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DEPARTMENT- MLS

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COURSE MLS202

1. Write on the purpose of fixation

In performing their protective role, fixatives denature proteins by coagulation, by forming additive compounds, or by a combination of coagulation and additive processes. A compound that adds chemically to macromolecules stabilizes structure most effectively if it is able to combine with parts of two different macromolecules, an effect known as cross-linking. Fixation of tissue is done for several reasons. One reason is to kill the tissue so that postmortem decay (autolysis and putrefaction) is prevented .Fixation preserves biological material (tissue or cells) as close to its natural state as possible in the process of preparing tissue for examination. To achieve this, several conditions usually must be met.

First, a fixative usually acts to disable intrinsic biomolecules particularly proteolyticenzymes which otherwise digest or damage the sample.

Second, a fixative typically protects a sample from extrinsic damage. Fixatives are toxic to most common microorganisms (bacteria in particular) that might exist in a tissue sample or which might otherwise colonize the fixed tissue. In addition, many fixatives chemically alter the fixed material to make it less palatable (either indigestible or toxic) to opportunistic microorganisms.
Finally, fixatives often alter the cells or tissues on a molecular level to increase their mechanical strength or stability. This increased strength and rigidity can help preserve the morphology (shape and structure) of the sample as it is processed for further analysis.
Even the most careful fixation does alter the sample and introduce artifacts that can interfere with interpretation of cellular ultrastructure. A prominent example is the bacterial *mesosome*, which was thought to be an organelle in gram-positive bacteria in the 1970s, but was later shown by new techniques developed for electron microscopyto be simply an artifact of chemical fixation. Standardization of fixation and other tissue processing procedures takes this introduction of artifacts into account, by establishing what procedures introduce which kinds of artifacts. Researchers who know what types of artifacts to

expect with each tissue type and processing technique can accurately interpret sections with artifacts, or choose techniques that minimize artifacts in areas of interest

2. List 5 compound fixatives and composition

Bouin solution

37-40% Formaldehyde, Picric Acid, Glacial Acetic Acid

Gendre

37-40% Formaldehyde, 95% alcohol saturated with picric acid, Glacial acetic acid

Hollande

37-40% Formaldehyde, Distilled water, Picric acid, Copper acetate

Zenker and Helly

Mercuric Chloride, Distilled water, Potassium Dichromate, Sodium Sulfate

Orth

37-40% Formaldehyde, Distilled water, Potassium Dichromate, Sodium Sulfate