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Histological and Histochemical Methods - Theory and Practice

Reviewed by [Manuela Malatesta](#)

Fifth Edition. John A. Kiernan , 2015. Scion Publishing Ltd, Banbury, UK ISBN
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Histological and Histochemical Methods by Professor John A. Kiernan is a classic in the histochemical literature since its first edition, in 1981.

It is hard to decide what actually is the main reason for the success of this valuable book: students, research workers or technologists may here find a careful description of the basics of fixation, embedding and staining; the reactions of the tissue and cell chemical structures to the different processing steps are clearly explained; an exhaustive list is given of dyes to be used for detecting *in situ* a wide variety of chemical groups or molecular components within the cells or in the extracellular matrix; methods and protocols are described in detail, with useful suggestions and caveats in the key

passages; applications extend from prokaryotes to eukaryotic organisms. However, the secret of success of this book may probably be found in Professor Kiernan's words, in the book Preface: *The purpose of this book is to teach the chemical, physical and biological principles of fixation, staining and histochemistry. I urge the reader always to determine the reason for every step in a method before doing it [...]. This is to encourage an intelligent approach to microtechniques, in which the user reviews the rationale of each method instead of following a list of poorly understood instructions.* This is the reason: an intelligent approach, with attention to the rationale of each method!

This fifth edition has been updated with the latest technical developments in the fixation and processing of samples, as well with new staining procedures, although the original organization of the volume has been maintained. The first six chapters are aimed at introducing the microtechniques and at describing the principles and procedures for fixation, processing of soft or hard tissues, embedding and mounting of sections on slides, and single and multiple staining.

Professor Kiernan also wrote: *Nobody reads this kind of book from beginning to end.* This is certainly true; however, Chapters 1 to 6, and chapters 14 (Enzyme histochemistry: general considerations) and 19 (Immunohistochemistry) should unquestionably be read by all those, students or scientists, who are approaching histology and histochemistry. Chapters 7 to 12 deal with the methods for staining cells in suspension, and with the histochemical techniques for identifying nucleic acids, different functional groups of proteins, carbohydrates and lipids. Chapter 13 concerns the methods for detecting inorganic ions or pigments, such as melanin, lipofuscins or bile pigments. Enzyme histochemistry is the subject of chapters 14 to 16, where special emphasis on hydrolases and oxidoreductases is given. In Chapter 17, the methods for localizing soluble organic compounds of low molecular weight (especially amines) in bright-field or fluorescence microscopy are described, while Chapter 18 illustrates staining methods which produce deposits of metals or dark final reaction products: these are used to demonstrate the presence of chemical compounds which cannot be stained with *conventional* dyes, and may be applied for a variety of

purposes, from general histology, to microbiology or neurobiology, or to induce amplification of the final reaction products of histochemical or immunohistochemical reactions. The final Chapter 20 collects a miscellanea of useful recipes for buffers and physiological solutions, and a list of mammalian tissues to be used as positive controls for histochemical and enzyme histochemical reactions. A table of contents precedes the main text of each chapter, and the volume ends with a very rich bibliography (about fifty pages), which allows the reader to go deeper into the theory and application of specific methods, referring to the articles where these have originally been proposed. A set of questions and answers (which may be interesting and useful especially for students) is available at the website www.scionpublishing.com/HHM5.

This book should be present on the bookshelves of every research or analysis Laboratory where histology and histochemistry are routinely used, as an essential reference source of basic and practical information for scientists and technicians. It may also be envisaged as a textbook of histochemical techniques for students in advanced courses of biomedical technology, histopathology and laboratory medicine.

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