

Confocal Microscopy of Non-melanocytic Skin Lesions

Squamous cell, basal cell carcinoma, other common neoplasms

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- All lines are muted during the presentation
- Please ask your questions when you think of them via the "Question box" in your control panel



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Consultant for CALIBER ID (maker of Vivascope)



Reflectance Confocal Microscopy



 Non invasive, harmless and quick way of diagnosing skin lesions using a laser (830nm) based scope
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Clinical Confocal Microscope



Commercially available RCM Systems:

- FDA 510(k) Cleared
- Class I Laser Device
- No goggles required
- Class II medical device
- No adverse events reported in over 500 clinical studies

CM is a real-time, non-invasive and painless approach to tissue diagnosis

Confocal

image stack





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DERMOSCOPY 3 CONFOCAL







RCM and Non-melanocytic Skin Lesions

- Seborrheic Keratosis
- Actinic Keratosis
- Squamous Cell Carcinoma
- Basal Cell Carcinoma
- Other tumors



Confocal Patterns and Cytology



Keratinocytic Atypia



Yellow circle= atypical honeycomb White arrow= atypical keratonicytes



Keratinocytic Atypia (Close up)









IRREGULAR HONEYCOMBED PATTERN

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Reference: Hofmann-Wellenhof R, Pellacani G, Malvehy J, Soyer HP, eds. *Reflectance confocal microscopy for skin diseases*. New York, NY: Springer Berlin Heidelberg, 2012.





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RCM Features of Seborrheic Keratosis



Increased Interpapillary spaces





•Keratin-filled surface invaginations •Horn cysts







White arrow: Horn cyst



RCM Features of Actinic Keratosis

• Disarray of keratinocytes in the epidermis

Focal Cytological atypia





White arrow: Focal Keratinocytic atypia





Dilated small blood vessels and chronic inflammation
Extensive solar elastosis





Reference: Hofmann-Wellenhof R, Pellacani G, Malvehy J, Soyer HP, eds. *Reflectance confocal microscopy for skin diseases*. New York, NY: Springer Berlin Heidelberg, 2012.

RCM squamous cell carcinoma

• Epidermis

- Stratum corneum- hyperkeratosis and parakeratosis
- Stratum granulosum and spinosum-atypical honeycomb pattern or disarranged pattern with uneven dyspalstic, detached keratinocytes and irregular cell outlines
- Round nucleated cells infiltrating the dermis





Parakeratotic Hyperkeratosis,
Full thickness keratinocyte atypia and nuclear pleomorphism



Individual corneocyte formation, disruption of the stratum corneum and parakeratosis



Reference: Hofmann-Wellenhof R, Pellacani G, Malvehy J, Soyer HP, eds. *Reflectance confocal microscopy for skin diseases*. New York, NY: Springer Berlin Heidelberg, 2012.



White arrow: Atypical Nucleated Keratinocytes







Pleomorphic cells with large nuclei and bright rim of cytoplasm





Orange asterik and circle: Atypical Honeycomb pattern © 2017 College of America Black Agricowa: Pleomorphic keratinocytes



Aggregates of enlarged atypical keratinocytes with marked nuclear pleomorphism





Reference: Hofmann-Wellenhof R, Pellacani G, Malvehy J, Soyer HP, eds. *Reflectance confocal microscopy for skin diseases*. New York, NY: Springer Berlin Heidelberg, 2012.



•Severe solar elastosis









Clinical Case Example of SCC











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RCM Features of Basal Cell Carcinoma

- Tumor islands with peripheral palisading
- Streaming
- Telangiectasia
- Black silhouette



Polarization of nuclei along the

same axis



20 µm

González S, Tannous Z. J Am Acad Dermatol 2002;47:869-874



<u>Architectural Pleomorphism.</u> <u>Keratinocyte dissarray</u>





Dark Silhouettes

Harold Rabinovitz group













 Dermal islands of atypical basaloid cells
 Focal peripheral palisading of nuclei surrounded by © 2017 College of American Pathologists. All rights reserved.







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Other tumors



DERMATOFIBROMA

KEY RCM FEATURES

- •Bright papillary rings at the DEJ.
- Increased density of papillary rings at the DEJ.
- •High refractile collagen bundles in the dermis.
- •Papillary rings pulled down by the sclerotic collagen bundles.



Dermatofibroma





TRICHOEPITHELIOMA

KEY RCM FEATURES

Dermal basaloid tumor cell islands tightly wrapped in stroma
Brightly refractile stroma arranged in parallel bundles
Horn cysts within tumor islands







SEBACEOUS HYPERPLASIA KEY RCM FEATURES Dilated central follicular infundibulum Enlarged morula-like clusters of round cells with bright speckled cytoplasms (sebaceous lobules) Crown vessels



Crown vessel adjacent to a dilated sebaceous duct



Morula-like lobules of round cells corresponding to hyperplastic sebaceous lobules

Clinical Case- BCC



Clinical Information

- 85 Year-old Female
- Site of lesion: Right posterior neck
- Size: 5mm
- Description: A papule with irregular pigmentation and







• Image 1: RCM mosaic shows irregular honeycomb pattern at the level of epidermis (red circle).





 Image 2: RCM mosaic (depth: 170 µm) showing thick tortuous blood vessels (yellow arrow) around tumor area (red square).





 Image 3: RCM mosaic (depth: 180µm) shows tumor lobules (red square) with peripheral palisading (blue arrows) and focal streaming (yellow asterisk).



Upcoming Webinars

DATE	TOPIC	SPEAKER(s)
10/3	Light-sheet microscopy for 3D pathology	Nicholas P. Reder, MD, MPH Lawrence D. True, MD
11/7	Rapid examination of fresh tissue using light-sheet microscopy	Nicholas P. Reder, MD, MPH

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The CAP In Vivo Microscopy Resource Guide – see handout

- The IVM resource guide highlights current IVM articles and other resources that assist in understanding and potentially adopting IVM and EVM
 - Printed guides are available for members (\$39) and non-members (\$69)
 - The digital copies of all four Resource Guides are a complimentary member benefit
 - Access them <u>www.cap.org</u> > Resources and Publications









IVM Short Presentations on Emerging Concepts (SPECs) – see handout

- IVM SPECs are:
 - Short PowerPoints, created for pathologists
 - Useful for educating pathologists
 colleagues about IVM and GI specialist on
 the role and value of pathologists in IVM

• IVM SPEC Topics:

- In Vivo Microscopy (IVM): A New Role for Pathologists
- IVM of the GI Tract
- Ex Vivo Microscopy (EVM): A New Tool for Pathologists (NEW)



Access them <u>www.cap.org</u> > Resources



CAP17 The Pathologists' Meeting – IVM Highlights

- Visit the IVM Table at the Fellowship Fair to find out about IVM and EVM fellowships that you can participate in
- Learn about CAP's in vivo microscopy resources and talk with fellow members who are pioneering these technologies at the CAP's IVM Resources Booth in the Exhibit Hall
- Sign up for the complimentary breakfast workshop Justifying the Introduction of Emerging Technologies into a Pathology Department: How to Develop a Business Plan



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