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Expression via Immunohistochemistry

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Abstract

The use of immunohistochemical labelling in the diagnosis of aberrant cells, such as those found in malignant tumours, is common. Specific biological events, such as growth or cell death, are marked by specific molecular markers (apoptosis). Immunohistochemistry is also commonly employed in basic research to determine the distribution and localization of biomarkers and differentially expressed proteins in various areas of a biological tissue.

Keywords: Coconut oil; Handicraft production; Chemical composition; Food

Introduction

The most prevalent application of immunostaining is immunohistochemistry (IHC). It entails using the idea of antibodies attaching particularly to antigens in biological tissues to selectively identify antigens (proteins) in cells of a tissue segment. Immunohistochemistry (IHC) is an ancillary method that allows pathologists to identify diagnostic and prognostic/predictive therapeutic response protein markers on tissue samples using specific monoclonal antibodies and chromogenic substances that allow the antibody–antigene binding complex to be visualised under a light microscope. In 1941, Coon et al. [1] were the first to use fluorochrome-conjugated antibodies in clinical treatment. Since then, IHC has evolved from a technique for identifying the differentiation line of otherwise undifferentiated cells to one that can provide not only diagnostic, but also prognostic and predictive indications of responsiveness to various therapy alternatives. IHC has become one of the most often utilised supplementary procedures in the histopathological approach to human neoplastic and non-neoplastic disorders due to the aforementioned characteristics.

Immunohistochemistry in Diagnostic Procedures

One of the major advantages of IHC is the detection on tissue specimens of protein markers capable of

identifying the differentiation line (melanocytic, epithelial, neural, mesenchymal, or lymphoproliferative) of poorly differentiated tumours; since its introduction, it has represented a valid diagnostic tool that, when combined with "evergreen" morphology, has allowed pathologists to formulate a more accurate diagnosis of neoplasms previously labelled as "undifferentiated. Furthermore, as knowledge of the genetic landscape of human neoplasms has improved, specific genes derived from molecular alterations and encoding proteins whose expression was restricted to a specific cancer type have been identified; such proteins could be easily targeted by IHC, greatly improving the diagnostic accuracy of neoplasms with specific molecular alterations, such as solitary fibrous tumour (SFT) or glioblastoma multiforme (GBM).[2]

Immunohistochemistry's Prognostic and Predictive Value

Previous research has looked at the involvement of histone deacetylase 6 (HDAC6) in the control of androgen receptor (AR) in prostate cancer; however, HDAC6's role in breast cancer has yet to be determined. The goal of this study was to look at the expression of HDAC6 and AR, see if there was a link between the two, and see whether HDAC6 and AR had any predictive value in breast cancer. A total of 228 invasive breast cancer cases were chosen at random. Immunohistochemistry was used to look at the expression of HDAC6 and AR. 2 Tests were run to see if there was a link between HDAC6, AR, and HDAC6/AR co-expression and traditional clinicopathological variables. The main clinical significance of IHC, however, is not in the diagnostic sector, but in providing critical prognostic and predictive information about therapy response to oncologists. The immunohistochemical detection of Hormone Receptors (oestrogen and progesterone receptors) and HER-2/neu in the diagnostic approach to breast cancer was introduced in clinical practise with the introduction of the immunohistochemical detection of Hormone Receptors (oestrogen and progesterone receptors) and HER-2/neu in the diagnostic approach to breast cancer; in this regard, the "molecular" classification of breast cancer (Luminal A vs. Luminal B). In the field of uncommon cancers with poor prognoses, the hunt for new prognostic variables that can be quickly identified by IHC has been and continues to be intensive. Our research group has recently published certain immunohistochemistry markers of prognostic value in terms of overall survival, disease-free survival, and risk of distant metastasis in rare and prognostically poor cancers such uveal melanoma (UM) and malignant mesothelioma.

Future Perspectives

The development of novel molecular tests such as fluorescence in situ hybridization (FISH), real-time polymerase chain reaction (rt-PCR), and next generation sequencing (NGS) has not replaced IHC, which remains the most often used first level diagnostic due to its low prices and immediate applicability. The 11 papers in this Special Issue provide the scientific community with new potential application fields for IHC in human neoplastic and non-neoplastic diseases, emphasising the concept that identifying new factors capable of predicting disease biological behaviour must represent a research direction in medical science.

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