



COMMENTARY

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The Importance of Choosing the Right Fixative in Tissue Processing

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Description

Tissue processing is an essential component of histology, a field of biology that involves the study of tissues and their structure. Tissue processing refers to a series of steps that are used to prepare biological tissues for examination under a microscope. This process involves the use of chemicals and equipment to remove water and lipid content from the tissue, replace it with a supporting medium, and then cut the tissue into thin sections for analysis.

The first step in tissue processing is the collection of a tissue sample. This sample is typically taken from an animal or human using a biopsy needle or surgical procedure. The tissue is then placed in a fixative solution that prevents degradation and preserves the tissue structure. Fixative solutions can vary depending on the type of tissue being studied and the intended analysis. Common fixatives include formaldehyde, paraformaldehyde, and glutaraldehyde. Once the tissue has been fixed, it is processed through a series of dehydration and clearing steps. Dehydration involves the use of alcohol solutions of increasing concentration to remove water from the tissue. This process is important because water can interfere with the penetration of other chemicals into the tissue. Clearing involves the use of organic solvents, such as xylene, to remove the alcohol from the tissue and make it transparent.

After the tissue has been dehydrated and cleared, it is infiltrated with a supporting medium. The most common supporting media are paraffin and resin. Paraffin is a wax-like material that is melted and used to embed the tissue. Resin is a hard plastic that is used for more complex procedures, such as electron microscopy. Once the tissue has been embedded in the supporting medium, it is cut into thin sections using a microtome. The thickness of the sections can vary depending on the intended analysis. The tissue sections are then placed on a microscope slide and stained.

Staining is used to enhance the contrast of the tissue and highlight specific structures. Different stains are used depending on the tissue type and the intended analysis. Hematoxylin and Eosin (H&E) is a common stain used to identify general tissue structure, while special stains can be used to highlight specific structures such as collagen, muscle fibers, or nerve cells.

After staining, the tissue sections are covered with a coverslip and examined under a microscope. Microscopes are used to examine the tissue at various magnifications, allowing for the analysis of the tissue structure and the identification of any abnormalities. The images can be captured using a camera attached to the microscope and stored for future analysis. Tissue processing is a critical step in the study of tissues and the diagnosis of diseases. Without proper tissue processing, the tissue structure can be distorted or degraded, making accurate analysis difficult or impossible. Tissue processing allows for the examination of tissues at a cellular level, providing valuable information about the health of the tissue and the presence of disease.

There are several factors that can affect tissue processing, including the quality of the tissue sample, the choice of fixative, and the processing conditions. It is essential to carefully select the appropriate processing protocol for each tissue type to ensure the best possible results. The duration of the fixation and processing steps can also affect the quality of the tissue sections. Over fixation can lead to tissue hardening, while under fixation can lead to tissue degradation.

In conclusion, tissue processing is an essential step in histology and the study of tissues. It involves the use of chemicals and equipment to prepare biological tissues for examination under a microscope. Proper tissue processing ensures that the tissue structure is preserved and that accurate analysis can be performed. Tissue processing protocols should be carefully selected and optimized for each tissue type to ensure the best possible results.

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