Chapter 1
Short Historic Overview

Immunohistochemistry, or IHC, is a technique that utilizes antibodies—products of the immune system—to analyze histological tissues under the microscope. IHC evolved from histochemistry, a technique that utilizes chemical and biochemical techniques for probe histological tissues. It appears that the founder of histochemistry was George Gomori (1904–1957), a Hungarian-born scientist who immigrated to the United States in 1938 and co-founded the Histochemical Society in 1950. In the introduction to his classical textbook *Microscopic Histochemistry: Principles and Practice*, published by the University of Chicago Press in 1952, he defined histochemistry as "…a borderline field between histology and analytical chemistry or biochemistry. Its subject matter is the identification and localization of chemical substances in the tissues on a cytological scale." He emphasized that the term histochemistry refers to nondestructive analysis of histological tissues using only methods "…in which the identifying chemical reaction is observed directly through the microscope, in tissues of which the architecture is not grossly altered." In his remarkable textbook *Histochemistry: Theoretical and Applied*, A.G. Everson Pearse further defined histochemistry as "the identification, localization and quantification, in cells and tissues and by chemical or physical tests, of specific substances, reactive groups, and enzyme-catalyzed activities." The evolution from histochemistry into immunohistochemistry occurred due to the efforts of Dr. Albert Hewett Coons, who suggested using antibodies conjugated to fluorescent dyes for visualization of antigens in tissue sections, which he described as "putting tail lights on antibodies." In 1941, he published his pioneering paper describing the coupling of the fluorescent dye anthracene isocyanate to anti-pneumococcus serum. In addition to agglutinating the cocci by the antibodies in the serum, the cocci turned brightly fluorescent and could be easily visualized under the microscope. Dr. Coons's concept that antibodies can be labeled to visualize tissue antigens gave birth to IHC. Other researchers have since found that in addition to fluorescent probes, antibodies can be also labeled with many other visualization-enabling tags

A.E. Kalyuzhny, *Immunohistochemistry*, Techniques in Life Science and Biomedicine for the Non-Expert, DOI 10.1007/978-3-319-30893-7_1

including biotin, enzymes, and colloidal gold and silver, and short oligonucleotides. Since Dr. Coons's discovery, hundreds and thousands of scientific IHC papers have been published and IHC has become an indispensable technique for research and diagnostic applications. It is absolutely impossible to imagine modern-day life sciences without IHC, which still remains a very dynamic developing discipline.