Immunohistochemistry

Immunohistochemistry or IHC refers to the process of detecting antigens (e.g., proteins) in cells of a tissue section by exploiting the principle of antibodies binding specifically to antigens in biological tissues.

IHC takes its name from the roots “immuno,” in reference to antibodies used in the procedure, and “histo,” meaning tissue (compare to immunocytochemistry). The procedure was conceptualized and first implemented by Dr. Albert Coons in 1941.

Immunohistochemical staining is widely used in the diagnosis of abnormal cells such as those found in cancerous tumors. Specific molecular markers are characteristic of particular cellular events such as proliferation or cell death (apoptosis). IHC is also widely used in basic research to understand the distribution and localization of biomarkers and differentially expressed proteins in different parts of a biological tissue.

Visualising an antibody-antigen interaction can be accomplished in a number of ways. In the most common instance, an antibody is conjugated to an enzyme, such as peroxidase, that can catalyse a colour-producing reaction (see immunoperoxidase staining). Alternatively, the antibody can also be tagged to a fluorophore, such as fluorescein or rhodamine (see immunofluorescence).

Certain immunohistochemistry, FISH, or PCR-based molecular markers, including isocitrate dehydrogenase1/2 (IDH1/2) mutations, epidermal growth factor receptor variant III (EGFRvIII) mutation, vascular endothelial growth factor overexpression (VEGF) overexpression, or (O6-Methylguanine-DNA methyltransferase promoter) MGMT promoter methylation status, are well-described; however, their clinical usefulness and accuracy are limited, and tumor tissue samples are always necessary.