



A Note on Cytopathology and its Parameters

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Description

Cytopathology is a branch of pathology that studies and diagnoses illnesses at the cellular level. The discipline was founded in 1928 by George Nicolas Papanicolaou. In contrast to histopathology, which examines whole tissues, cytopathology examines samples of free cells or tissue fragments. Cytopathology is often referred to as “cytology,” which means “the study of cells.” Cytopathology is a technique for examining diseases that affect a wide range of bodily sites, and it is frequently used to aid in the diagnosis of cancer, as well as some viral diseases and other inflammatory ailments. The Pap smear, for example, is a typical cytopathology application that is used to detect precancerous cervical lesions that may lead to cervical cancer. Because the materials are smeared across a glass microscope slide for staining and microscopic analysis, cytopathologic tests are also known as smear tests. Cytology samples, on the other hand, can be prepared in a variety of techniques, including cytocentrifugation. A cytocentrifuge, also known as a cytospin, is a specialized centrifuge that is used to concentrate cells from fluid specimens onto a microscope slide so they may be stained and analyzed. Cytocentrifuges are employed in cytopathology, haematology, and microbiology in the clinical laboratory, as well as in biological research. Fine needle aspirates, cerebrospinal fluid, serous and synovial fluid, and urine are among the specimens that can be used with the procedure.

Parameters

When analyzing a biological sample, the nucleus of the cell is crucial. A physical alteration in the nuclear characteristics of malignant cells can be seen as a result of changed DNA activity. The nucleus will be darker and less homogeneous, larger than in normal cells, and often show a bright-red nucleolus, as more DNA is unfolded and expressed. Other pathologies may be seen, such

as parasitic, viral, and/or bacterial infections, reactive changes, immune reactions, cell ageing, amyloidosis, and autoimmune diseases, while the cytologist's primary responsibility is to determine whether cancerous or precancerous pathology is present in the cellular sample analyzed. Various normal cell development, metabolism, and division functions can fail or work abnormally, resulting in illnesses. Cytopathology is best used as one of three instruments, with the physical examination and medical imaging being the other two. Cytology can be used to diagnose a problem without requiring a patient to undergo surgery in order to get a larger specimen. Thyroid FNAC is an example; many benign disorders can be detected with a superficial biopsy, and the patient can immediately resume normal activities. If a malignant disease is discovered, the patient may be able to begin radiation/chemotherapy immediately, or surgery may be required to remove depending on the stage of malignancy.

Sarcomas, for example, might be difficult to biopsy. Pheochromocytoma, for example, is a rare tumor that might be harmful to biopsy. A fine needle aspiration can be performed anywhere a needle can safely be inserted, including the liver, lung, kidney, and superficial masses. It takes time to master proper cytopathology technique. Clinicians can benefit from the help of cytotechnologists and cytopathologists with sample collection. A “quick read” is a rapid look under the microscope that can notify the practitioner if enough diagnostic material was collected. To avoid damaging the cells, cytological specimens must be appropriately processed. Immunohistochemical stains and molecular testing can provide additional information about the material, especially if it was generated using liquid based cytology. “Reflex” testing, such as HPV testing on an abnormal Pap test or flow cytometry on a lymphoma specimen, is frequently used.