



Miller Van Gieson (MVG)

Adeline Lee Voon Hui

Learning Objectives



- **Understand the principles and sequence of MVG staining**
- **Identify elastic fibres and distinguish them from background tissues**
- **Recognise the impact of oxidation, bleaching, and differentiation steps**

What is Miller Van Gieson (MVG) Stain?



01 Improved staining method

For elastic fibres over the classical method of Elastic Verhoeff-Van Gieson (EVG)

02 Modified stain

Demonstrate elastic fibres selectively - better staining of coarse and fine fibres

03 Counterstain

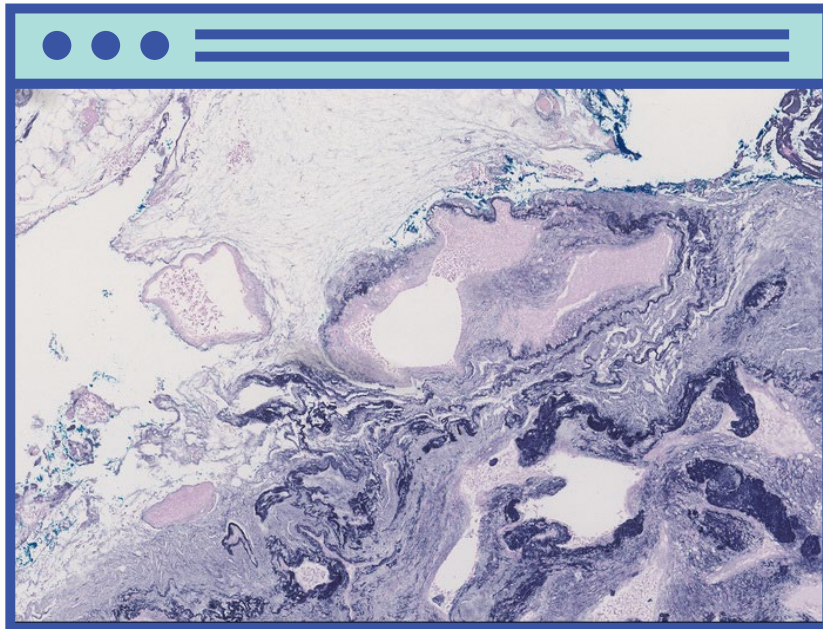
MVG (Nuclear Fast Red)

- Better elastin-to-background contrast

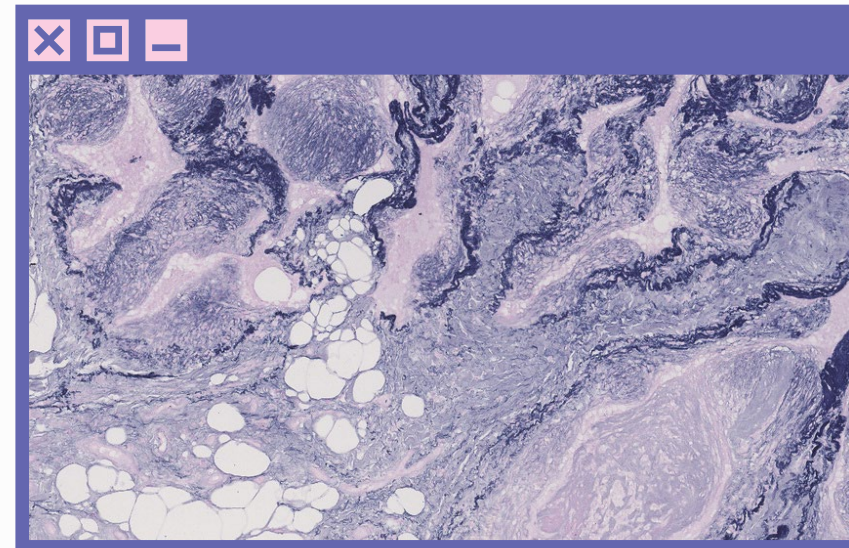
EVG (Van Gieson)

- Increase chances of section being differentiated (picric acid)

Examples of MVG Stain

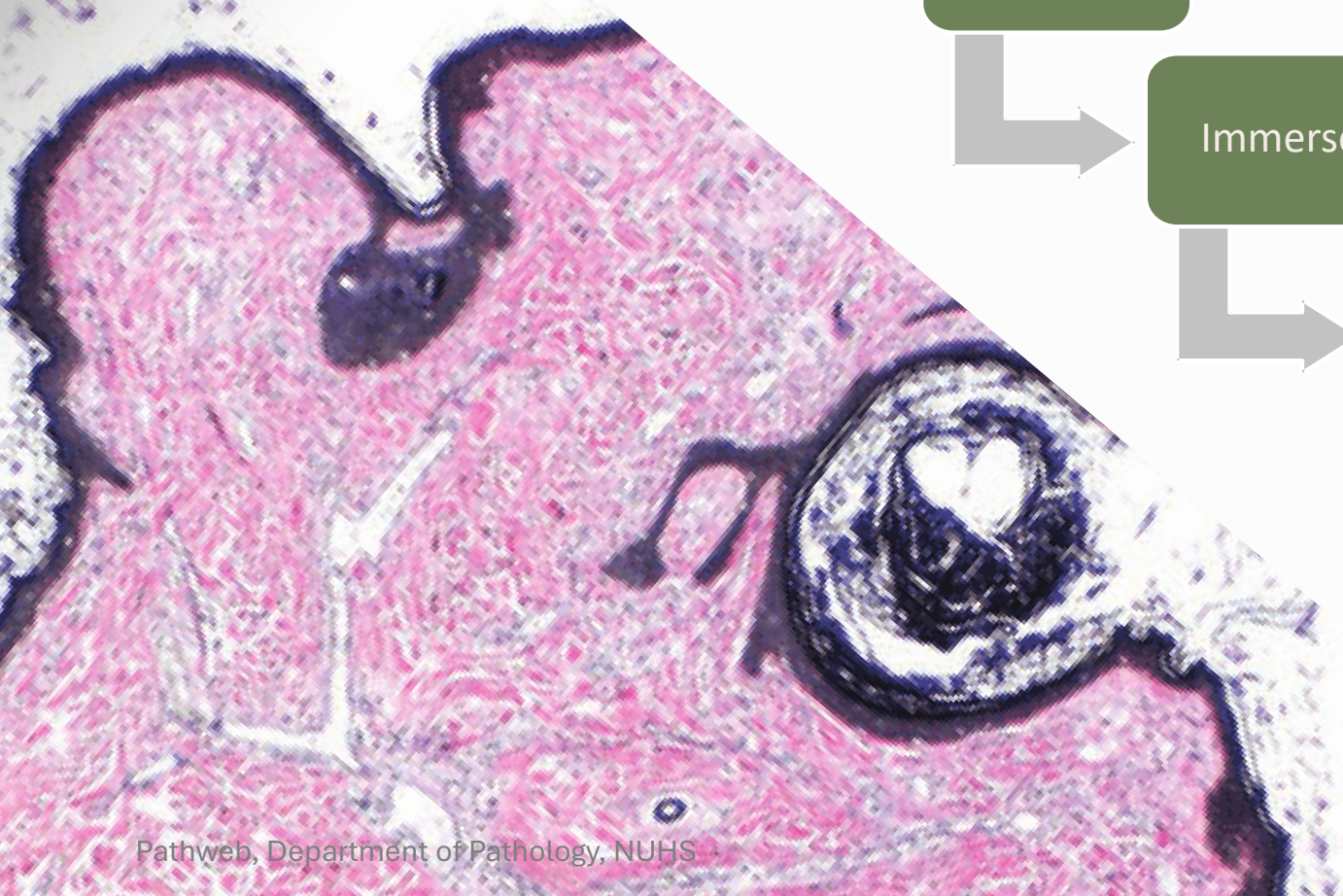
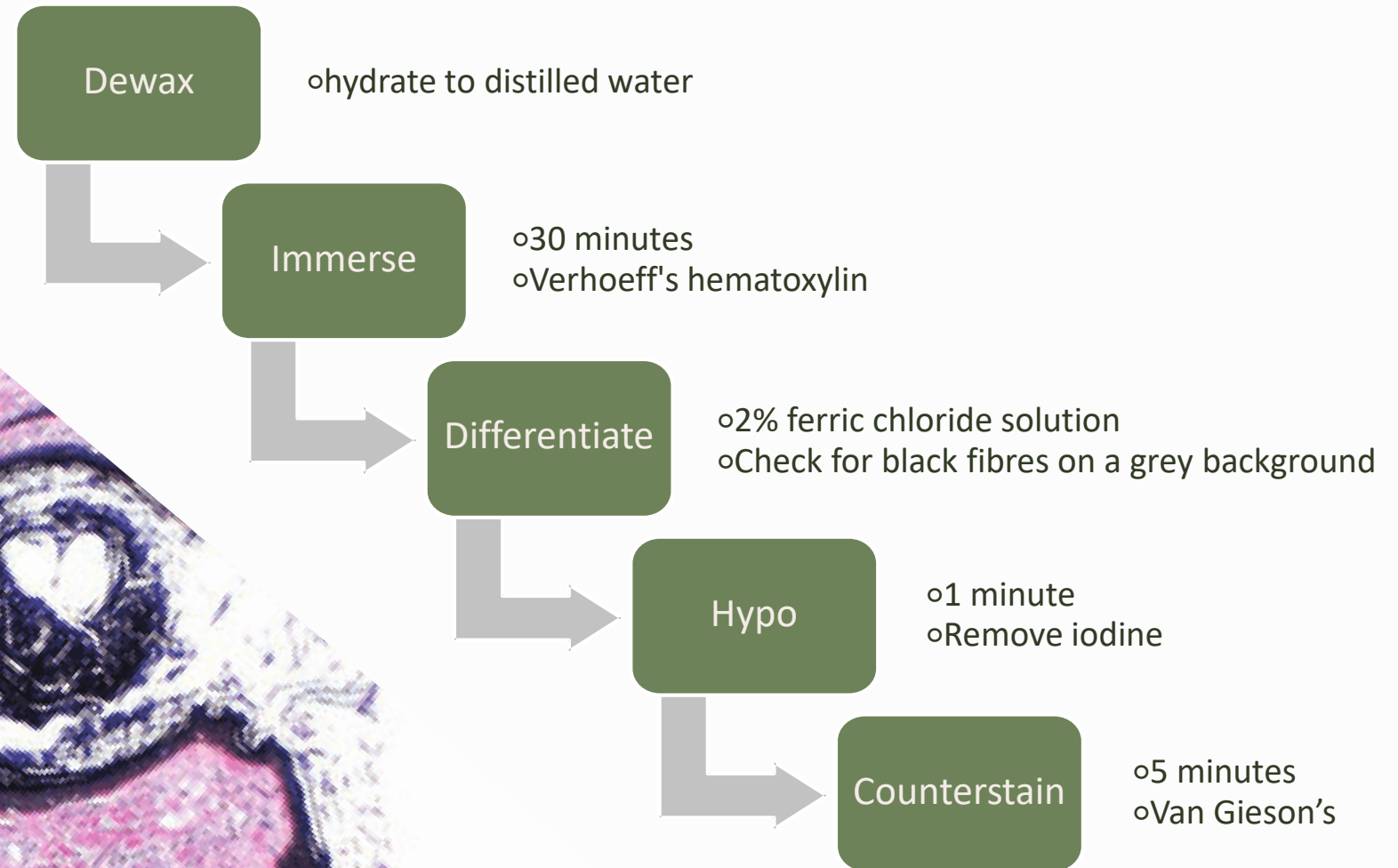


Dark blue - Elastic fibres
Pale pink - Background

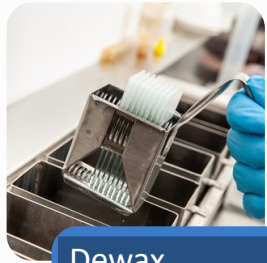


- Skin, colon, nerve, muscle
- Look at the quantity & pattern of fibers present
- Determine the appropriate treatment

Verhoeff's Van Gieson (EVG)

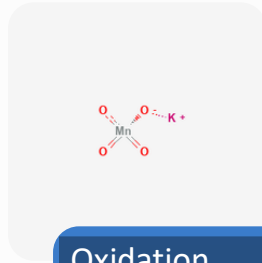


Miller Van Gieson (EVG)



Dewax

- Deparaffinise
- Hydrate sections to distilled water



Oxidation

- 0.25% KMnO_4
- 5 minutes



Bleach

- 1% Oxalic Acid
- 2 minutes
- colourless



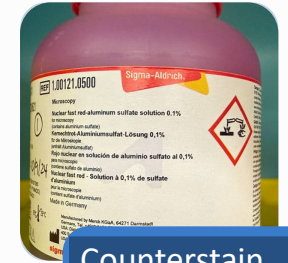
MVG Solution

- 30 minutes
- Room Temperature



Differentiation

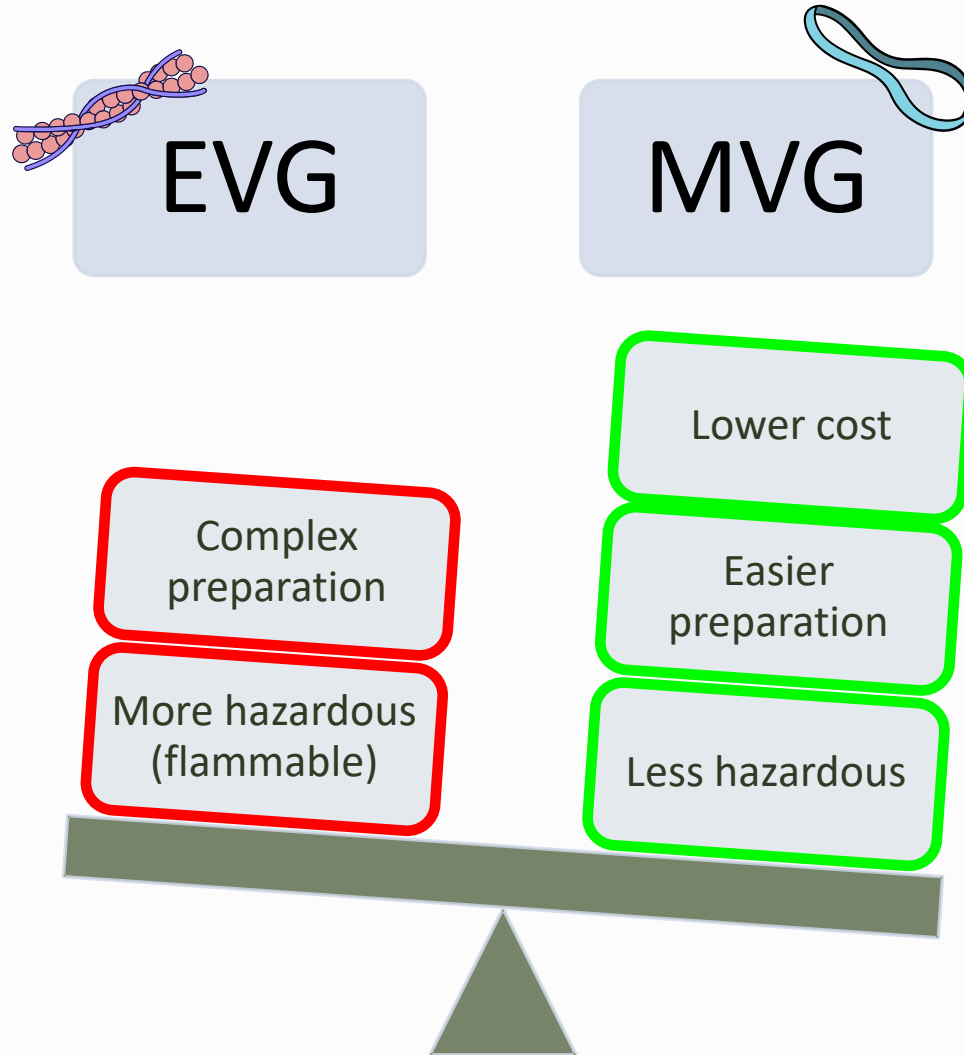
- 95% ethanol
- 1 minute



Counterstain

- Nuclear Fast Red
- 2 minutes

Why MVG?



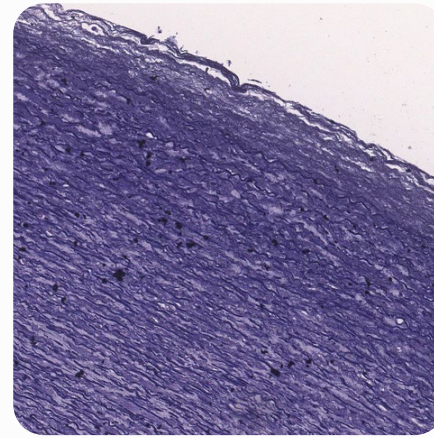
Can you recognise the differences between these stained MVG slides?



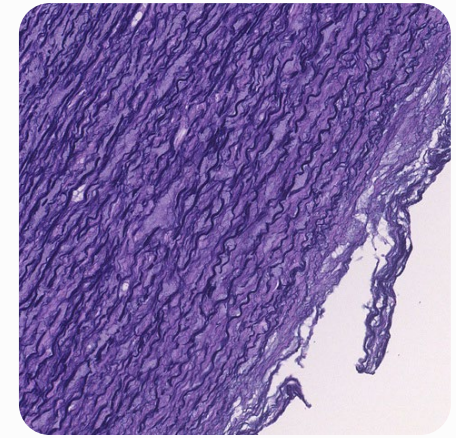
Control



A

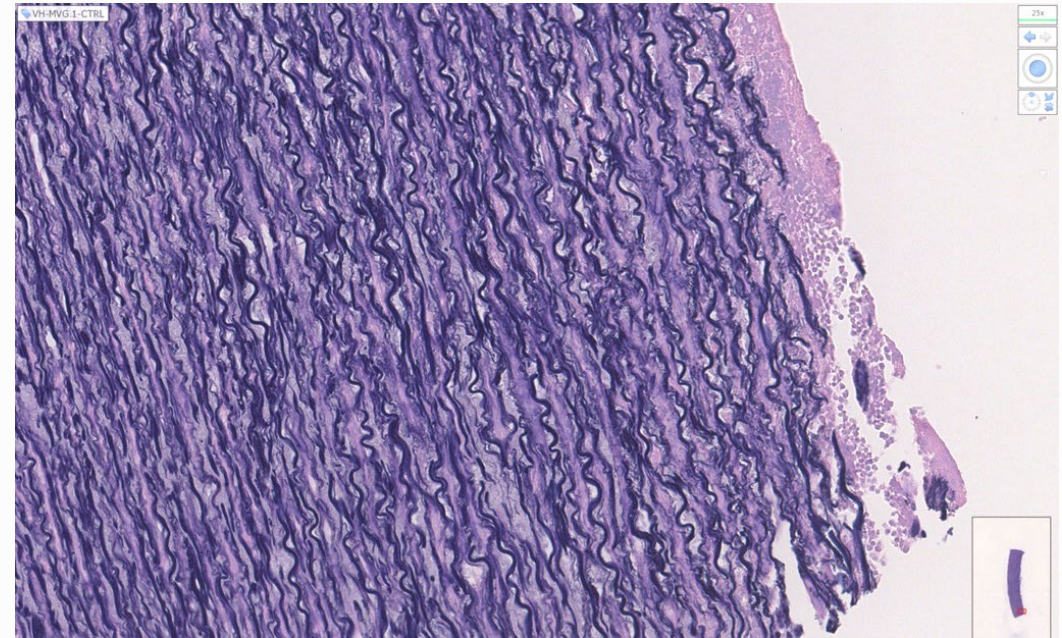
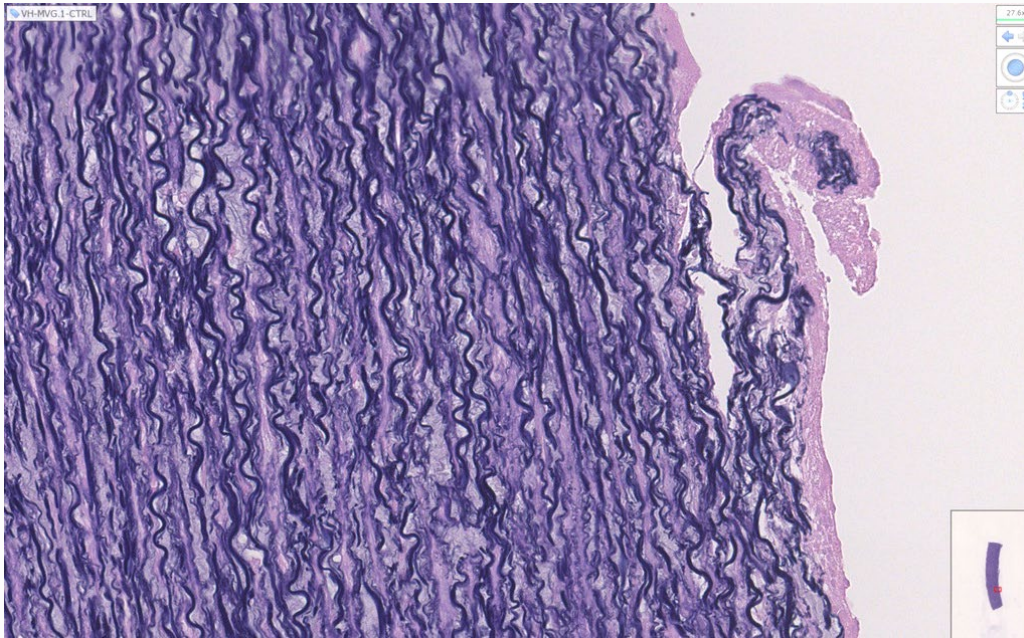


B



C

MVG Control

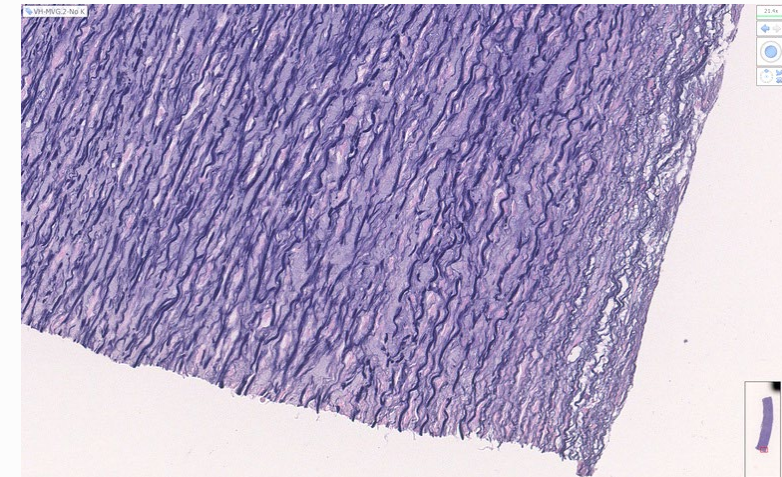
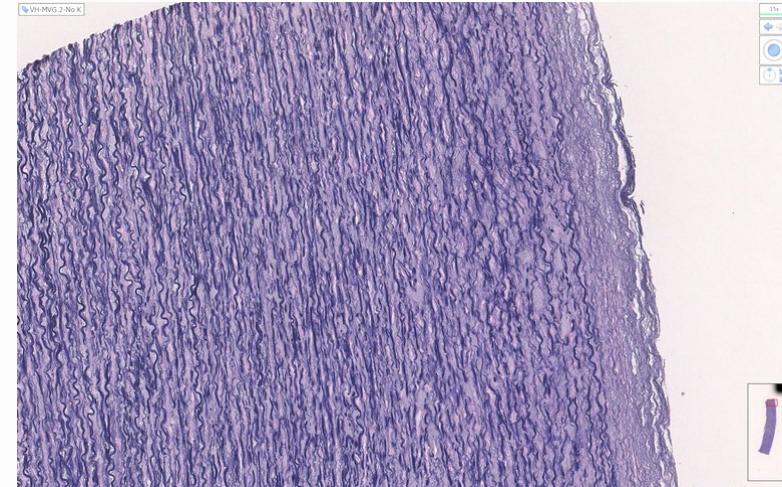


Oxidation

What happens during oxidation?

Acidified Potassium Permanganate (KMnO₄)

- strong oxidizing agent
- accepts electrons from other molecules
- causing the tissues to be oxidized
- sensitize the elastic fibers

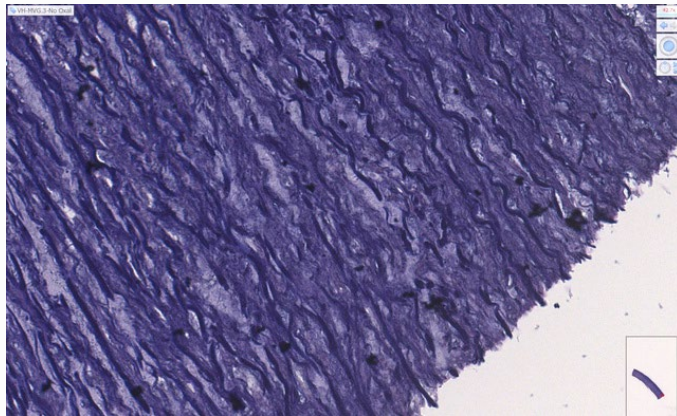
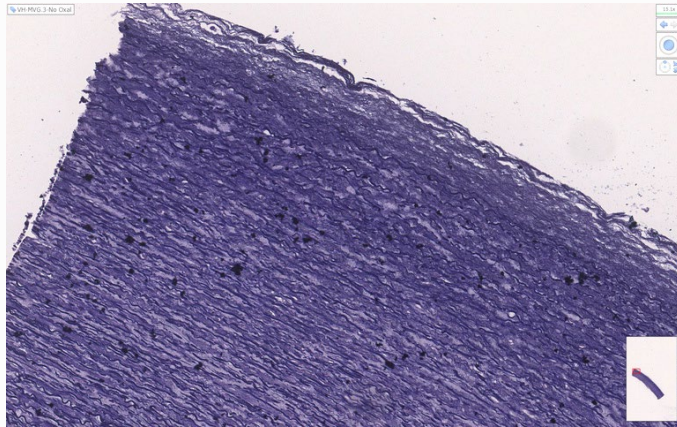


Skip Oxidation Step (A)

Bleach

1% Oxalic acid

- decolorizing agent
- removes the remaining brown pigment
- makes the elastic fibers receptive to the main stain



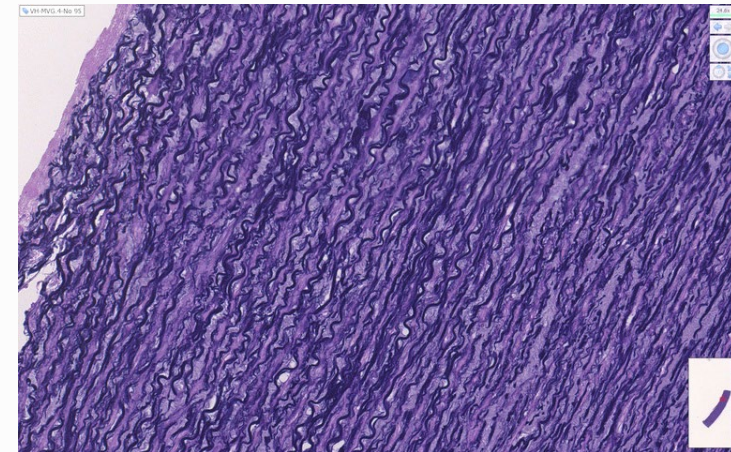
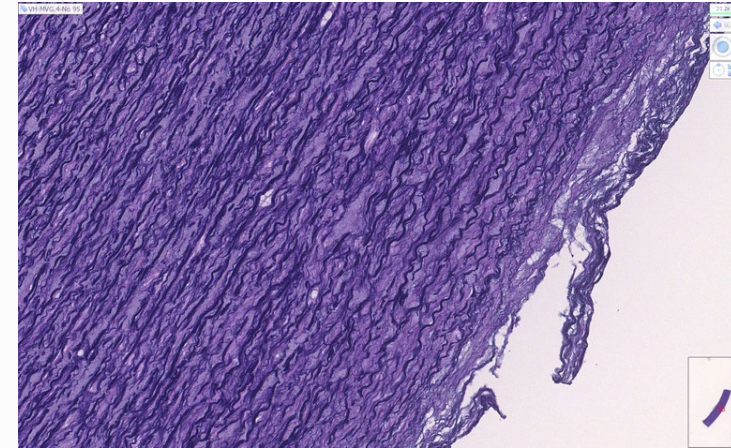
Skip Bleach Step
(B)

Differentiation

What happens during differentiation?

95% ethanol

- wash away excess staining solution
- removal of excess stain - collagen and cytoplasm, which are later counterstained
- selective retention - elastic fibres
- controlled differentiation - elastic fibers are sharply delineated



Skip Differentiation Step (C)

Take Home Messages



- MVG is a modified elastic stain with improved elastin-to-background contrast
- Elastic fibres stain dark blue to black, while background is pale pink
- Oxidation sensitises elastic fibres; omission leads to poor fibre visibility
- Recognise the impact of oxidation, bleaching, and differentiation steps