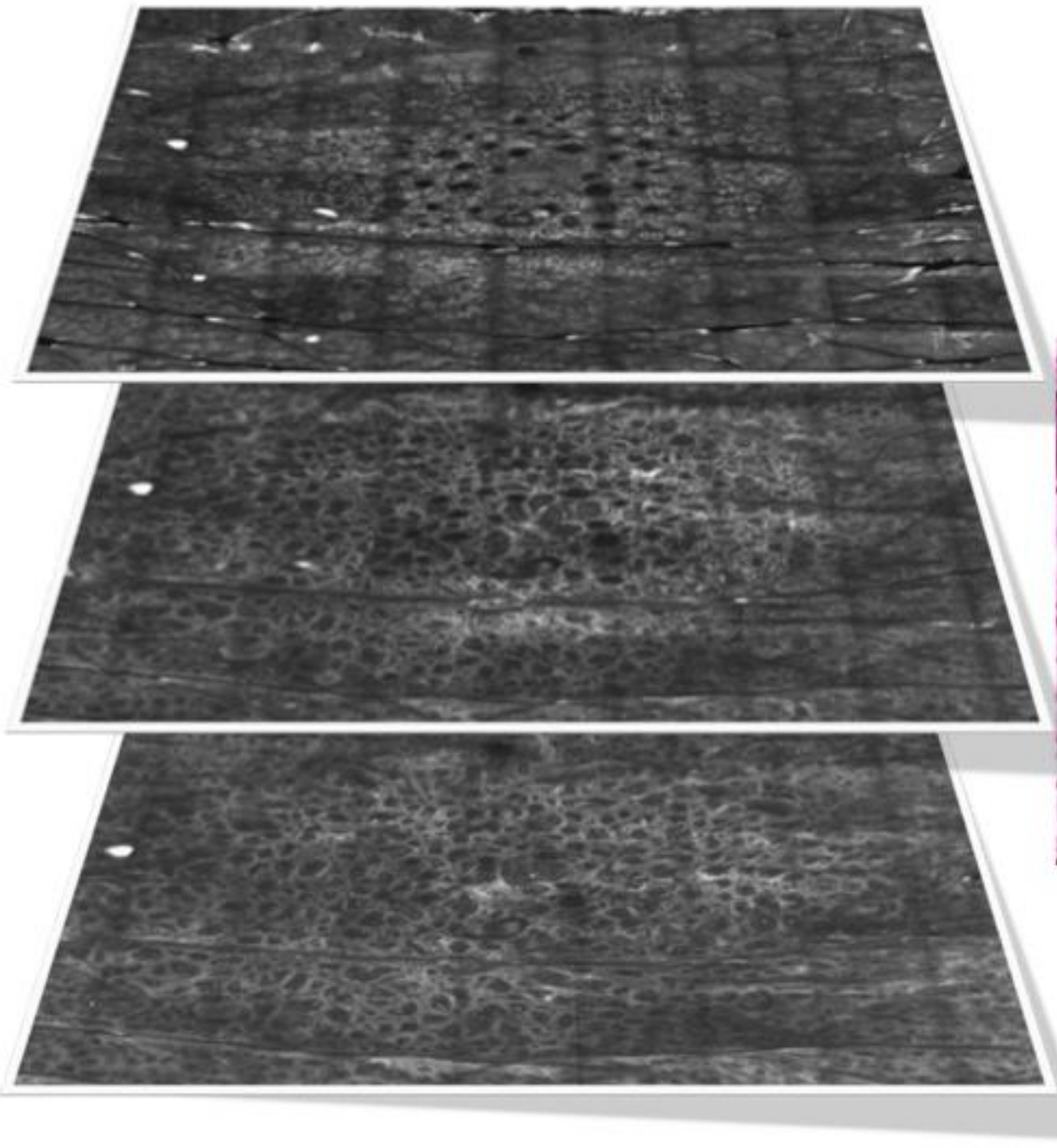
MOSAIC: composite image formed by consecutive confocal frames and mounted together in order to form a horizontal section of an area up to 8 by 8 mm

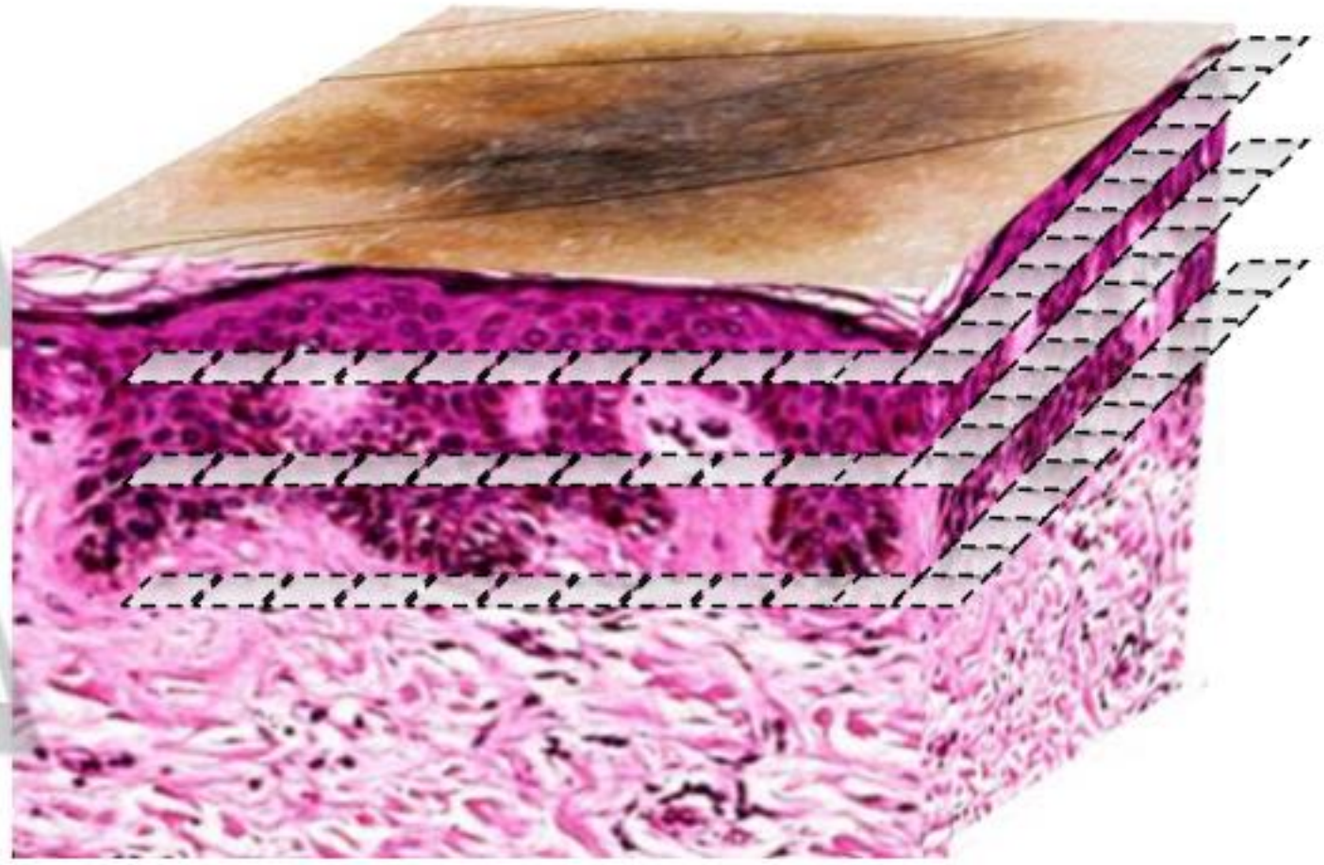




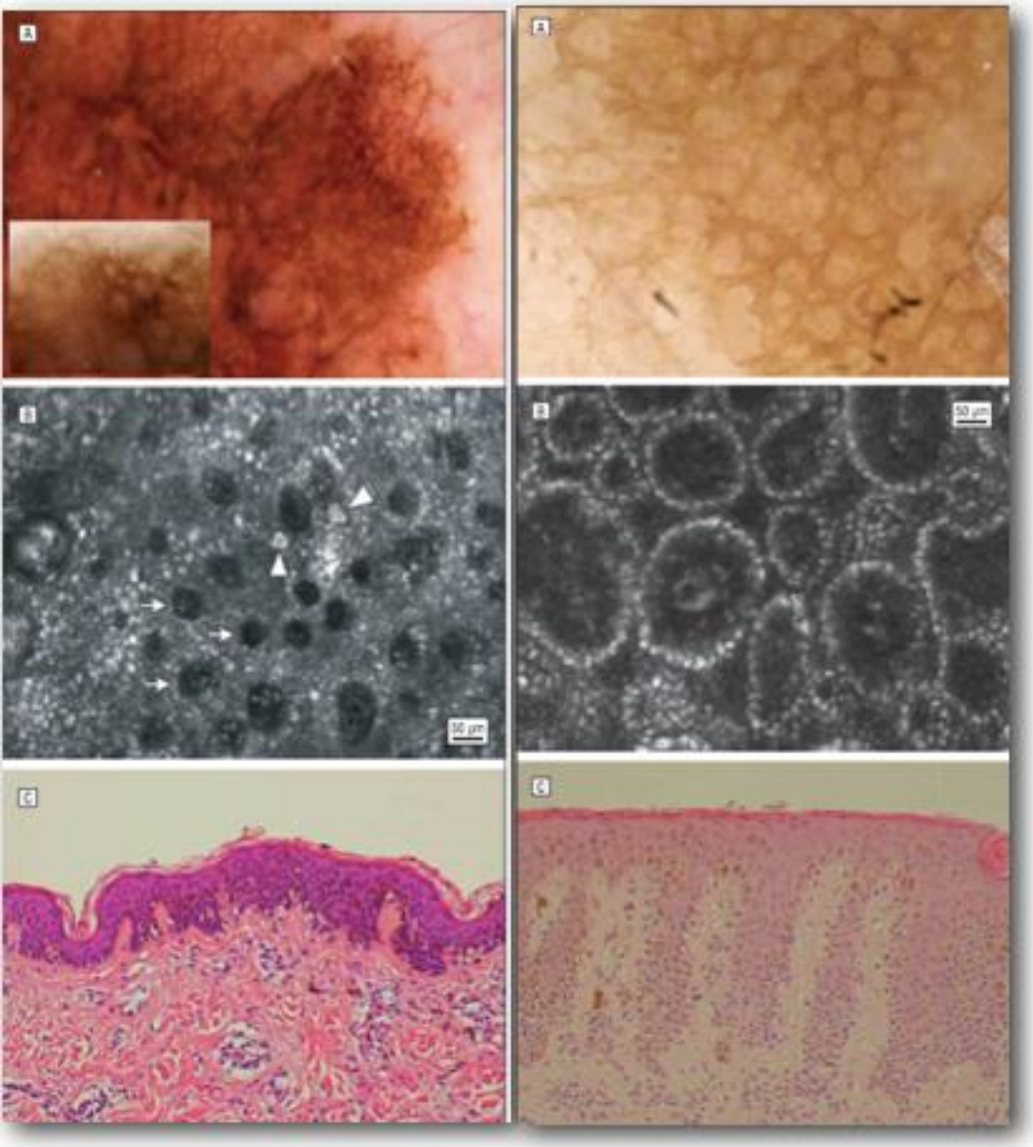
Confocal Technology

MOSAIC: composite image formed by consecutive confocal frames and mounted together in order to form a horizontal section of an area up to 8 by 8 mm

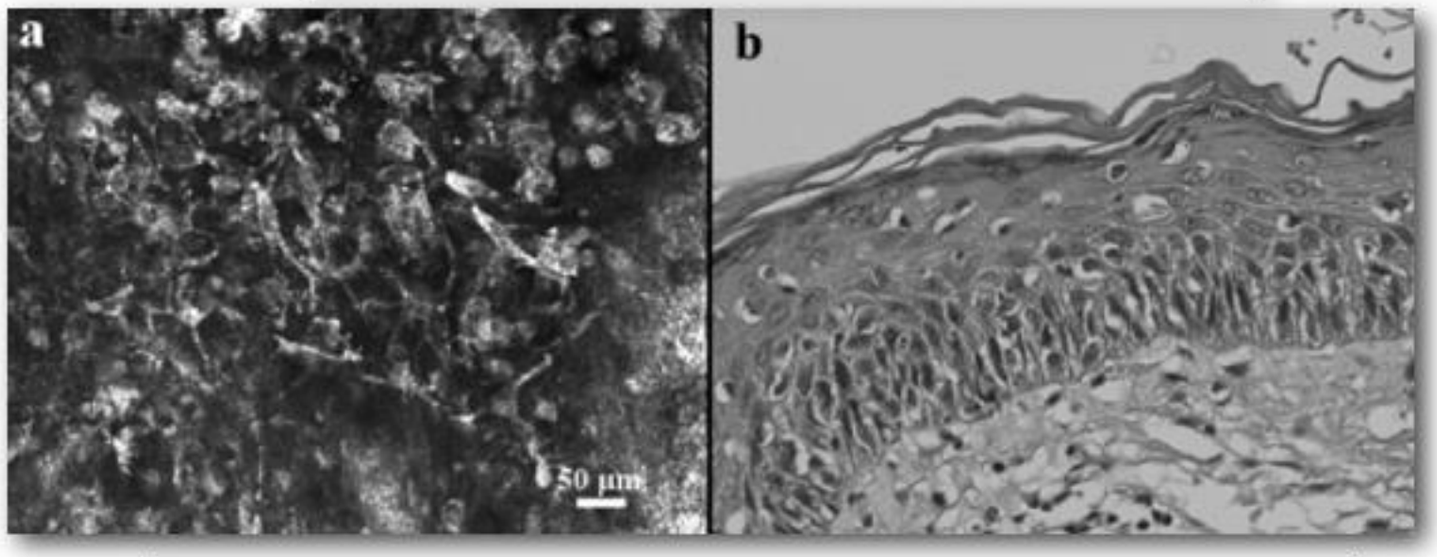




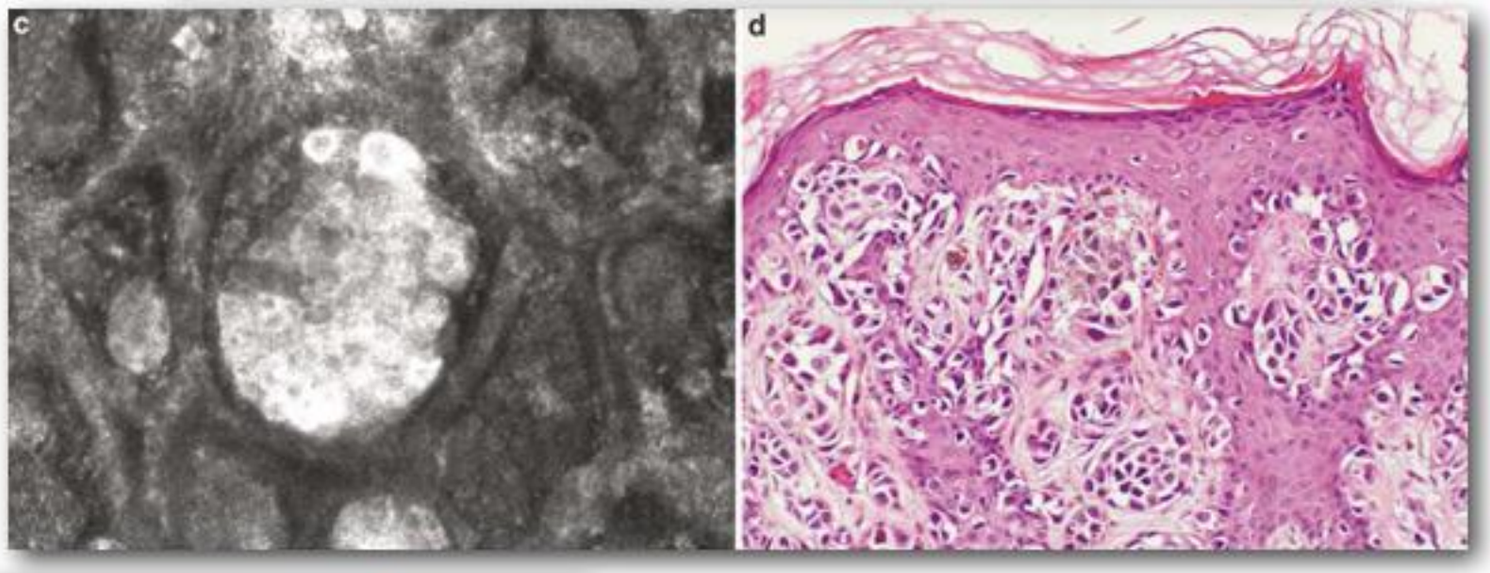
Network

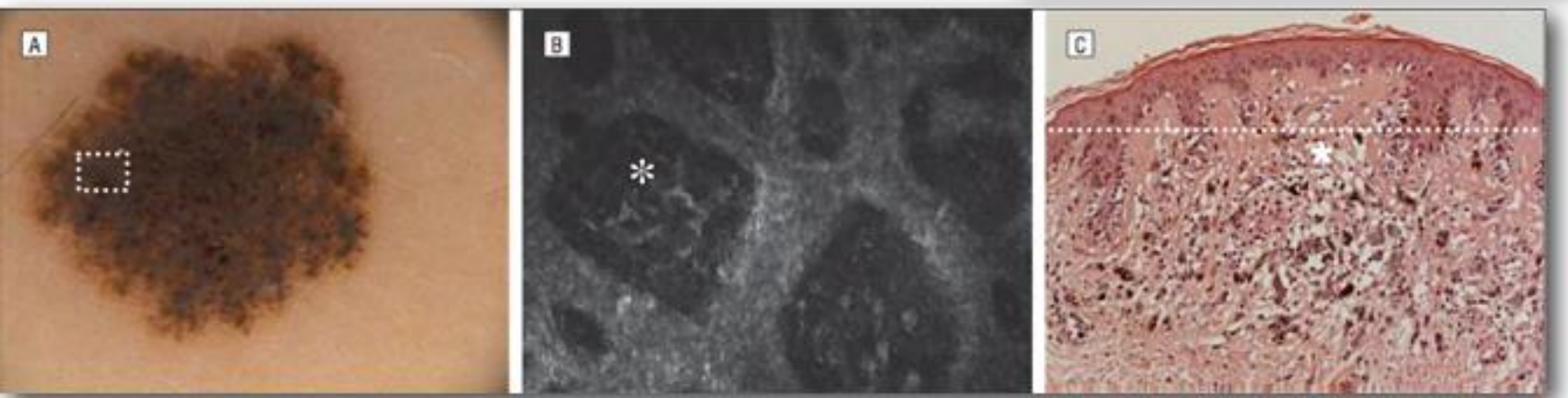


Pagetoid Spread

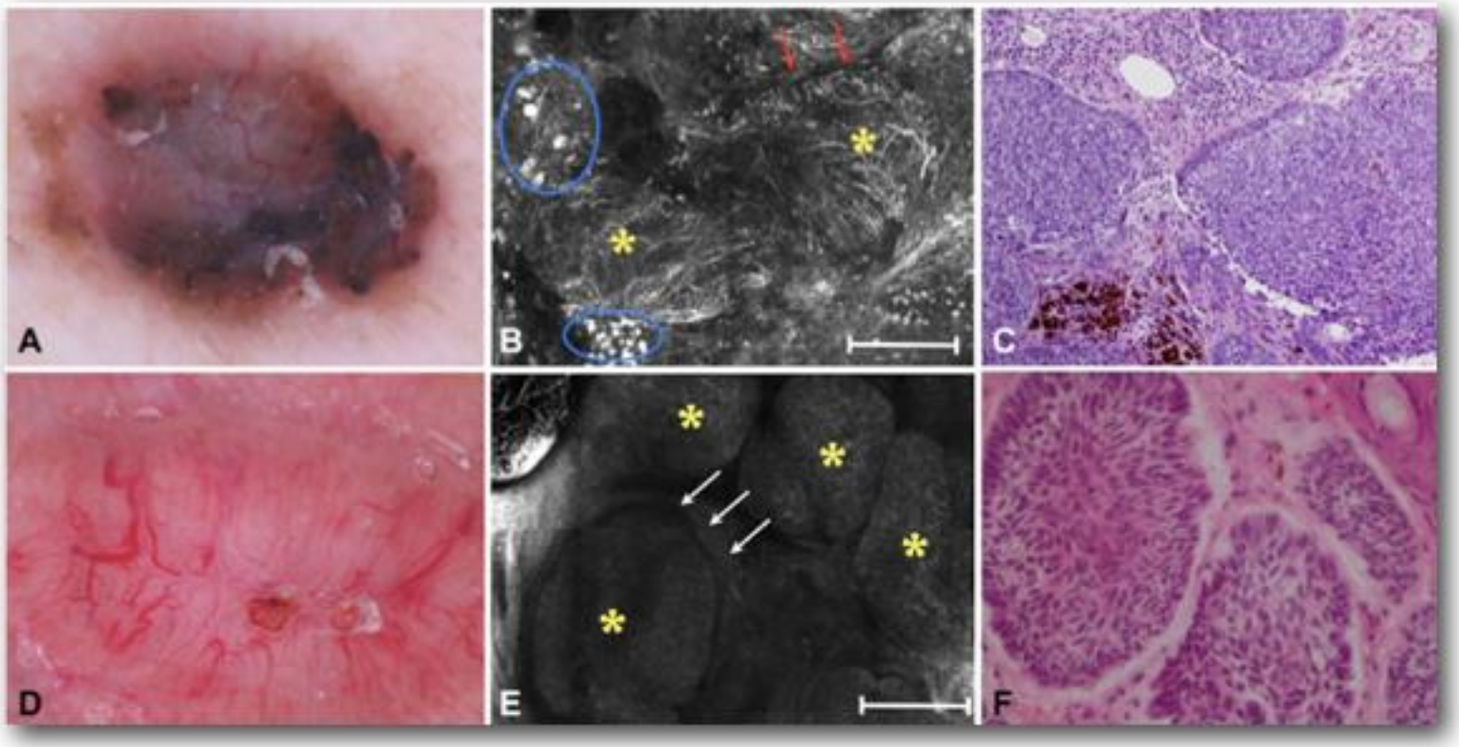


Melanocytic nesting

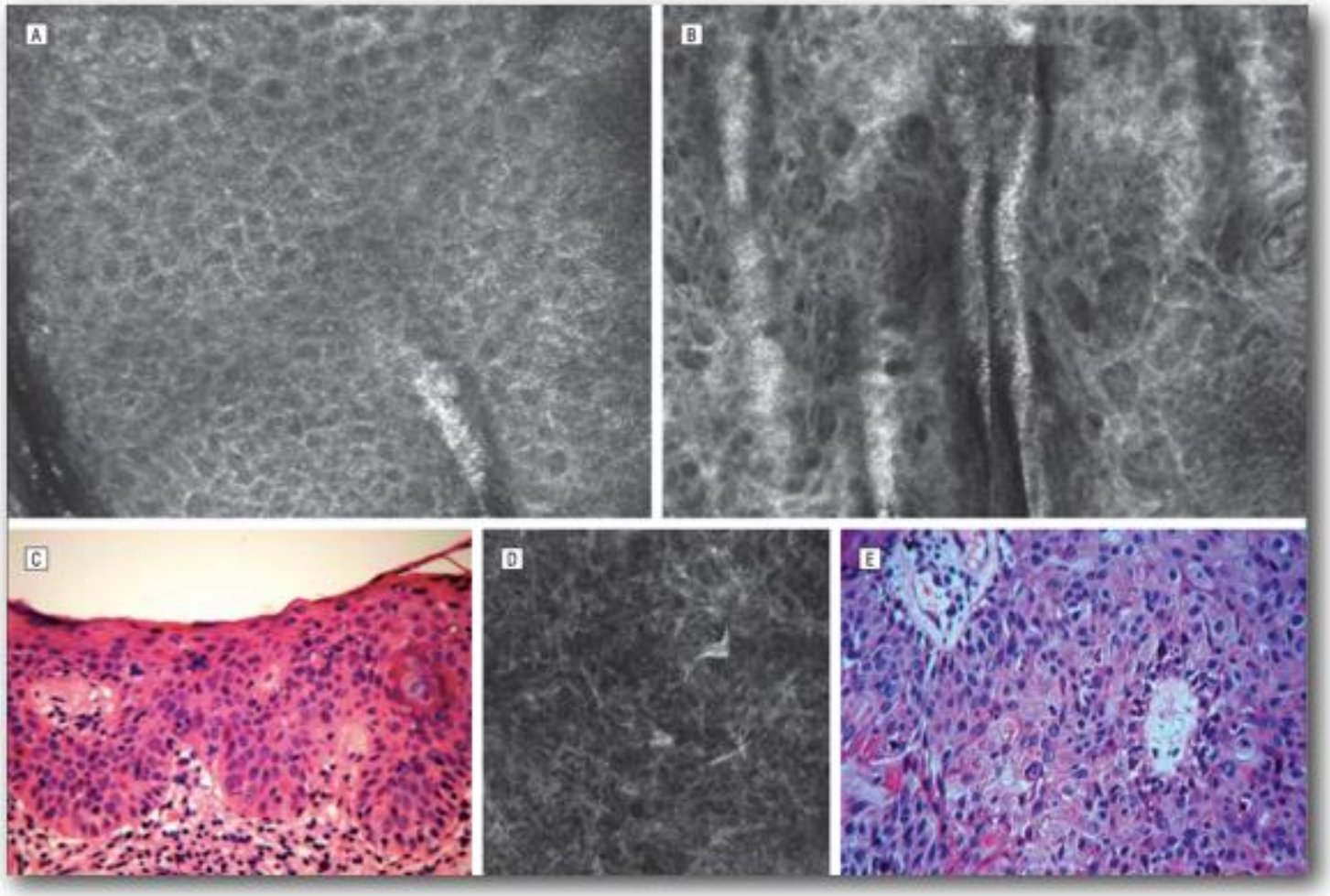




Histologic correlates

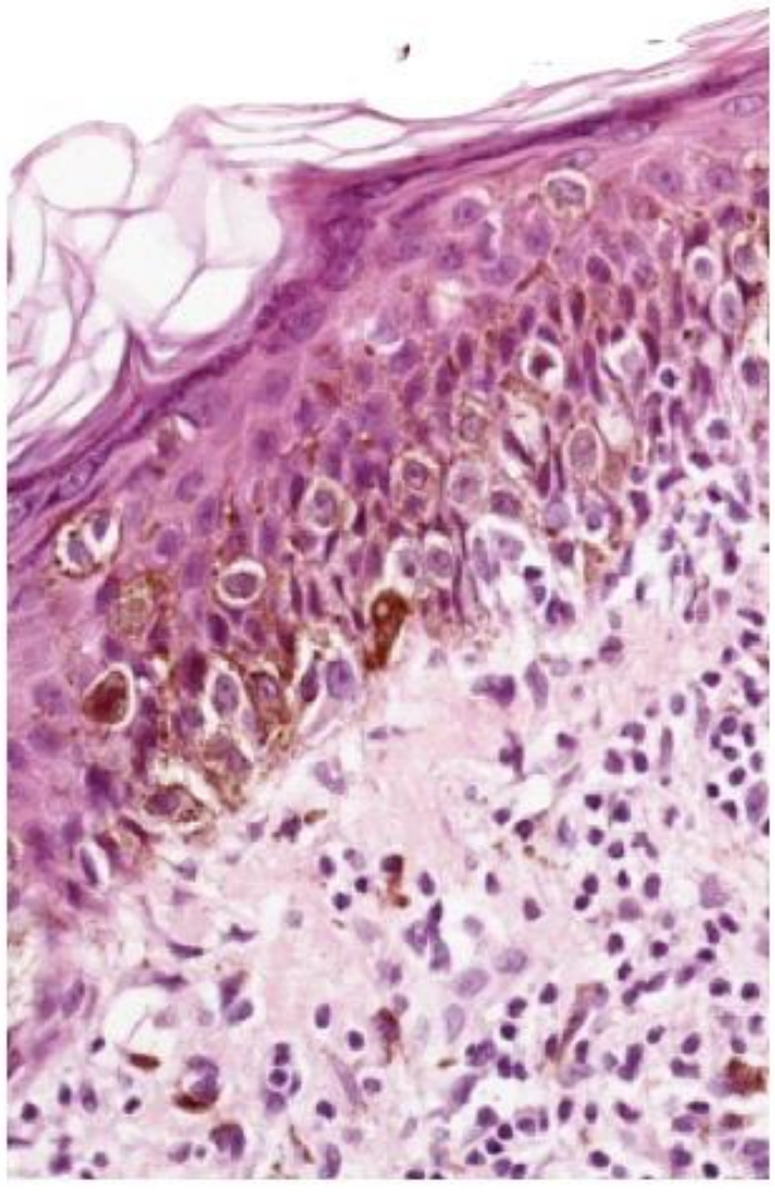


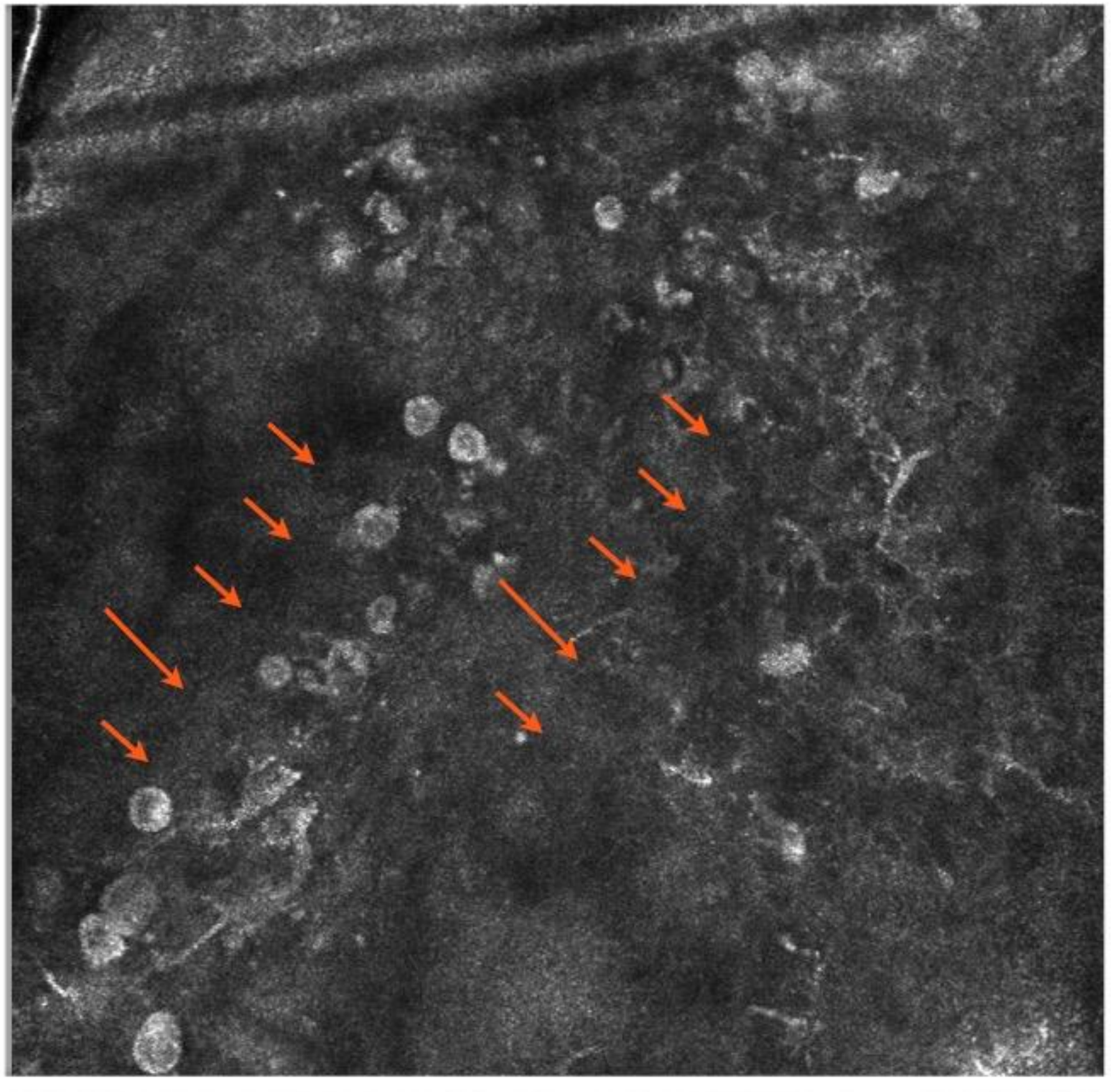
Basaloid tumor islands



Keratinocytic tumors

MELANOMA

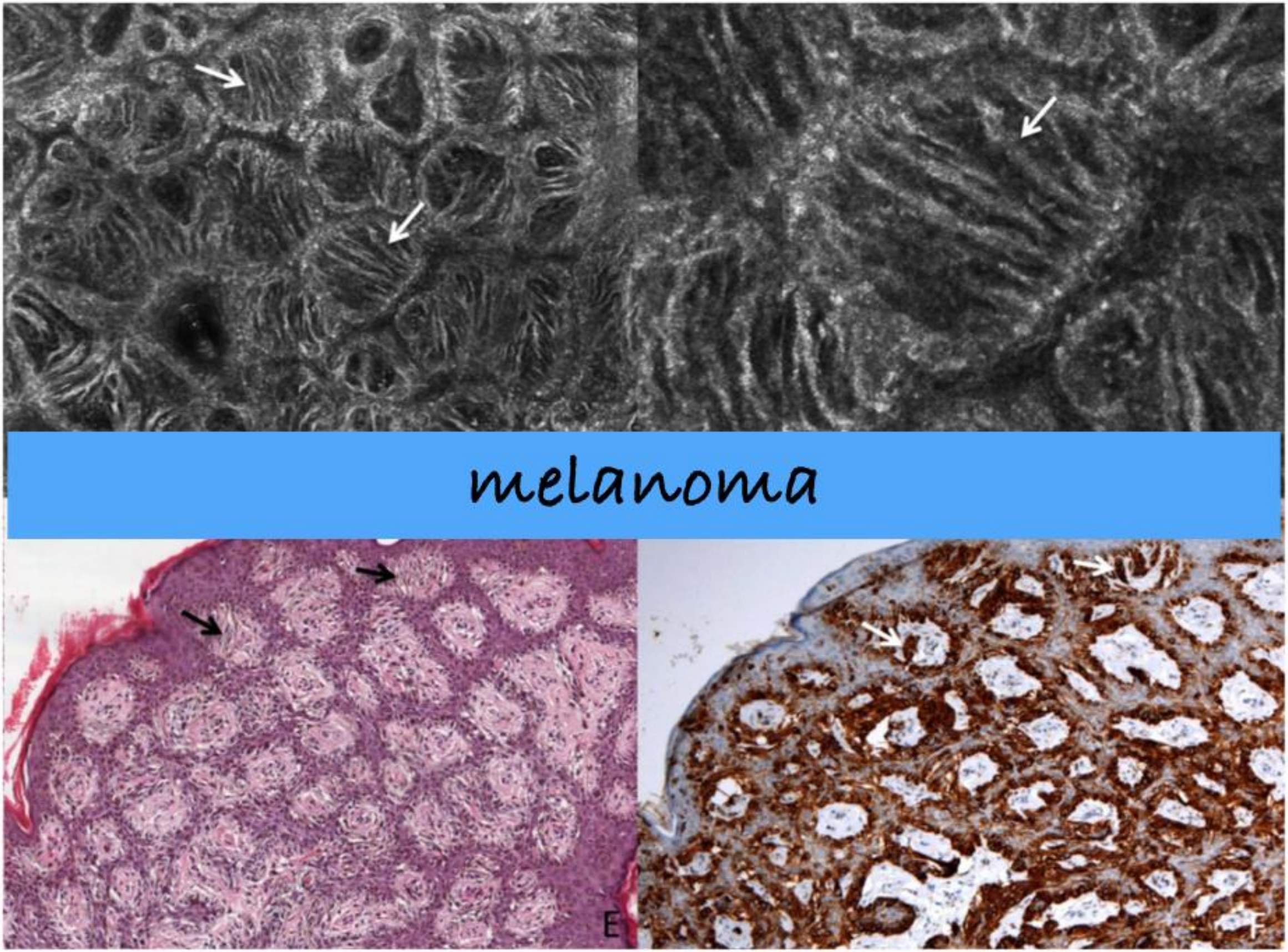




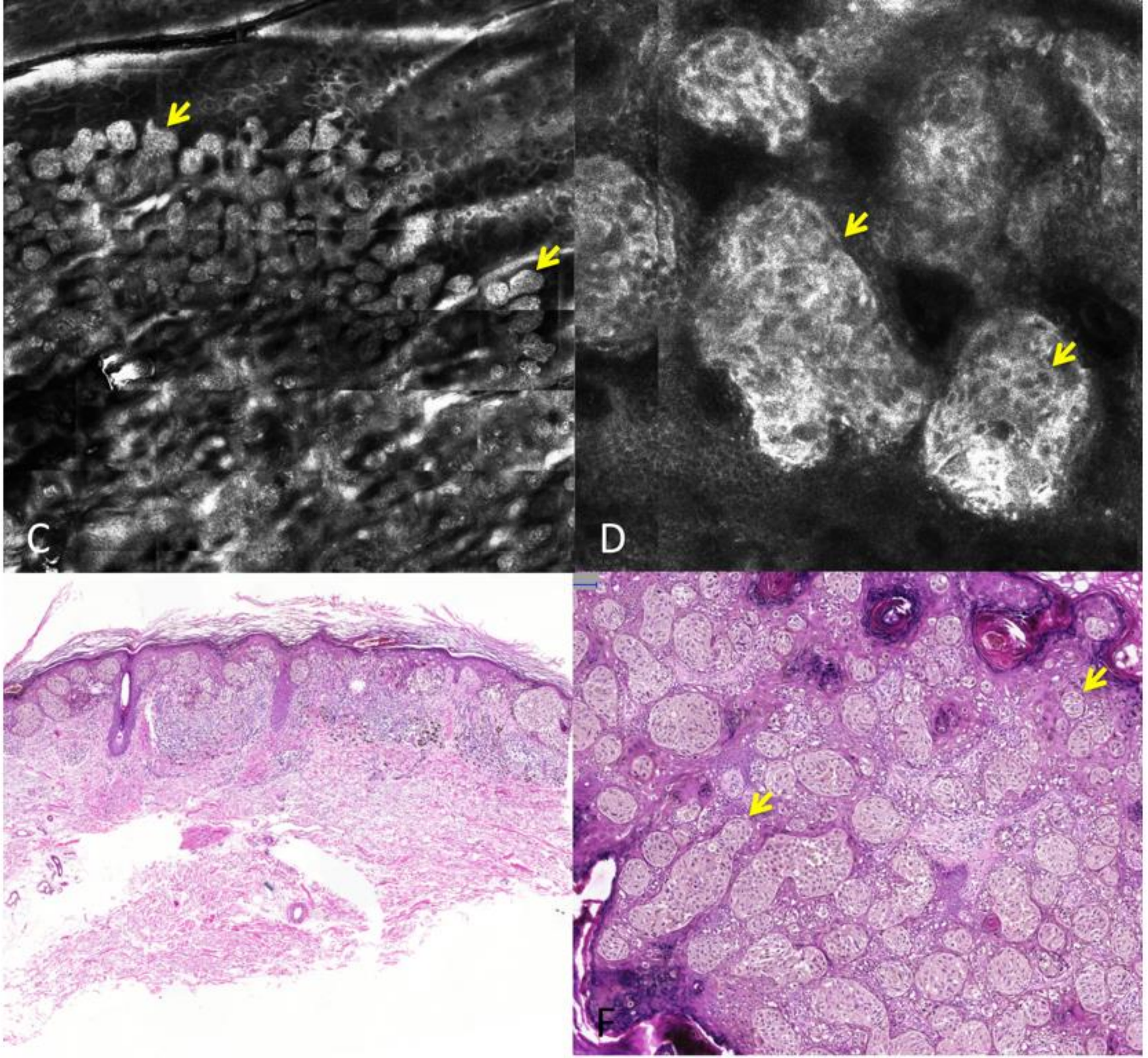
EN FACE sectioning

nevo

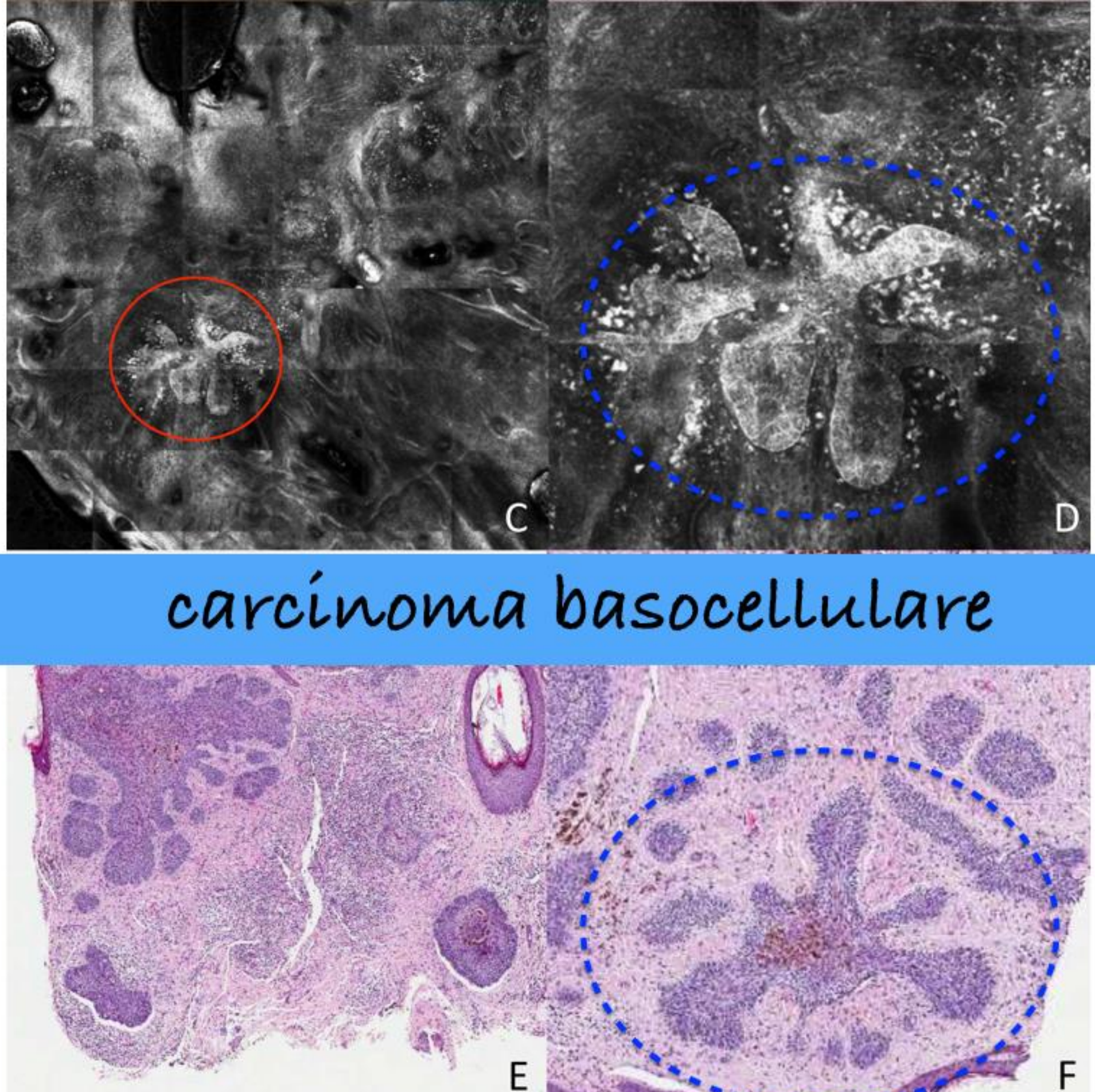
EN FACE sectioning



melanoma

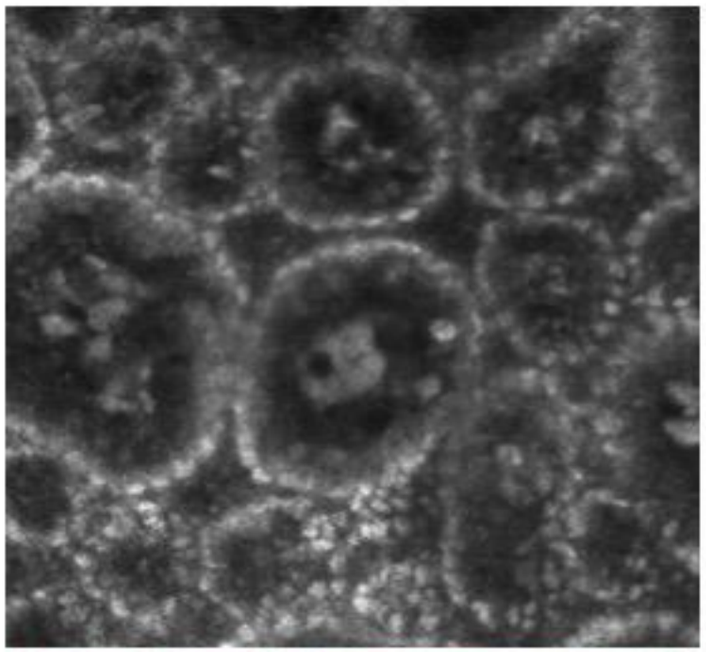

C
D
F

carcinoma basocellulare

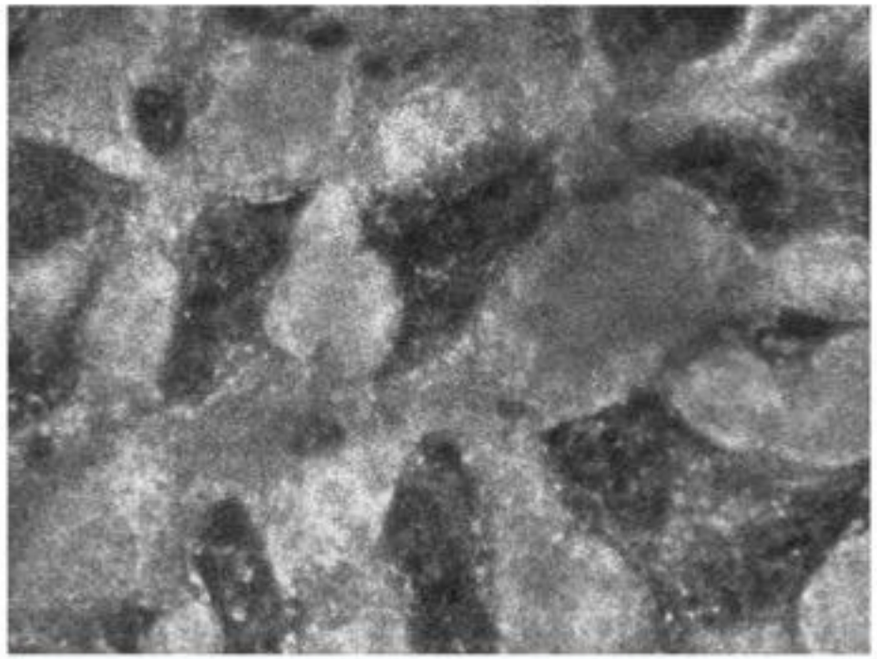


NEVI

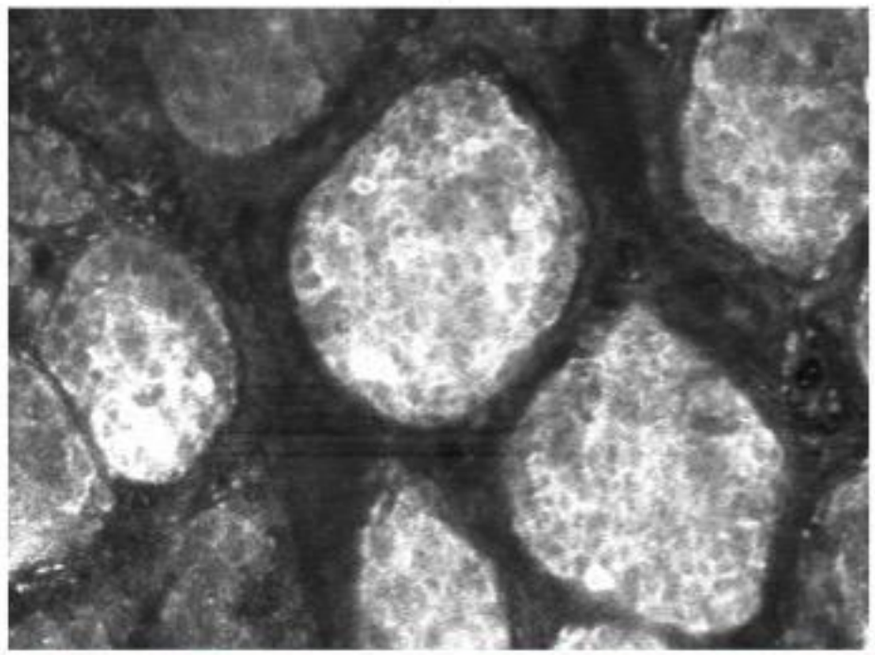
RINGED pattern

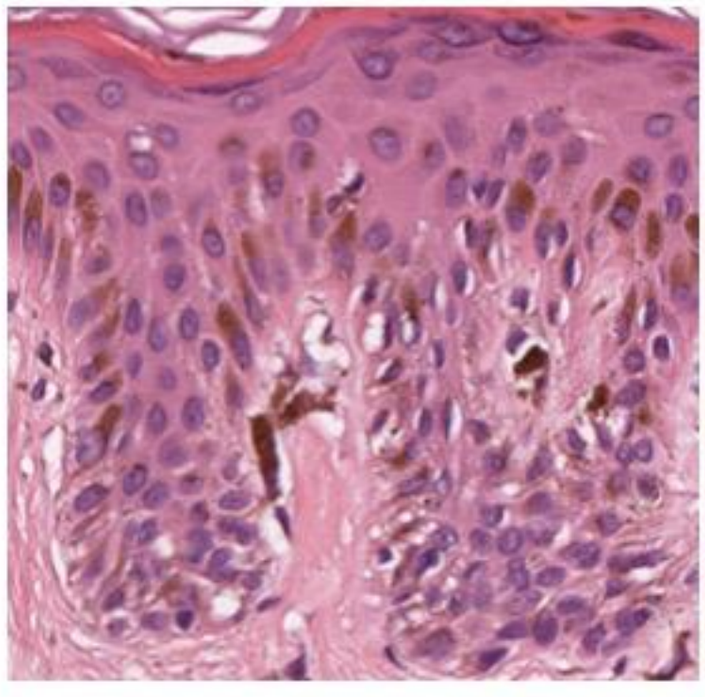


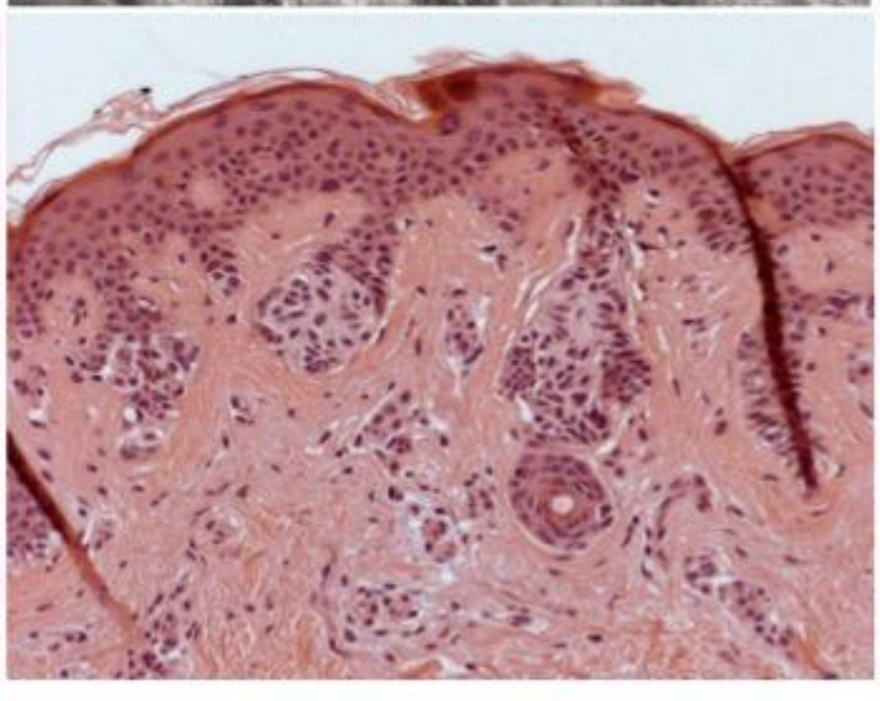
MESHWORK pattern

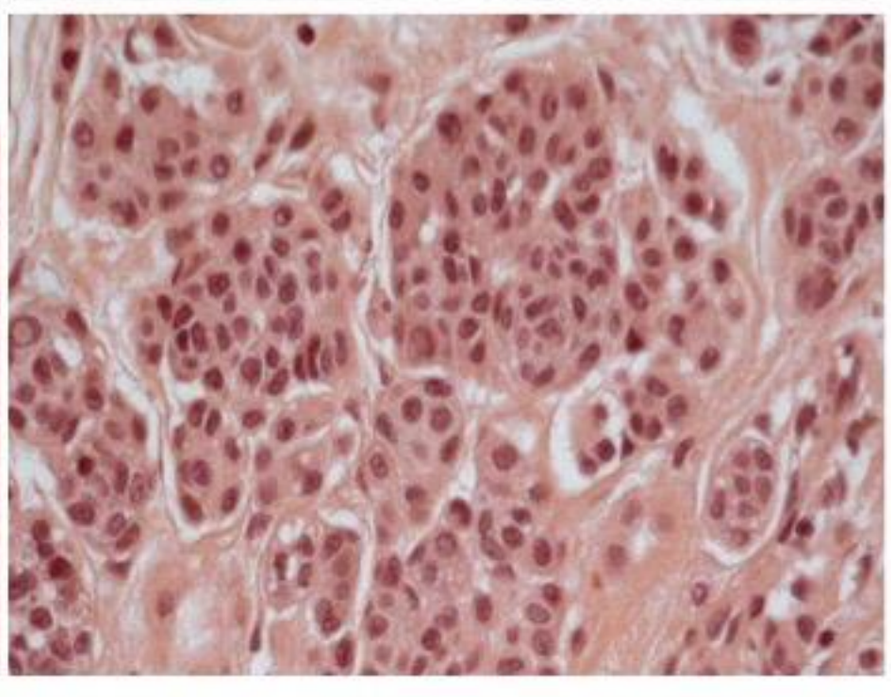


CLOD pattern









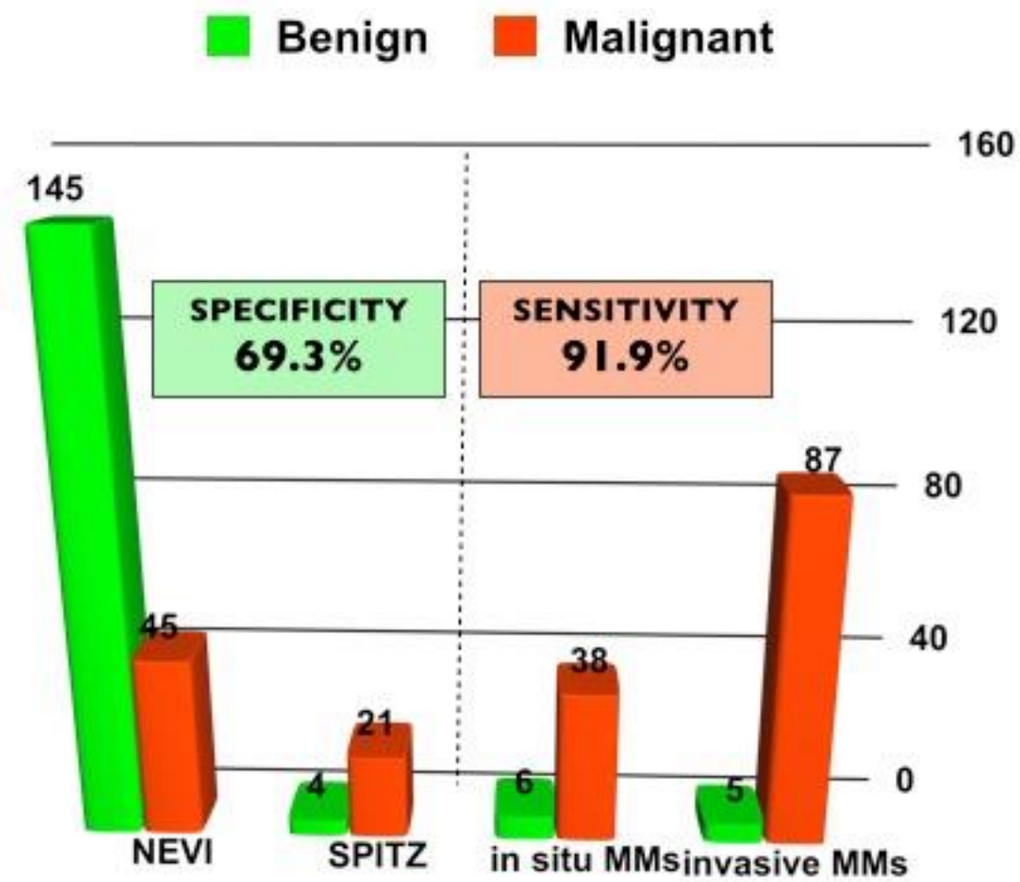
The Impact of *In Vivo* Reflectance Confocal Microscopy for the Diagnostic Accuracy of Melanoma and Equivocal Melanocytic Lesions

Giovanni Pellacani[1], Pascale Guitera[2], Caterina Longo[1], Michelle Avramidis[2], Stefania Seidenari[1] and Scott Menzies[2]

In vivo confocal reflectance microscopy recently showed promising results for melanoma (MM) diagnosis on a limited series. The aim of the study was to evaluate the sensitivity and specificity of confocal features for the diagnosis of MM 351 equivocal melanocytic lesions (136 MMs and 215 nevi) were evaluated for 37 confocal features by two blinded expert observers. χ^2 test, multivariate discriminant analysis and binary logistic regression were performed for the identification of the significant features and for testing newly created diagnostic models. Melanomas were mostly characterized by epidermal disarray and pagetoid cells in the epidermis, non-edged papillae, and cellular atypia at the junction, and atypical nests and bright nucleated cells in the upper dermis. On the other hand, regular dermal-epidermal architecture, and absence of pagetoid infiltration and atypical cells were suggestive of benign lesions. Five out of 136 melanomas, with mildly atypical melanocytes and occasional pagetoid cells at histopathology, were not diagnosed by confocal microscopy. Nevertheless, new diagnostic models showed no significant improvement compared with the previously proposed confocal microscopy algorithm. Owing to the visualization of cellular aspects, confocal microscopy seems useful for second level examination of clinically and dermoscopically equivocal lesions.

Journal of Investigative Dermatology (2007) 127, 2759-2765; doi:10.1038/sj.jid.5700993; published online 26 July 2007

J Invest Dermatol 2007

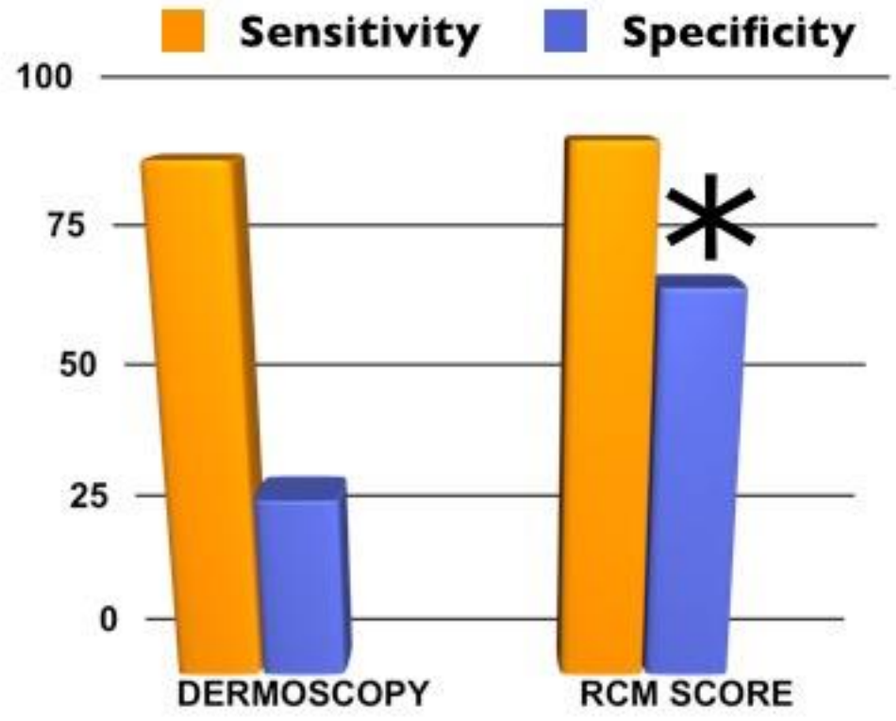


In Vivo Reflectance Confocal Microscopy Enhances Secondary Evaluation of Melanocytic Lesions

Pascale Guitera[1], Giovanni Pellacani[2], Caterina Longo[2], Stefania Seidenari[2], Michelle Avramidis[1] and Scott W. Menzies[1]

We recently described an *in vivo* reflectance confocal microscopy (RCM) method and our aim was to evaluate a possible additive value of this type of analysis in the management of melanocytic lesions. In two referral centers (Sydney and Modena), lesions (203 nevi and 123 melanomas (MMs) with a median Breslow thickness of 0.54 mm) were excised on the basis of clinical suspicion (history, dermoscopy examination, and/or digital monitoring). The RCM method was also trialed on a non-biopsied population of 100 lesions, which were clinically and dermoscopically diagnosed as benign nevi. All RCM and dermoscopy diagnoses were performed blinded to the histopathological diagnosis. Firstly, in the study population, a high interobserver agreement (on a subset of 90 lesions) was seen with the RCM method, which had superior specificity (68%, 95% confidence interval (95% CI): 61.1–74.3) for the diagnosis of MM compared with dermoscopy (32%, 95% CI: 25.9–38.7), while showing no difference in sensitivity (91%, 95% CI: 84.6–95.5, RCM; 88%, 95% CI: 80.7–92.6 dermoscopy). The two techniques had a weak correlation, resulting in only 2.4% of MMs being misclassified by both techniques. Diagnosis of light-colored lesions is improved by RCM (specificity 84%, 95% CI: 66.3–94.5) compared with dermoscopy (specificity 39%, 95% CI: 23.7–56.2). Secondly, the RCM method classified 100% of the non-biopsied control nevi population as benign.

J Invest Dermatol 2009

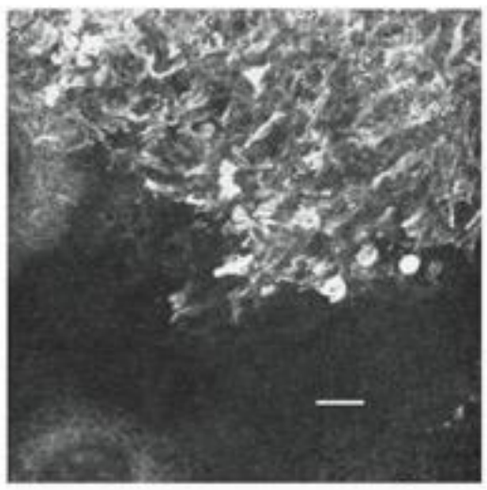


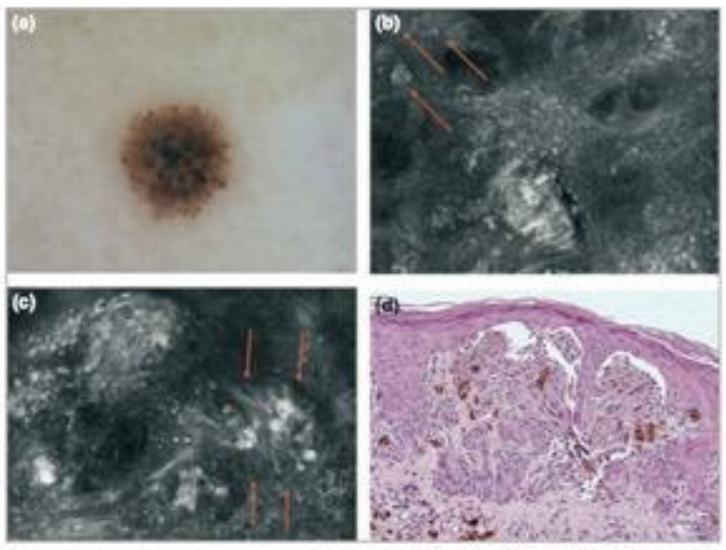
CONFOCAL HELPS IN CLINICAL AND DERMOSCOPIC DIFFICULT SITUATIONS

The Impact of *In Vivo* Reflectance Confocal Microscopy on the Diagnostic Accuracy of Lentigo Maligna and Equivocal Pigmented and Nonpigmented Macules of the Face

Pascale Guitera[1,7], Giovanni Pellacani[2], Kerry A. Crotty[1], Richard A. Scolyer[3,4], Ling-Xi L. Li[3], Sara Bassoli[2], Marco Vinceti[5], Harold Rabinovitz[6], Caterina Longo[2] and Scott W. Menzies[1,7]

JID 2011





CLINICAL AND LABORATORY INVESTIGATIONS

BJD
British Journal of Dermatology

Small-diameter melanocytic lesions: morphological analysis by means of *in vivo* confocal microscopy

G. Pupelli,[1] C. Longo,[2] L. Veneziano,[1] A.M. Cesinaro,[3] G. Ferrara,[4] S. Piana,[5] E. Moscarella,[2] C. Ricci,[2] I. Zalaudek,[2] S. Seidenari,[1] G. Argenziano[2] and G. Pellacani[1]

[1]Department of Dermatology and [3]Department of Pathology, University of Modena and Reggio Emilia, Italy

[2]Dermatology and Skin Cancer Unit and [5]Department of Pathology, Arcispedale Santa Maria Nuova, (Istituto di Ricovero e Cura a Carattere Scientifico-IRCCS), Reggio Emilia, Italy

[4]Department of Oncology, Anatomic Pathology Unit, Gaetano Rummo General Hospital, Benevento, Italy

BJD 2013

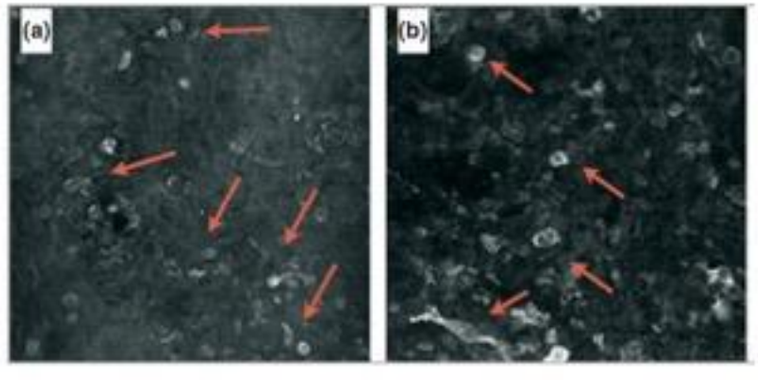
CLINICAL AND LABORATORY INVESTIGATIONS

BJD
British Journal of Dermatology

Is confocal microscopy a valuable tool in diagnosing nodular lesions? A study of 140 cases

C. Longo,[1] F. Farnetani,[2] S. Ciardo,[2] A.M. Cesinaro,[3] E. Moscarella,[1,2] G. Ponti,[4] I. Zalaudek,[1,5] G. Argenziano[1] and G. Pellacani[2]

BJD 2013



Clinically/dermoscopically equivocal lesions

Which are clinical/dermoscopic criteria that predict a good RCM performance?

Which are RCM best indications?

REGGIO EMILIA STUDY

JAMA DERMATOL 2016 in press

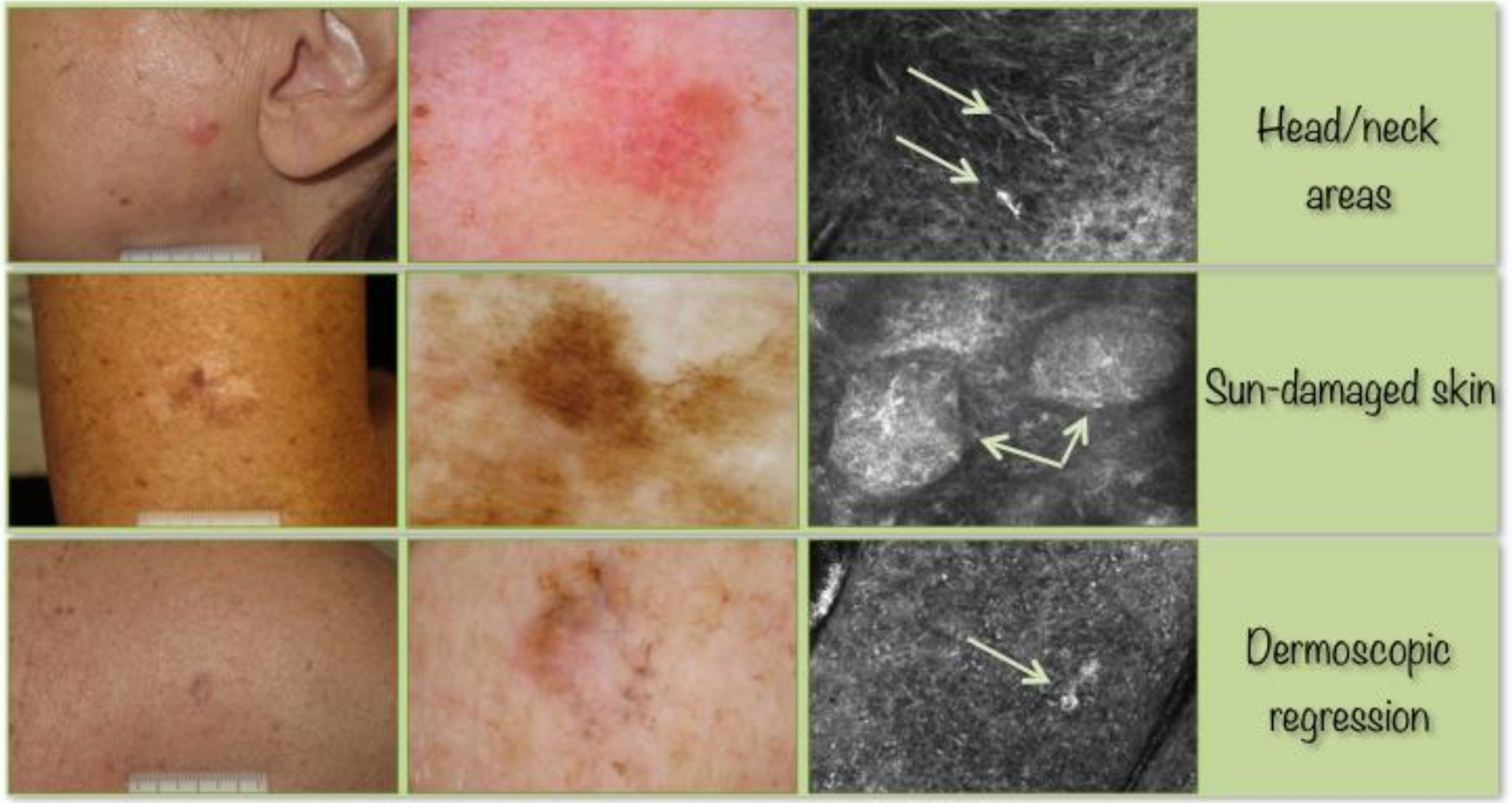
1256 clinically and dermoscopically equivocal lesions

Sensitivity: 95.3%

Specificity: 83.9%

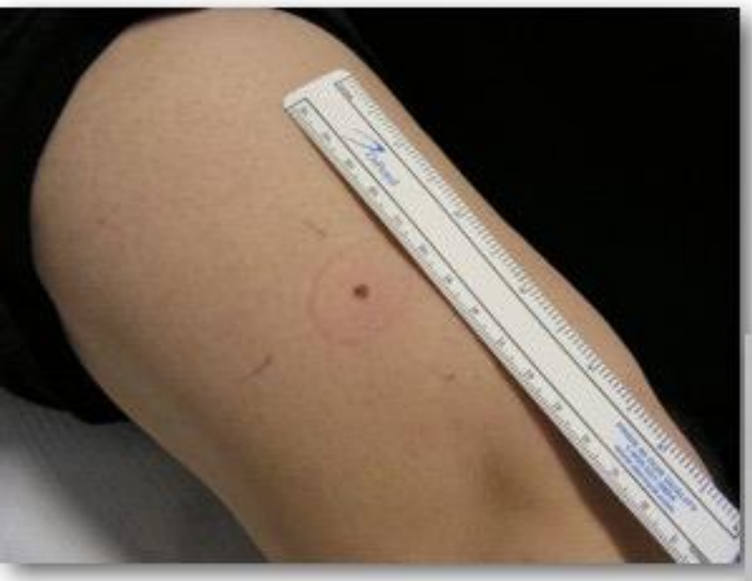
	p-value	Odds Ratio	95% CI for OR Lower	Upper
Body site:				
-Head/neck	0.071	0.464	0.202	1.068
-Chest	0.044	0.434	0.192	0.979
-Abdomen	0.000	0.295	0.158	0.554
-Back	0.000	0.200	0.098	0.408
-Upper limbs	0.000	0.238	0.125	0.455
-Lower limbs				
Sun-damaged skin	0.001	2.129	1.375	3.296
Regression	0.002	2.134	1.314	3.466
BCC specific criteria	0.028	9.355	1.276	68.577

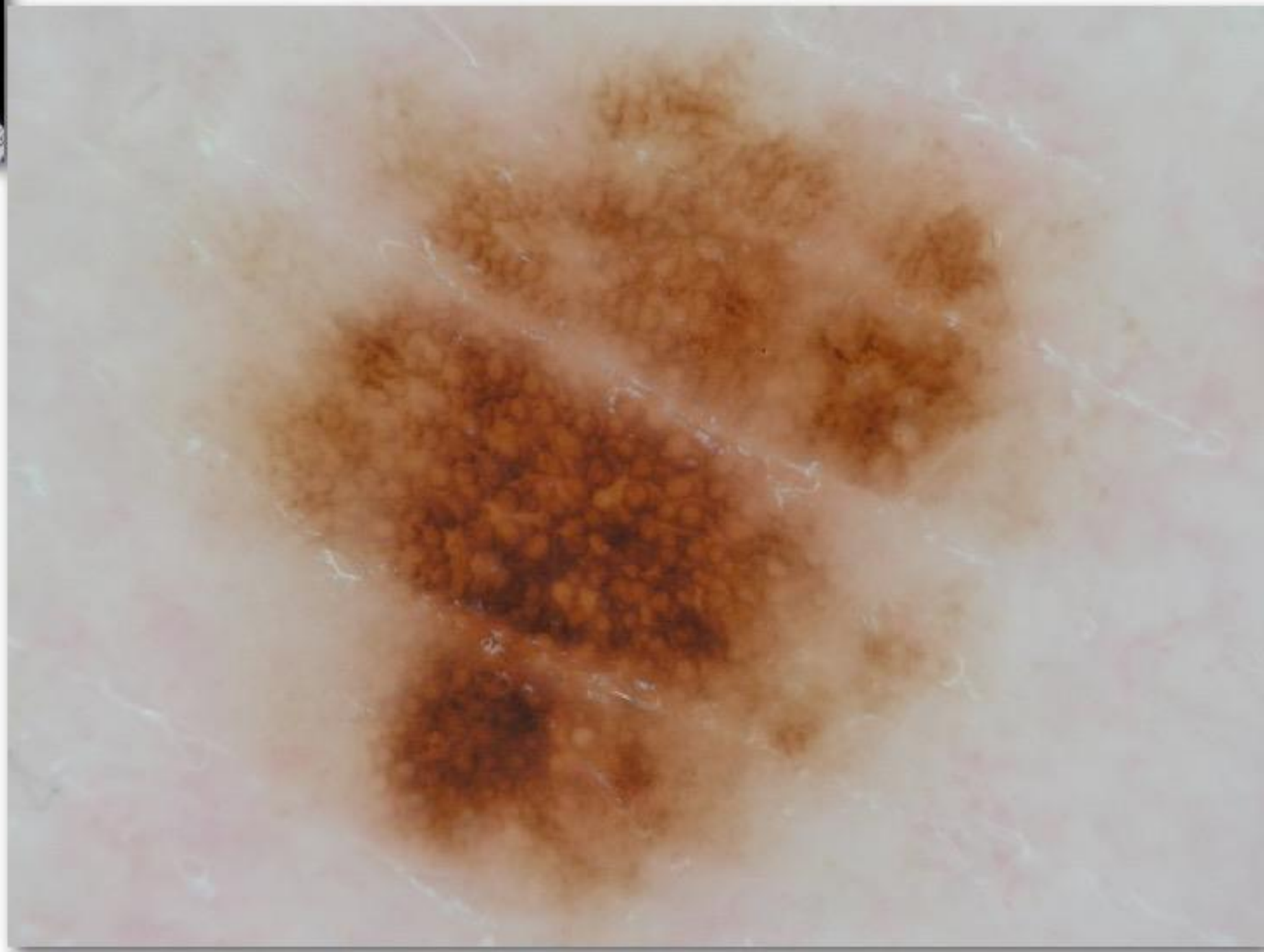
Number needed to excise to detect a melanoma (NNE): 2.4

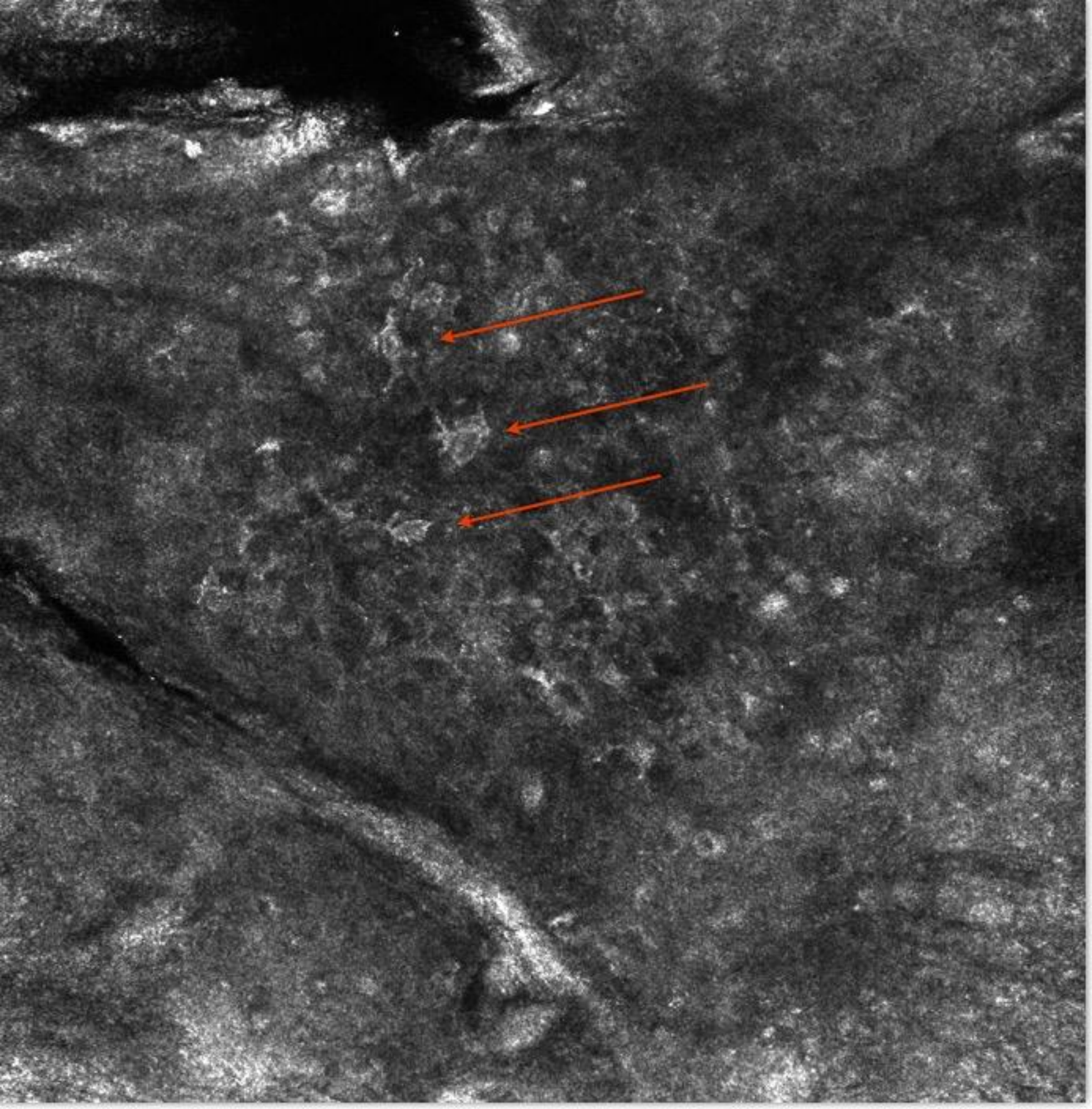


HOW TO INTEGRATE RCM IN DERMOSCOPY ROUTINE?

Better SELECTION of lesions to be EXCISED



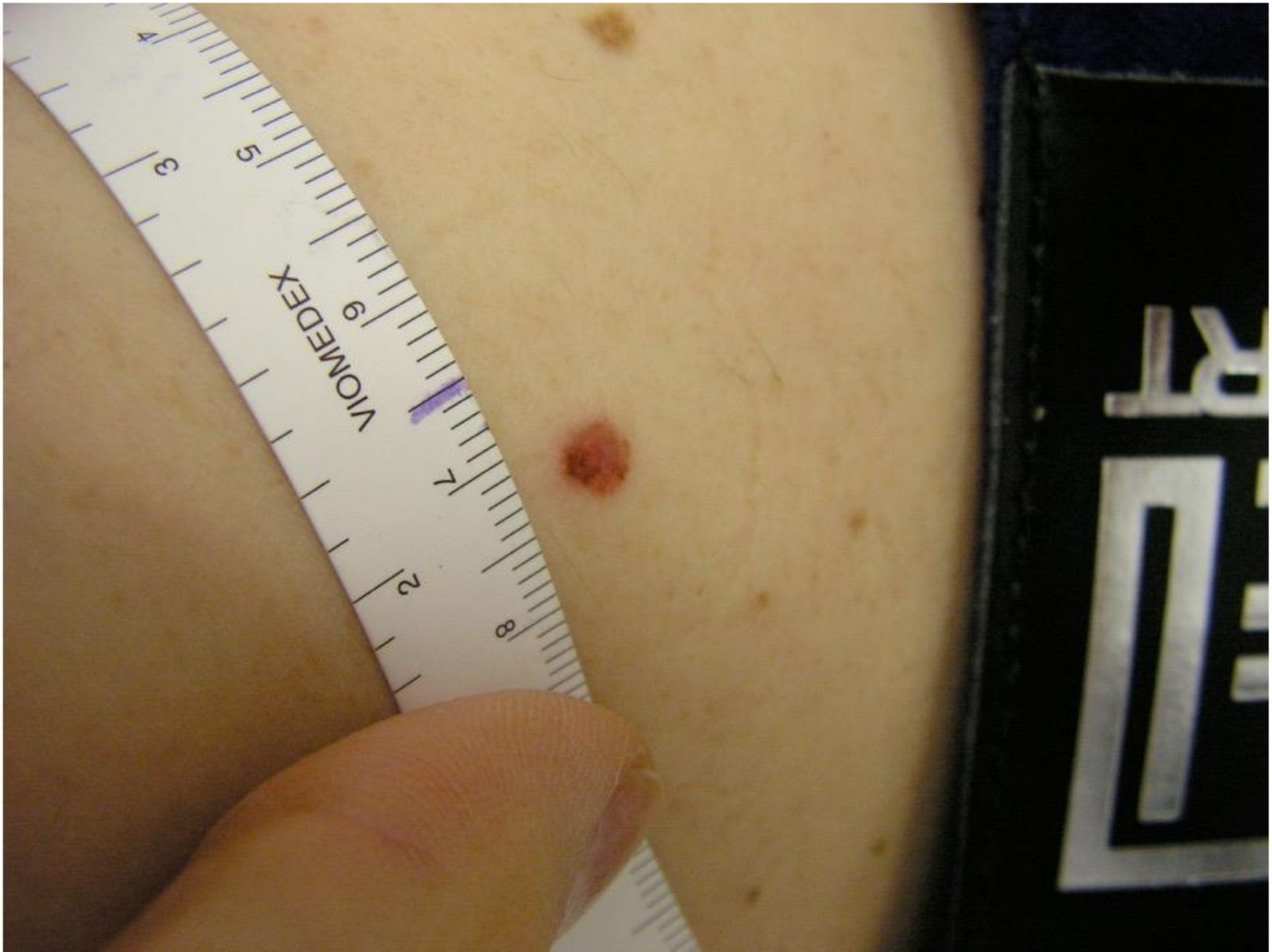




Pagetoid cells

melanoma in situ

Avoid to delay the excision of malignancies

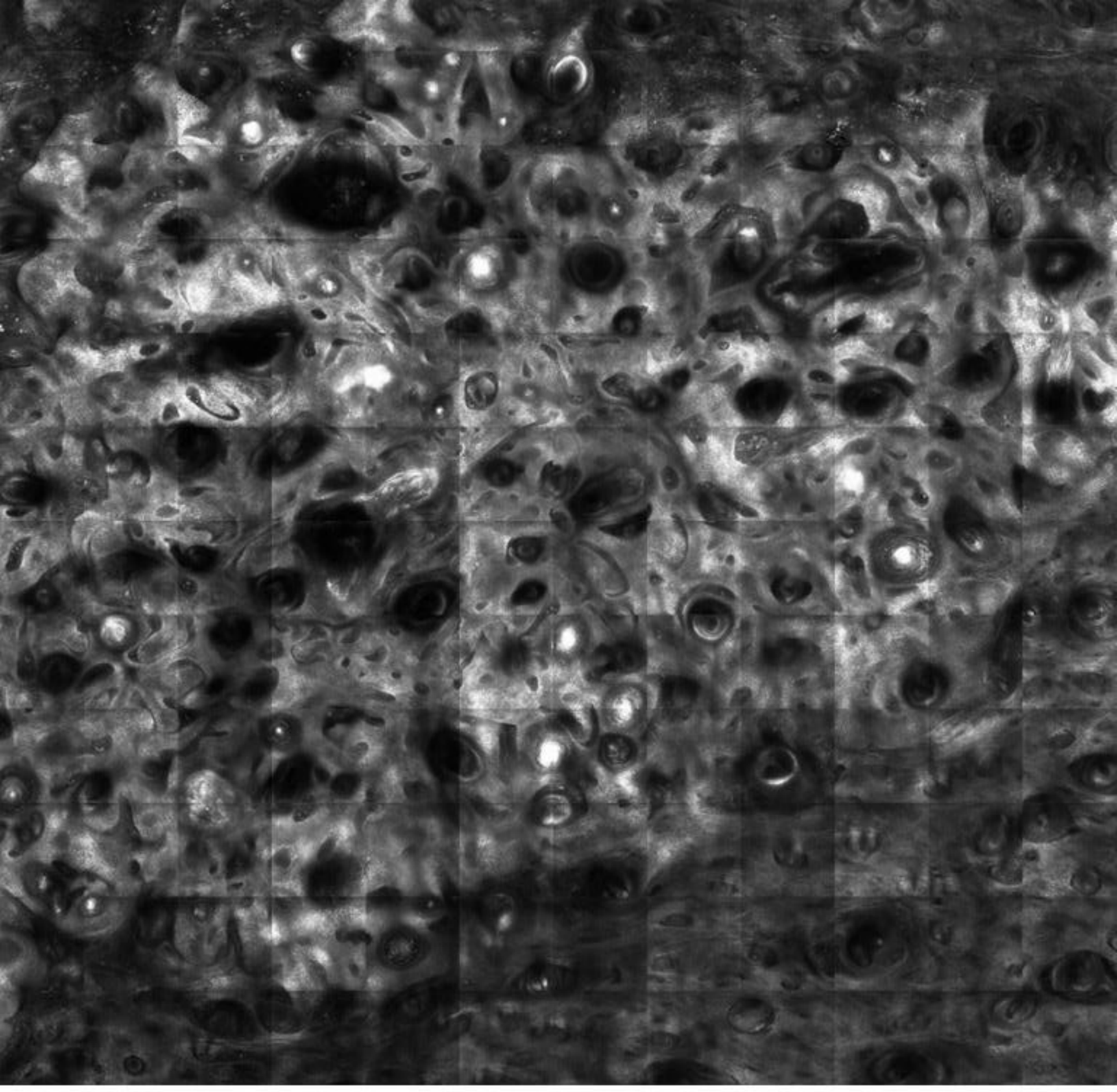


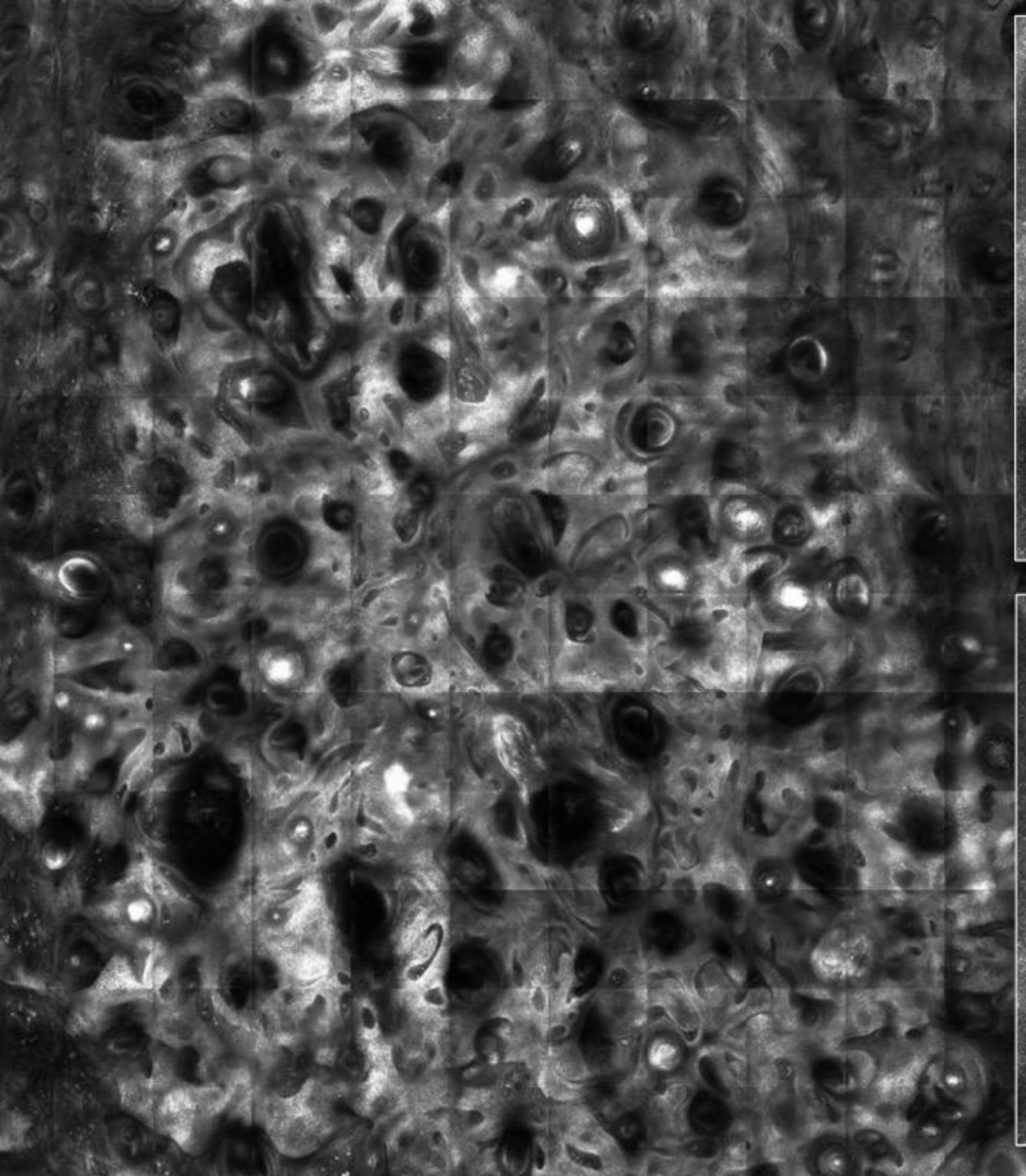
pagetoid spread

several enlarged vessels
cerebriform nests

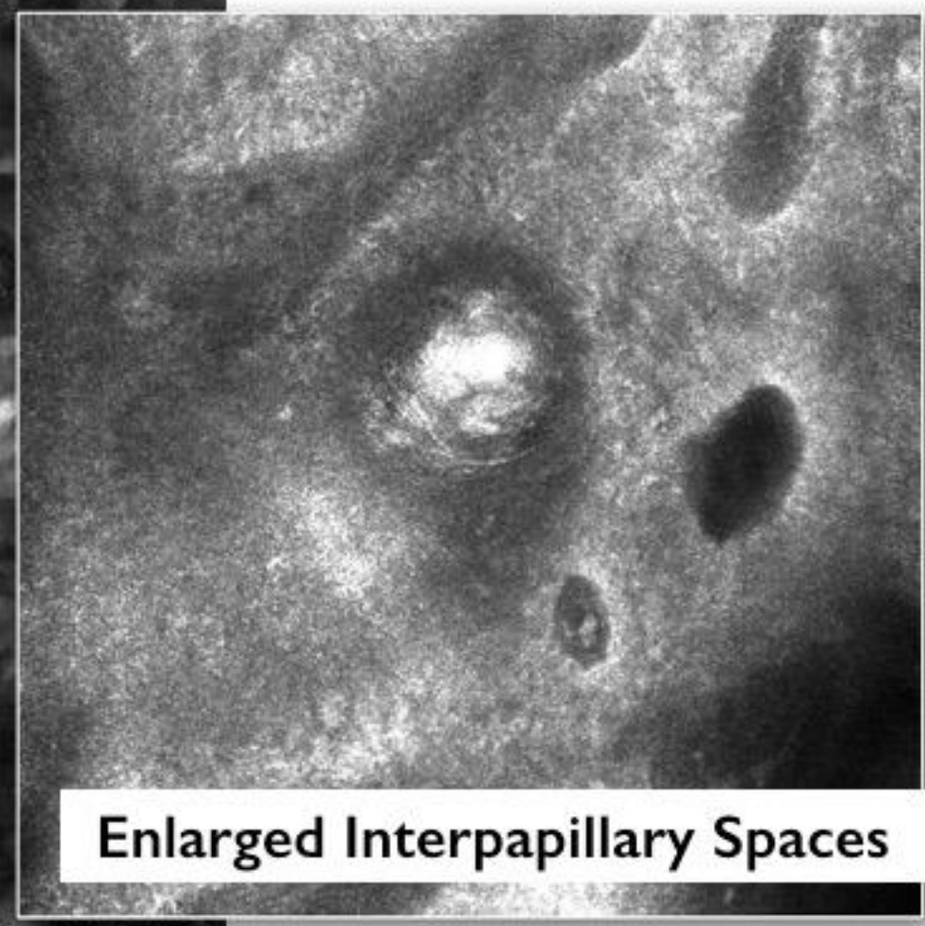
melanoma 0.98 mm ulc+

Save unnecessary excisions





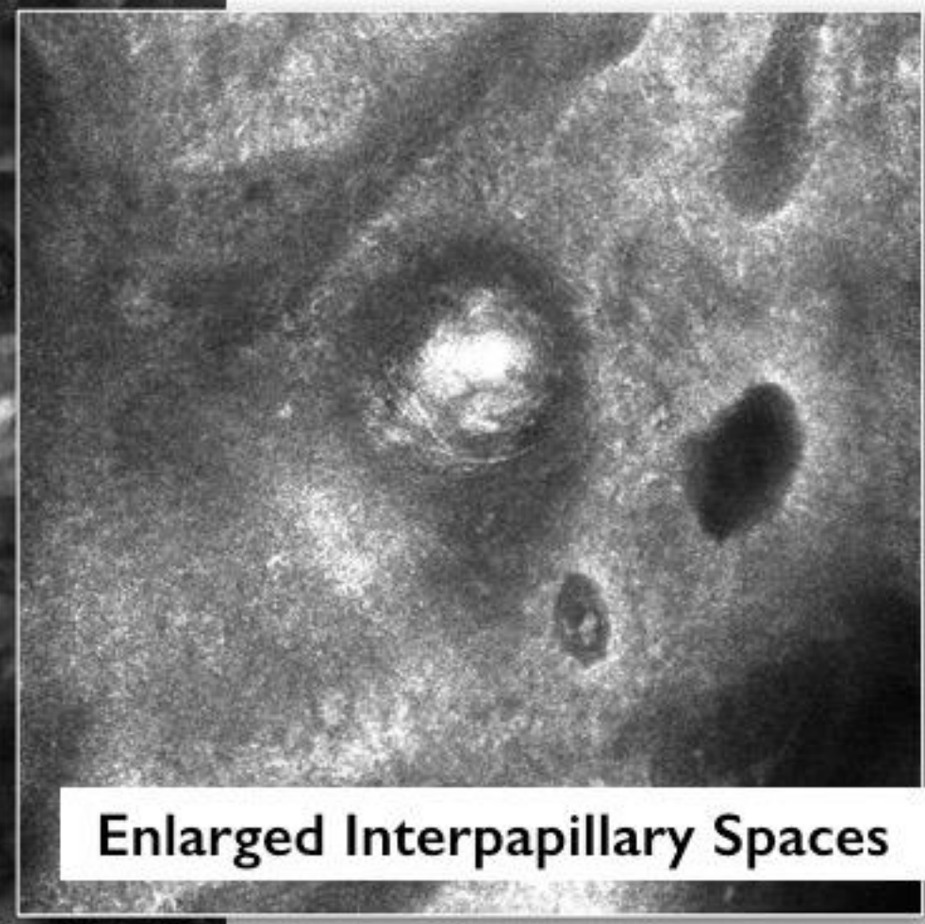
Milia-like cysts



Enlarged Interpapillary Spaces

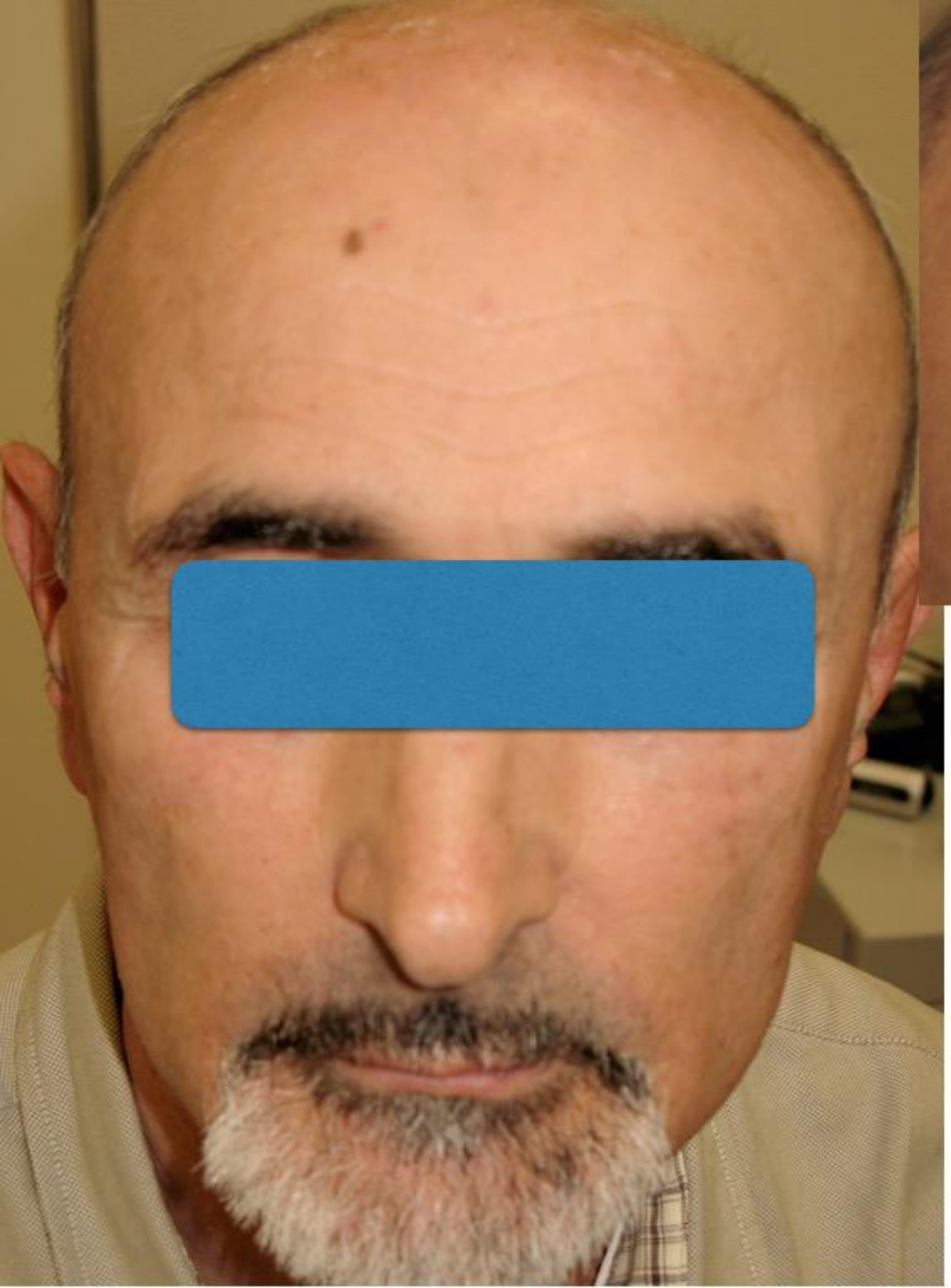
SEBORRHEIC KERATOSIS

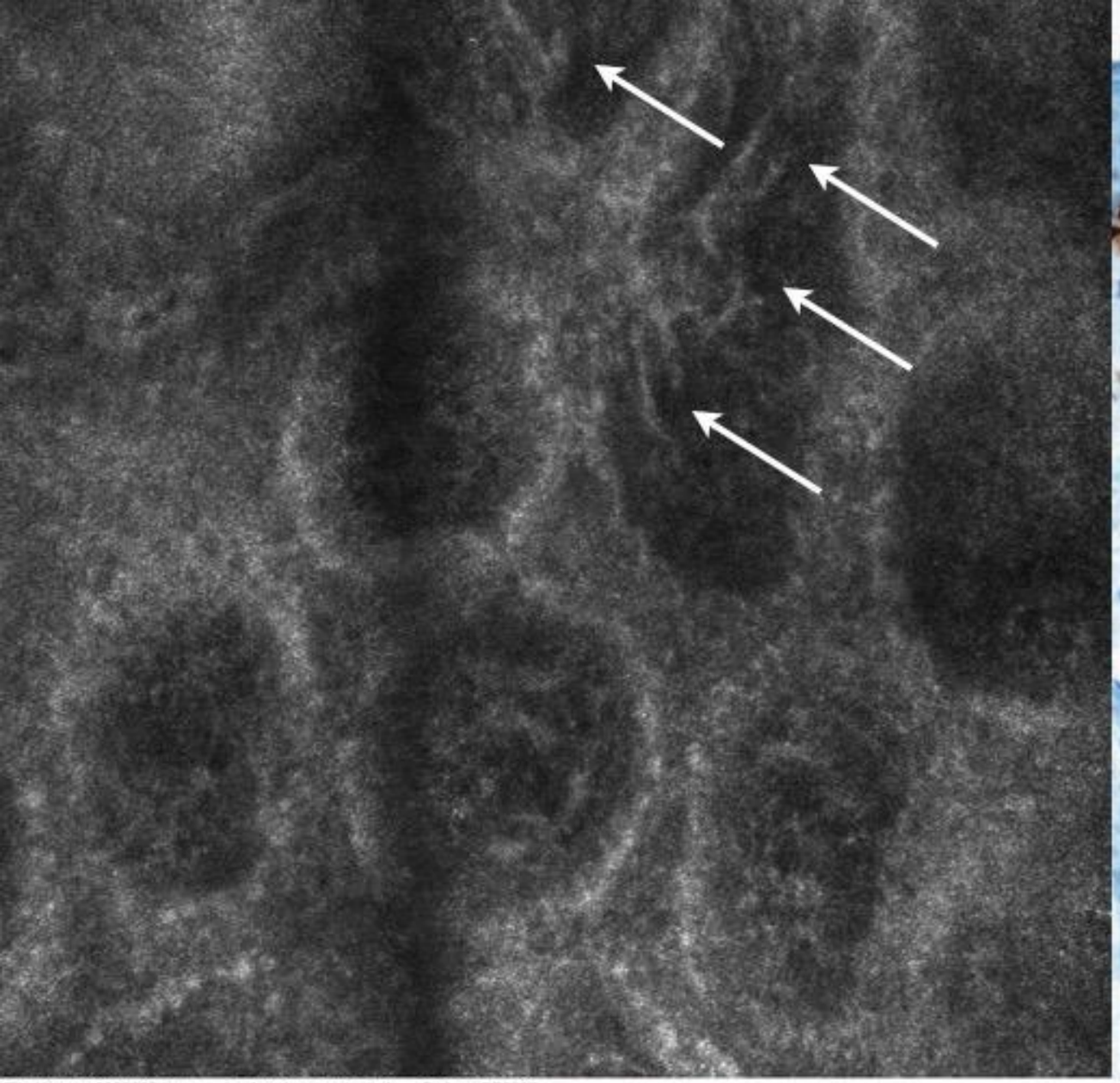
Milia-like cysts



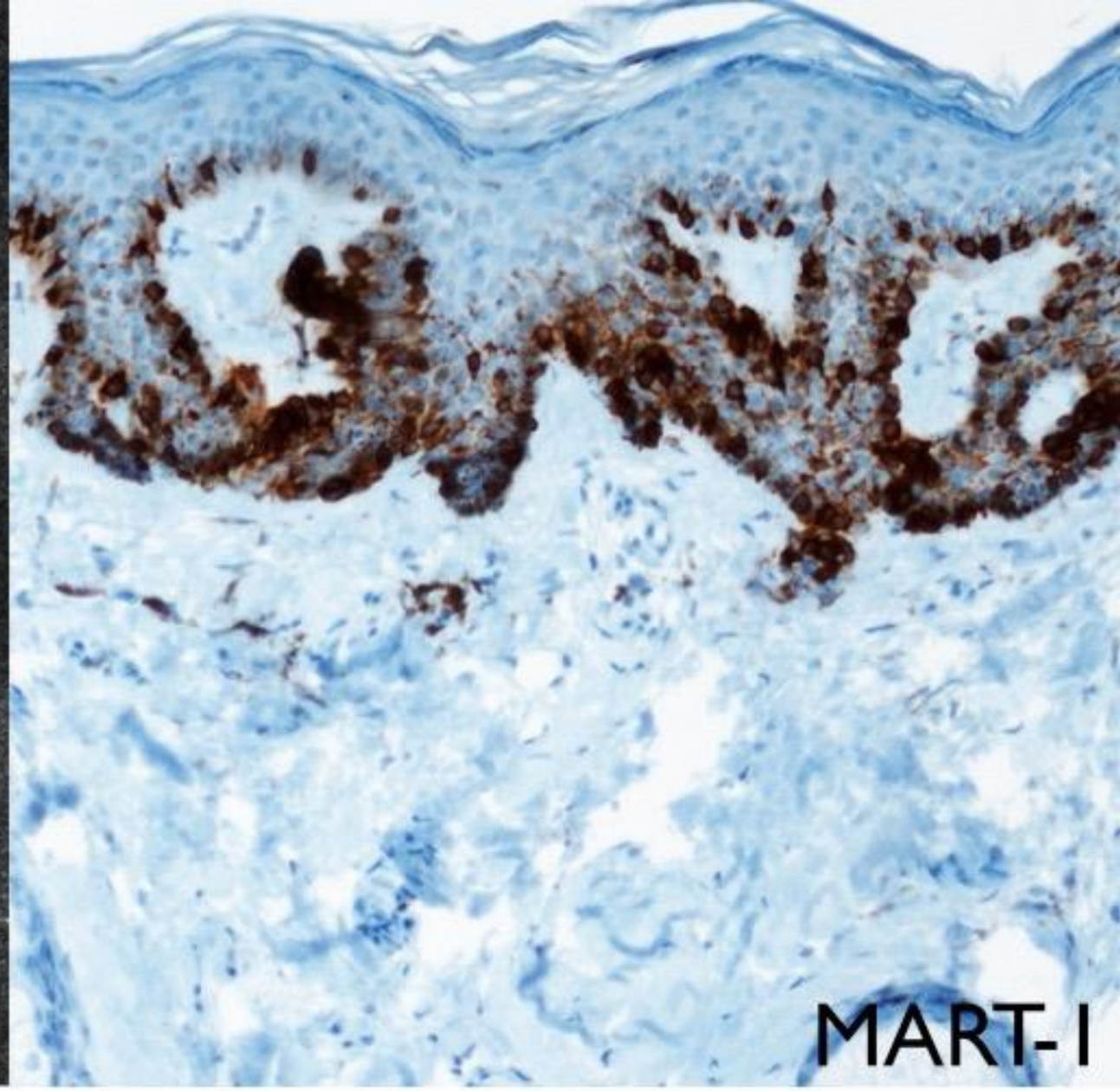
Enlarged Interpapillary Spaces

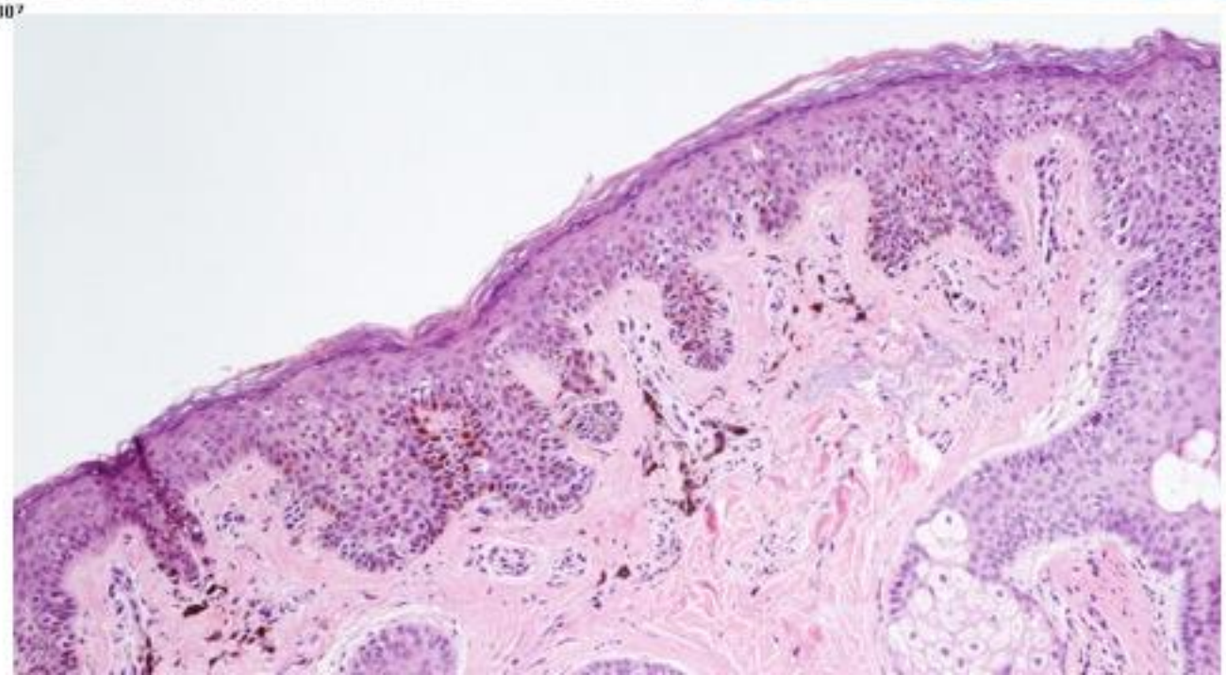
Confocal microscopy helps to increase diagnostic accuracy, reducing the number of not necessary excisions



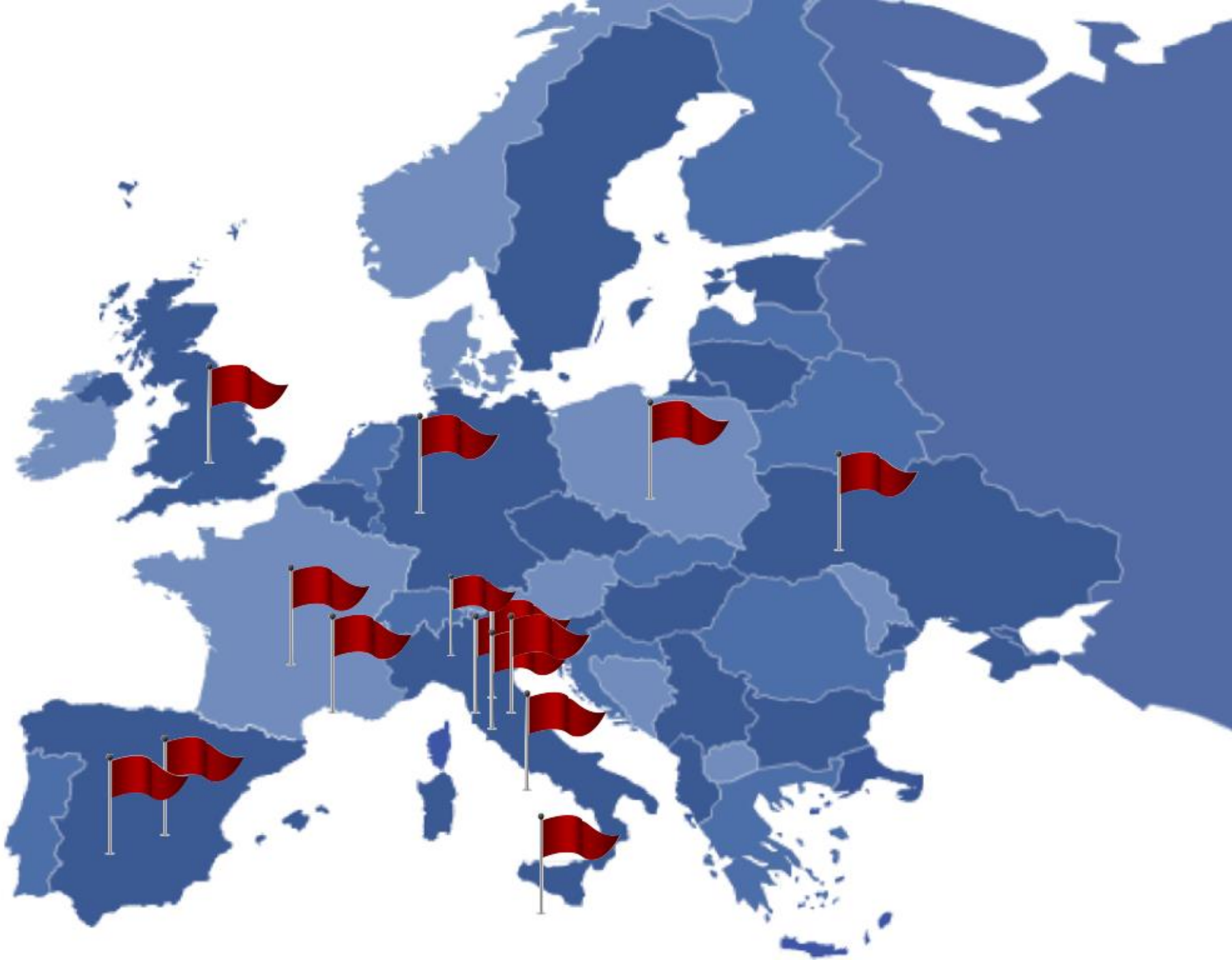


File Name: v0000065.bmp Lesion: fronte calzolari Patient: RE030?
x: -0.23 mm y: 0.23 mm z: 0.00 um Laser Power: 2.1 mW





Lentigo maligna



Summary of the studies on diagnostic accuracy for MELANOMA

First Author, year, journal	Country of the study	Study type	Number of lesions	Number of tumors (MM-NMSC)	Accuracy for MM	Note
Ferrari, 2014 JEADV	Italy	Retrospective	322	70 MMs	Se: 96% Sp: 70%	Dermoscopically equivocal 7-point score 0-5
Pupelli 2014 BJD	Italy	Retrospective	96	24 MMs	n.a.	Dermoscopically equivocal small lesions
Longo, 2013 BJD	Italy	Retrospective	140	32 MMs,34 NMSC	Se: 96% Sp: 94%	Dermoscopically equivocal nodular lesions
Guitera 2012 JID	Italy, Australia	Retrospective	710	216 MMs, 119 BCCs	Se: 89% Sp: 68%	Clinically/Dermoscopically equivocal
Guitera 2010 JID	Italy, Spain, Australia, USA	Retrospective	219	81 LMs	Se: 85% Sp: 76%	Clinically/Dermoscopically equivocal
Guitera 2009 JID	Italy, Australia	Retrospective	326	123 MMs	Se: 91% Sp: 68%	Dermoscopically equivocal comparison with dermoscopy
Segura 2009 JAAD	Spain	Retrospective	134	36 MMs, 27 BCCs	Se: 100% Sp: 57%	Dermoscopically equivocal
Pellacani, 2007 JID	Italy	Retrospective	351	136 MMs	Se: 92% Sp: 69%	Dermoscopically equivocal
Pellacani, 2005 JAAD	Italy	Retrospective	102	37 MMs	Se: 97% Sp: 72%	Dermoscopically equivocal
Time frame 9 years	**4 Countries**	**only 2 Prospective**	**3236**	**870 MMs**	**Se: 93% Sp: 73%**	**Dermoscopically equivocal and difficult lesions**

Summary of the studies on NNE for MELANOMA

(prospective interventional setting)

First Author, year, journal	Country of the study	Study type	Number of lesions	Number of tumors (MM-NMSC)	Accuracy for MM	Note
Pellacani, 2014 BJD	**Italy**	**Prospective**	493	23 MMs; 19 BCCs	**NNE 6.8**	Dermoscopically equivocal
Alarcon, 2014 BJD	**Spain**	**Prospective**	343	92 MMs	**NNE 2.9**	Dermoscopically positive

CLINICAL AND LABORATORY INVESTIGATIONS

BJD
British Journal of Dermatology

Impact of *in vivo* reflectance confocal microscopy on the number needed to treat melanoma in doubtful lesions

I. Alarcon,[1] C. Carrera,[1,2] J. Palou,[3] L. Alos,[3] J. Malvehy[1,2] and S. Puig[1,2,4]

2014

CLINICAL AND LABORATORY INVESTIGATIONS

BJD
British Journal of Dermatology

Reflectance confocal microscopy as a second-level examination in skin oncology improves diagnostic accuracy and saves unnecessary excisions: a longitudinal prospective study

G. Pellacani,[1] P. Pepe,[1] A. Casari[1] and C. Longo[2]

2014

Craig Hansen, et al, J Am Acad Dermatol. 2009

Argenziano G, Cerroni L, Zalaudek I, et al. Accuracy in melanoma detection: a 10-year multicenter survey. J Am Acad Dermatol. 2012

Salerni G, Terán T, Puig S, et al. Meta-analysis of digital dermoscopy follow-up of melanocytic skin lesions: a study on behalf of the International Dermoscopy Society. J Eur Acad Dermatol Venereol. 2013

NNE = 8-30

NNE = 8

very high expertise
high prevalence setting
stressed use of digital follow-up

NNE = 10-20

good expertise
skin cancer clinics
routine use of digital follow-up

NNE = 20-30

fair to good expertise
dermatology units
no/less use of digital follow-up

DERMOSCOPY

Quality clinical and dermoscopy images
including rage skin area to total body pictures

GOOD ACCURACY

Risk to delay a MM diagnosis by using DIGITAL FOLLOW-UP 1:20 Patients / 1:100 Lesions

Craig Hansen, et al, J Am Acad Dermatol. 2009

Argenziano G, Cerroni L, Zalaudek I, et al. Accuracy in melanoma detection: a 10-year multicenter survey. J Am Acad Dermatol. 2012

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DERMOSCOPY

Quality clinical and dermoscopy images
including rage skin area to total body pictures

GOOD ACCURACY

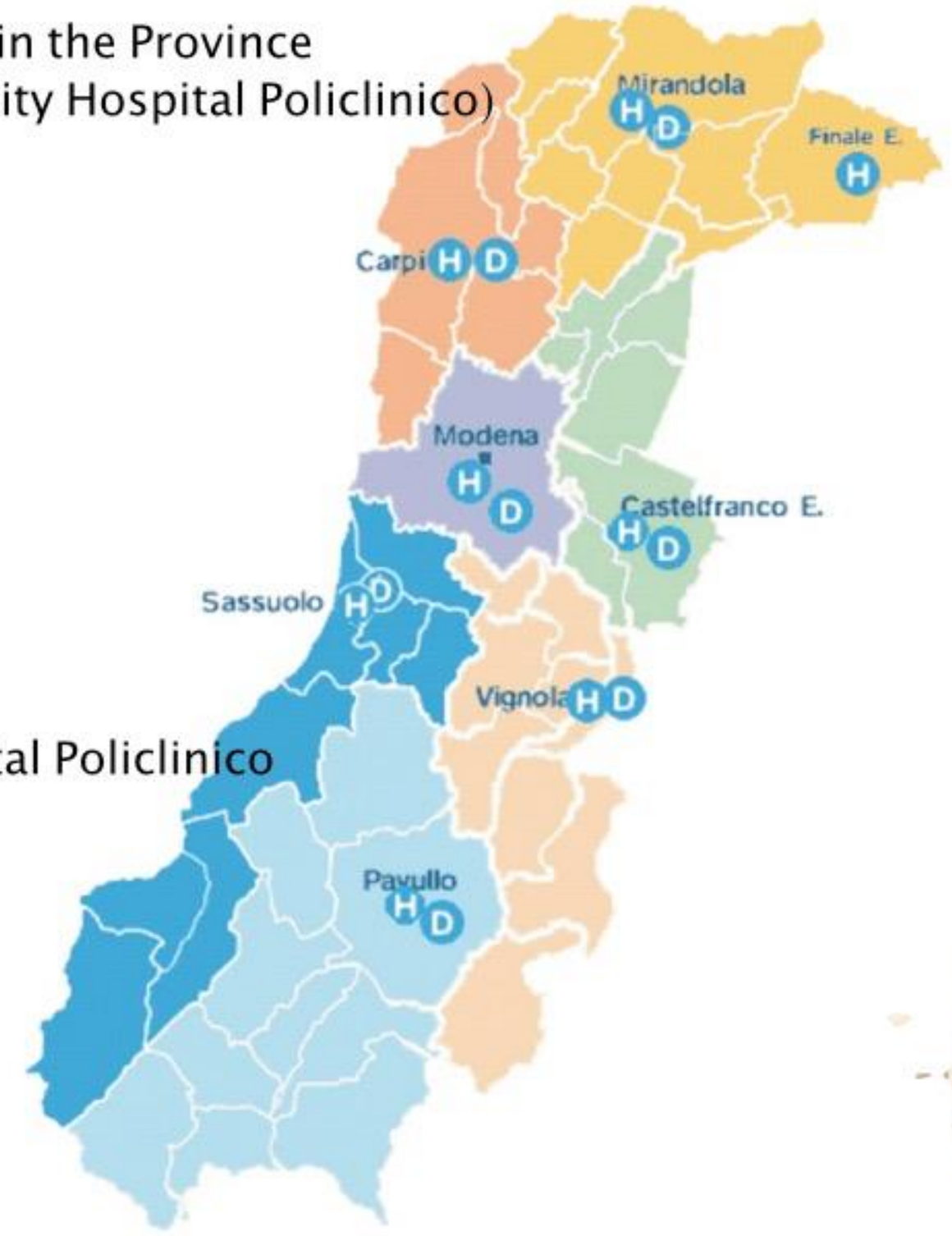
CONFOCAL MICROSCOPY

Quasi-histologic imaging
High-reliable patterns for benign lesions

HIGH CONFIDENCE

CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETTING JAN-JUN 2013 - Data from Pathology Registry

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)



University Hospital Policlinico

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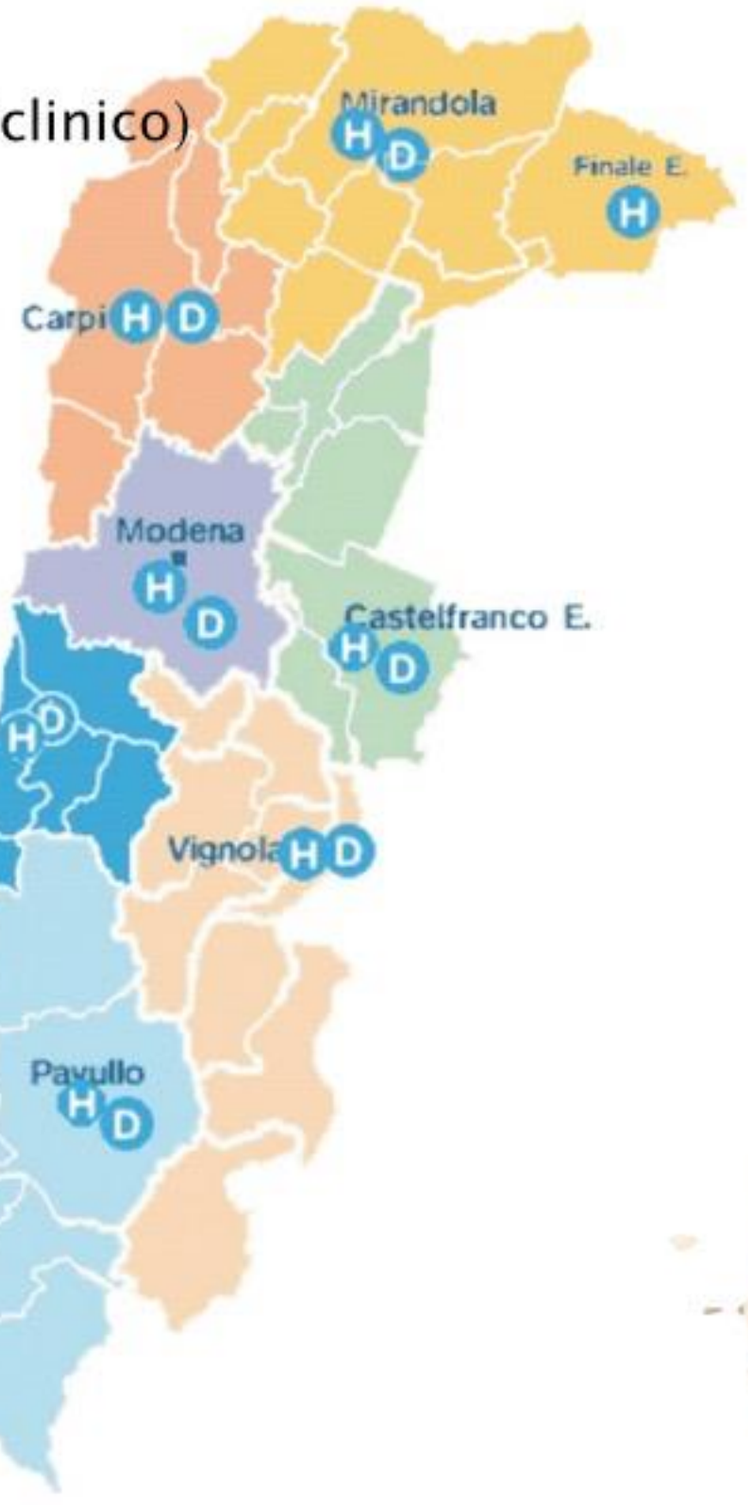

University Hospital Policlinico

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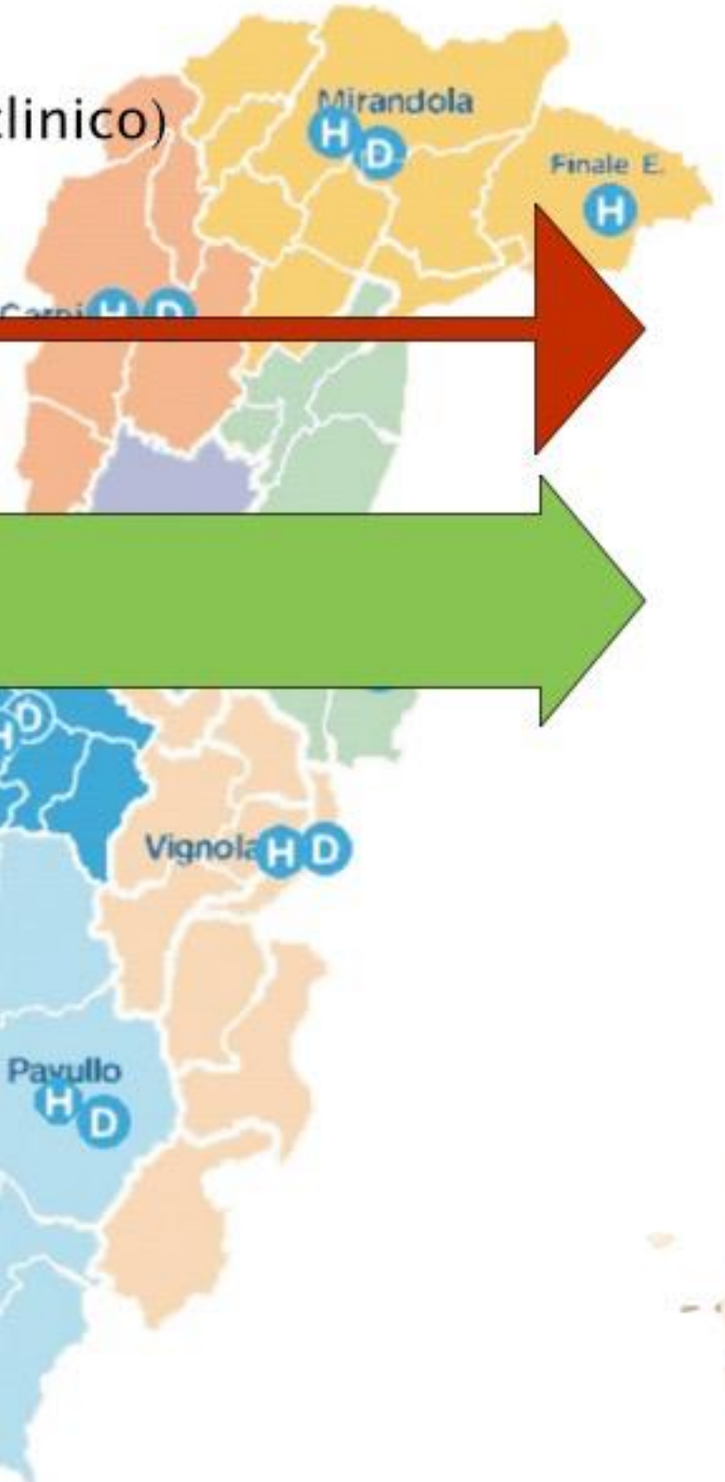


University Hospital Policlinico

CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETTING

JAN-JUN 2013 - Data from Pathology Registry

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)

University Hospital Policlinico

1 64 MM

–

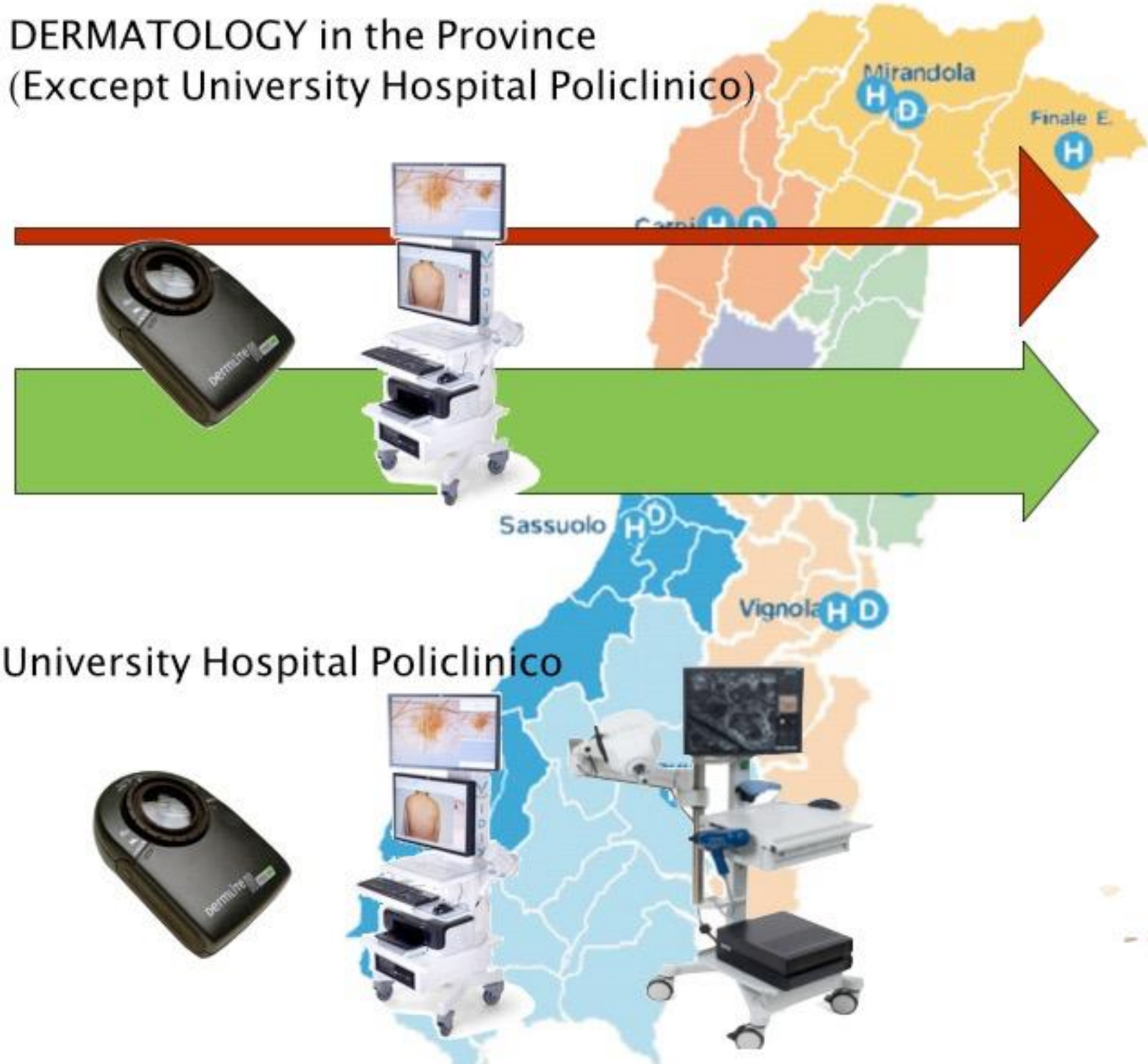
1242 benign

19.4 (+620 NMSC)

CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETTING

JAN-JUN 2013 - Data from Pathology Registry

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)



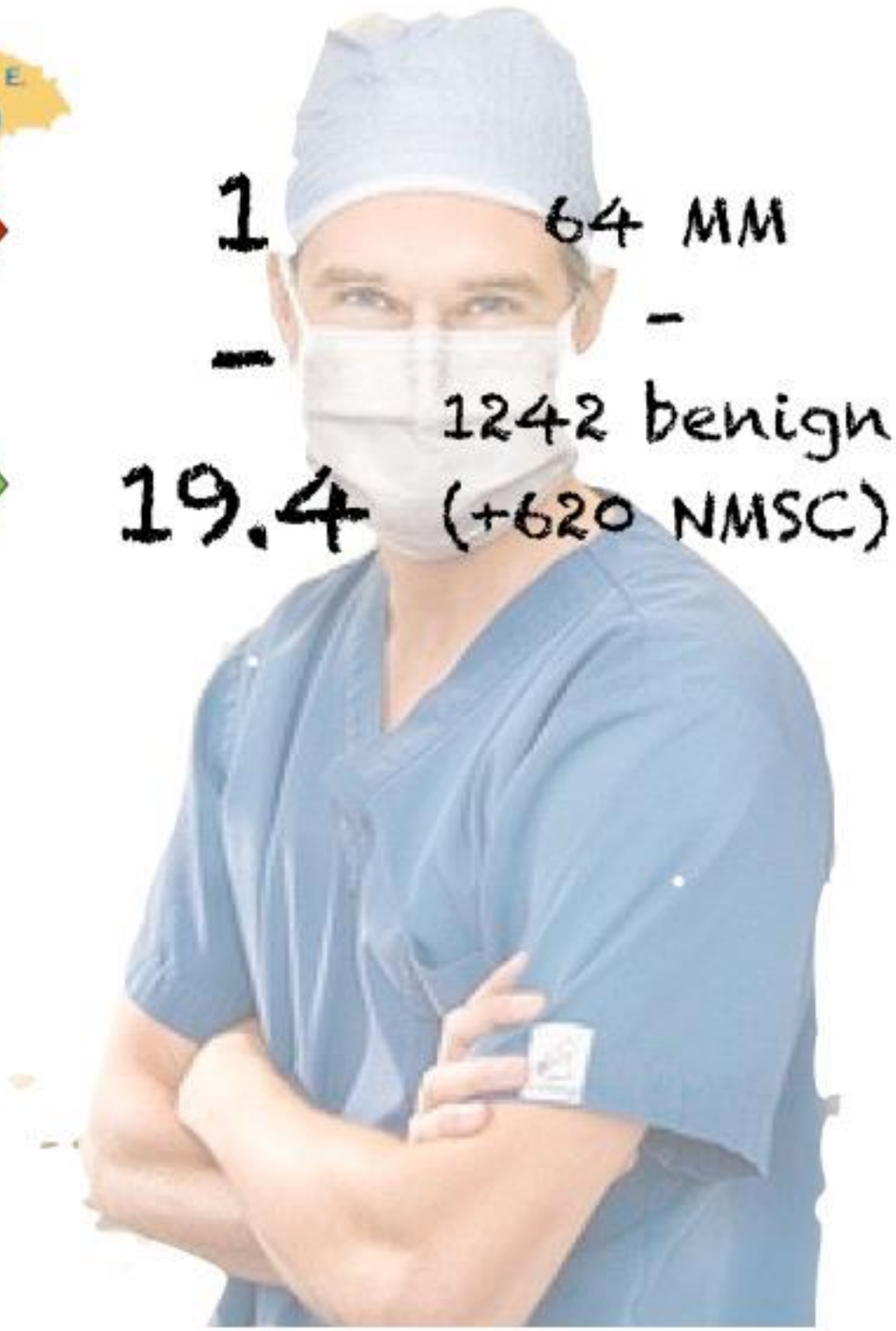
University Hospital Policlinico

1 64 MM

-

1242 benign

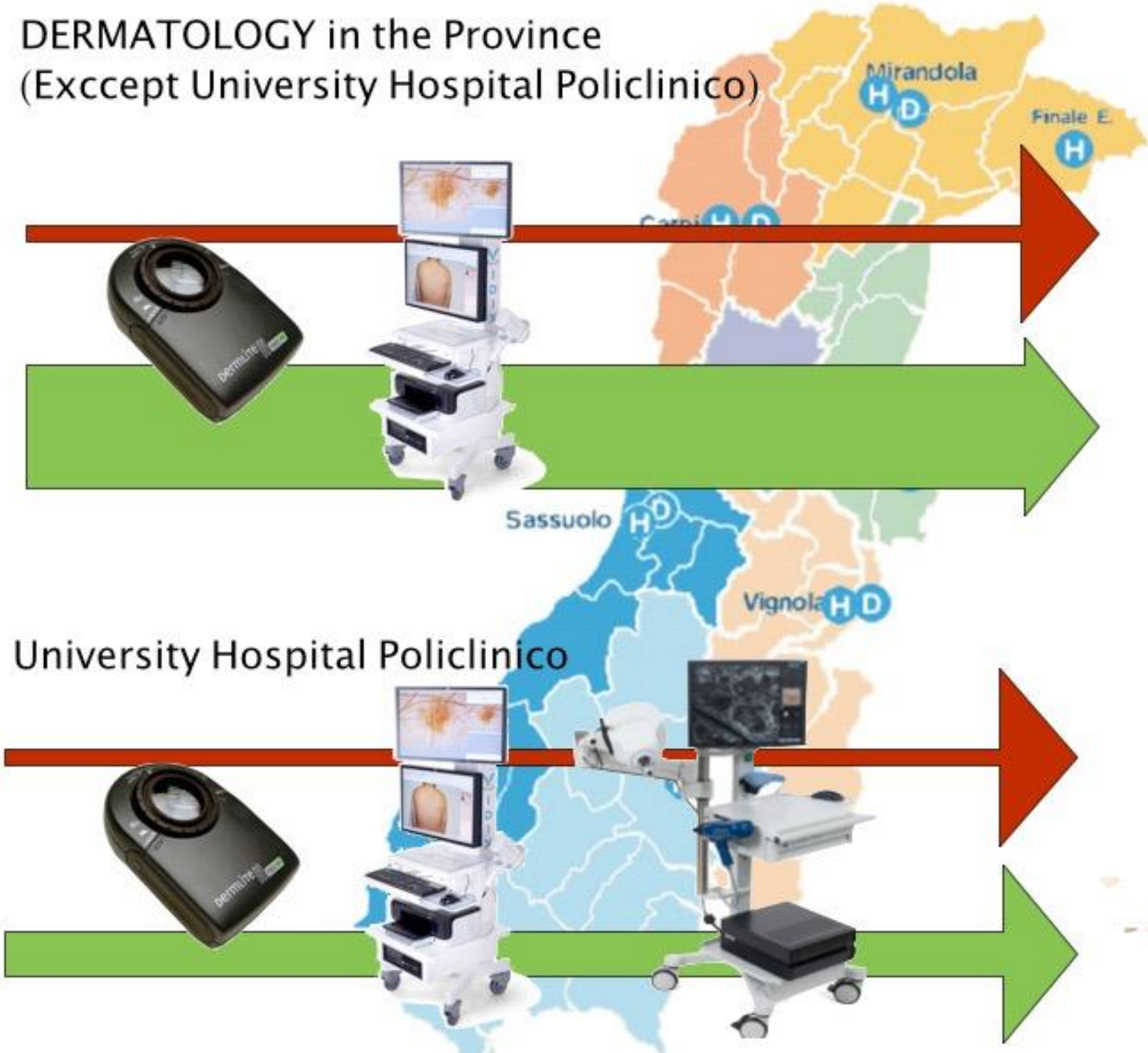
19.4 (+620 NMSC)



CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETTING

JAN-JUN 2013 - Data from Pathology Registry

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)



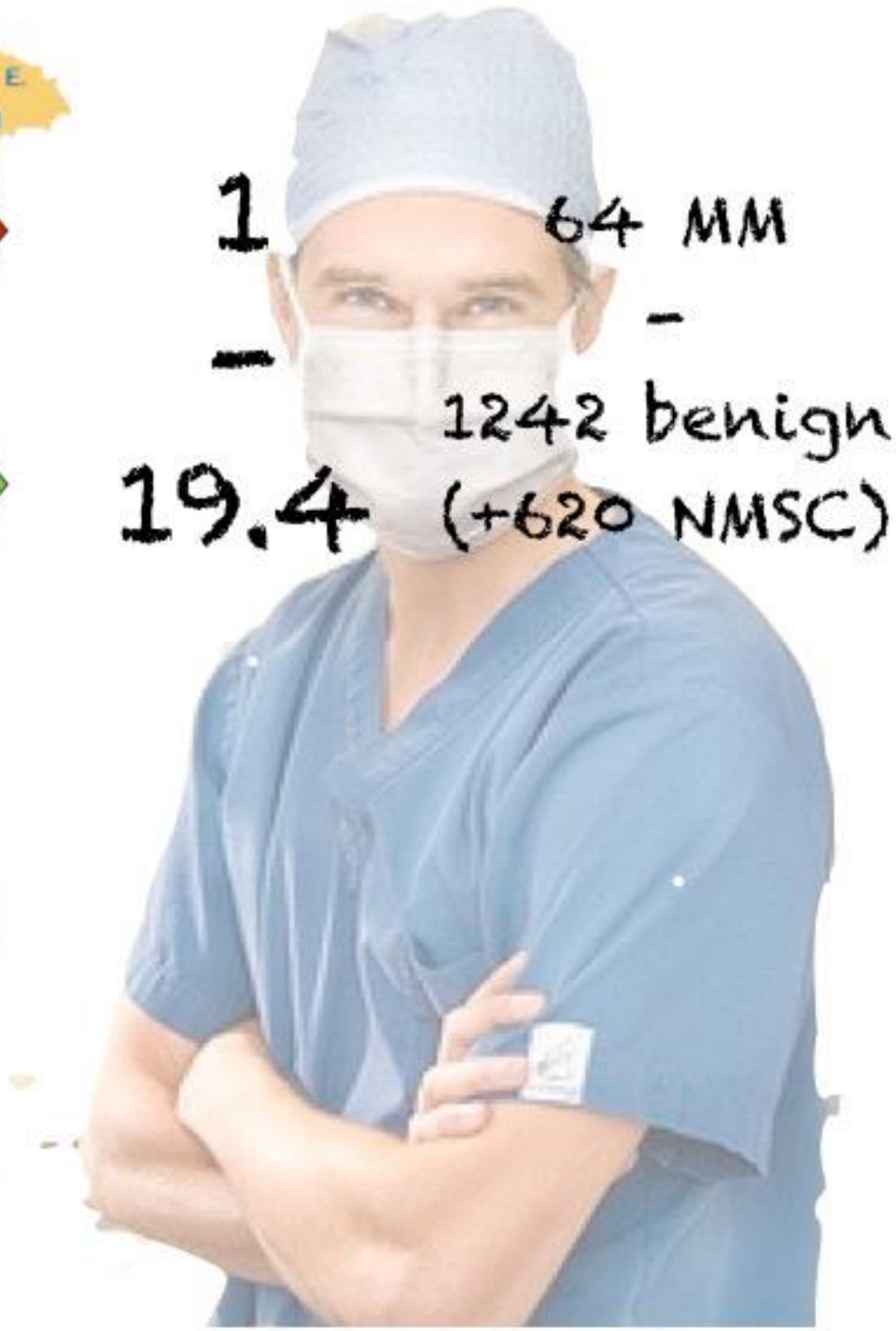
University Hospital Policlinico

1 64 MM

-

1242 benign

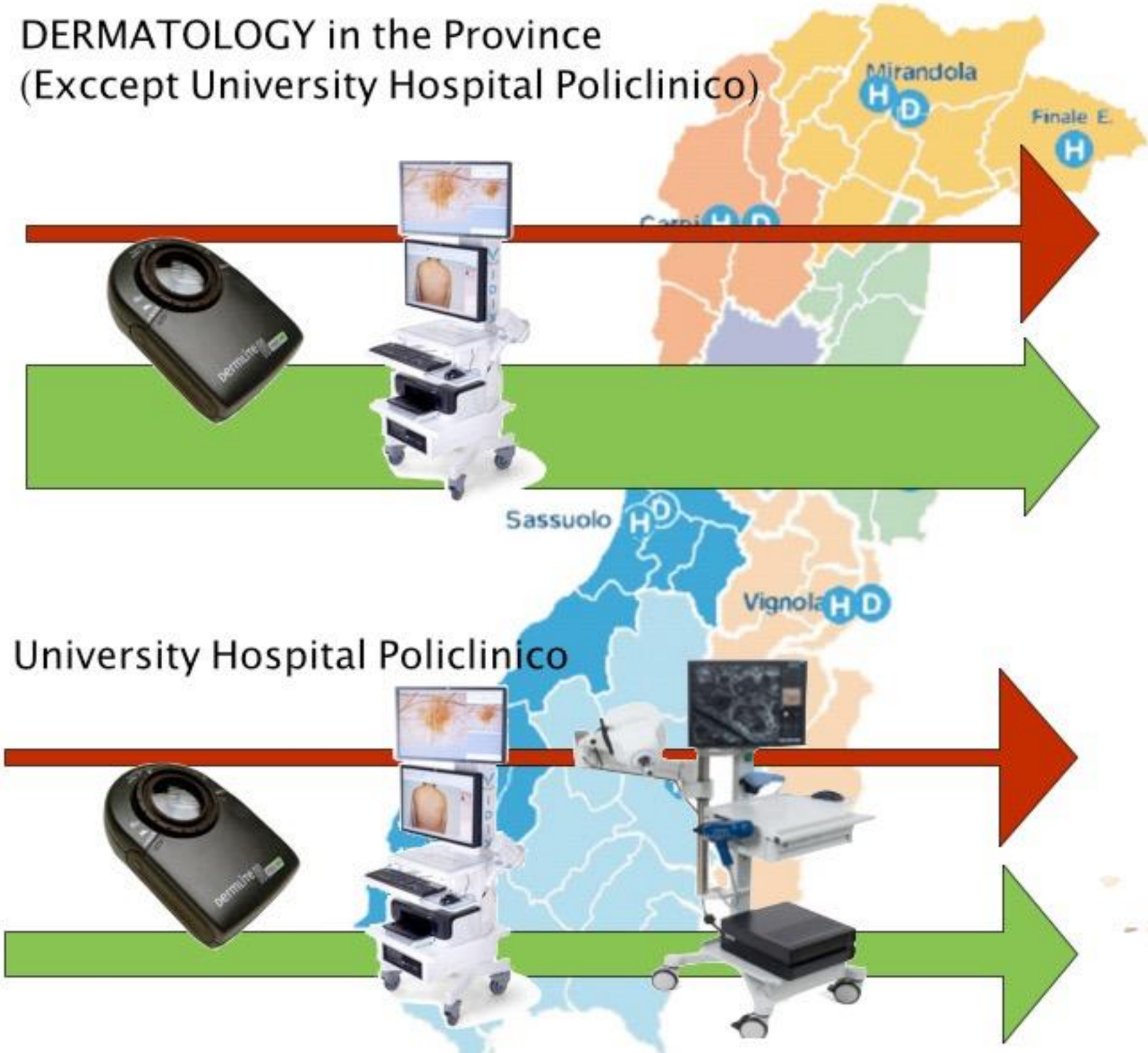
19.4 (+620 NMSC)



CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETTING

JAN-JUN 2013 - Data from Pathology Registry

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)



1 – 64 MM

19.4 – 1242 benign (+620 NMSC)

University Hospital Policlinico

1 – 52 MM

6.2 – 327 benign (+546 NMSC)

CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETTING JAN-JUN 2013 - Data from Pathology Registry

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)

1	64 MM	
–	–	
19.2	1242 benign (+620 NMSC)	

University Hospital Policlinico

1	52 MM	
–	–	
6.4	327 benign (+546 NMSC)	

CONFOCAL MICROSCOPY EFFECTIVENESS IN A REAL SETT
JAN-JUN 2013 - Data from Pc

DERMATOLOGY in the Province
(Exccept University Hospital Policlinico)

1 — 19.2

64 MM
-
1242 benign
(+620 NMSC)

University Hospital Policlinico

1 — 6.4

52 MM
-
327 benign
(+546 NMSC)

POPOLAZIONE 770.000 abitanti

Riduzione di 3.600 ESCISSIONI x anno

300€ ca. x escissione

Risparmio 1.000.000€

FUTURE CHALLENGE: INTEGRATION OF DERMOSCOPY AND RCM FOR EARLY/SMALL SKIN CANCER DIAGNOSIS

HIGH SENSITIVITY (NOT MISS MELANOMA)
ESPECIALLY "THICK/NODULAR" ONES

↓

SCREENING OF A LARGE NUMBER OF PATIENTS
RULE OUT POSSIBLE "KILLERS"
IDENTIFY AT RISK POPULATION

BENEFICIAL POPULATION

MASS (CHEAP AND FAST) APPROACH

SCREENING INFORMATION CAMPAIN
TRIAGE DECISION

FUTURE CHALLENGE: INTEGRATION OF DERMOSCOPY AND RCM FOR EARLY/SMALL SKIN CANCER DIAGNOSIS

HIGH SENSITIVITY (NOT MISS MELANOMA)
ESPECIALLY "THICK/NODULAR" ONES

↓

SCREENING OF A LARGE NUMBER OF PATIENTS
RULE OUT POSSIBLE "KILLERS"
IDENTIFY AT RISK POPULATION

SECONDARY PREVENTION
EARLY DIAGNOSIS OF MM (INCREASE IN SENSITIVITY)

↓

MONITORING SELECTED HIGH RISK PATIENTS

BENEFICIAL POPULATION

MASS (CHEAP AND FAST) APPROACH

SCREENING INFORMATION CAMPAIN
TRIAGE DECISION

MD SPECIALISTS AND TOOLS FOR SELECTED PATIENTS

FUTURE CHALLENGE: INTEGRATION OF DERMOSCOPY AND RCM FOR EARLY/SMALL SKIN CANCER DIAGNOSIS

HIGH SENSITIVITY (NOT MISS MELANOMA)
ESPECIALLY "THICK/NODULAR" ONES

↓

SCREENING OF A LARGE NUMBER OF PATIENTS
RULE OUT POSSIBLE "KILLERS"
IDENTIFY AT RISK POPULATION

SECONDARY PREVENTION
EARLY DIAGNOSIS OF MM (INCREASE IN SENSITIVITY)

↓

MONITORING SELECTED HIGH RISK PATIENTS

REDUCTION OF COSTS FOR NOT NECESSARY EXCISIONS (INCREASE IN SPECIFICITY)

↓

DIGITAL FOLLOW-UP AND CONFOCAL MICROSCOPY IN SPECIALIZED CENTERS

BENEFICIAL POPULATION

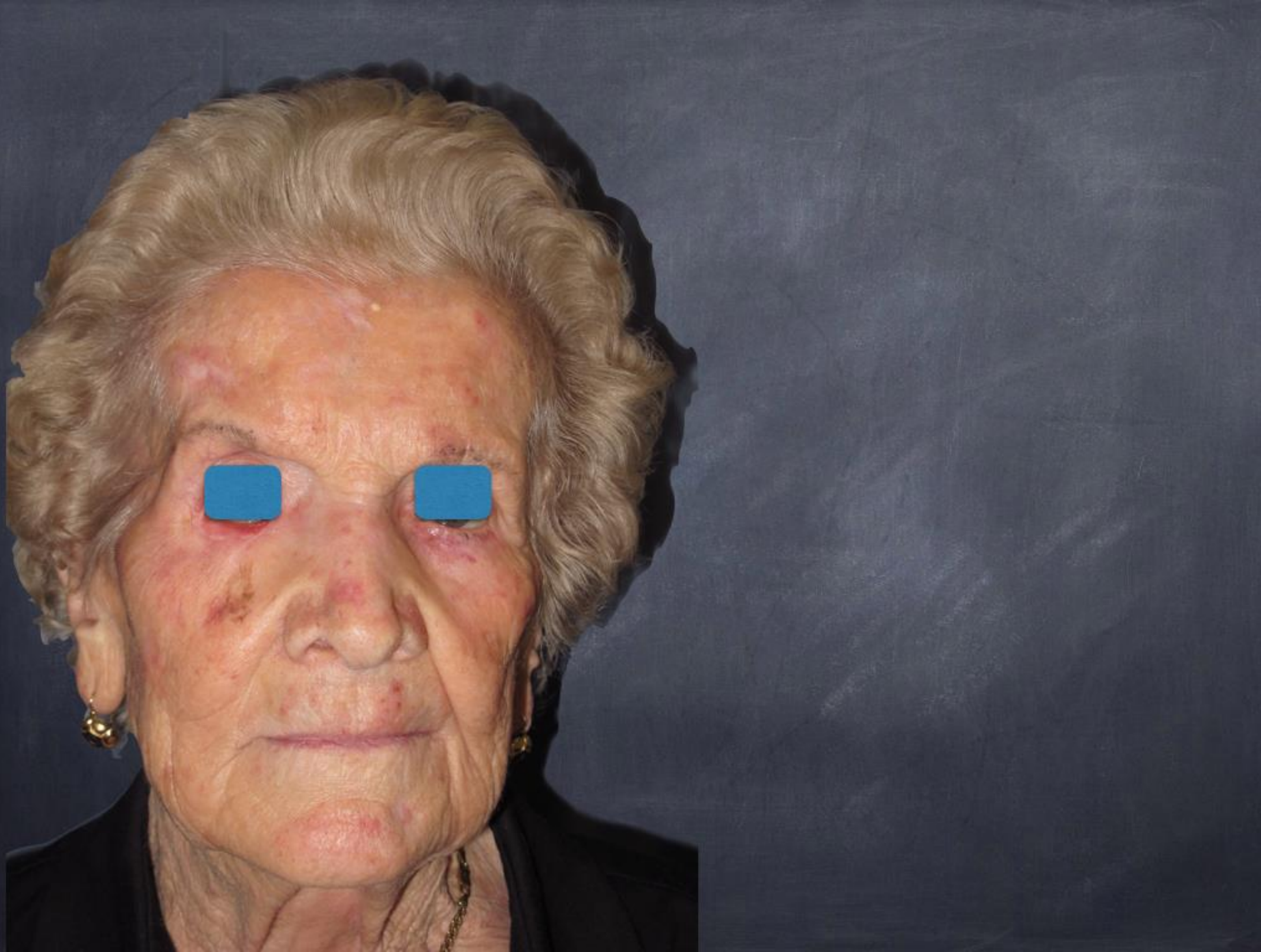
MASS (CHEAP AND FAST) APPROACH

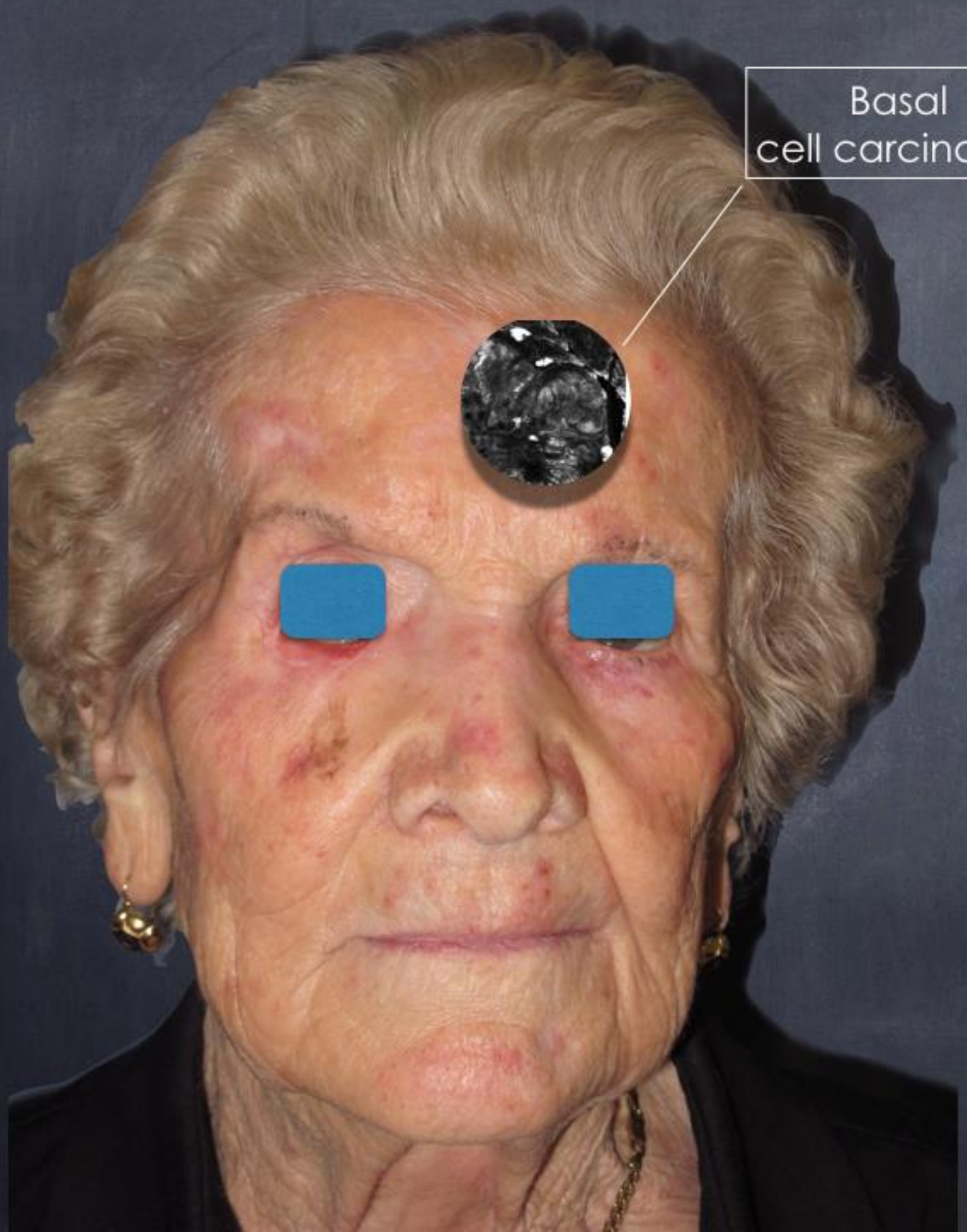
SCREENING INFORMATION CAMPAIN
TRIAGE DECISION

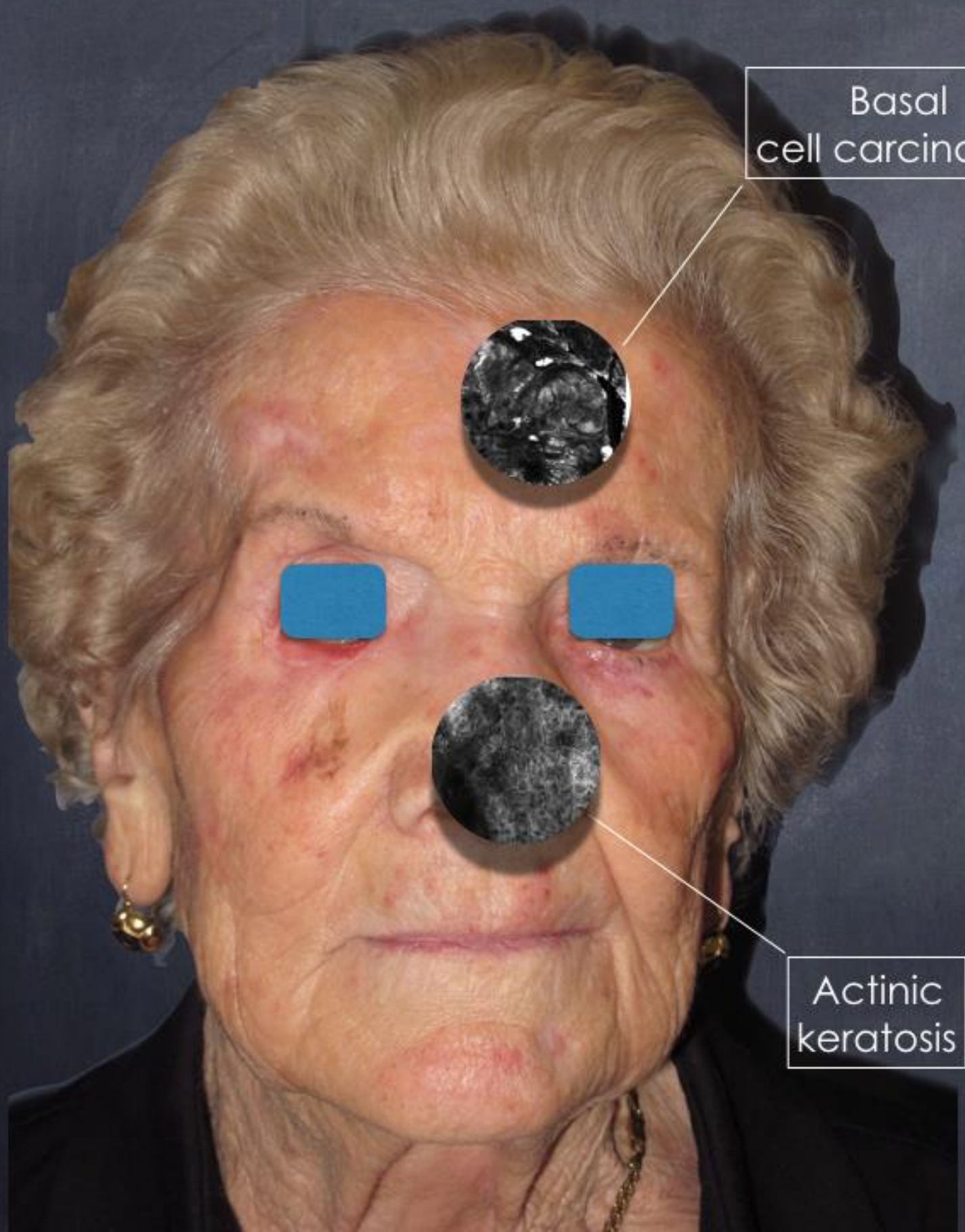
MD SPECIALISTS AND TOOLS FOR SELECTED PATIENTS

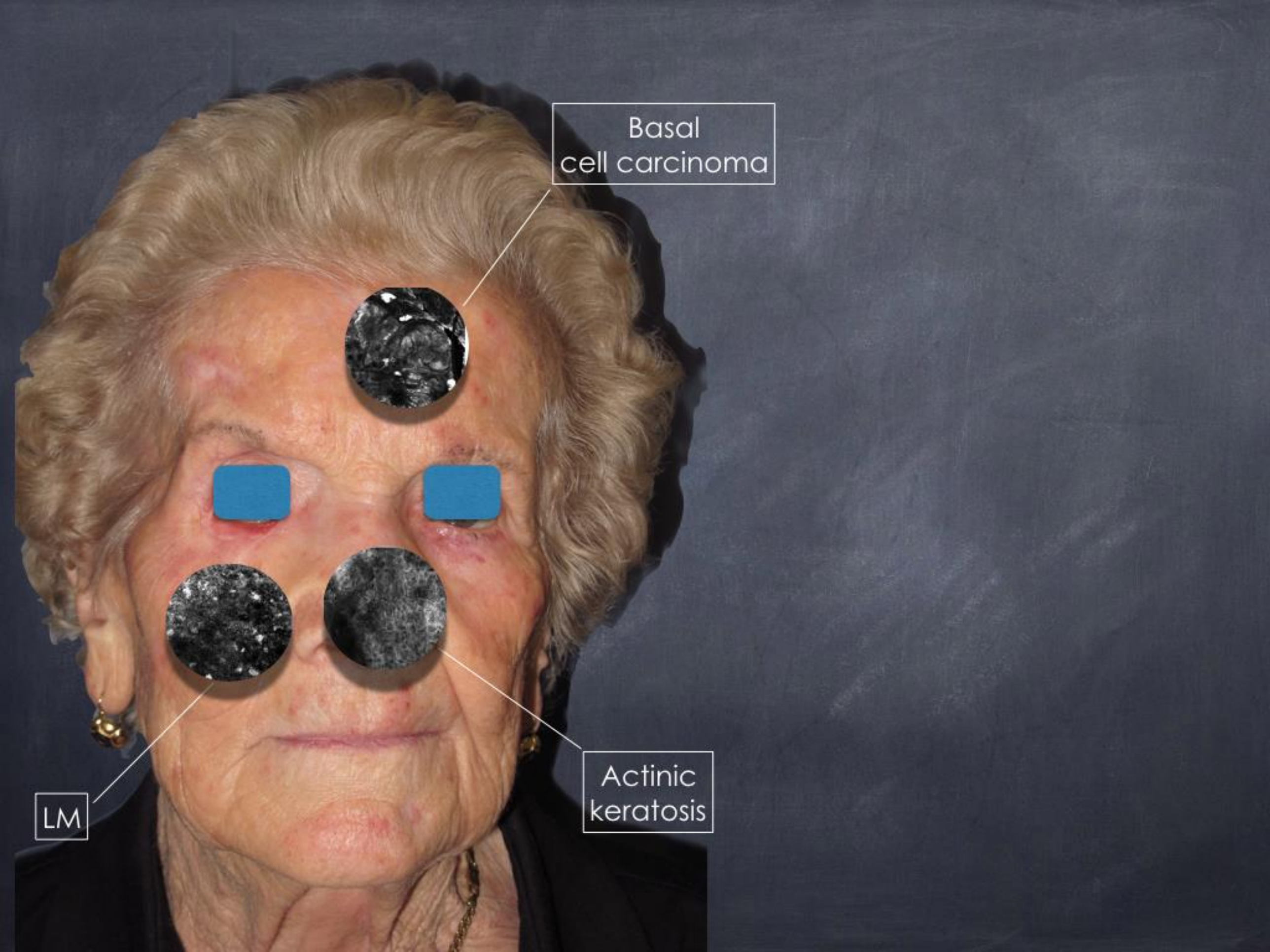
HIGHLY SPECIALIZED CENTERS AND MDs

TOOLS FOR SELECTED PATIENTS AND LESIONS




Basal
cell carcinoma


Basal
cell carcinoma
Actinic
keratosis


Basal
cell carcinoma
LM
Actinic
keratosis

Basal cell carcinoma

Actinic keratosis

LM

Confocal microscopy greatly enhances our diagnostic accuracy in REAL clinical setting