Short Communication
Volume 6:3, 2022

Journal of Microbiology and Pathology

ISSN: 2952-8119 Open Access

A Short Communication on Diagnostic pathology *in vitro* Assays

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Introduction

Understanding the molecular aetiology of cancers and infectious diseases is advancing very quickly. This information is employed in pathology diagnostics and in the selection of tailored treatments for particular disorders. These quick advancements have been made possible by numerous novel approaches, including RNA profiling, genomics, proteomics, and laser capture microdissection. Anatomic pathologists' capacity to make molecular pathologic diagnoses is increased by their ability to see these changes in protein and nucleic acid levels in tissues under a microscope [1].

Description

Over a long period of time, *in situ* techniques have often coupled histopathologic investigations with advancements in chemistry and biochemistry. The application of immunohistochemistry and *in situ* hybridization techniques for tissue diagnosis resulted from the fusion of molecular biology advancements with histological techniques over the previous two decades [2,3]. The pathologist can easily see changes in diseased tissue and compare them to normal tissue in the same section under the microscope using the combination of these techniques. These methods have produced more understanding of the onset and development of disease processes than could previously be comprehended by morphologists. The experienced morphologist does not have to guess which sort of tissue cell is contributing to the amplified or aberrant signal that is identified, which is an evident benefit of this approach [4].

Laser capture microdissection is at best an indirect method, making it less effective than direct *in situ* observations, even if it has attempted to bridge the gap between monitoring molecular events and assigning these changes to a certain cell type. Four publications in this special part of the journal integrate direct histopathologic observations with molecular methods that have direct clinical diagnostic applications, such as fluorescent *in situ* hybridization (FISH), chromogenic *in situ* hybridization (CISH), and *in situ* polymerase reaction.

The most common clinical use of CISH and FISH, breast cancer, is examined in the work [5]. The examination of HER2 amplification, 12p13 amplification, and investigation of the basal-like phenotype in breast cancer by these scientists demonstrates how *in situ* molecular genetic analyses are altering diagnostic and prognostic approaches to breast cancer. These findings demonstrate how FISH and CISH are assisting in deciphering the intricate molecular genetics of breast cancer.

Regular histology is frequently insufficient for diagnosing the precise etiologic agents of infections [6]. These investigations demonstrate the necessity of *in situ* polymerase chain reaction amplification for the localization of certain viruses in intact cells. These studies also demonstrate the adaptability of *in situ* strategies for HPV detection in lesions such cervical squamous intraepithelial lesions and cervical cancer. This paper illustrates the *in situ* detection of Epstein Barr virus in a wide range of pathological situations, including post-transplant lymphoproliferative diseases and AIDS lymphoma. The location of HIV in various tissues has also revealed new information about the part this virus plays in infection.

The use of extremely high sensitivity and resolution to visualise endogenous gene copies in non-amplified tissues and to resolve multiple gene copies to enable copy enumeration in amplified tissues without the need for fluorescence optics makes the article on metallographic methods a significant advancement for *in situ* diagnostics [7].

The work shows how quickly diagnostic cytology has advanced from the detection of single cells or cell clusters to the molecular diagnosis of some cancers. These concepts are demonstrated in esophageal carcinoma, Barrett esophagus, and carcinomas of the bladder, biliary system, and lung in addition to dysplastic alterations in these conditions [8].

Conclusion

It is hoped that the reader will concur that the *in situ* diagnostics golden age is quickly approaching and that we can all be enthusiastic about the future of *in situ* techniques in diagnostic pathology after reading these outstanding publications.

Acknowledgement

None.

Conflict of Interest

There is no conflict of interest by author.

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Date of Submission: 01 May, 2022, Manuscript No.JMBP-22-69812; **Editor assigned:** 04 May, 2022, PreQC No. P-69812; **Reviewed:** 17 May, 2022, QC No. Q-69812; **Revised:** 21 May, 2022, Manuscript No. R-69812; **Published:** 28 May, 2022, DOI: 10.37421/2952-8119.2022.6.153.

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How to cite this article: Haroon, Mohamad. "A Short Communication on Diagnostic pathology in vitro Assays." *J Microbiol Pathol 6* (2022): 153.