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MATRIC NO:17/MHS01/252

COURSE:CELLULER PATHOLOGY

QUESTION:1. Write explicitly on 5 diagnostic techniques use in pathology, relevant illustrations and examples required. 2. Cellular Adaptation precedes cell death, discuss. Diagrams essential

### **Techniques:**

Techniques The various techniques in the pathology are: Cellular storage and Histopathological Studies Autopsy Staining, Reagents and Solutions ( Histochemistry / hostological biochemistry) Blood Banking and testing Culture Media Microscopy Cryogenetics Immunofluorescence Flow Cytometry Morphometry Lasers DNA Microarrays Molecular Pathology Other new techniques

### **Cellular storage and Histopathological Studies :**

Cellular storage and Histopathological Studies The tissues are taken out from living body. The tissues usually are removed by means of surgery – either major or minor . Histopathological studies involves techniques of Biopsy ,Paraffin Embedding and frozen section for rapid diagnosis. Biopsy of the tissue specimen so obtained is done .The process involves tissue cutting, gross description and selection of tissue for pathologic examination. Nowadays , the gross description is written with the help of dictaphone without aid of assistant to write it.

Autopsy: The autopsy enlightens about the pathogenesis of diseases , reveals hazardous effects of therapy administered and settles the differences between antemortem and postmortem diagnosis. Block extraction of the abdominal and thoracic organs or in situ organ – by-organ dissection . This confirms the disease, cause of death , establish the final diagnosis, diagnosis of missed diseases and discovery of new ones.

Staining, Reagents and Solutions The stains / dyes are used when there is need to demonstrate the specific substances or constituents of cells to confirm etiologic, histogenic , or pathogenetic substances. The staining depends on the solubility of stains with the tissues. It help in detection of the certain abnormalities in the tissue sample shown by discoloration, excess coloration and viewed under microscopes . Reagents are also of importance when it comes to microscopic examination of tissues.Some reagents are designed to preserve tissue by a process called fixation.Some others are use for toning and others for clearing the tissue or to take traces of mercury from already fixed tissue. Fixatives are histology reagents use to preserve tissue from degradation and to maintain the cell structure. One of the most popular fixative in histology is 10% neutral formalin for light microscopes. There are many others that have increased in popularity like: Davidson's for the fixation of the eyes. Bouin's Fluid is another well known fixative use for histology. Carnoy's fluids now can be used without chloroform, avoiding the health hazards of chloroform. Acetic Acid, 0.5% up to 10% is used for clearing or differentiation of the tissue after staining; also, Acid Alcohol is used for Clearing. Gold Chloride, 0.1% up to 5% is use for toning. Other reagents can be use to promote a reaction like: an oxidation reaction in those categories which have Potassium Permanganate 0.25% up to 3%. Periodic Acid 0.5% up to 5% reacts with Schiff's reagent to oxidize formaldehyde producing a magenta color for the demonstration of glycogen.

Blood Banking and testing Blood banking, the process of collecting (donation), testing, processing, and storing blood for later use (transfusion), is a cornerstone of emergency and surgical medicine and is dependent on the clinical laboratory for ensuring the safe use of blood and its components. Involves Donating Blood, Protecting Supply, ensuring its proper use, and the Risks involved for donors as well as recipients

Microscopy Microscope is the basic tool of the pathologist. It is an instrument which produces greatly enlarged images of minute objects. The usual type of microscope used is the light microscope which is further of simple and compound types. The simple microscope has simple hand magnifying lens of 2x and 200x . The compound microscope had battery of lenses which is fitted in a complex instrument . They can have simple eye piece (monocular) or two (binocular ) which has two eye pieces. Multi- headed microscopes are used as aid to teaching and for demo.

[Cellular adaptation](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZab2d8e7d1379cd27b4f26cd1a328a06d) is the ability of cells to respond to various types of stimuli and adverse envn can rapidly replicate, and therefore can also regenerate after injury, whereas [permanent tissue](https://www.amboss.com/us/knowledge/The_cell_cycle%22%20%5Cl%20%22xid%3DMo0McS%26anker%3DZ09c8b3ee754811758ab5c64521ef64de) such as neural and cardiac tissue cannot regenerate after injury. If cells are not able to adapt to the adverse environmental changes, [cell death](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZb3483fa4a700b90a3cd8ccb27fb6b899) occurs physiologically in the form of [apoptosis](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZe3b1d969dabac0178de882d11ad4ffbf), or pathologically, in the form of [necrosis](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZ28b2cd3d009fe208ee54280c99b41b38). This learning card provides an overview of the main cellular adaptive mechanisms and their different consequences in the human body.ironmental changes. These adaptations include [hypertrophy](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZ2565f5179622b57d8e166369a90801a0) (enlargement of individual cells), [hyperplasia](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZ7c2f7198db9b555525515960ad48bd59) (increase in cell number), [atrophy](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZa78e93e8d8af6655bfa6f64569ad19e2) (reduction in size and cell number), [metaplasia](https://www.amboss.com/us/knowledge/Cellular_changes_and_adaptive_responses%22%20%5Cl%20%22xid%3DVP0GdT%26anker%3DZ5ec4db6c6a3e8cb9a5fb34c44a09d751) (transformation from one type of [epithelium](https://www.amboss.com/us/knowledge/General_histology%22%20%5Cl%20%22xid%3DIo0YWS%26anker%3DZ23c08800c35f1f71236b85bd916db48b) to another), and [dysplasia](https://www.amboss.com/us/knowledge/General_oncology%22%20%5Cl%20%22xid%3DWM0Png%26anker%3DZ409fc6a3e32d11acbee6f0b5c89913e1) (disordered growth of cells). Tissues adapt differently depending on the replicative characteristics of the cells that make up the tissue. For example, [labile tissue](https://www.amboss.com/us/knowledge/The_cell_cycle%22%20%5Cl%20%22xid%3DMo0McS%26anker%3DZ7ed1b61f7418895d90fe1d84f164dbb9) such as the ski.