Sudan III Staining Solution

Cat #: A-CSH303

Size: 3×50mL

Storage: Room temperature, avoid light (12 months)

Product Composition

Component	3×50mL	Store at
Reagent (A): Mayer hematoxylin staining solution	50ml	10~30°C, and were protected from light
Reagent (B): Sudan differentiation solution	50ml	10~30°C
Reagent (C): Sudan staining solution	50ml	10~30°C, and were protected from light

Product Description

Lipids are a collective term for neutral fats, phospholipids, and their derivatives. They share the common physical characteristic of being insoluble in water but soluble in organic solvents such as ethanol and ether. In the human body, there are two main types of fats: 1) Storage fats, such as neutral fats, which are primarily located in subcutaneous tissues, kidneys, and pancreas. 2) Structural fats, such as phospholipids, glycolipids, and cholesterol, which are mainly found within cells.

Neutral fat, also known as triglycerides, is a type of lipid composed of three fatty acid molecules and one glycerol molecule. It is neutral in nature. Neutral fat serves as a way to store energy, which is released upon oxidation. Under normal conditions, cells other than adipocytes are almost invisible for lipid droplets under an optical microscope. The presence of a large number of lipid droplets in the cytoplasm indicates lipid degeneration, commonly observed in hepatocytes, myocardial cells, renal tubular epithelial cells, and others.

Sudan dyes, such as Sudan II, Sudan III, Sudan IV, Sudan Black B, and Oil Red O, are frequently used for lipid staining.

The mechanism of lipid staining with Sudan dyes is generally attributed to the physical solubilization and adsorption of the dyes in lipids. Due to the higher solubility of Sudan dyes in lipids compared to organic solvents, the dyes transfer from the staining solution to the lipid being stained, causing the lipid to acquire the color of the staining solution.

Sudan III staining solution is mainly used to demonstrate lipid degeneration in tissue organs and abnormal lipid deposition in lipids. It is commonly observed in the fatty degeneration of solid organs such as the liver, kidney, and heart, where numerous neutral fat droplets appear within the cells. This staining technique helps in the identification and diagnosis of tumors occurring in fatty tissues and their nature.

To perform lipid staining, it is recommended not to use fixatives containing ethanol (10% neutral formalin can be used for fixation if needed) and not to use paraffin for sectioning. Instead, frozen sections or carbon wax sections should be used.

Usage

1. Fresh tissues should be sectioned at low temperatures, generally around -20 to -25°C. If the sample is a lipoma, the temperature should be adjusted to -30°C.
2. Cut frozen sections with a thickness of 6-15 μm (preferably 6-8 μm) and place them on glass slides.
3. Rinse with distilled water.
4. Incubate the sections in Mayer's hematoxylin staining solution for 1 minute to lightly stain the nuclei.
5. After rinsing with tap water, differentiate the sections in Sudan III differentiation solution for a few seconds until the nuclei appear blue.
6. Rinse with distilled water, followed by a brief immersion in 70% ethanol.
7. Incubate the sections in Sudan III staining solution for 30 minutes.
8. Differentiate briefly in 70% ethanol, then rinse with tap water.
9. Use filter paper to remove excess water from the sections and allow them to air-dry slightly.
10. Seal the sections with glycerol gelatin.

Staining Results

neutral fat	hyacinth
nucleus	nattier blue

Notes

1. Do not use fixatives containing ethanol or paraffin for the specimens. Frozen sections should be used. If fixation is necessary, 10% neutral formalin or 10% formaldehyde-calcium solution can be used.

2. It is important to prevent dye precipitation during the staining process. Therefore, the sections should be sealed and protected from exposure to moving air to avoid precipitation caused by solvent evaporation.

3. Frozen sections are more prone to staining, so caution should be exercised to avoid over-staining with Mayer's hematoxylin.

4. Sudan dyes are prone to fading and should be stored in a tightly sealed container.

5. Samples sealed with glycerol gelatin have a limited shelf life. If long-term preservation is required, neutral gum can be applied at the edges where the cover glass meets the slide to create a seal.

6. For your safety and health, please wear a lab coat and disposable gloves while performing the procedure.

Disclaimer

The reagent is only used in the field of scientific research, not suitable for clinical diagnosis or other purposes.