

Diagnostic Immunohistochemistry: Principles and Pitfalls

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About the Study

Immunohistochemistry (IHC) also referred to as immunocytochemistry is a common technique for detecting protein expression in various tissue samples. Pathologists use molecular techniques to aid in immune histologic diagnosis to enhance and improve this methodology where DNA and RNA are tested for mutations to assist in the diagnosis. It is necessary to understand the molecular abnormalities of various disease states and how molecular techniques relate to their research in order to properly interpret these histological tests. These methods in addition may also be useful in diagnosing non-specific immune histological findings.

The choice of primary antibody has a significant impact on immunohistochemistry. Cross-reactivity might be a major hindrance in this area. There are many antibodies available, and some may be more sensitive than others at binding to the target protein. Furthermore, certain antibodies might react with several proteins that are similar in structure. Some of these factors include the amount of antibody used, the solvent in which it's dissolved, how long it's combined with tissue, and the temperature at which immunohistochemistry was conducted.

IHC is a faster and less expensive technique than FISH. Pathologists rarely employ FISH because it takes a long time and needs considerable technical and professional competence. Anaplastic lymphoma kinase rearrangement in lung cancer can be diagnosed via immunohistochemistry. An anaplastic lymphoma kinase-targeted treatment potential might be determined using this method, which is both reliable and cost-effective in regular pathology labs. It would be used to identify appropriate patients for anaplastic lymphoma kinase-targeted treatment.

Studies conducted in recent years have shown that patients with ALK rearrangement exhibit adenocarcinoma histology. Their findings also show that the IHC has a 100 percent sensitivity and a high specificity, with no false-negative results. While experts admit that further research with a bigger cohort is needed to demonstrate IHC as a reliable screening test. In addition, RT-PCR confirmed that some lung cancers with ALK IHC however no FISH seemed to have translocation events. Consequently, ALK inhibitory treatment should be beneficial to the subgroup of patients. The prognostic usefulness of ALK IHC in these individuals has to be explored further in future clinical studies, according to the researchers.

Pitfalls in the use of IHC might emerge during the technical, design, and interpretation phases of the work-up. Despite the fact that immunohistochemistry has become an essential component of the surgical pathology laboratory and practice, it remains an undefined specialty. Pathologists should be aware of these pitfalls, and they should collaborate with the technologist on the validation, testing, design, and interpretation of IHC assays. The same guiding common sense principles that a skilled pathologist employs in his or her approach to H&E diagnosis can be applied to IHC practices. Pathologists and technologists are continuously challenged by the increasing growth of this field to determine the suitable operating conditions for antibody reagents and the appropriate detection methods and instrumentation. If researchers make fewer mistakes in