Histopathology of Nail Disease

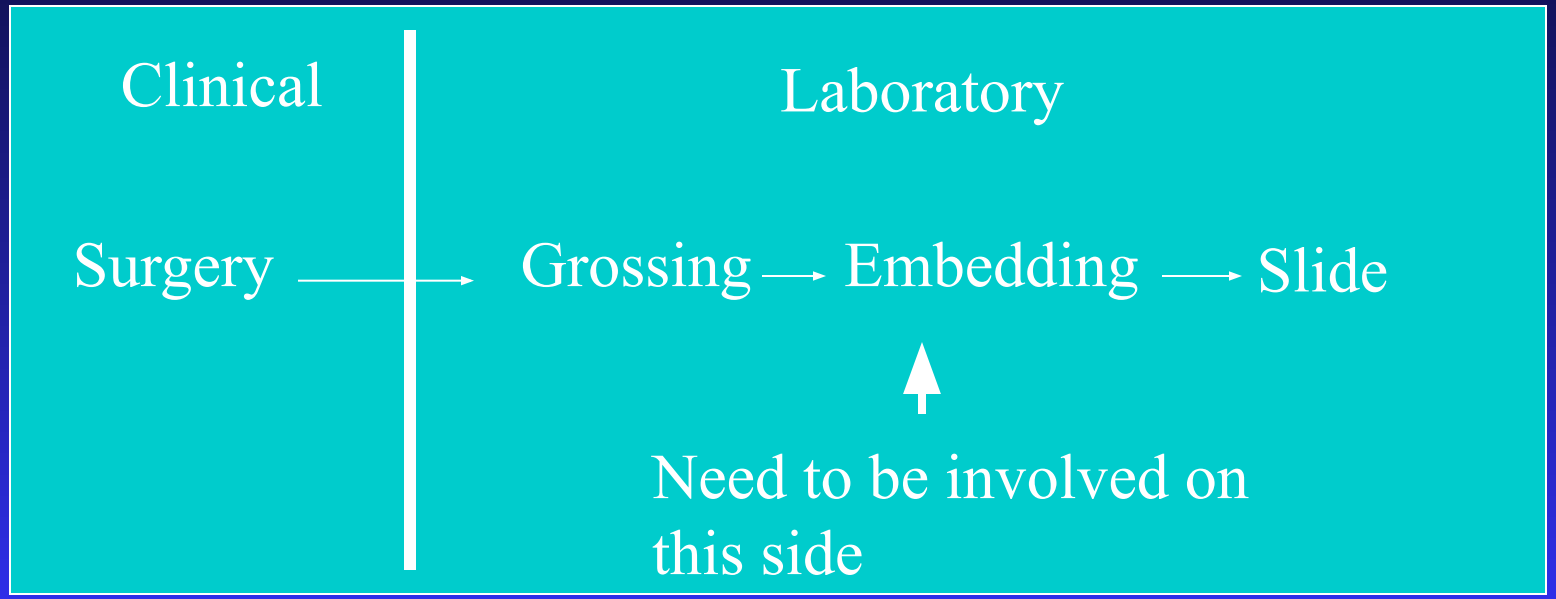
Curtis T. Thompson, M.D.
CTA Lab
and
Clinical (Affiliate) Professor of Dermatology and Pathology
Oregon Health and Sciences University
Portland, Oregon, USA

Objectives

- Tissue submission/processing
- Most common nail lesions
- Fungal identification including mold

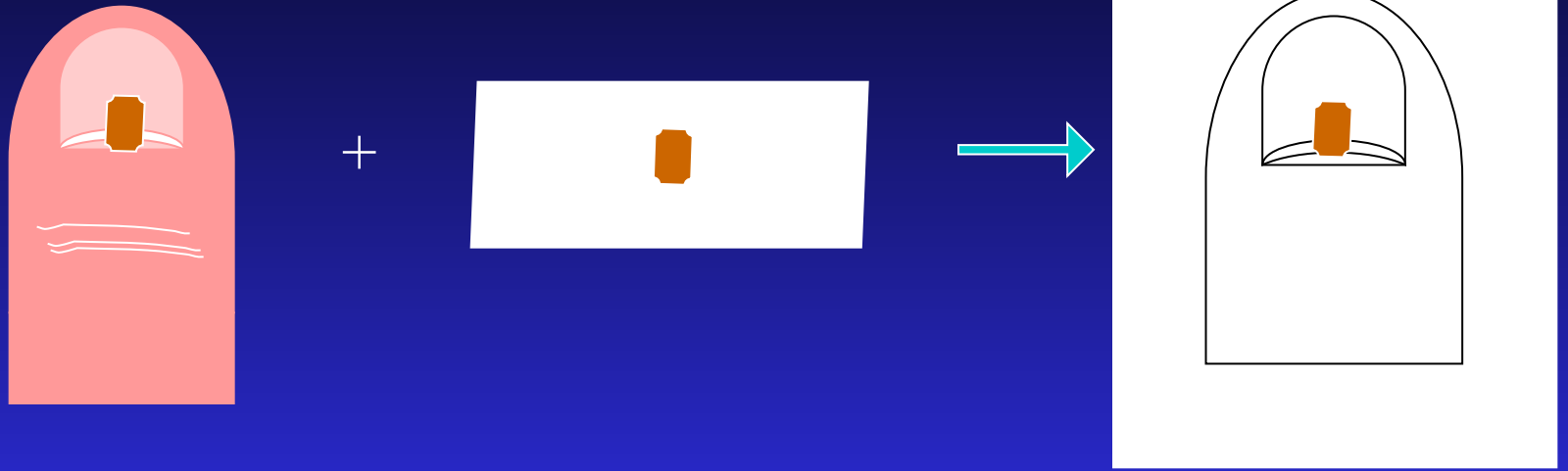
What can the nail surgeon do to submit a bed/matrix specimen for appropriate interpretation?

Need to be involved in lab prep



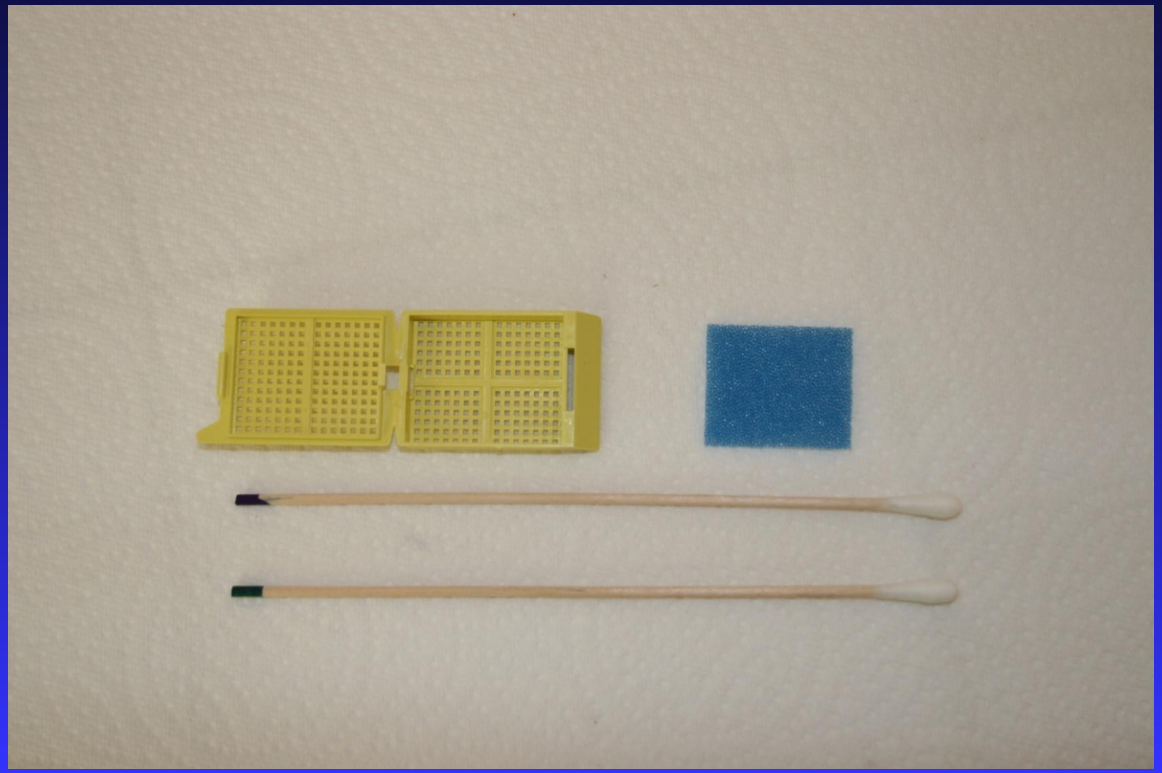
Need concise and clear guidelines for specimen submission:

- Orientation of tissue
- Clear information to histotechnicians
- Reproducible among different laboratories



Print template at www.cta-lab.com

Histology Materials



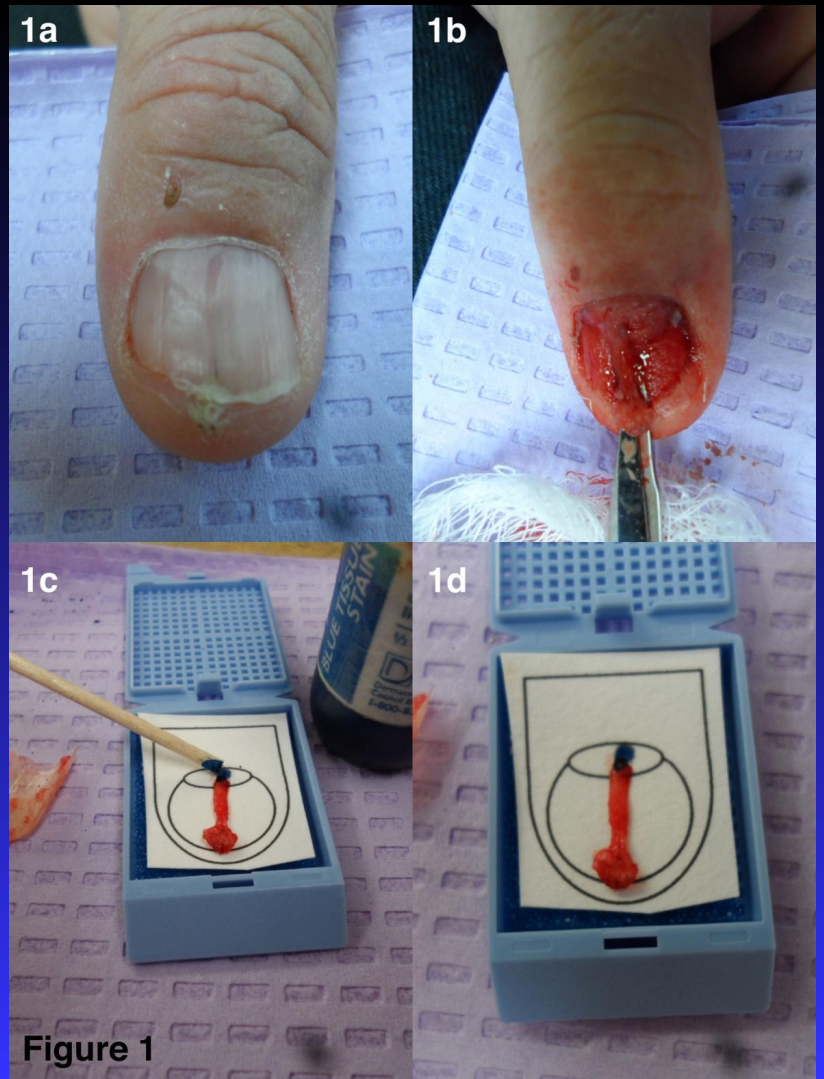


Figure 1

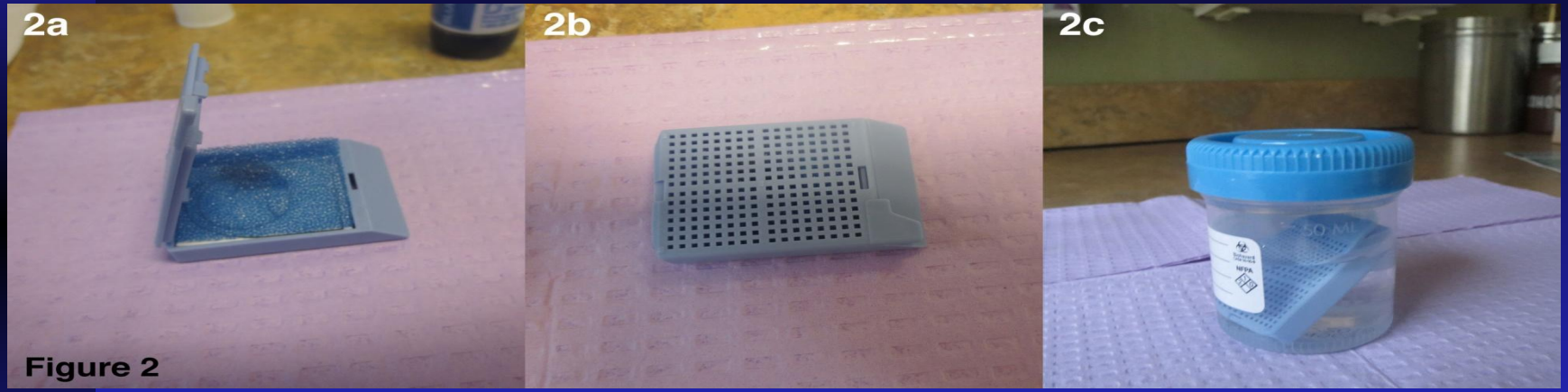
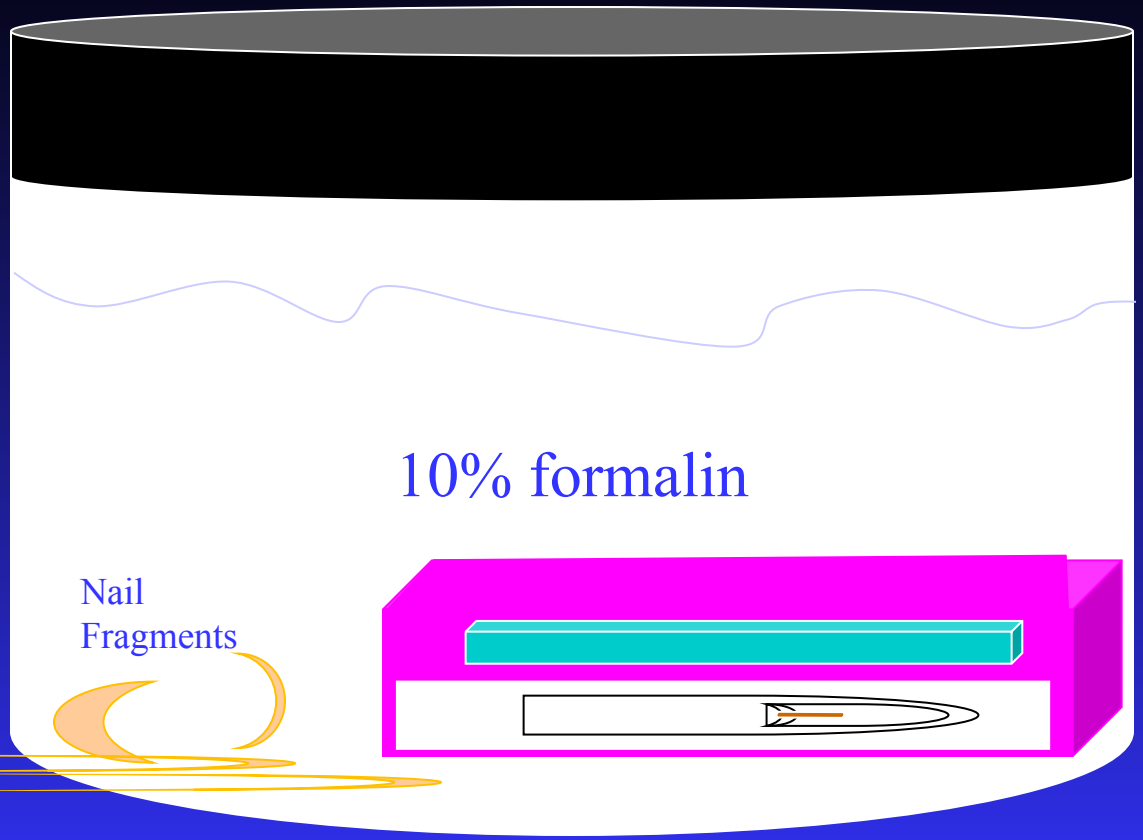


Figure 2


10% formalin
Nail
Fragments

Each specimen is different

Pathologist review before grossing

- Number tissue blocks
- Unstained slides or levels at the start
- Special stains
- Importance of nail
- Reserve nail for culture

Think about the differential diagnosis when grossing

- Onychopapilloma
- Onychomatricoma
- Digital myxoid/mucous cyst
- Squamous cell carcinoma
- Longintudinal melanonychia

Onychopapilloma

- Clinical
  - Logintudinal erythronychia (redness)
  - Distal nail split

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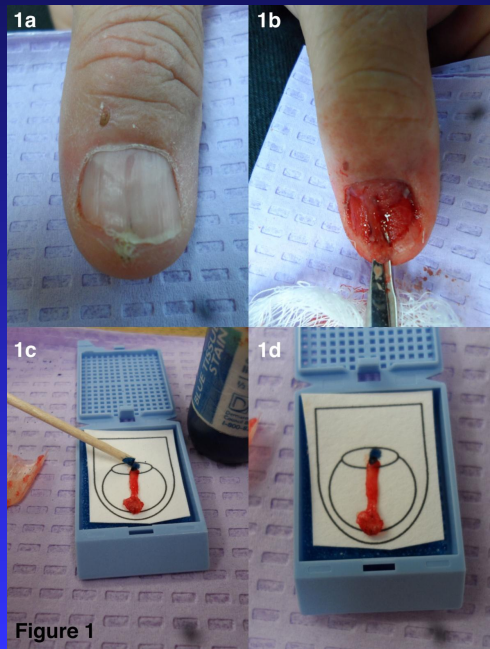
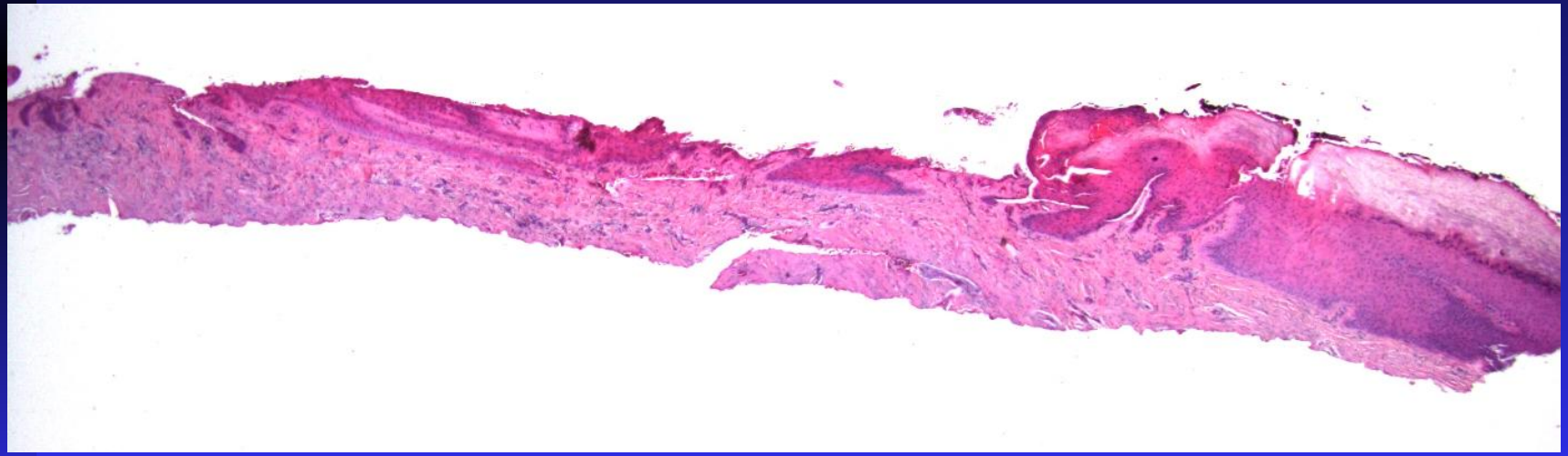
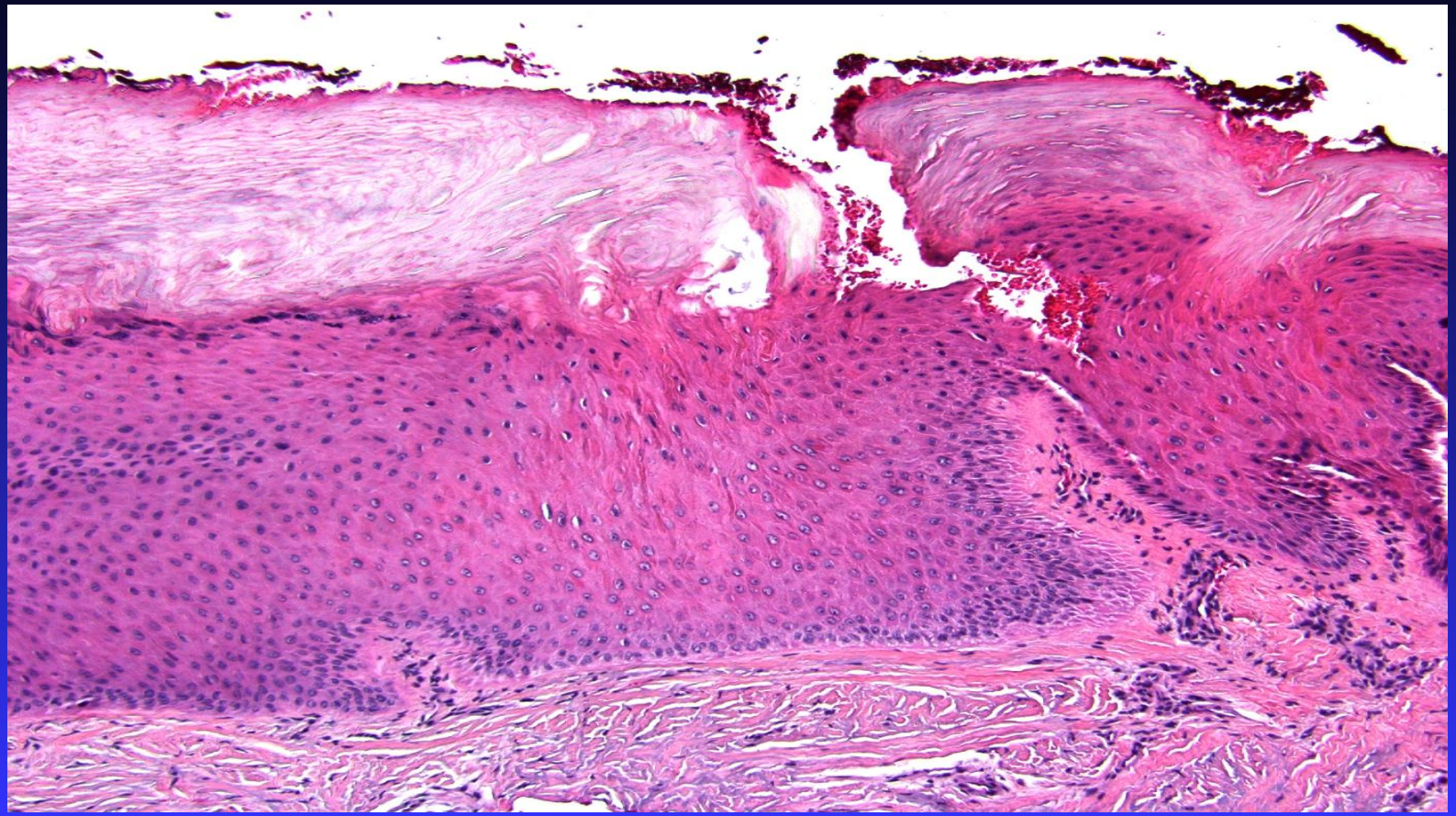


Figure 1

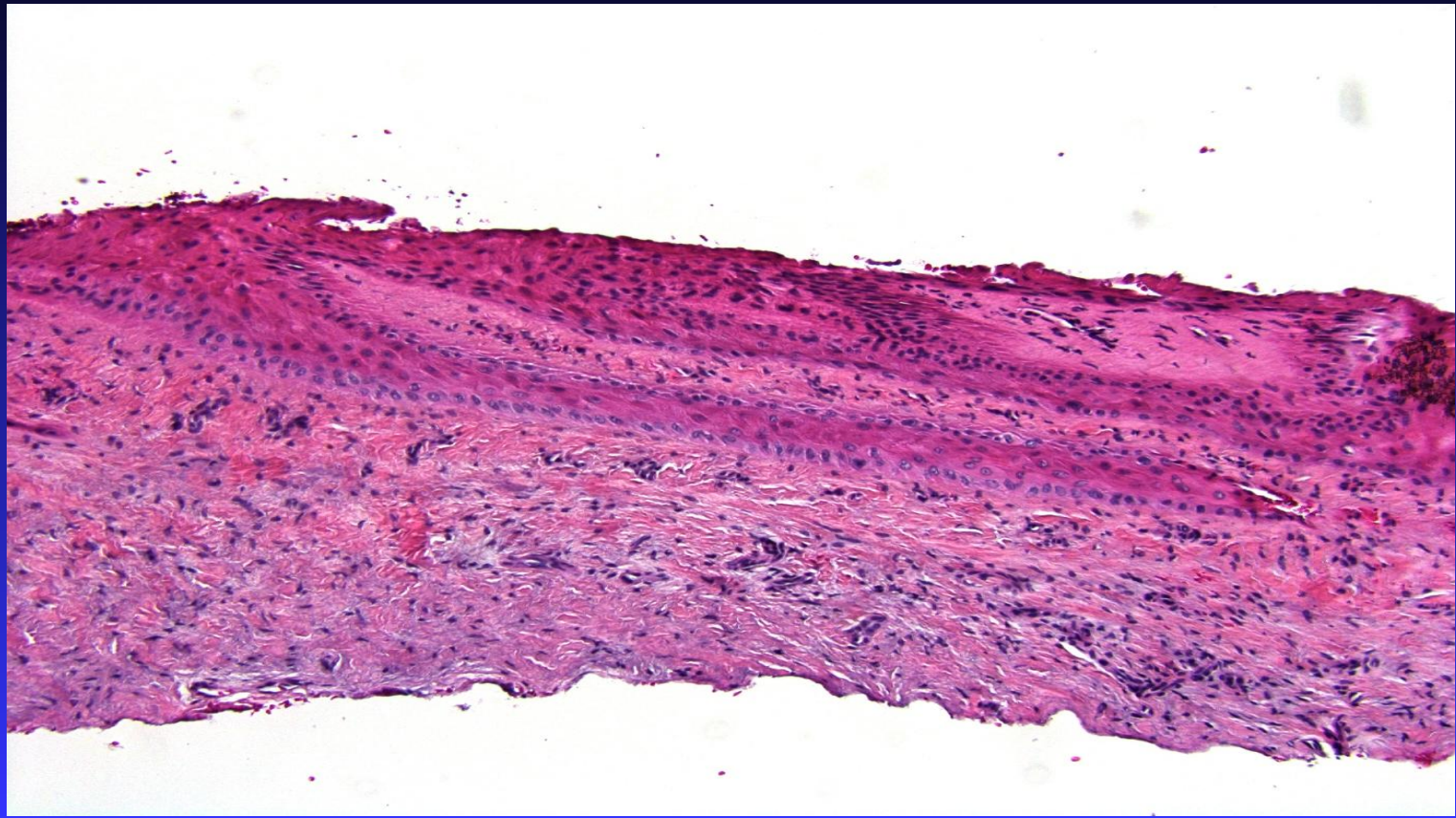
Onychopapilloma—Keratin Producing



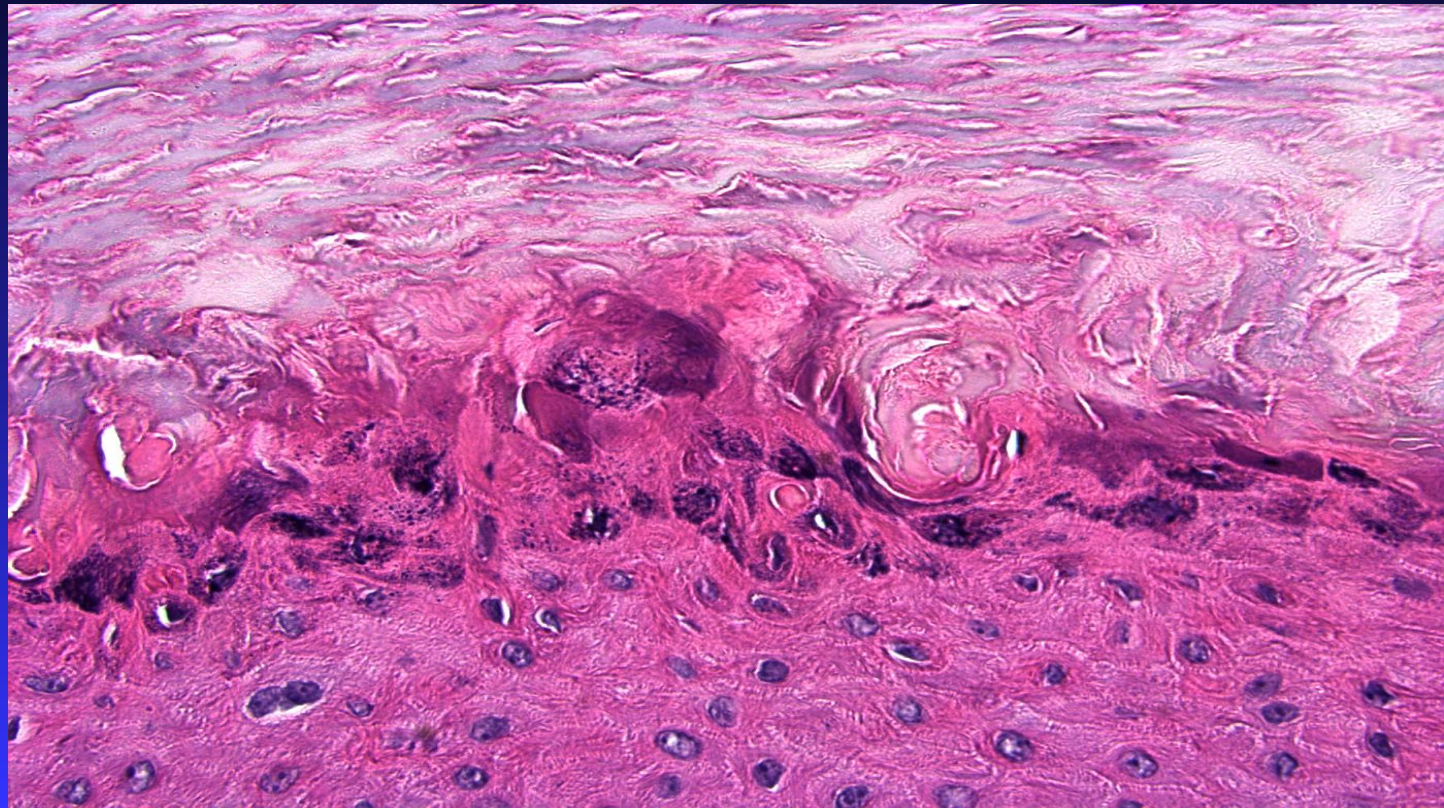
Onychopapilloma—Keratin Producing



Onychopapilloma



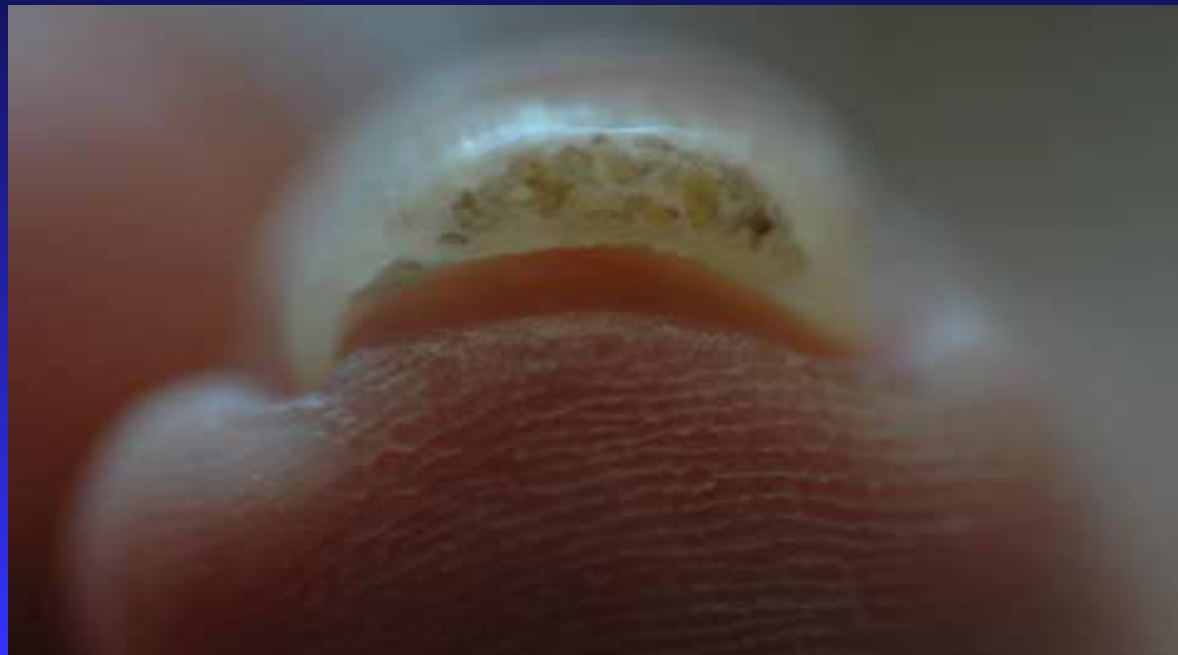
Onychopapilloma—Not a wart



Onycomatricoma

Onycomatricoma

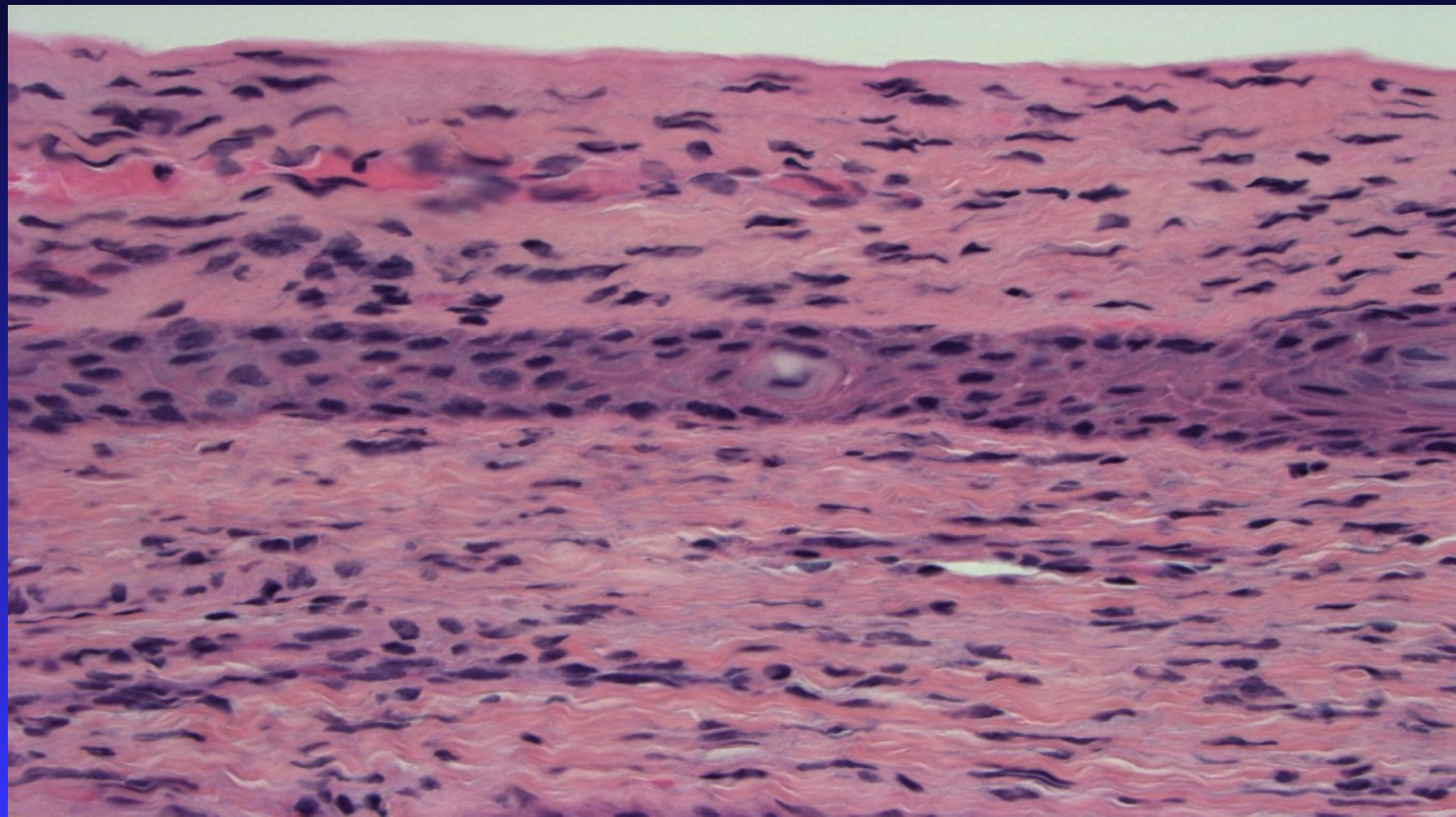
- Examine nail for holes—Transverse sections of dystrophic nail



Onychomatricoma

Epithelial and dermal components

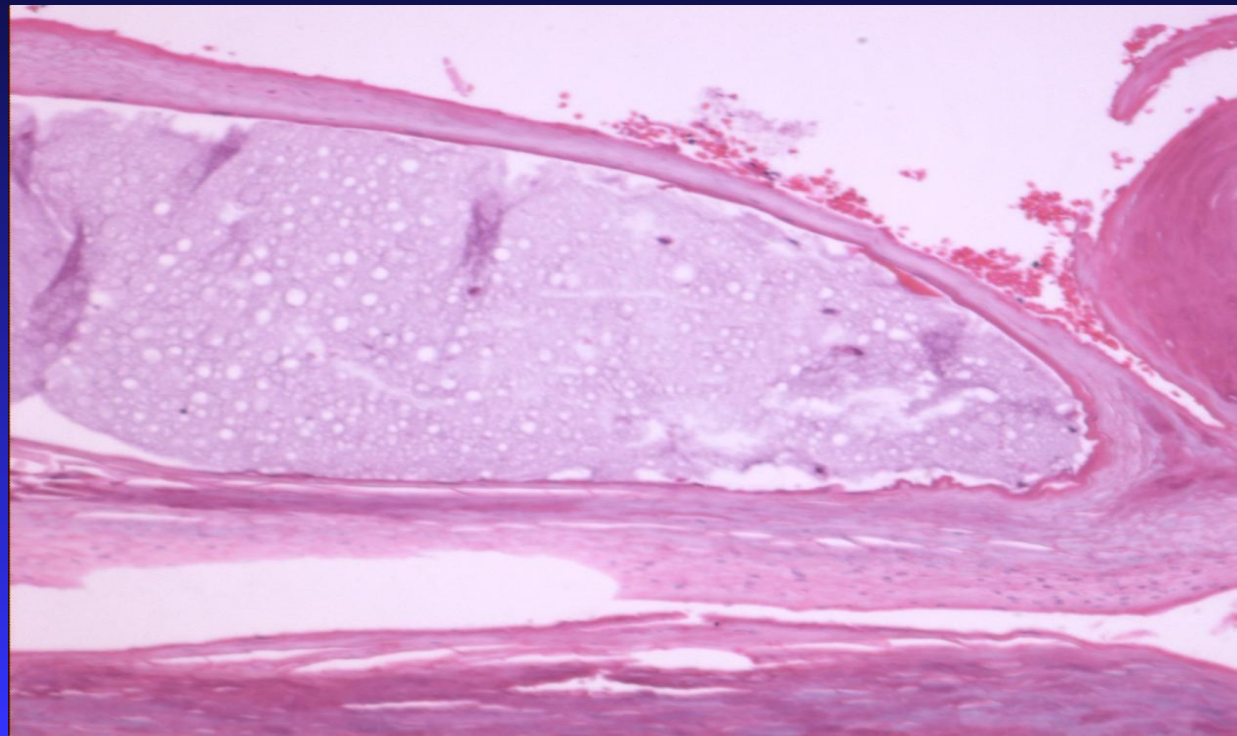
Onychomatricoma



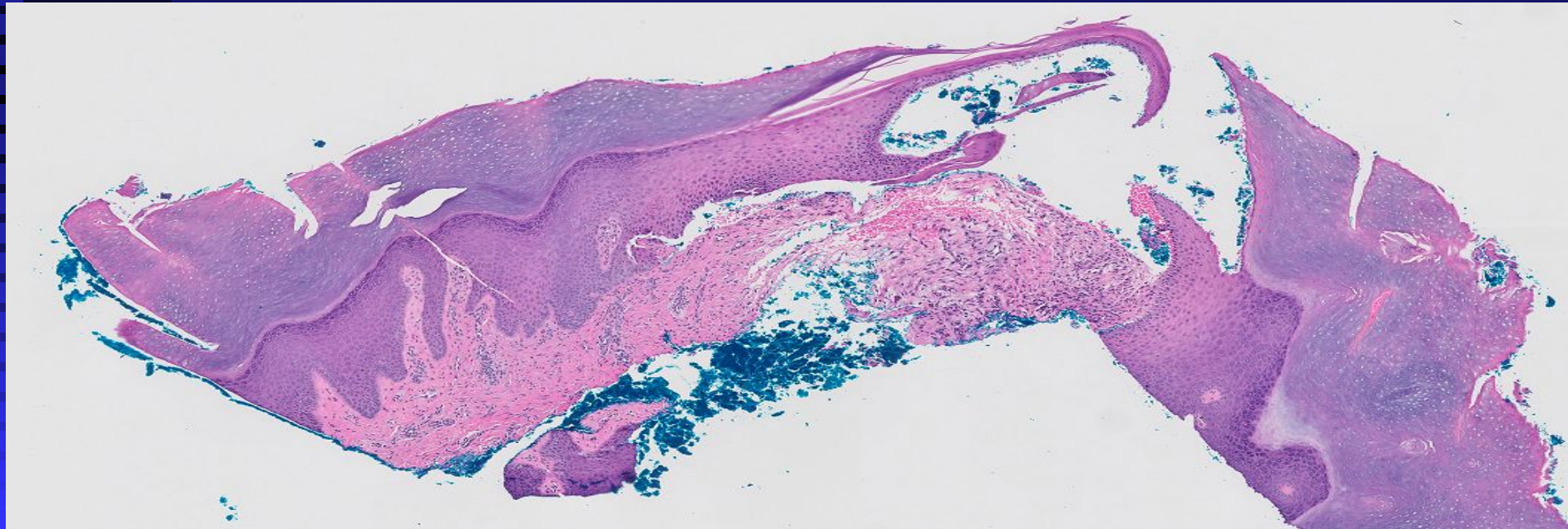
Digital Myxoid/Mucous Cyst

Digital Myxoid/Mucous Cyst

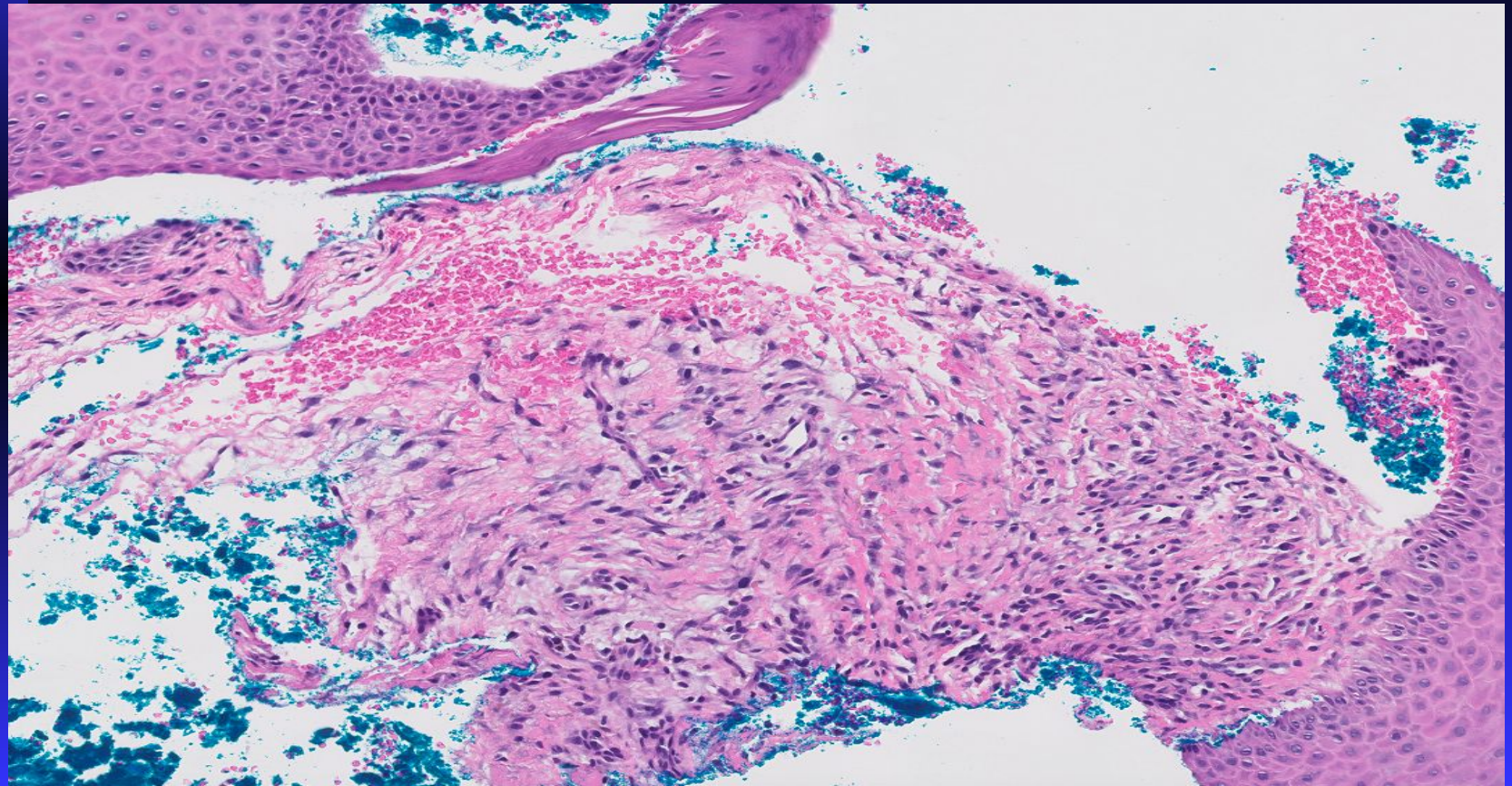
- Mucin may be anywhere



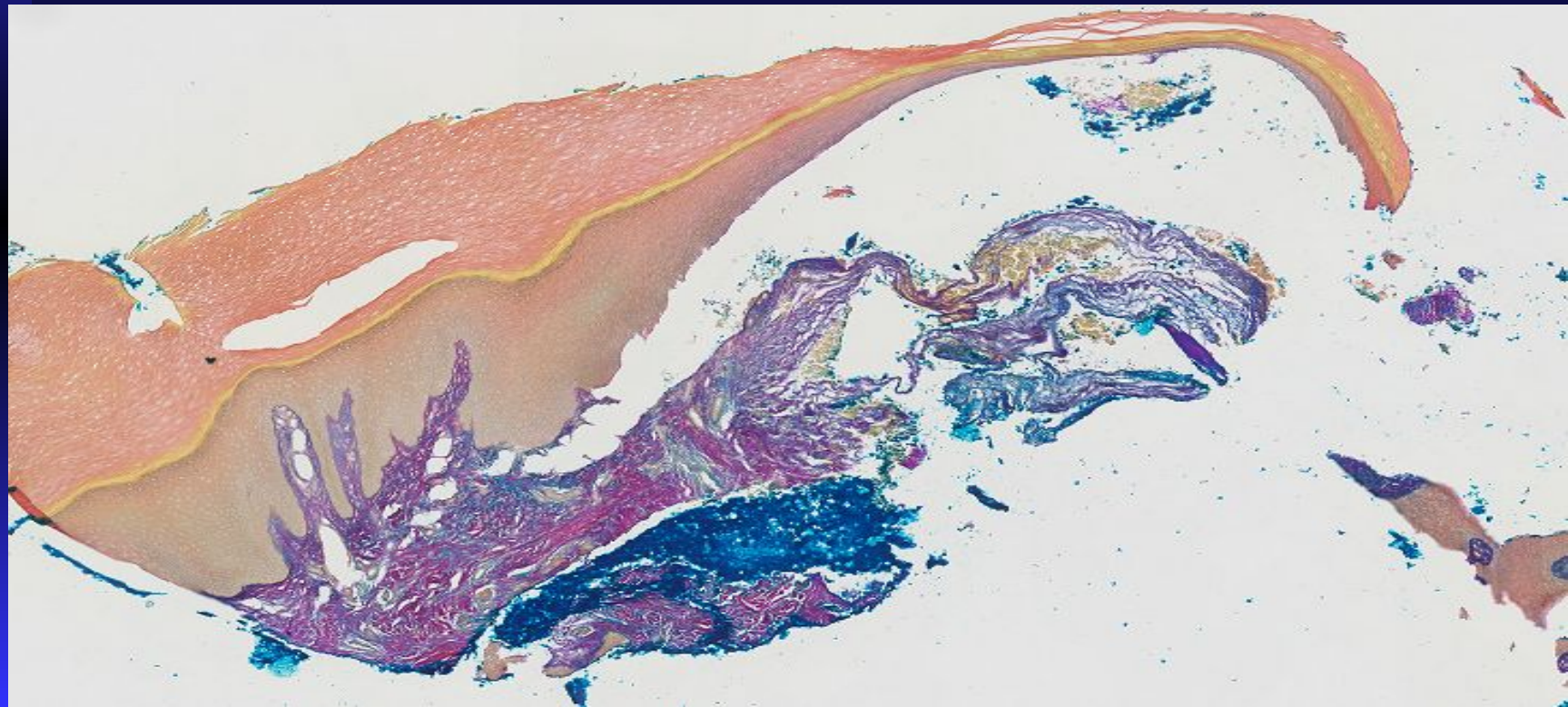
H&E may show only scar and reactive change



H&E may not show mucin



Mucin stain often required



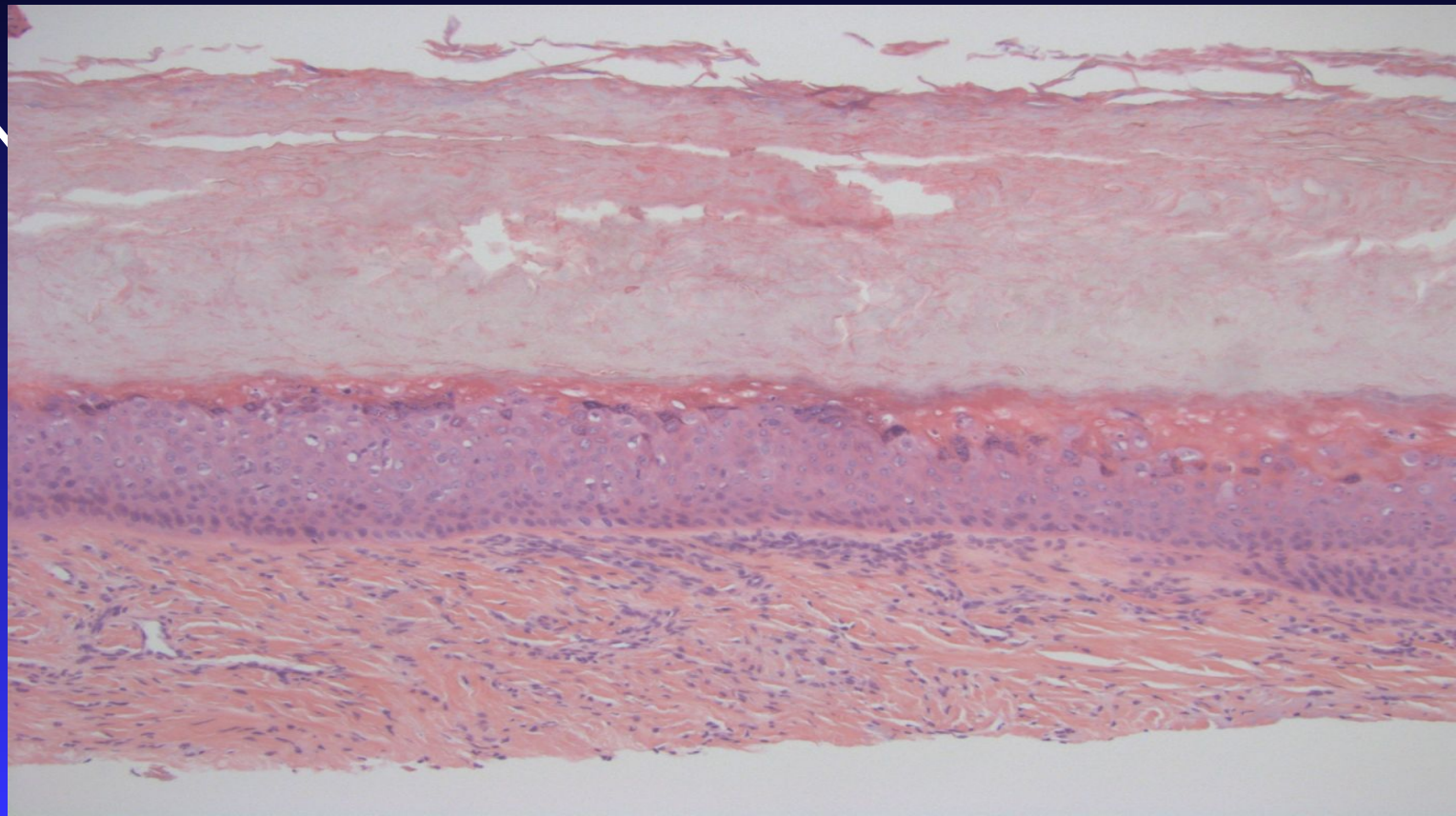
Think about the diagnosis when grossing

- Squamous cell carcinoma
  - Sampling
  - HPV-Verruca etiology

Squamous cell carcinoma

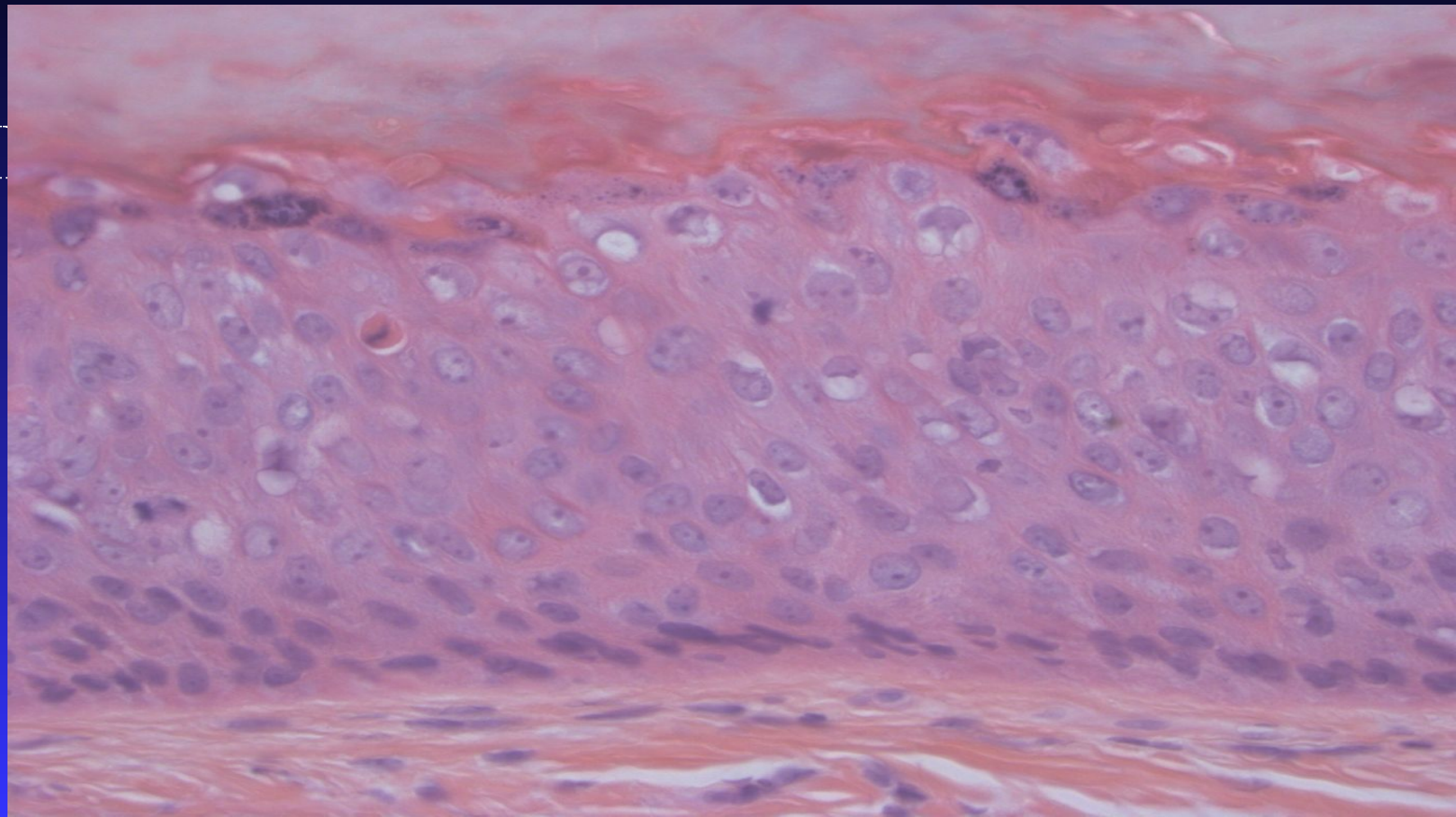
Squamous cell carcinoma

- IN



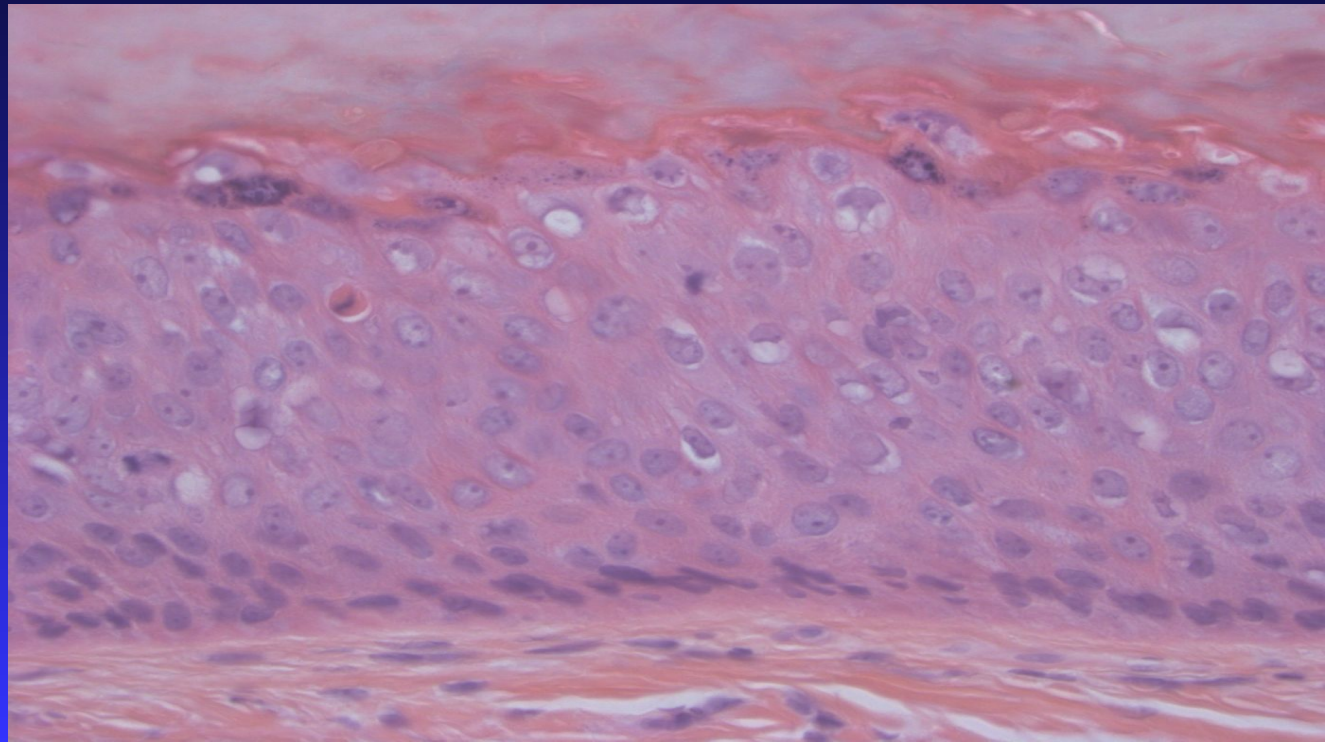
Squamous cell carcinoma in-situ

- I

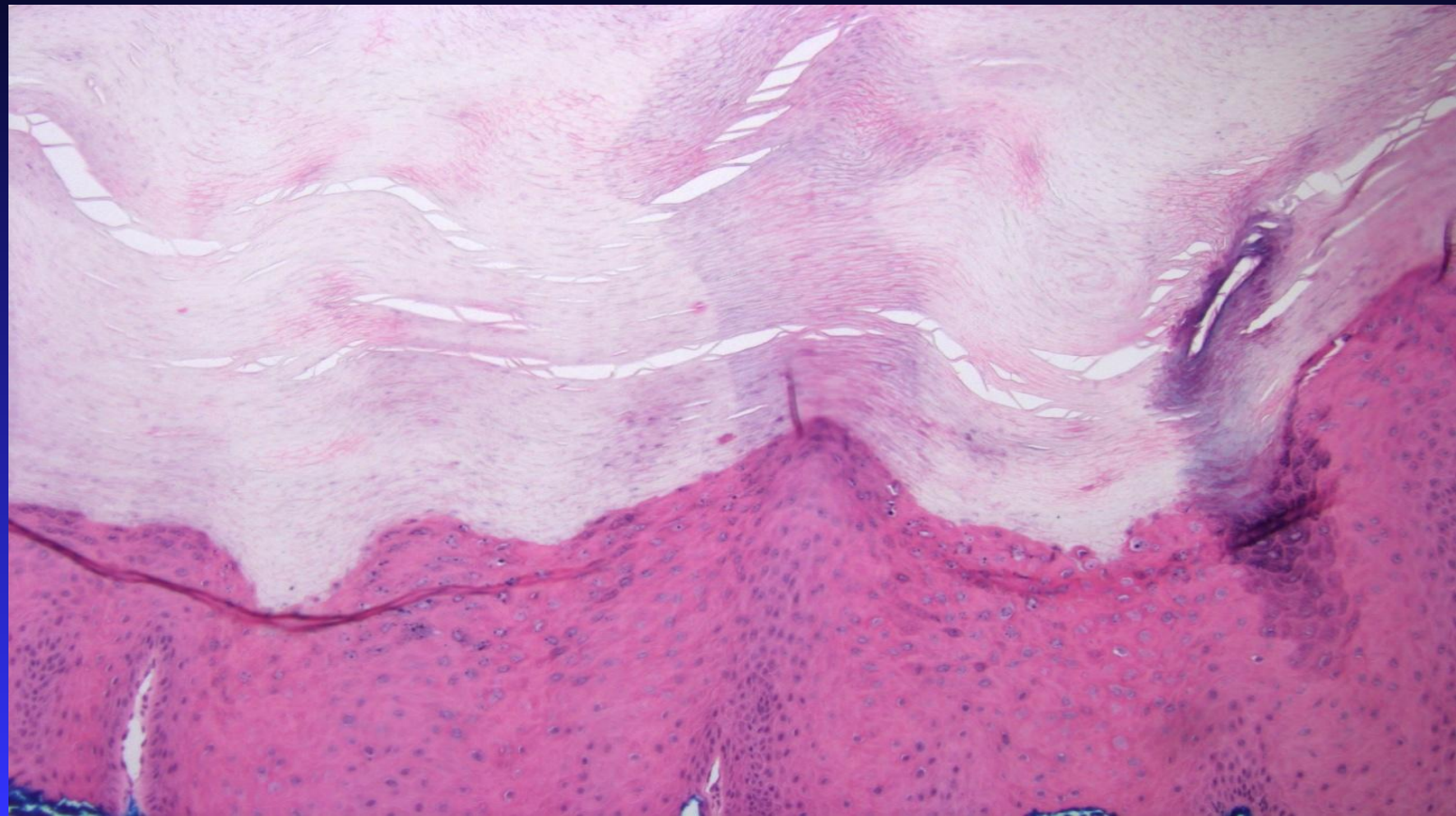


Squamous cell carcinoma in-situ

- Human Papillomavirus (HPV) features



SCC versus Wart/Verruca



SCC versus Wart/Verruca

- Clinical correlation often necessary
  - Immunosuppression (esp HIV)
  - If it is destroying bone, it is not benign!
  - Sample more if suspicious

HPV In-situ Hybridization (ISH)

- HPV Subtypes—Same as cervical
  - Low risk--Verruca
  - High risk—Squamous cell carcinoma
  - Pan HPV test—Benign and malignant

Think about the diagnosis when grossing

- Longintudinal melanonychia
  - Identify source of clinical pigmentation

Benign activation of junctional melanocytes

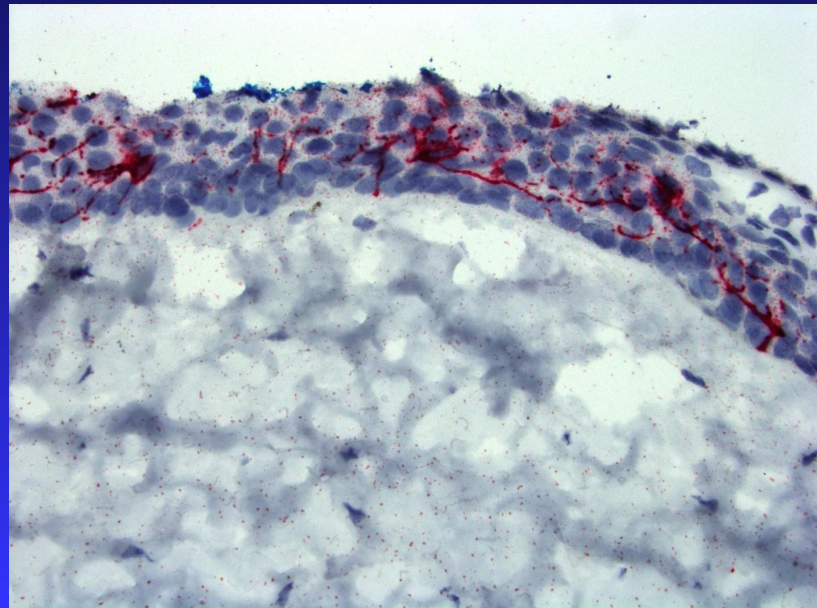
- Synonyms
  - Melanotic macule of the nail
  - Nail unit lentigo

Features of melanotic macule can be subtle.

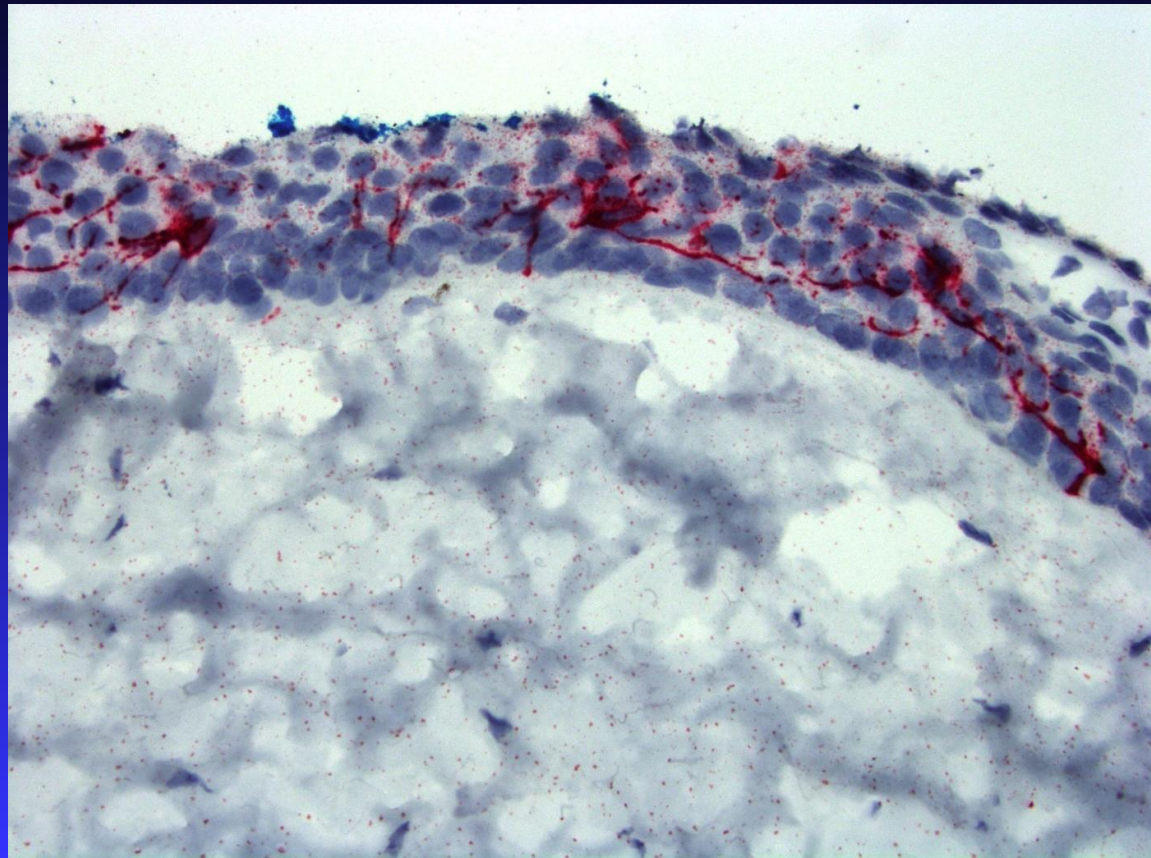
- H&E with initial levels
- MelanA IHC
- Fontana-Masson
- PAS fungus
- Unstained slides

MelanA/Mart1 for melanonychia

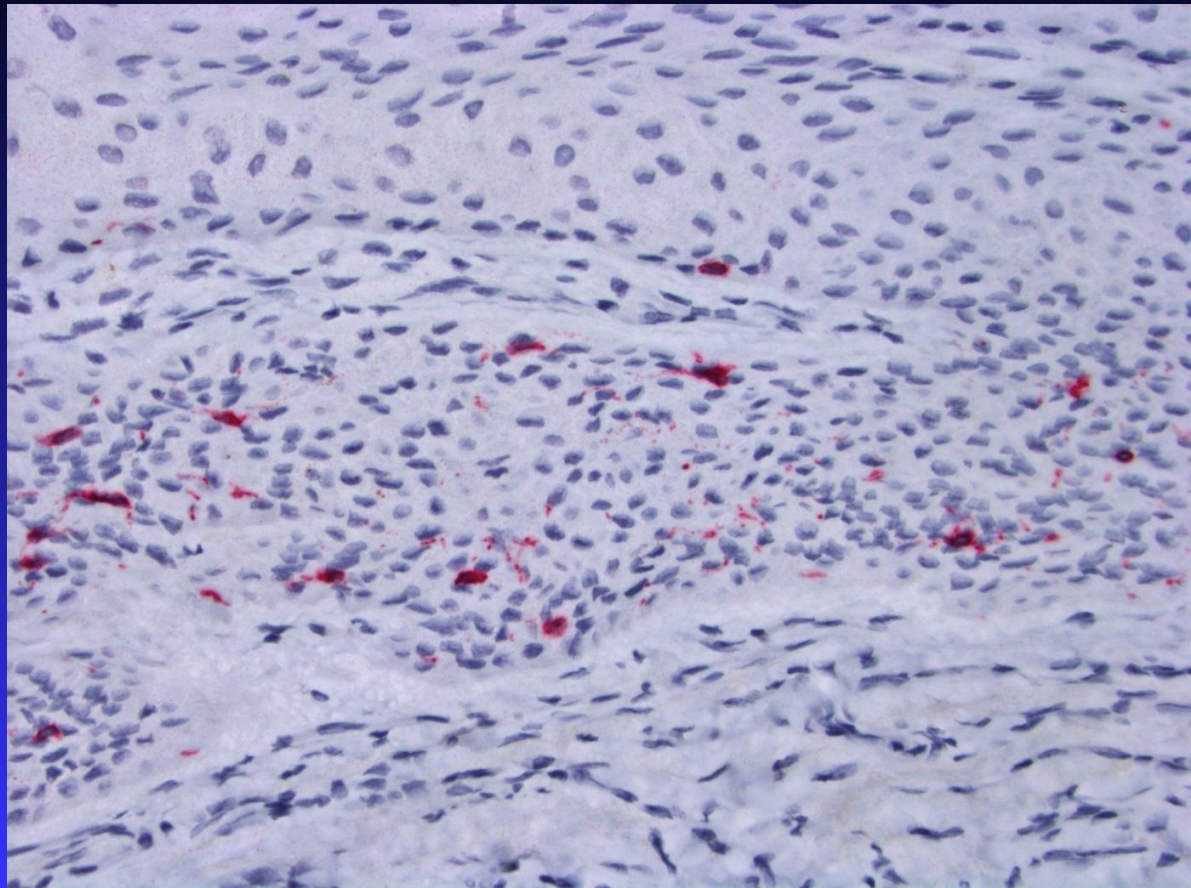
- Melanocytes density may vary highly, especially in melanoma in-situ
- Use a red chromogen



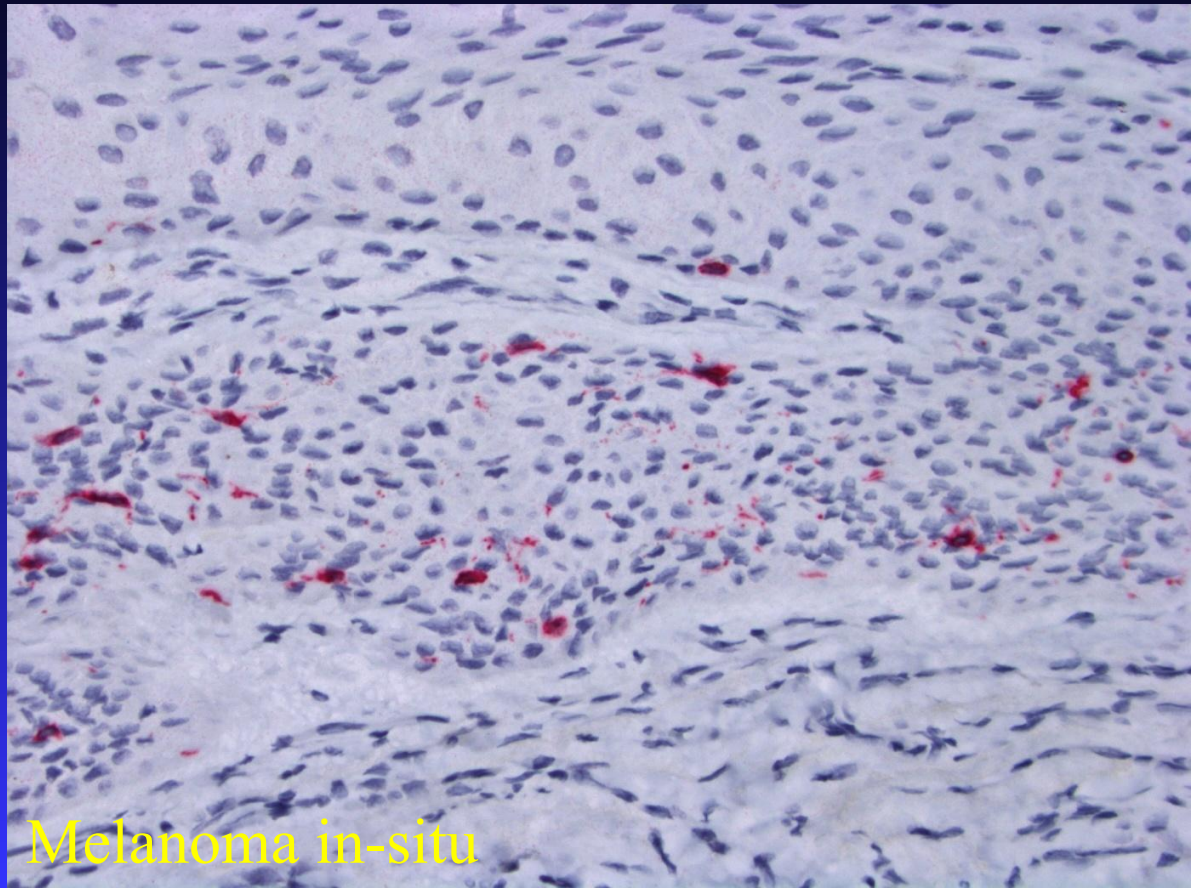
MelanA/Mart is better than SOX/Mitf



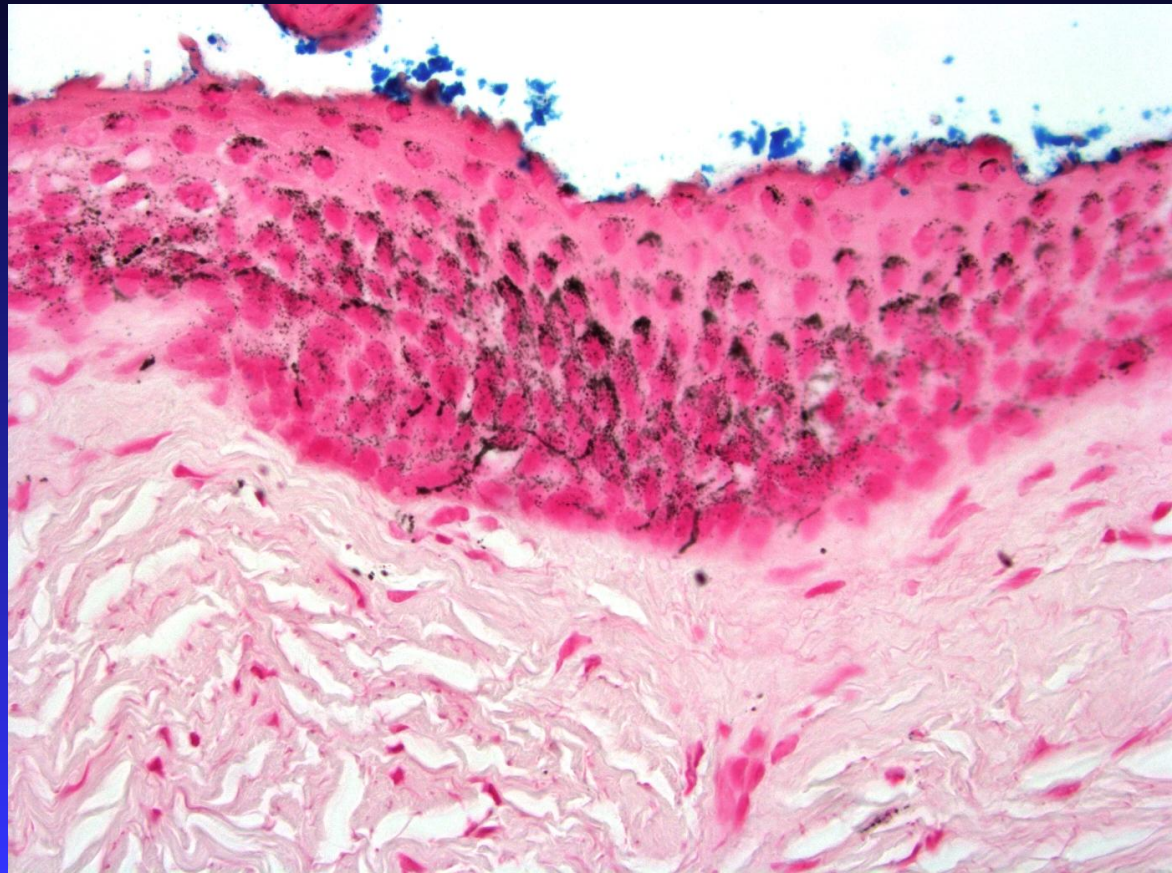
Variable density of melanocytes



Variable density of melanocytes



Fontana-Masson for melanonychia

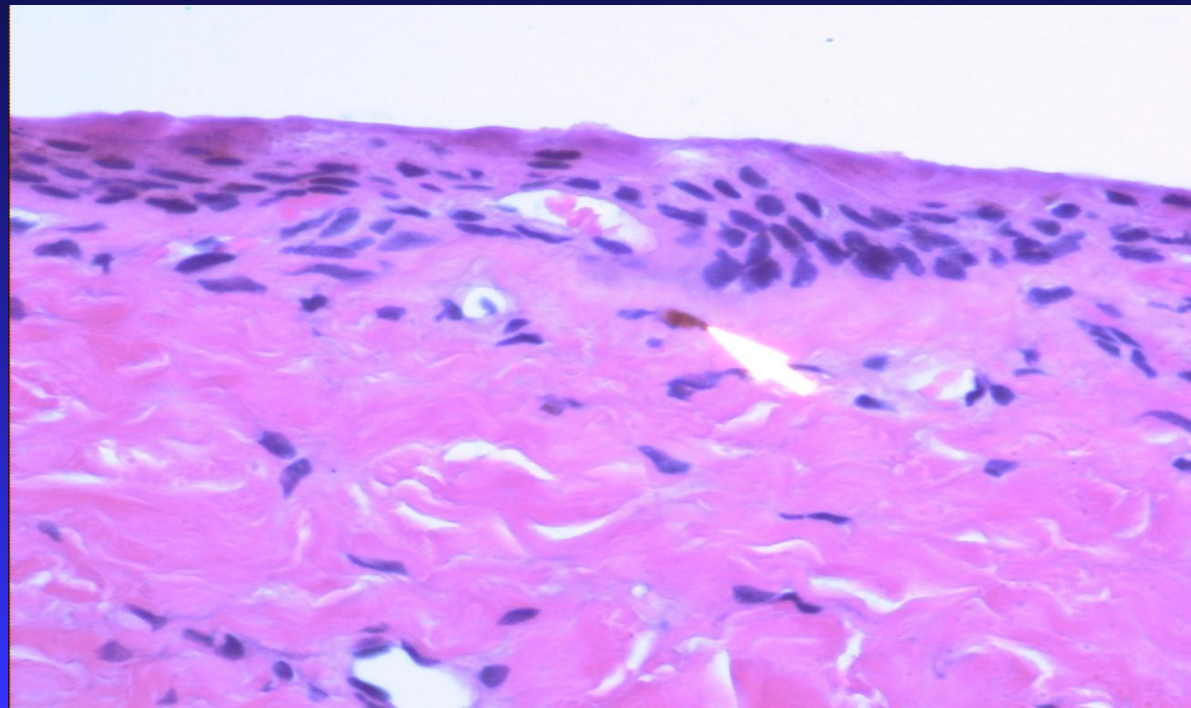


Special stains for pigment do not work in nail plate

- Fontana-Masson—must dilute

Single melanophage

May be the only diagnostic findings in benign activation

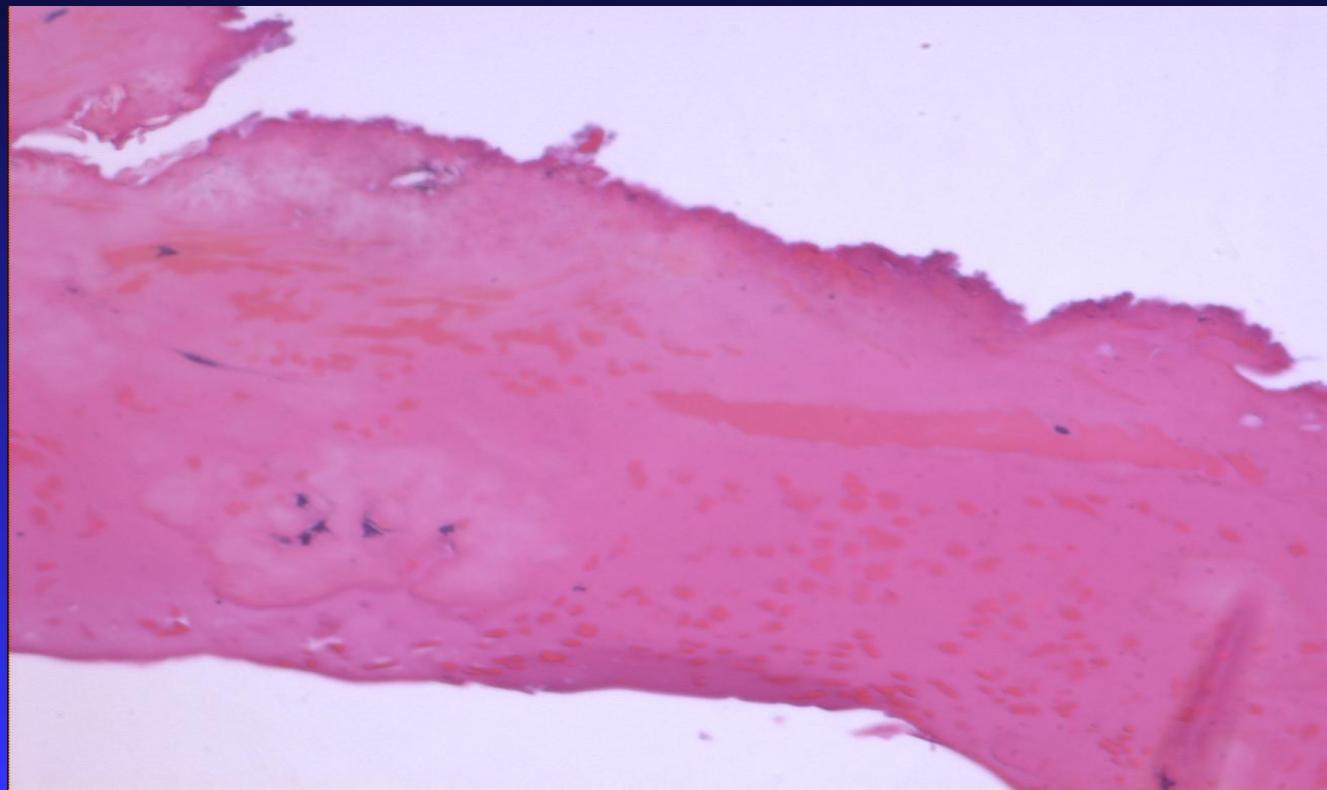


H&E for melanonychia

- H&E level sections
  - Blood
  - Exogenous material
  - Medication deposition

Blood in nail plate

Perl's iron stain does not work

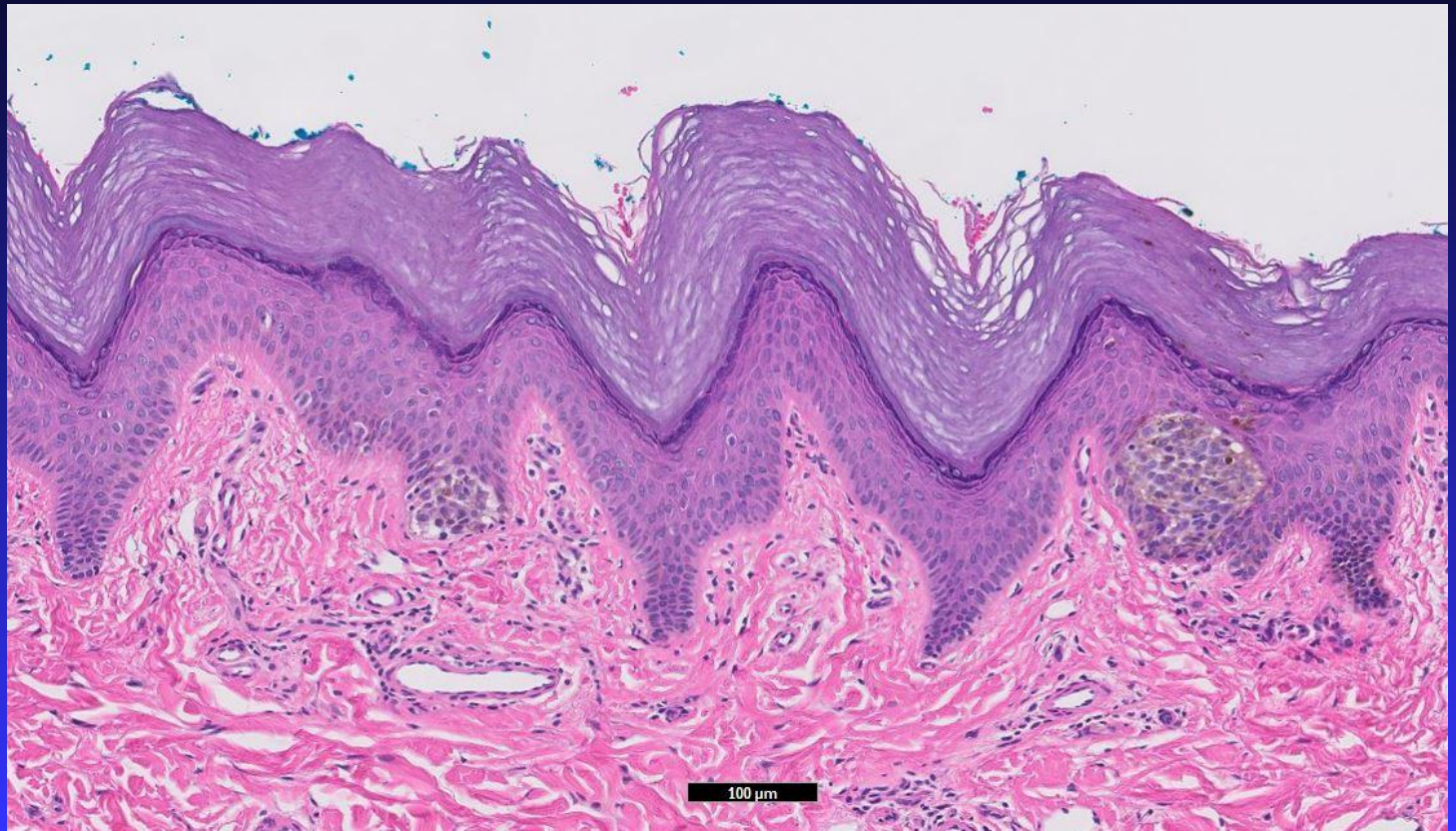


Pediatric nail nevi

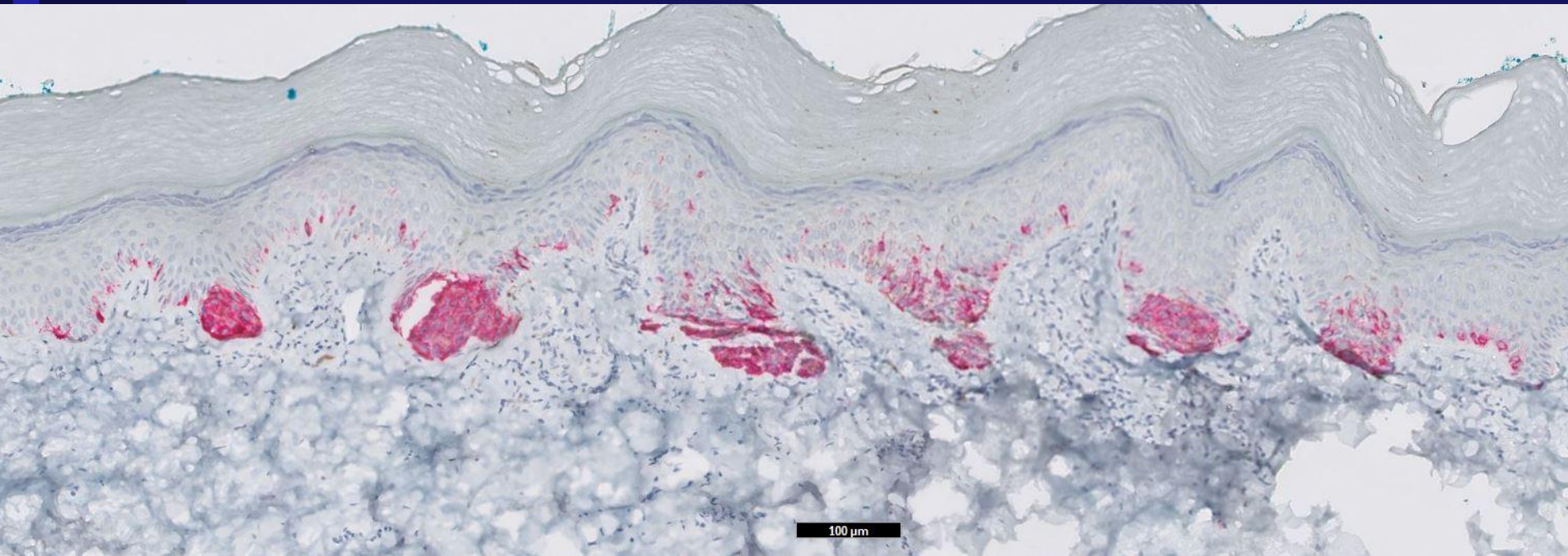
- Few pediatric melanocytic tumors sampled—nail experts do not sample
- Traditional criteria for benign vs atypical vs malignant do not apply

10 y/o Left great toe

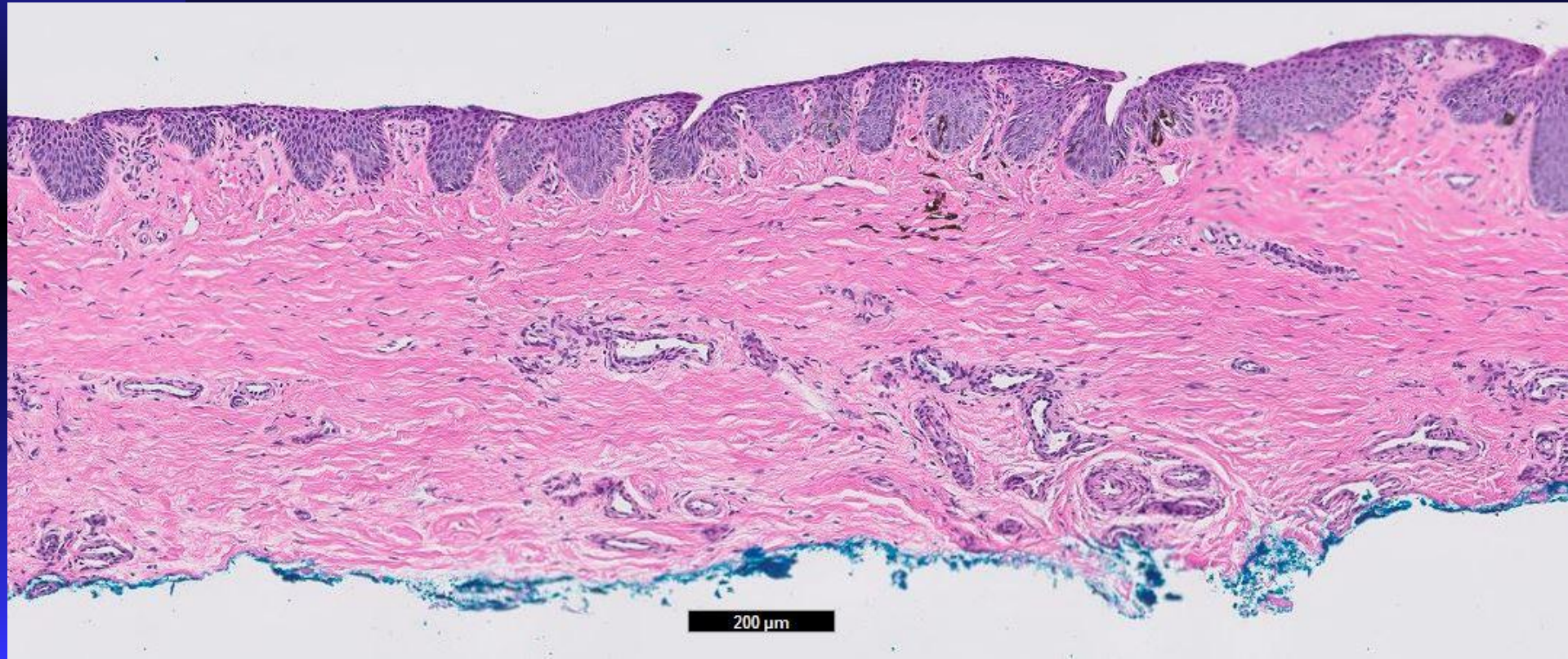
Proximal nail fold



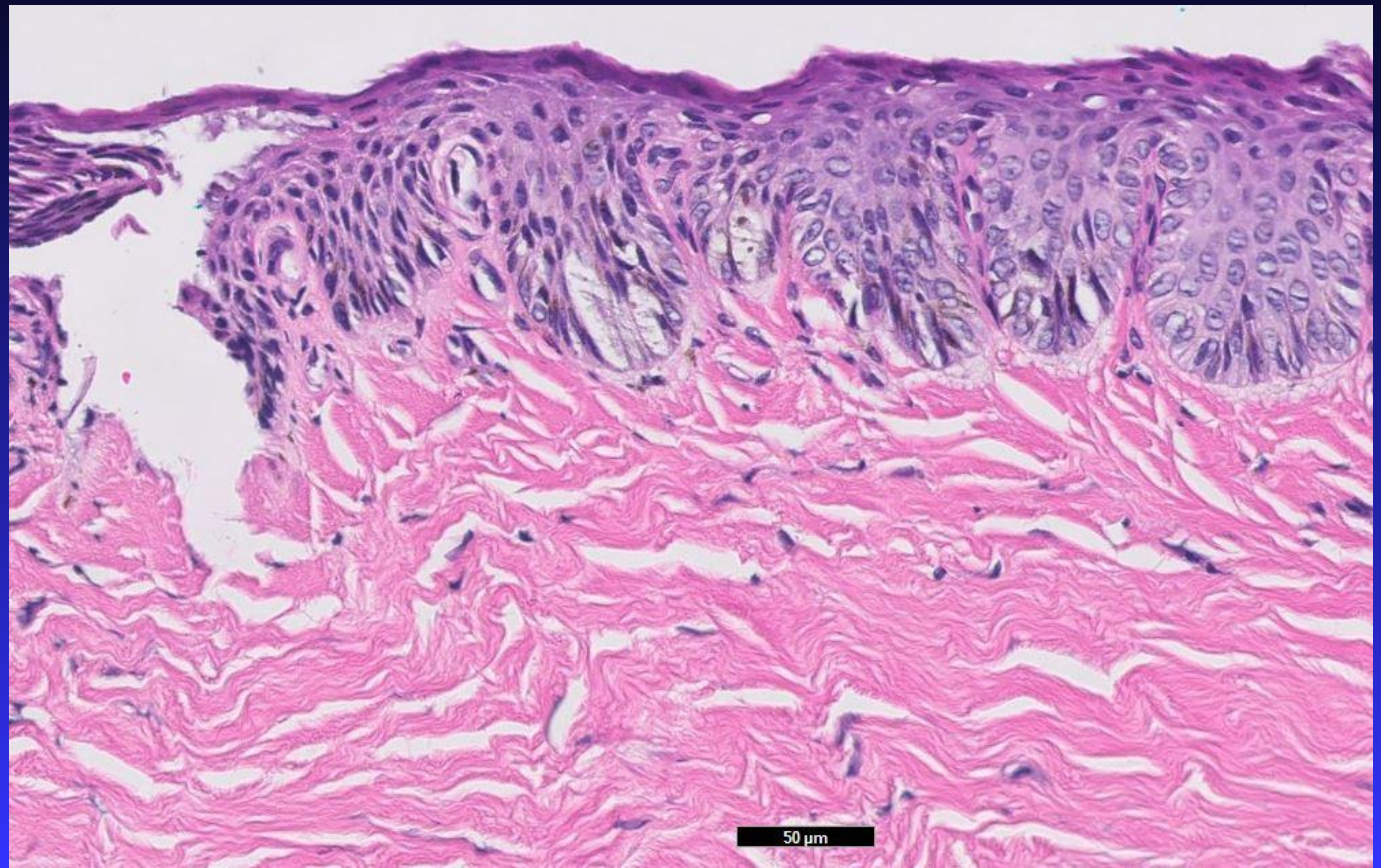
Proximal nail fold



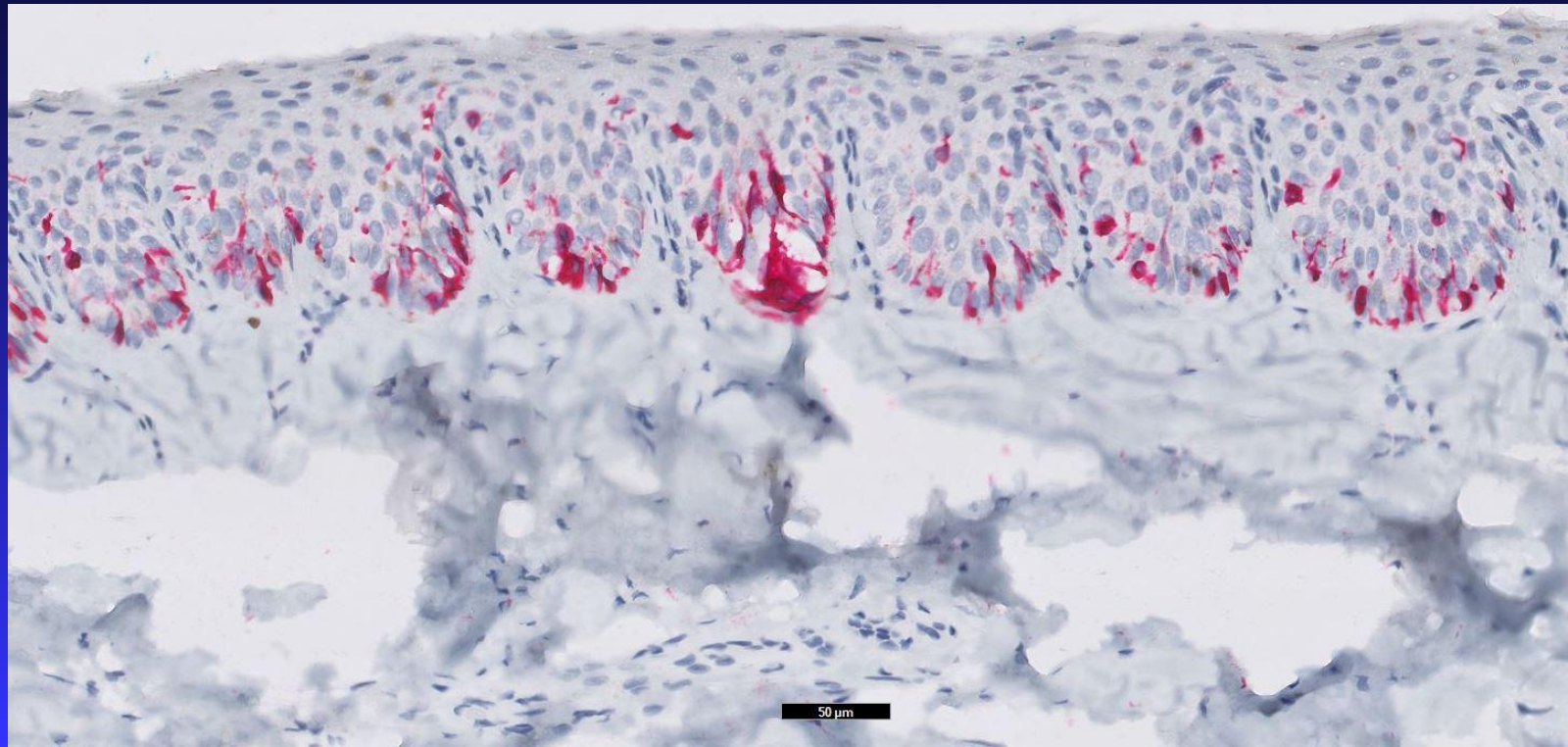
Nail bed/matrix



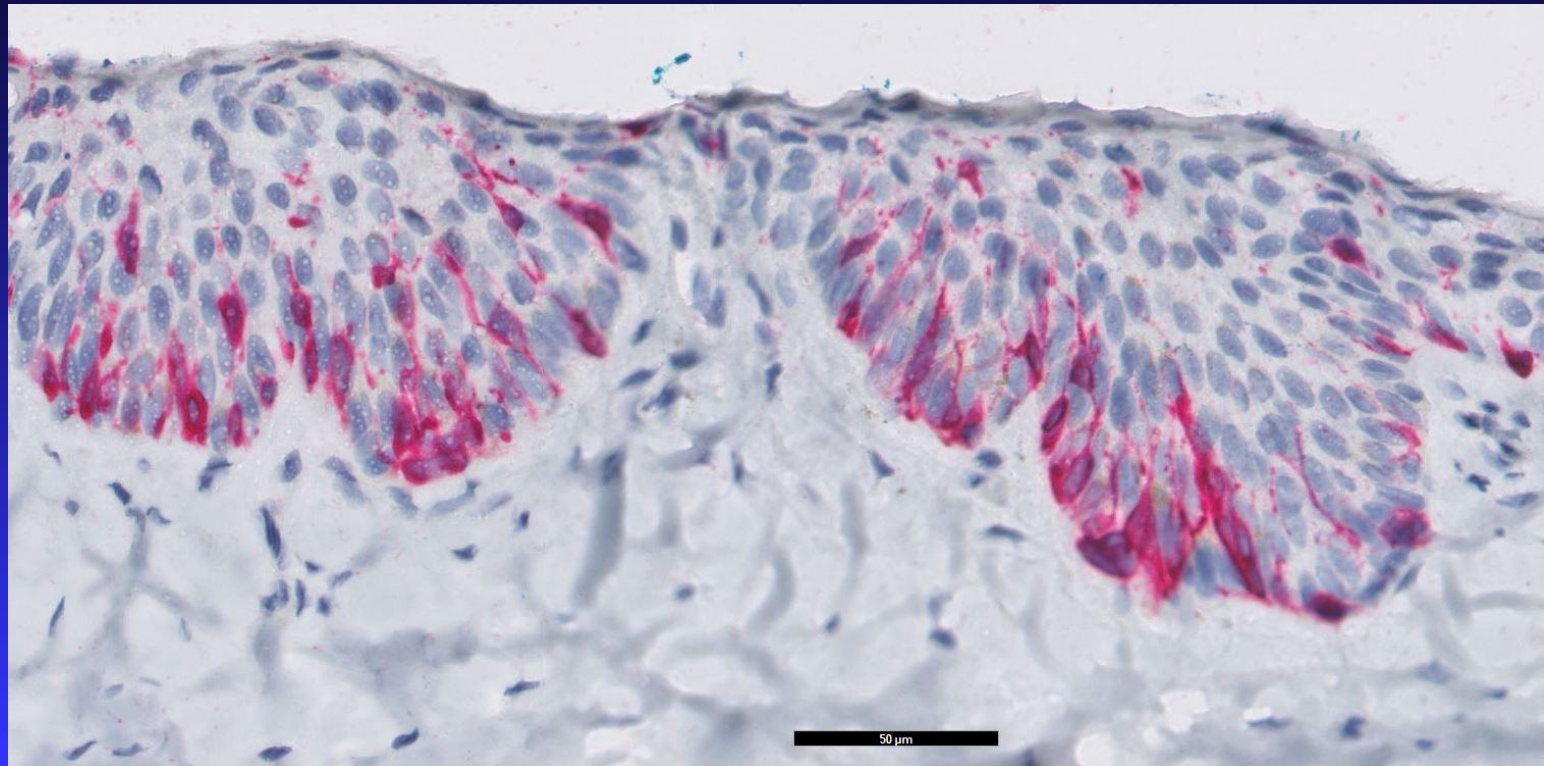
Case Nail bed/matrix



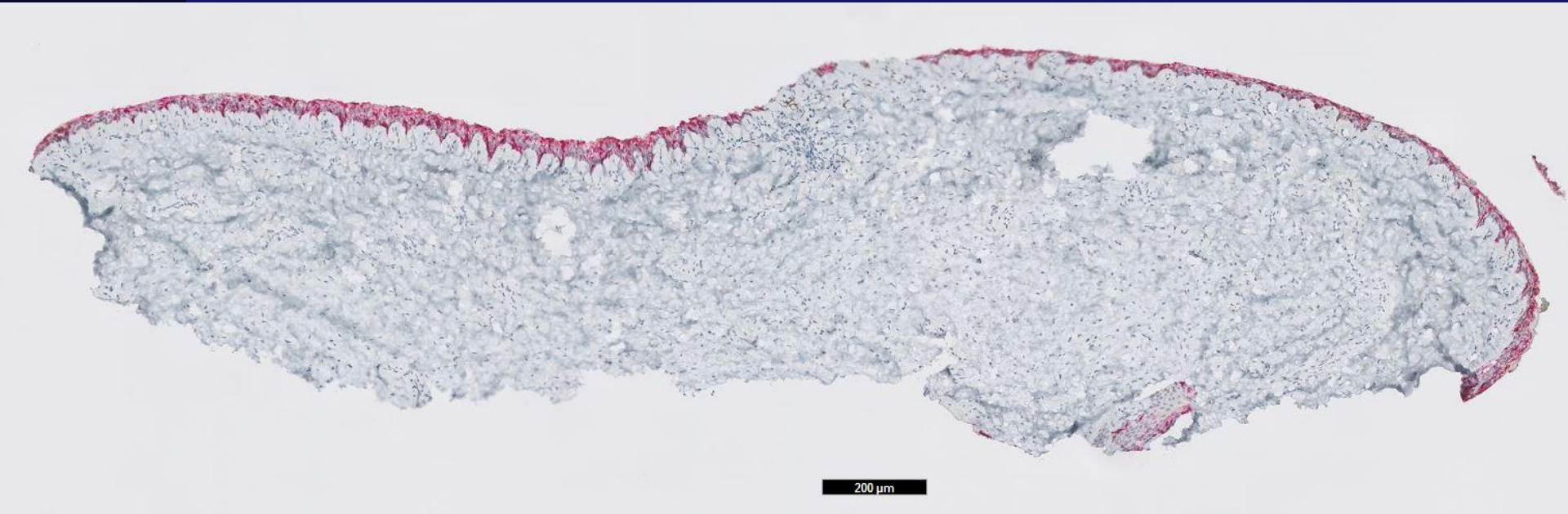
Nail bed/matrix



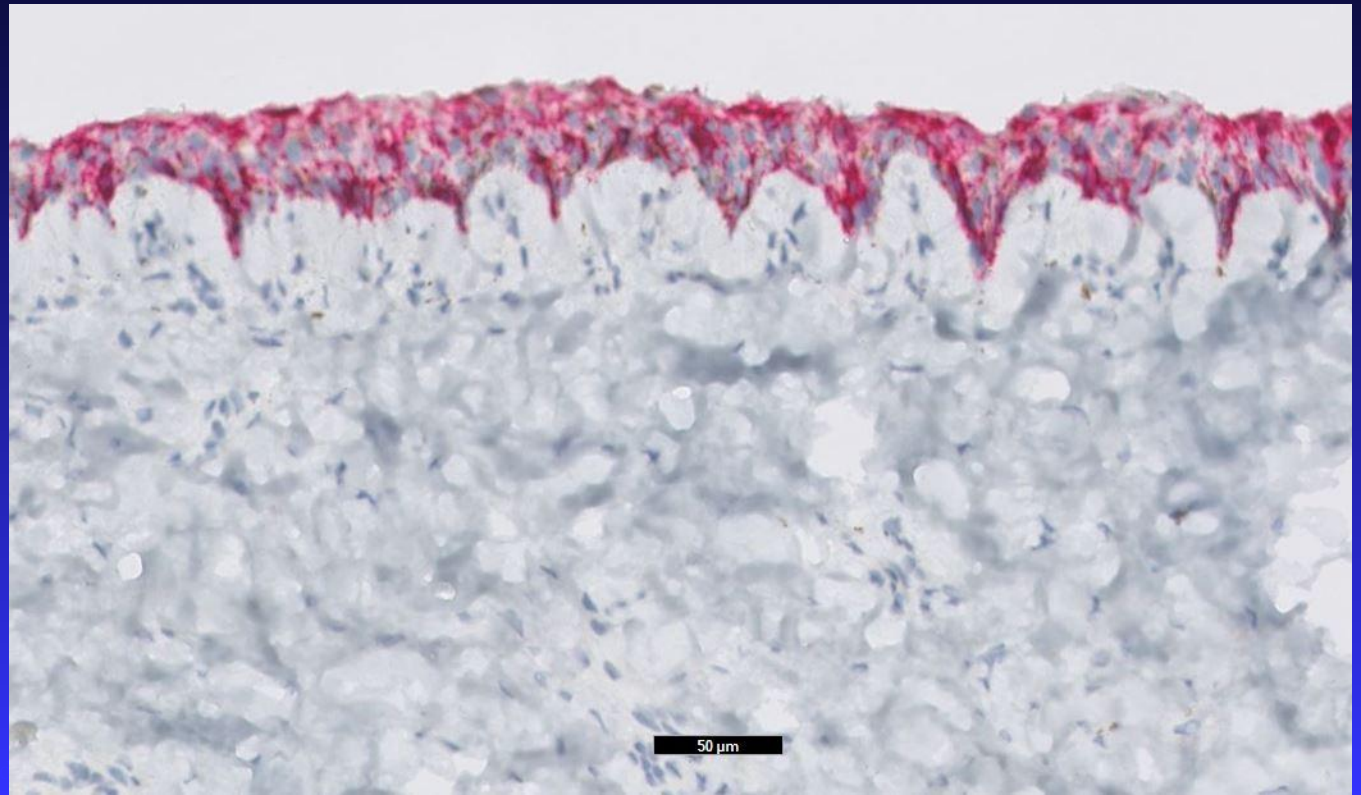
Nail bed/matrix



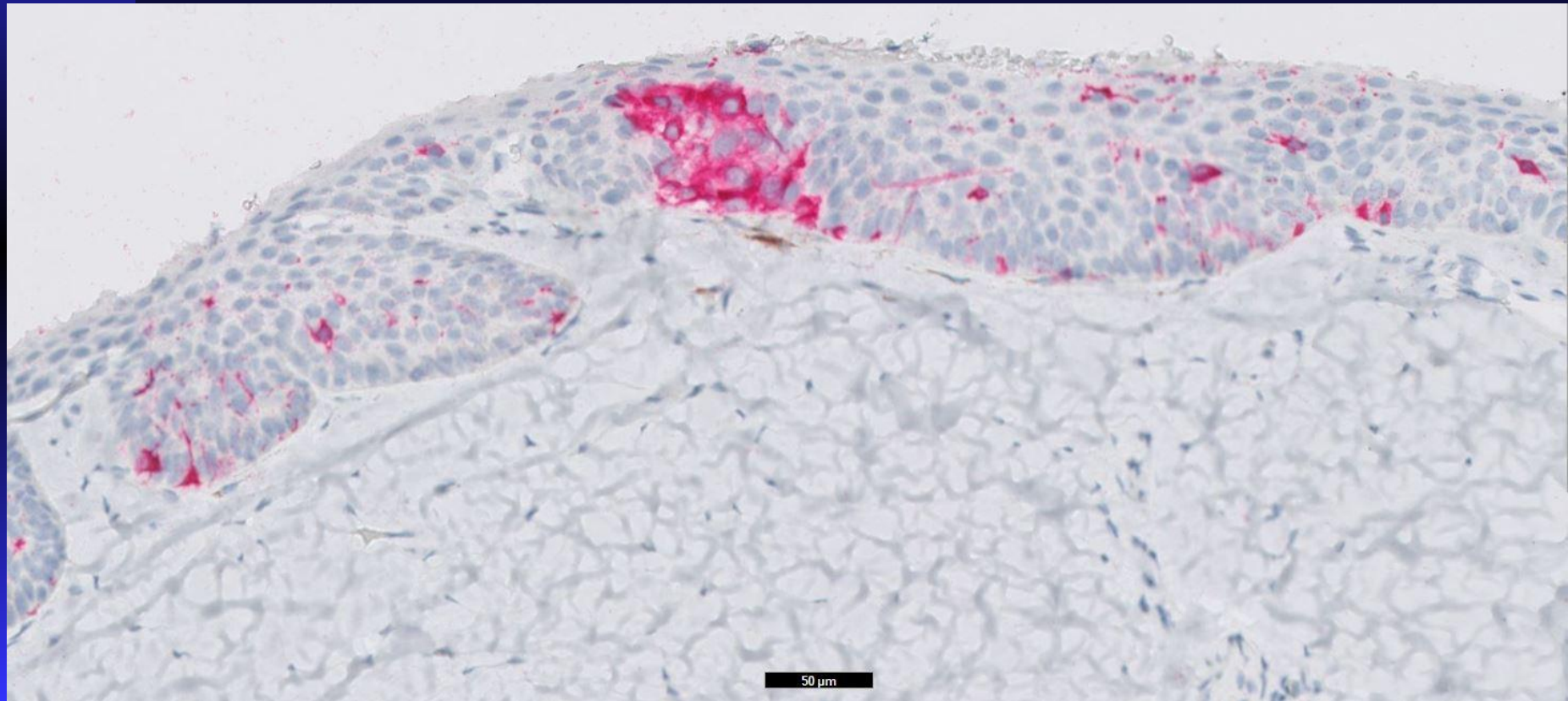
13 y/o nailbed



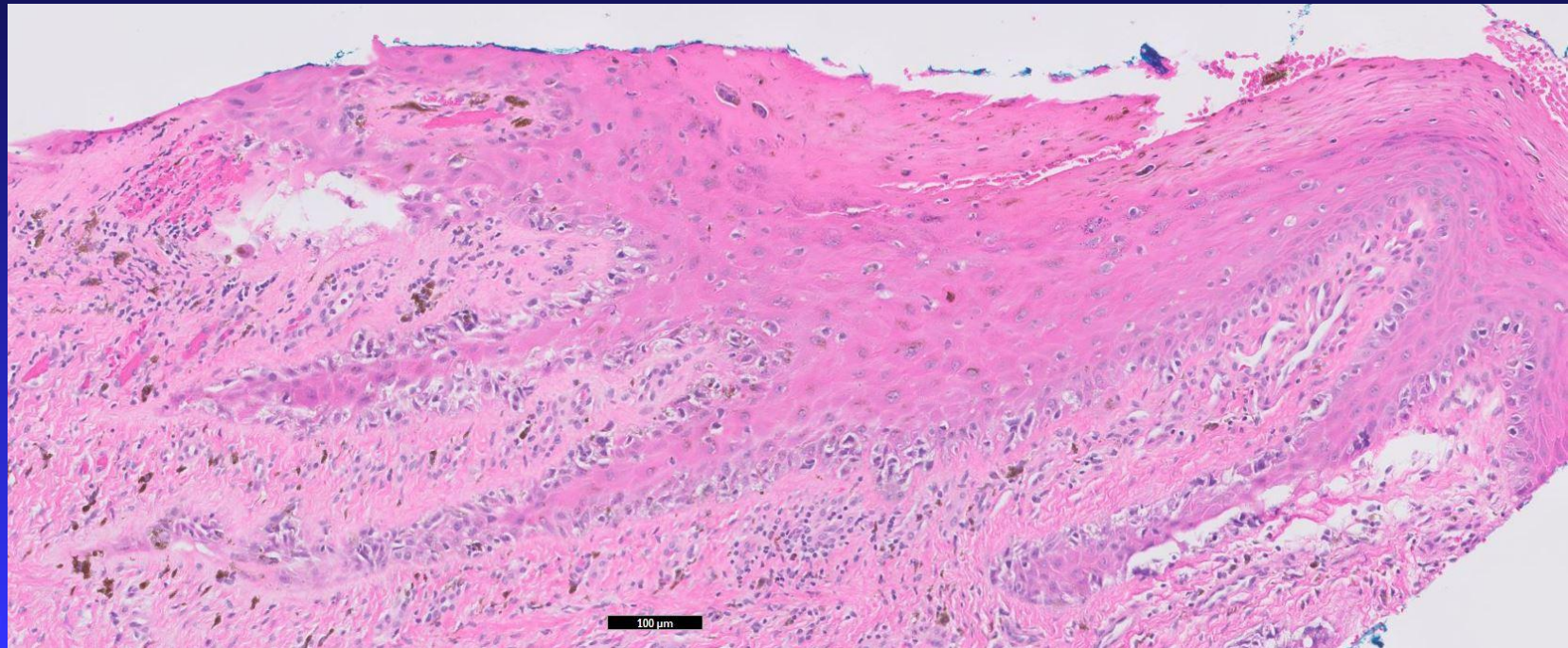
13 y/o nailbed



18 y/o nail



Case



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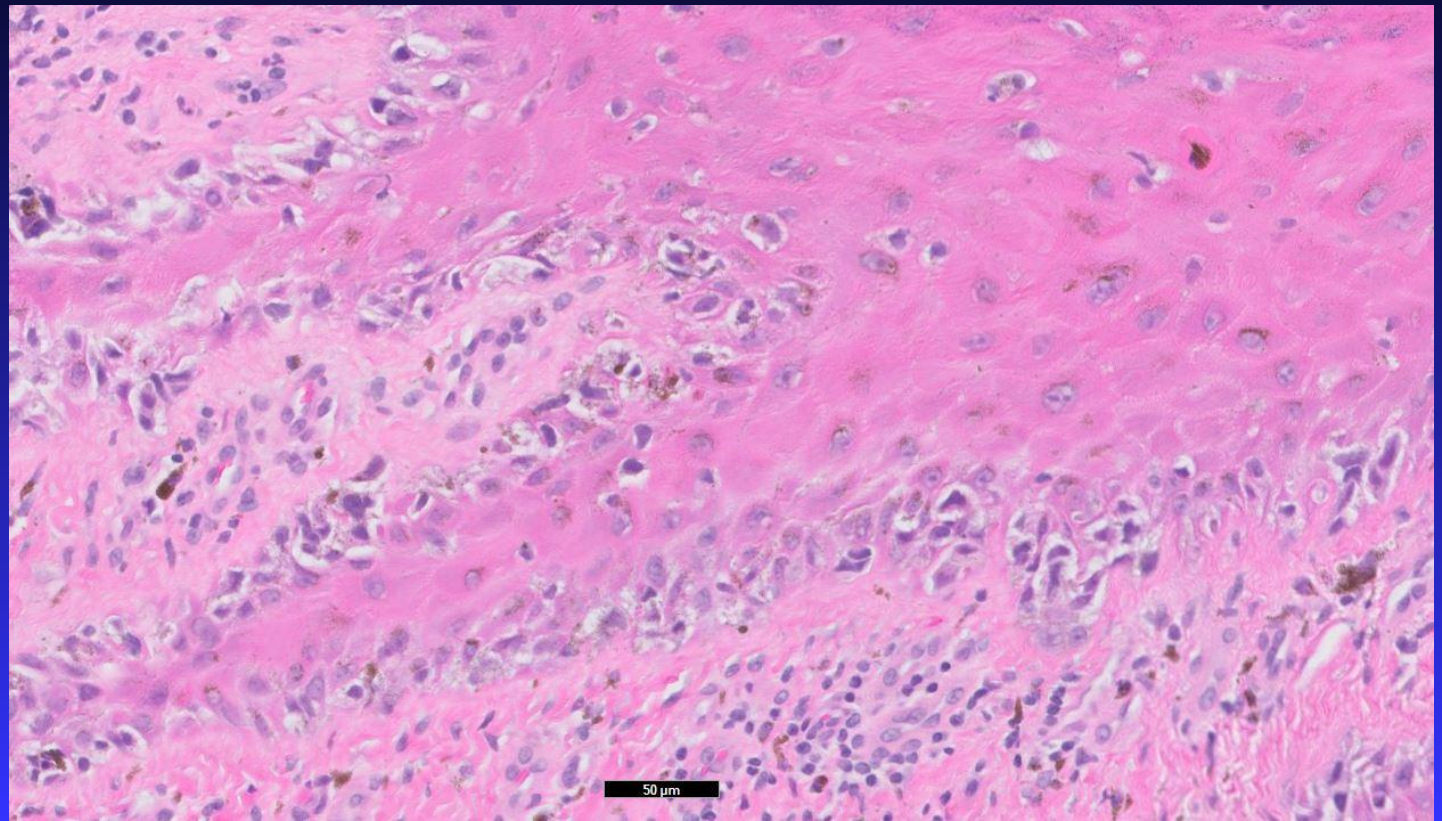

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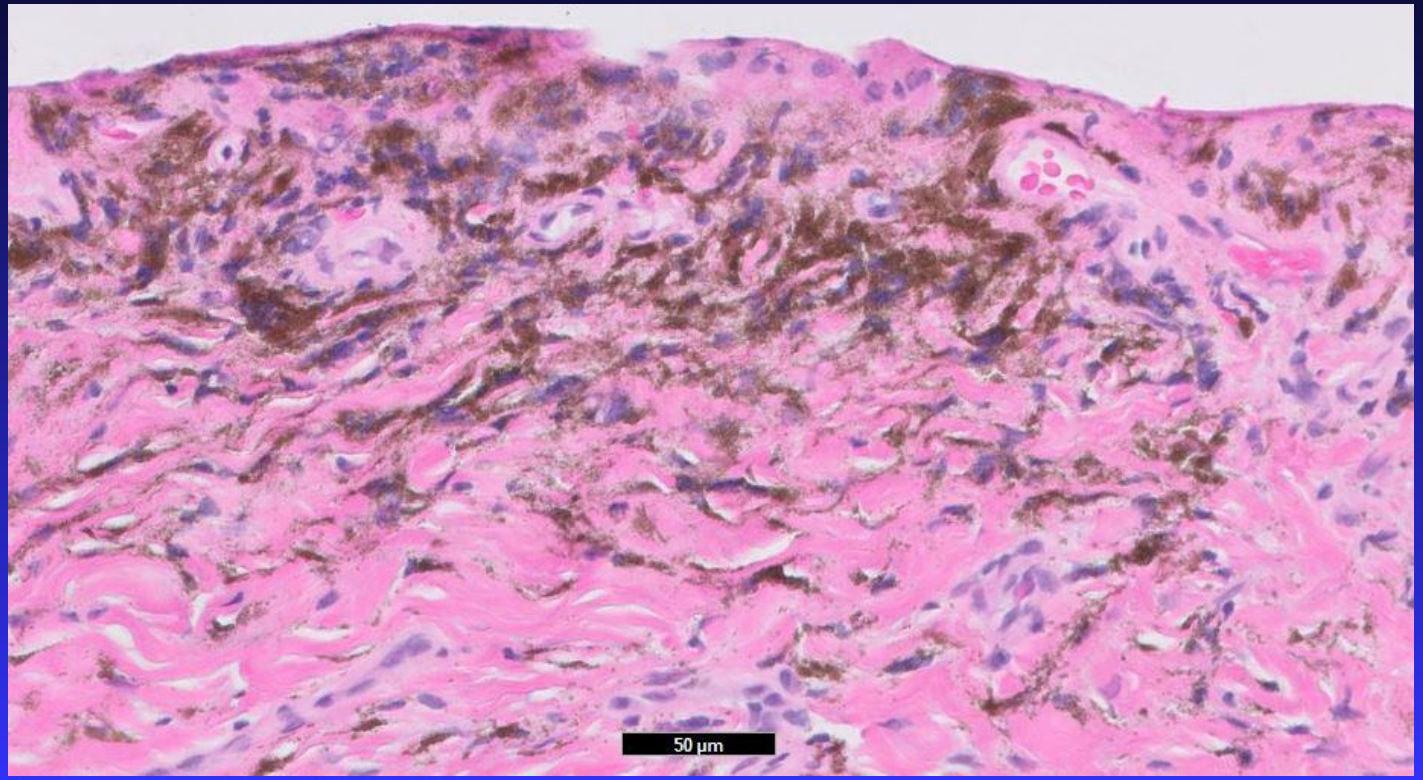
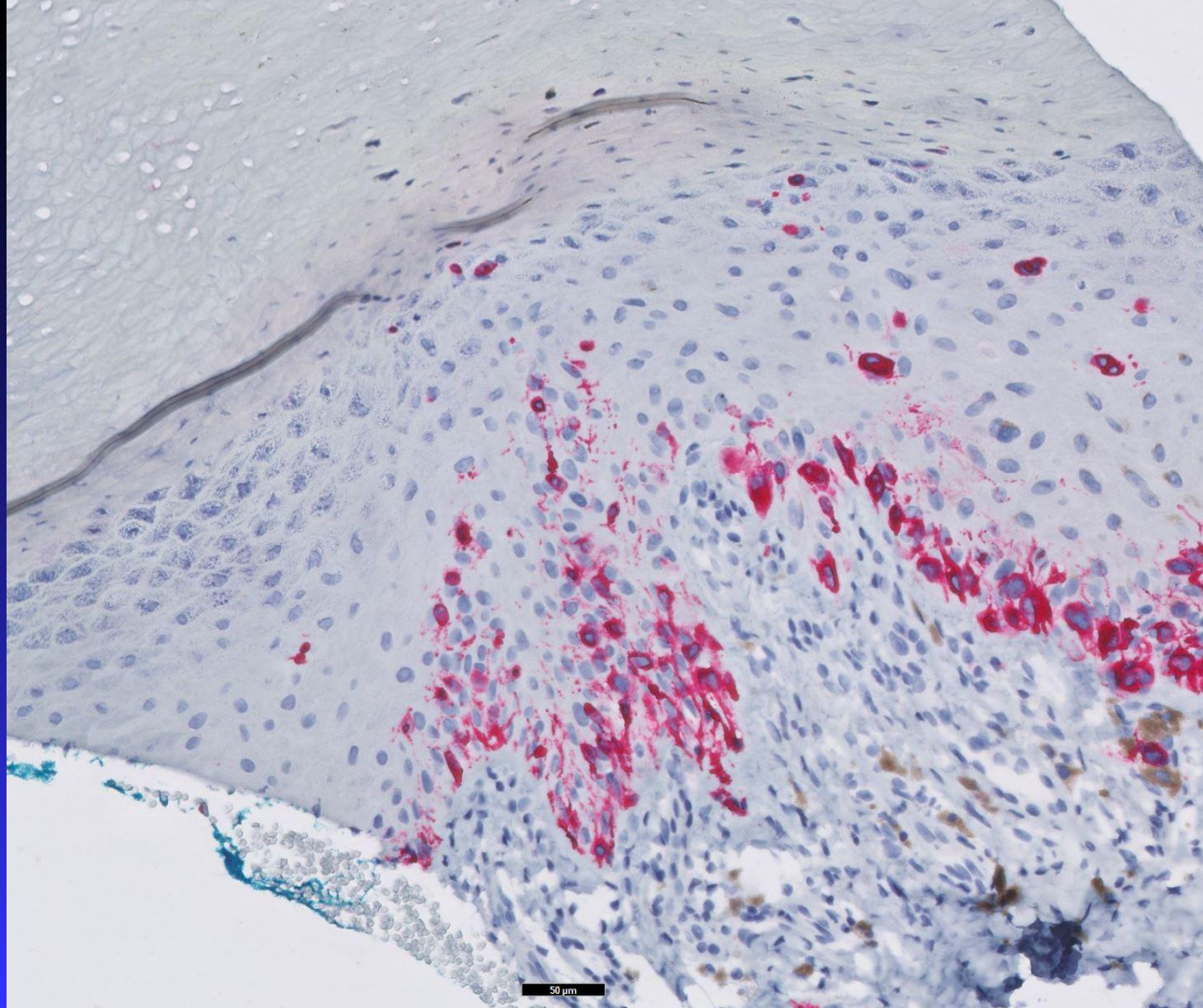
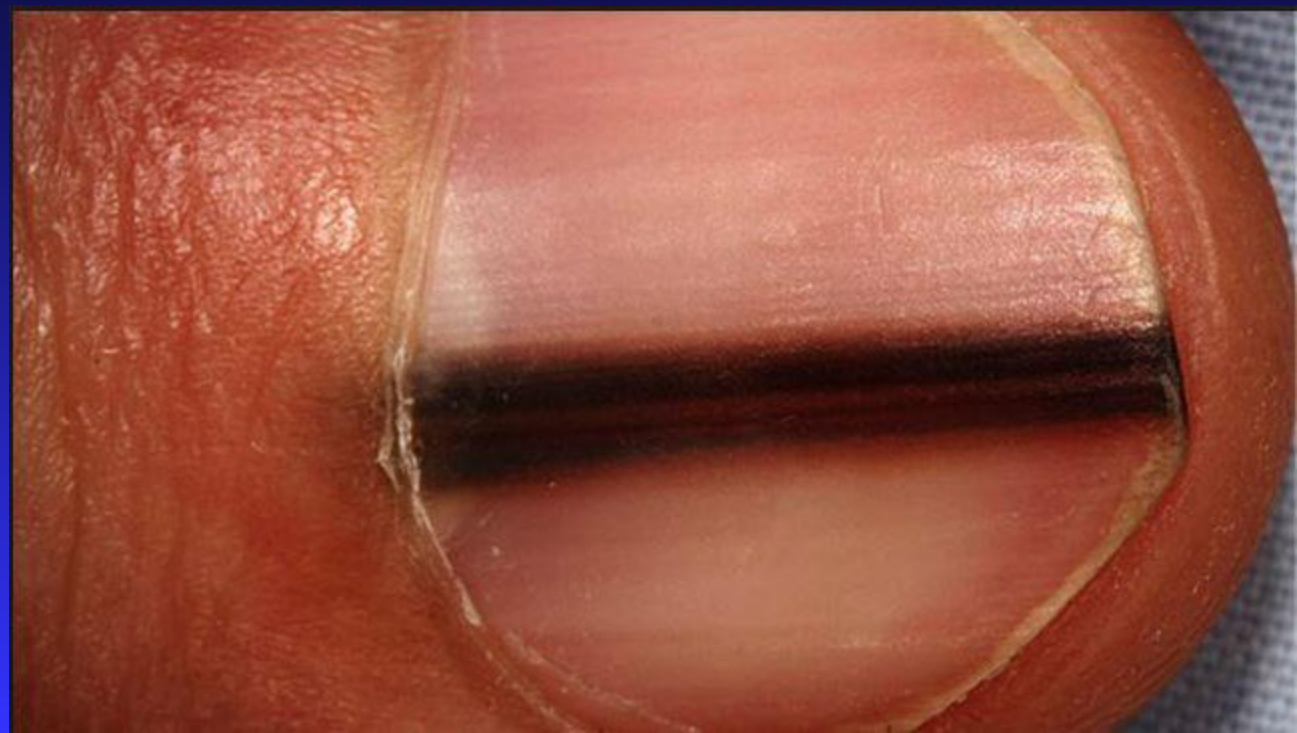


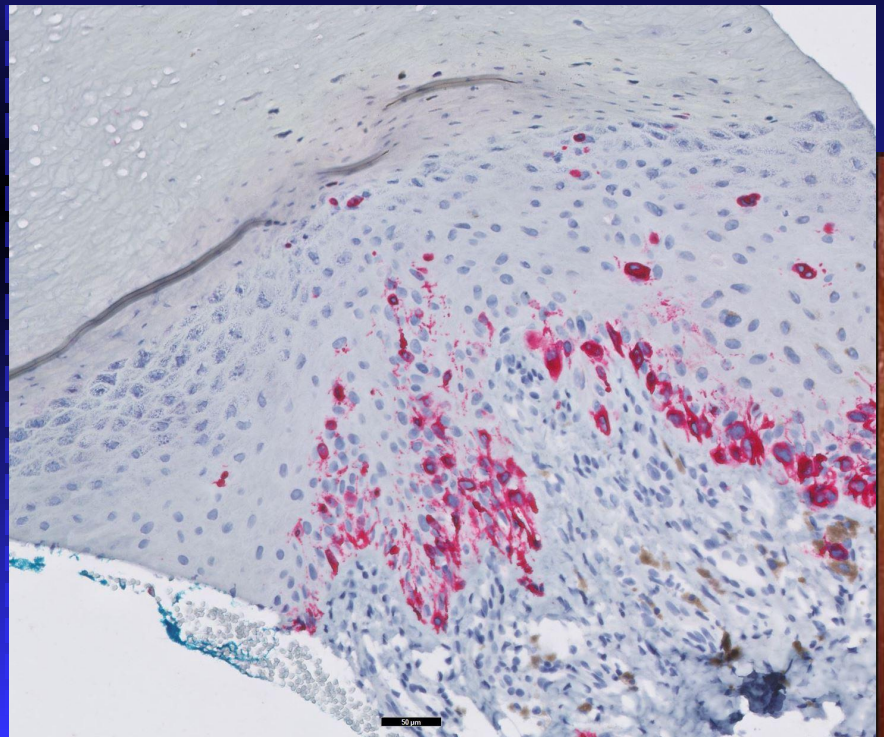
Case

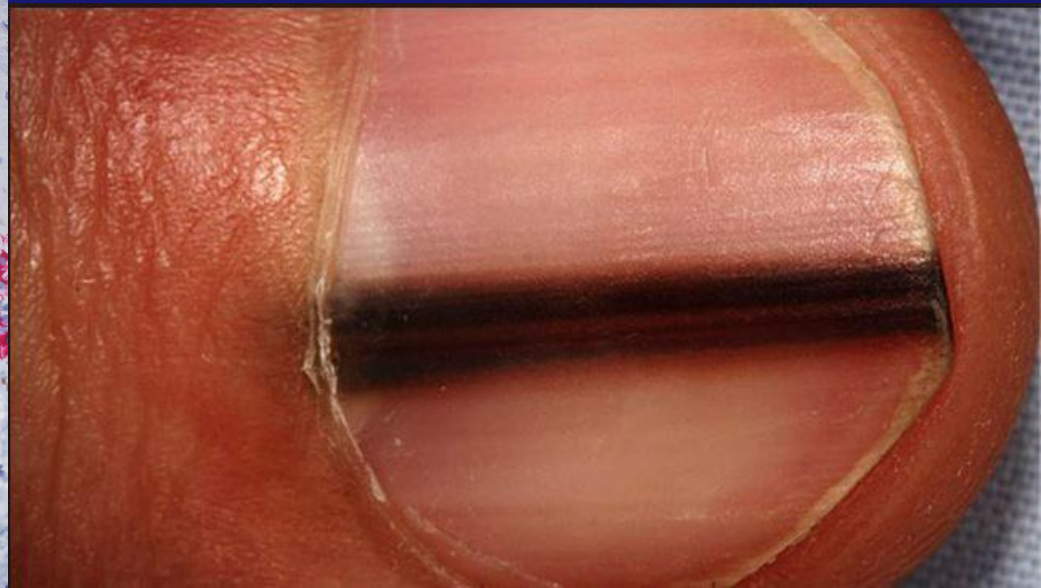


Case 60 y/o Left thumbnail

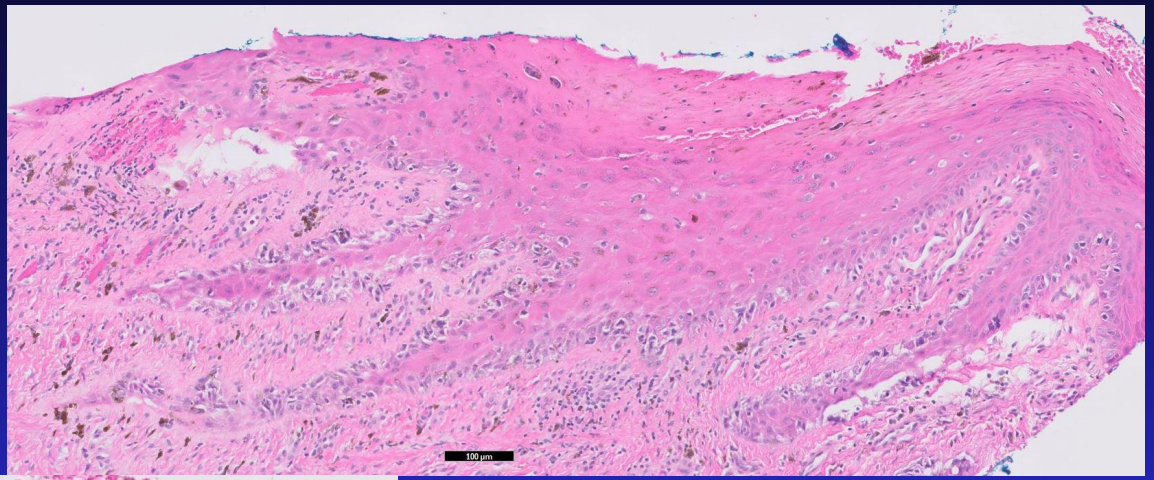


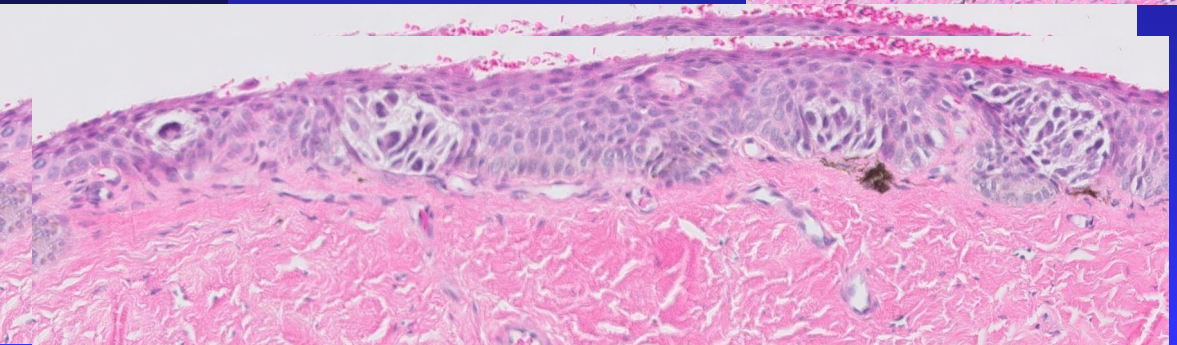
Case Melanoma in-situ





Benign? Atypical? Malignant?





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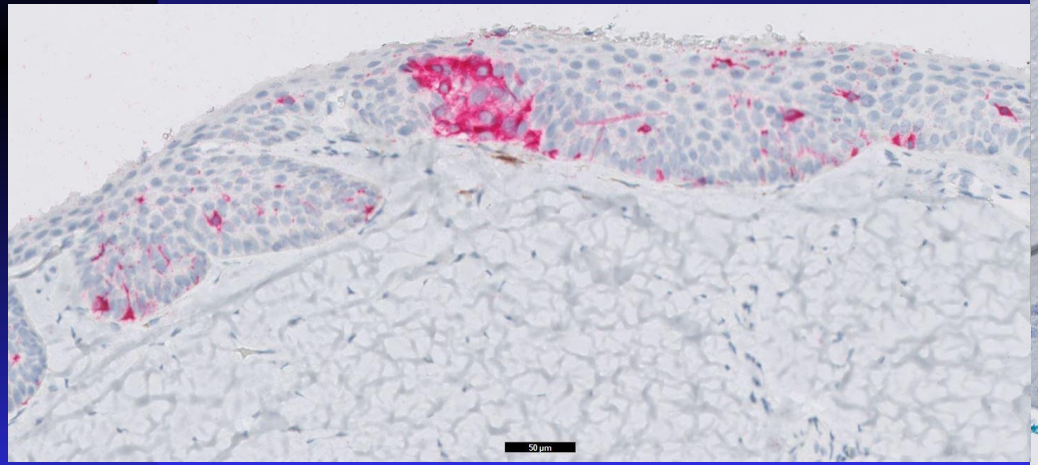
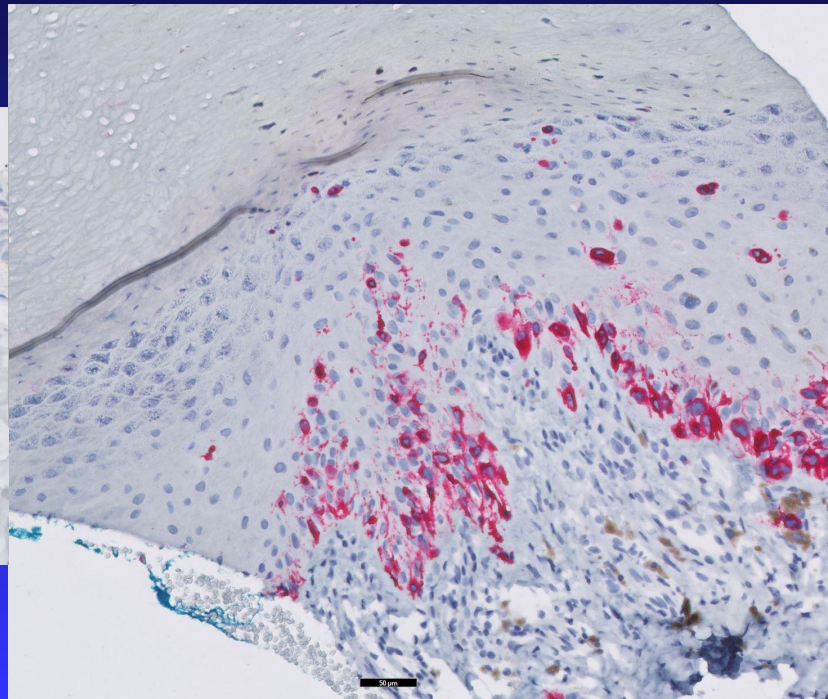
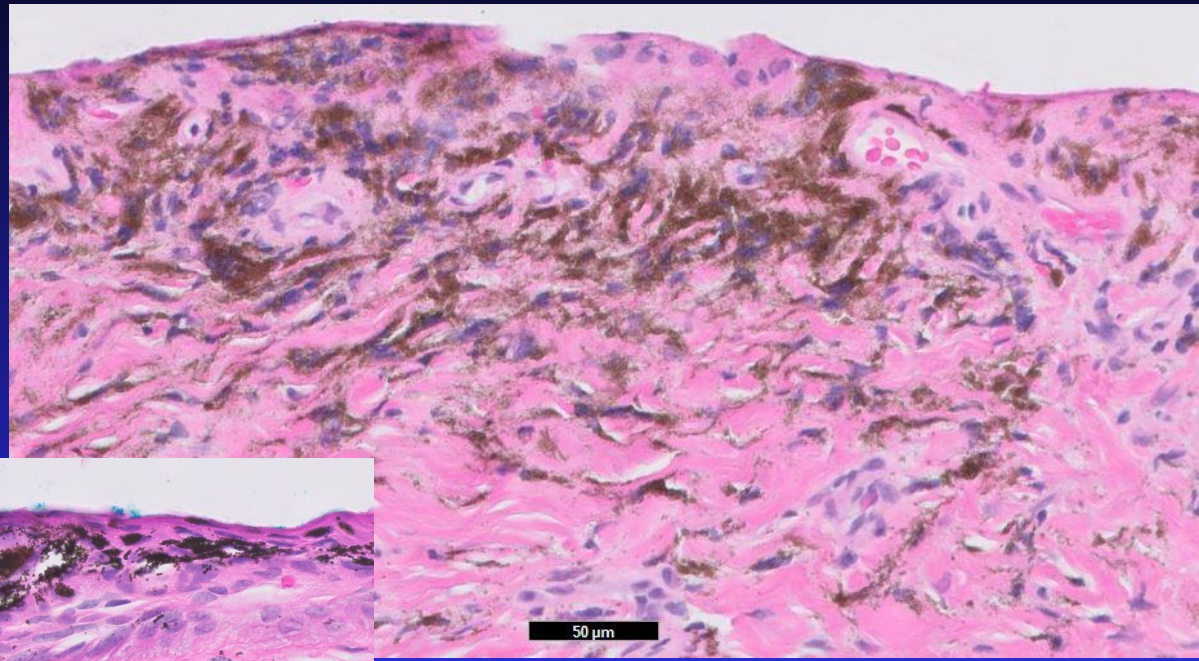
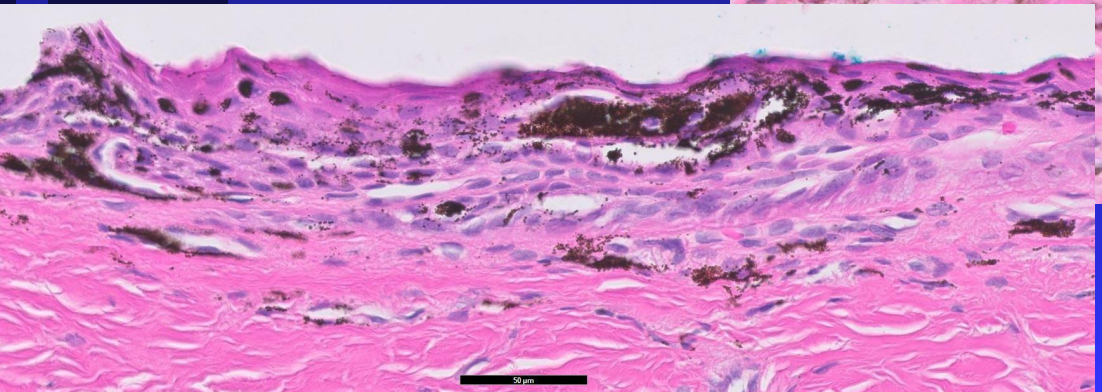




Benign? Atypical? Malignant?

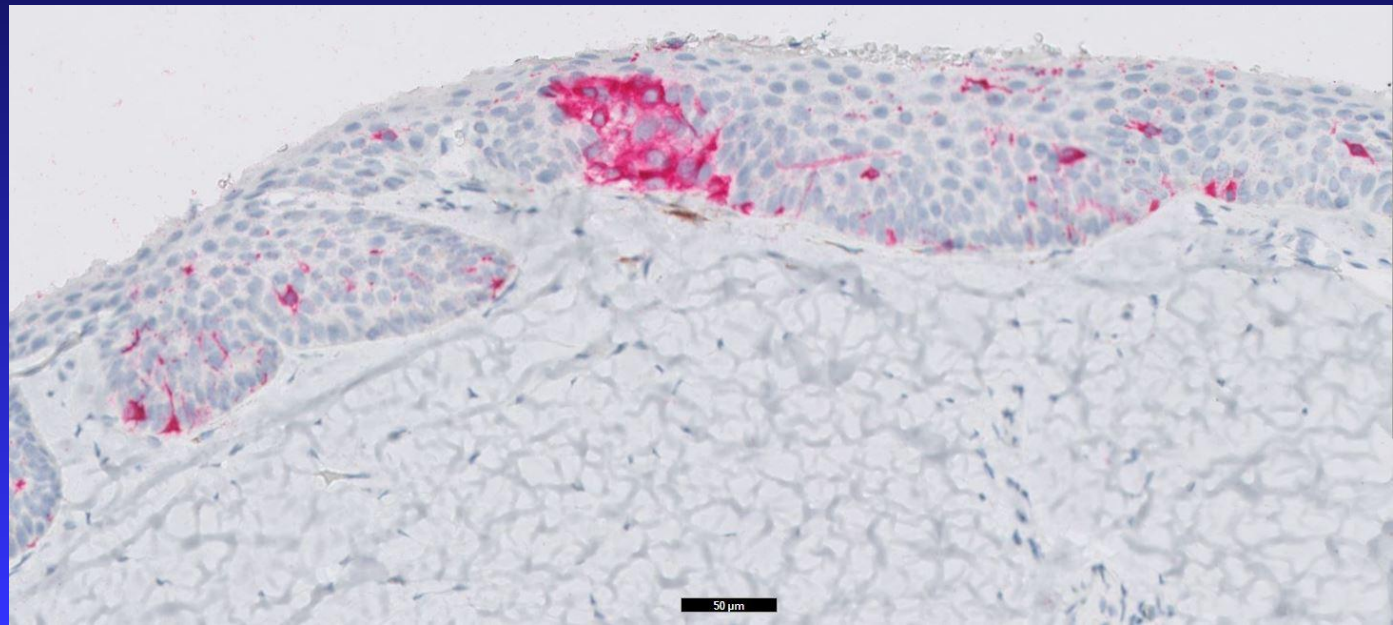




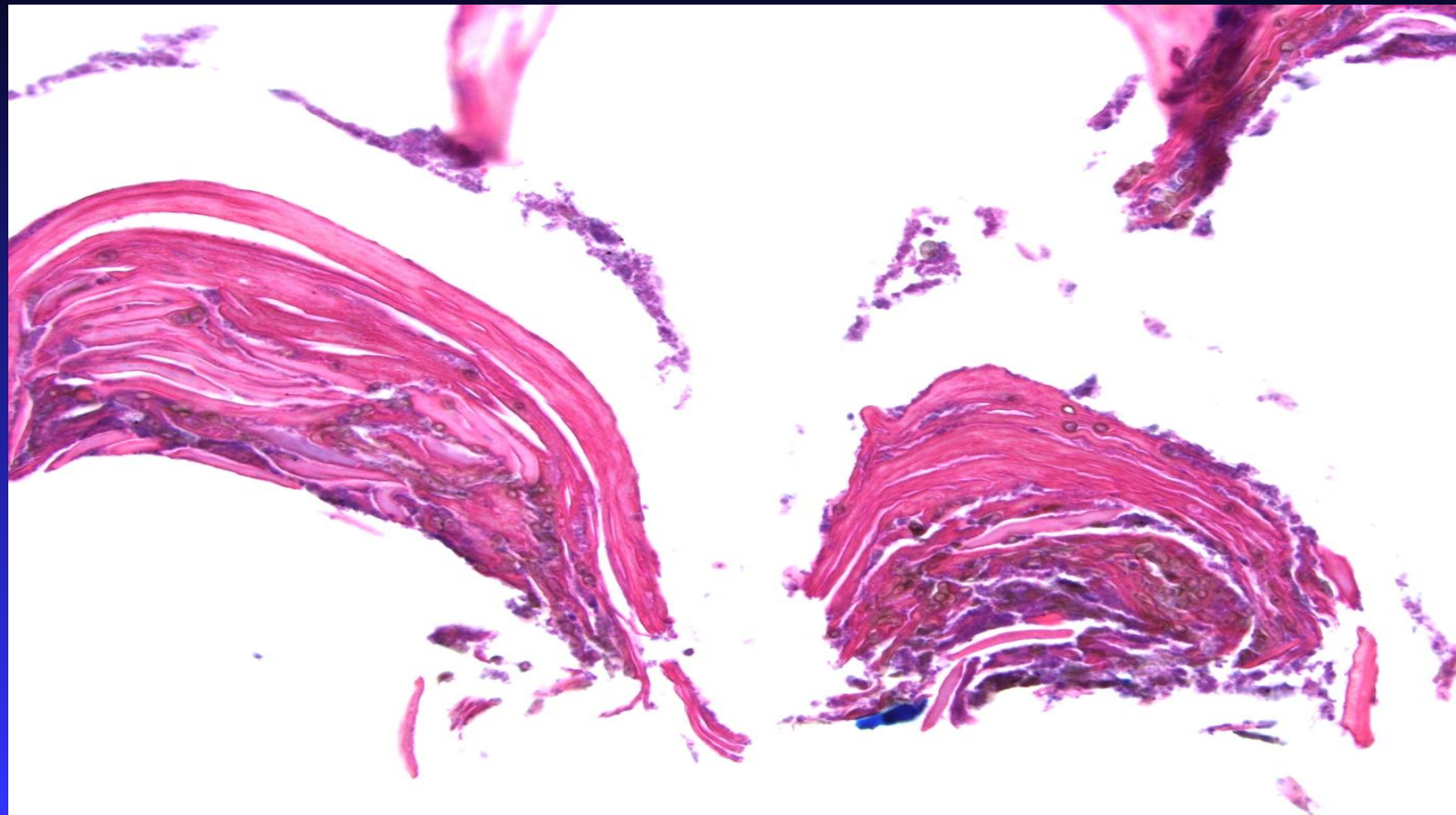
Current histopathology assessment is of limited utility.

- H&E
- Immunohistochemistry
- Genetic analysis—not yet possible

- Immunohistochemistry
  Currently only highlights melanocytes



Pigmented fungus



Nail Fungus Diagnostics

- Sampling is an issue
  - Subungal debris is better than nail plate for sampling.

JAAD
Journal of the American Academy of Dermatology

Subungual debris cytopathology increases sensitivity of fungus detection in onychomycosis

Christian S. Jordan, MD, PhD, Brandon Stokes, CHT, Curtis T. Thompson, MD

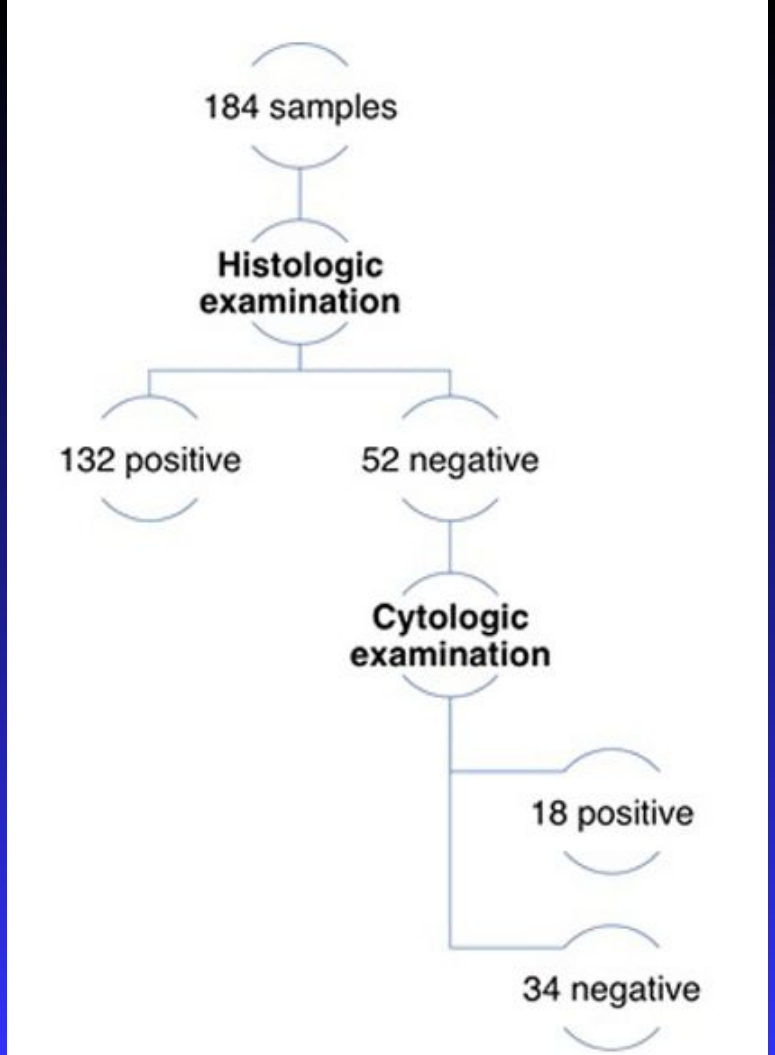
Centrifuge
(Cytospin, Fisher HealthCare)

Centrifuge with slide

Centrifuge with slide

J Am Acad Dermatol
Volume 75, Number 1

Fig 1. Onychomycosis. Microscopic examination of PAS-stained subungual debris. (Original magnification: ×400.) Subungual debris was collected by centrifugation of the formalin in which nail clipping specimens were submitted. Microscopic examination of a thin-layer preparation of PAS-stained subungual debris reveals multiple darkly staining fungal forms associated with a single keratin aggregate.


184 samples
Histologic examination
132 positive
52 negative
Cytologic examination
18 positive
34 negative

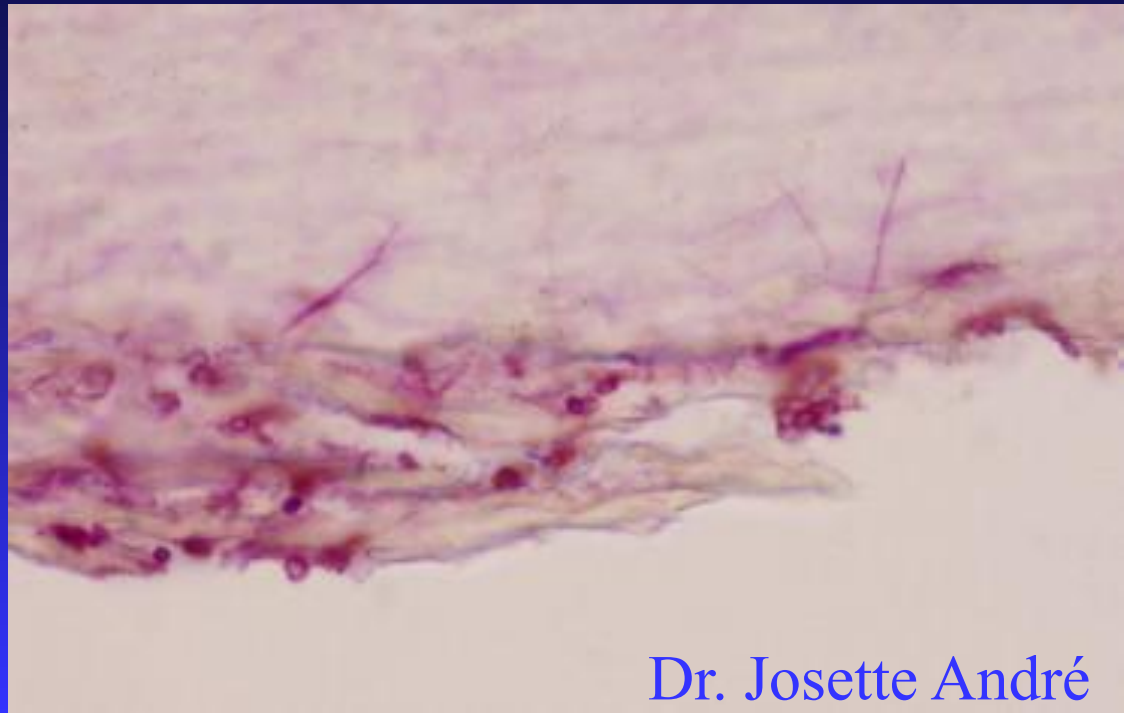
Submit specimen dry in a small envelope

- Test nail plate first
- If plate negative, then centrifuge and PAS

Mold

Mold vs Dermatophyte

- Invades vertical to nail plate.



Dr. Josette André

Mold vs dermatophyte speciation

- PCR—only to identify a mold or speciate a dermatophyte (tinea)
- PCR less sensitive than PAS stain

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curtisinportland@gmail.com

CTA Lab

CURTIS THOMPSON, MD & ASSOCIATES

Skin, Hair and Nail Pathology Experts