

Alcian Blue Staining Solution (pH2.5)

A1507852

Storage: 2-8°C. Store in the dark.

Introduction:

Alcian Blue, also known as Azure Blue or Alcian Blue, is a copper phthalocyanine-conjugated dye. It was originally used for dyeing textile fibers. As a cationic dye, it binds to acidic groups—specifically, it forms insoluble complexes with anionic groups (such as carboxyl and sulfate groups) present in tissues. Alcian Blue consists of a central copper-containing phthalocyanine ring linked to four isothioureia groups via thioether bonds. These isothioureia groups are moderately basic, giving Alcian Blue a cationic charge. The exact mechanism by which Alcian Blue stains carbohydrates remains unclear, but it is generally believed that the cationic isothioureia groups bind electrostatically to polyanions in tissues. For example, they form insoluble complexes with the carboxyl and sulfate groups of acidic mucous substances (containing carboxyl and sulfate groups). In other words, the positively charged salt bonds in the dye molecules combine with the negatively charged acidic groups in acidic mucous substances, resulting in a blue color.

Alcian Blue staining solution can distinguish different types of mucous substances by adjusting the pH value of the solution: At pH 2.5: Carboxyl groups in tissues ionize, carrying a negative charge. They form salt bonds with the cations in Alcian Blue, staining tissues containing carboxyl groups (e.g., proteoglycans/hyaluronic acid and epithelial acidic mucins). At pH 1.0: Sulfate groups in tissues ionize, carrying a negative charge. They form salt bonds with the cations in Alcian Blue, staining tissues containing sulfate groups (e.g., sulfated mucous substances). Neutral mucins (e.g., neutral mucins in the gastric mucosa and Brunner's glands) do not react with Alcian Blue.

Self-Prepared Materials:

Distilled water, a series of ethanol solutions, nuclear fast red staining solution, xylene, neutral balsam, etc.

Operating Procedures (for reference only):

1. Dewax sections with xylene, then pass through a graded ethanol series, and finally rehydrate in distilled water.
2. Immerse the sections in Alcian Blue Staining Solution - Solution A (pH 2.5) for 15-30 minutes, then rinse with running water for 5 minutes.
3. Counterstain with nuclear fast red staining solution for 10 minutes, then rinse with running water for 1 minute.
4. Dehydrate with ethanol in the usual manner, clear with xylene, and mount with neutral balsam.

Staining Results:

Acidic mucins (sulfated mucins and salivary mucins): Blue.

Proteoglycans and hyaluronic acid: Blue.

Cell nuclei: Red.

Precautions:

1. Use 10% neutral formalin fixative for tissue fixation.
2. To selectively identify sulfated mucins and proteoglycans, use Alcian Blue at a low pH (pH = 1.0) by adjusting the solution's pH to 1.0. The staining procedure is the same as that for Alcian Blue at pH 2.5, but the staining time should be extended accordingly.
3. Opened reagents should be used up within 6 months of opening. Tighten the bottle cap immediately after each use to prevent volatilization or deterioration.
4. For your safety and health, wear a lab coat and disposable gloves during operation.
5. This product is for scientific research only and must not be used for other purposes.