

Movat (Russell-Movat) Pentachrome Stain

The Russell-Movat stain is useful when studying the heart, blood vessels, and connective tissues. Because of the striking way in which it differentiates collagen, elastica, muscle, mucin, and fibrin, the Russell-Movat stain reveals early and subtle changes in the interrelationships of many of the tissues which are not apparent with routine and other special stains.

Fixation

Use 10% buffered neutral formalin or Karnovsky's.

Technique

Cut paraffin sections at 6 microns

Staining Solutions

1% Alcian Blue Solution

alcian blue, 8 GS (1.0 g)
distilled water (100.0 mL)
glacial acetic acid (1.0 mL)

Alkaline Alcohol

Ammonium hydroxide (10.0 mL)
Alcohol, 95% (90 mL)

Hematoxylin Solution

Absolute alcoholic hematoxylin, 5% (50 mL)
Ferric chloride, 10% aqueous (25.0 mL)
Iodine solution (25.0 mL)
 Iodine (2.0 g)
 Potassium iodide (4.0 g)
 Distilled water (100 mL)

Sodium Thiosulfate

Sodium thiosulfate (5.0 g)
Distilled water (100 mL)

Crocein Scarlet (Stock Solution)

Crocein scarlet (.1 g)
Distilled water (99.5 mL)
Glacial acetic acid (0.5 mL)

Acid Fuchsin (Stock Solution)

Acid fuchsin (.1 g)

Distilled water (99.5 mL)

Glacial acetic acid (0.5 mL)

Crocein Scarlet – Acid Fuchsin (Working Solution)

Mix 8 parts Crocein Scarlet “stock” with 2 parts Acid Fuchsin “stock”

Alcoholic Safran Solution

Safran de Getinaiis (6.0 g)

Absolute alcohol (100 mL)

(Keep tightly closed to prevent hydration)

Staining Procedure

1. Deparaffinize and hydrate in DI H₂O
2. Stain in Alcian blue for 20 minutes
3. Wash in running tap water for 5 minutes
4. Place slides in Alkaline alcohol for exactly 1 hour
5. Wash in running tap water for 10 minutes
6. Rinse in DI H₂O
7. Stain in Hematoxylin solution for 12 to 15 minutes
8. Rinse in several changes of DI H₂O
9. Differentiate carefully, each individual slide, by dipping 2 or 3 times in 2% aqueous ferric chloride; rinse in DI H₂O and check under microscope
10. Place slides in sodium thiosulfate for 1 minutes
11. Wash in running tap water for 5 minutes; rinse in DI H₂O
12. Stain in crocein scarlet-acid fuchsin for 1 ½ to 3 minutes, depending on desired redness
13. Rinse in several changes of DI H₂O
14. Rinse in .5% acetic acid water
15. Place slides in 5% aqueous phosphotungstic acid, 2 changes of 5 minutes each
16. Rinse in .5% acetic acid water
17. Rinse in 3 changes absolute alcohol
18. Stain in safran for 15 minutes
19. Rinse in 3 changes of fresh absolute alcohol and 2 changes of Xylene and mount in mounting medium

Results

Nuclei and elastic fibers – black

Collagen and reticular fibers – yellow

Ground substance, mucin – blue

Fibrinoid, fibrin intense – red

Muscle – red

Remarks: Differentiation of the elastica is usually accomplished quickly and is complete when the elastic fibers remain black and the background becomes relatively clear. Most sections contain blood vessels, and the elastica within them is easily identified and helpful in differentiation. A control section (e.g. skin) should be included

each time the stain is performed. The complete removal of alkaline alcohol with running water (Step #5 of staining procedure) is important. Failure to remove all alkaline alcohol will inhibit the stains that follow.

Reference

Russell, H.K.: A modification of the Movat pentachrome stain. Arch Pathol, 94: 187, 1972.

*This stain has been modified from the originally described formulation. This can be used only with paraffin (not plastic) sections.