Neutral Red Staining Solution

(Vacuolar System Specific)

N1513165

Storage Room temperature.
Shipping Regular transportation.

Introduction

Neutral red is a weakly basic pH indicator and a commonly used vital stain. Its color change range is pH 6.4–8.0 (red to yellow). Its molecular formula is $C_{15}H_{16}N_4 \cdot HCl$, and its molecular weight is 288.78. As a reagent for specific staining of the vacuolar system, its staining effect is closely related to cell viability, intracellular environment, and cell type. The specific characteristics and staining principles are as follows:

For plant cells, under neutral or slightly alkaline conditions, living cells can absorb large amounts of neutral red and excrete it into the vacuole. Since the vacuole of plant cells typically exhibits an acidic reaction, the neutral red that enters the vacuole dissociates into a large number of cations, resulting in a cherry-red color. During this process, the protoplasm and cell wall generally remain unstained. In dead cells, due to the denaturation and coagulation of the protoplasm, the cell sap cannot be maintained within the vacuole, and no vacuolar staining occurs after neutral red staining. Instead, the cations of neutral red bind to the negatively charged protoplasm and nucleus, staining both.

For animal cells, the vacuolar system consists of vesicles surrounded by a single membrane, including lysosomes, the Golgi complex, the endoplasmic reticulum, phagosomes, transport vesicles, etc. The vacuolar system is most developed in chondrocytes, and neutral red can specifically stain it.

The Neutral Red Staining Solution (Vacuolar System Specific) is neutral in pH. As a specific vital stain for the vacuolar system in tissues or cells, when staining living cells, it only stains the vacuolar system red, while the cytoplasm and nucleus remain unstained. This allows for precise and specific observation of the vacuolar system.

Component List

N1513165	Component	100 mL	Storage
N1513165A	Neutral Red Staining Solution (Vacuolar System Specific)	100 mL	RT.
N1513165B	Ringer Buffer	250 mL	RT.

Procedure (For Reference Only)

1. Sacrifice a toad or other animal by severing the spinal cord. Secure it on a wax dish, open the abdominal cavity, and obtain a small piece from the thinnest part of the xiphoid cartilage. Place it on a clean glass slide.
2. Add the Neutral Red Staining Solution (for Vacuolar System), ensuring the sample is completely covered by the stain. Stain for 15–20 minutes.
3. Use absorbent filter paper to remove excess stain from around the edges of the slide.
4. Add Ringer Buffer, cover with a coverslip, and use filter paper to absorb excess liquid from the side of the coverslip.
5. Immediately after completion, proceed to microscopic observation or photography.

Staining Results

Under the microscope, chondrocytes appear oval. The intracellular vacuolar system consists of vesicles of varying sizes, exhibiting a rose-red color. The cytoplasm and nucleus remain unstained, allowing clear distinction of the vacuolar system structures.

Notes

1. Long-term storage of the Neutral Red Staining Solution may produce a small amount of precipitate, which generally does not affect experimental use.
2. When using this reagent for the first time, it is recommended to perform a pilot experiment with 1–2 samples to confirm the staining effect and compatibility before proceeding with large-scale operations.
3. During staining, the staining time can be adjusted flexibly according to the actual staining results and experimental requirements.
4. This experiment involves vital staining. During sample collection, ensure accuracy and speed, and maintain the vital state of the sample throughout the process to avoid affecting the staining results.
5. For your safety and health, please wear a lab coat and disposable gloves during operation.
6. This product is intended for research use only and is strictly prohibited for any other purposes.