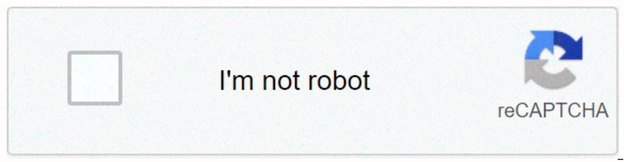

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Histopathological examination methods

See Histopathology (journal) for the journal. Microscopic examination of tissue to study and diagnose micrograph disease showing contraction bandnecrose, a histopathological finding of a heart attack (heart attack). Histopathology (connection of three Greek words: ἱστός histos tissue, πγγος pathos suffer, and -λογγα -logia study of) refers to the microscopic examination of tissue to study the manifestations of the disease. In particular, in clinical medicine, histopathology refers to the examination of a biopsy or surgical sample by a pathologist, after the sample has been processed and histological sections are placed on glass slides. Cytopathology, on the other hand, examines free cells or tissue microfragments (as cell blocks). Collection of tissues Histopathological examination of tissues begins with surgery, biopsy, or autopsy. The tissue is removed from the body or plant, and then, often after expert dissection in the fresh state, placed in a fixative that stabilizes the tissues to prevent decay. The most common fixative is formalin (10% neutral buffered formaldehyde in water). Preparation for histology Editorial: Histology The tissue is then prepared to view under a microscope using chemical fixation or frozen section. If a large sample is provided, for example from a surgical procedure, a pathologist looks at the tissue sample and selects the part that is likely to provide a useful and accurate diagnosis - this part is removed for examination in a process commonly known as grossing or cutting. Larger samples are cut to correctly situate their anatomical structures in the cassette. Certain specimens (especially biopsies) can undergo agar pre-embedding to ensure proper tissue orientation in cassette & then in the block & then on the diagnostic microscopy slide. This is then placed in a plastic cassette for most of the process. [quote needed] Chemical fixation Main Article: Fixation (histology) In addition to formalin, other chemical fixation agents have also been used. But with the advent of immunohistochemistry (IHC) staining and diagnostic molecular pathology testing on these sample samples, formalin has become the standard chemical fixative in human diagnostic histopathology. Fixation times for very small specimens are shorter and there are standards in human diagnostic histopathology. Processing Water is removed from the sample in successive stages by the use of increasing concentrations of alcohol. [1] Xylene is used in the last dehydration phase instead of alcohol - this is because the wax used in the next stage, is in xylene where it is not in alcohol through which wax can penetrate (infiltrate) the sample. [1] This process is generally automated and done at night. The wax infiltrated sample is then transferred to an individual sample embedding (mostly metal) metal) Finally, melted wax is introduced around the sample into the container and cooled to clotting to anchor it in the washing block. [1] This process is necessary to make a well oriented sample sturdy enough to obtain a thin microtome section (s) for the slide. Once the wax embedded block is finished, sections will be cut out of it and usually placed to float on a water bath surface that spreads the section. This is usually done by hand and is a skilled job (histotechnologist) with the lab staff making choices about which parts of the sample microtome wax ribbon to place on slides. A number of slides will usually be prepared from different levels in the block. After this, the thin section mounted slide is stained and a protective cover slip is mounted on it. Common stains typically use an automatic process; but rarely used stains are often done by hand. [1] Frozen section processing Editorial: Frozen section procedure The second method of histology processing is called frozen section processing. This is a highly technical scientific method performed by a trained histoscientist. In this method, the tissue is frozen and cut into thin slices using a microtome mounted in a cooling device below freezing, the cryostat. The thin frozen parts are mounted on a glass slider, immediately & briefly attached in liquid fixative, and colored using the similar coloring techniques as traditional wax embedded sections. The advantages of this method is a fast processing time, less equipment required, and less need for ventilation in the laboratory. The downside is the poor quality of the final slide. It is used in intraoperative pathology for determinations that can help in choosing the next step in surgery during that surgical session (for example, to determine the clarity of the resection margin of a tumor during surgery beforehand). Coloring of processed histology slides Main Article: Staining This can be done to slides processed by chemical fixation or frozen section slides. To see the tissue under a microscope, the sections are stained with one or more pigments. The purpose of coloring is to reveal cellular components; counterstains are used to provide contrast. The most commonly used stain in histology is a combination of hematoxylin and eosine (often abbreviated H&E). Hematoxylin is used to spot nuclei blue, while eosine cytoplasm and the extracellular connective tissue matrix is stained pink. There are hundreds of different other techniques that have been used to selectively stain cells. Other compounds used to color tissue sections are safranin, Oil Red O, silver salts and artificial dyes. Histochemistry refers to the science of the use of chemical reactions between laboratory chemicals and components in tissue. A common histochemical technique is the Prussian blue reaction of the Perls, Perls, iron deposits in diseases such as Hemochromatosis. [2] Recently, antibodies have been used to spot certain proteins, lipids and carbohydrates. Called immunohistochemistry, this technique has greatly increased the ability to specifically identify categories of cells under a microscope. Other advanced techniques include in situ hybridization to identify specific DNA or RNA molecules. These antibody staining methods often require the use of frozen section histology. These above procedures are also performed in the laboratory under control and precision by a trained specialized medical laboratory scientist (a histoscientist). Digital cameras are increasingly being used to capture histopathological images. Interpretation The histological slides are examined under a microscope by a pathologist, a medically qualified specialist who has completed an accredited training program. This medical diagnosis is formulated as a pathology report describing the histological findings and the advice of the pathologist. In the case of cancer, this represents the tissue diagnosis required for most treatment protocols. When removing cancer, the pathologist will indicate whether the surgical margin has been cleared, or is involved (residual cancer remains). This is done using either the bread loafing or CCPDMA method of processing. Microscopic visual artifacts may lead to a misdiagnosis of samples. In a heart attack Further information: Timeline of myocardial infarction pathology After a heart attack (heart attack) the first ~30 minutes no histopathology is seen. The only possible sign the first 4 hours is wavy fibers at the border. Later, however, a clotting nerose is initiated, with edema and bleeding. After 12 hours there is karyopyknosis and hypereosinophilia of myocytes with contraction bandnecrose in margins, as well as the onset of neutrophil infiltration. At 1 – 3 days there is persistent clotting necrosis with loss of nuclei and stripes and increased infiltration of neutrophils into interstitium. Until the end of the first week after the infarction there is the beginning of disintegration of dead muscle fibers, necrosis of neutrophils and the onset of macrophage removal of dead cells at the border, which increases the following days. After a week there is also the onset of granulation tissue formation at margins, which matures during the following month, and gets increased collagen deposition and reduced cellular position until the heart-and-plant scars is fully mature at about 2 months after a stroke. [3] See also Anatomical Pathology Molecular Pathology Frozen section procedure Medical technologist Laser Conquers Microdissection List of Pathologists References ^ a b c d Welcome mwap.co.uk - ^ Perl - Red Blood Cell - Staining. Scribd. ^ Chapter 11 in: Mitchell, Richard Sheppard; Kumar, Vinay; Vinay; Abul K.; Fausto, Nelson (2007). Robbins Basic Pathology. Philadelphia: Saunders. ISBN 978-1-4160-2973-1. 8th edition. External links Wikimedia Commons has media related to Histopathology. Virtual Histology Course - University of Zurich (German, English version in preparation) Histopathology of uterine cervix - digital atlas (IARC Screening Group) Histopathology Virtual Slidebox - University of Iowa Picked up from Written and peer-reviewed by doctors- but use at your own risk. Read our disclaimer and please report.b. Last updated: December 5, 2019SummaryThe primary objective of pathological techniques is the diagnostic classification of pathologically altered tissue (histology) and the assessment of cell morphology (cytology). In addition to postmortem examination, histological and cytological evaluation of tissue is the main task in pathology. Evaluating tissues and cells with light microscopy requires extensive skills in specimen assessment, processing and preservation. However, an alternative to more traditional macroscopic and microscopic examination can be found in new procedures that focus on the cellular level. This article gives an overview of the most common methods of research and staining in pathology. Specimen types In addition, the degree of penetration, the resection edges, the involvement of lymph nodes and visible metastasis are assessed in the case of tumors! Microscopic examination Cytology analyses cells and sampling is simple and minimally invasive. In histology, tissue is obtained using invasive techniques, but it allows the assessment of the local spread of tumor (T-phase of TNM score). Fixation Staining Methods Special methods in Pathology and Molecular Biology References Barone J, Castro MA. Kaplan USMLE Step 1 Lectures 2016. Kaplan Medical ; 2016 Raju K. Evolution of porridge stain. Biomed Res Ther. 2016; 3 (2). doi: 10.7603/s40730-016-0006-8 . | Open in Read by QxMD Kempf W, Hantschke M, Kutzner H, Burgdorf WHC. 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