
Encyclopedia of Pathology

Series Editor

J. H. J. M. van Krieken

The scope of this 15–20-volume set encompasses the entire field of pathology ranging from general pathological terms to specific diseases to diagnostic methods. Published as print edition and online version (eReference) in the Springer Reference Program each topical volume sticks out by clearly and homogenously structured entries. A team of international experts guarantee that the essays and definitions are scientifically sound. The A-Z format of each topical volume allow readers to quickly and easily find the information they need. The major advantage of the encyclopedia is the way it makes relevant information available not only to pathologists, but also to all clinicians and researchers of the neighboring disciplines working together with pathologists who occasionally might wish to look up terms online.

More information about this series at <http://www.springer.com/series/14876>

Maria Rosaria Raspollini
Antonio Lopez-Beltran
Editors

Uropathology

With 348 Figures and 14 Tables

 Springer

Editors

Maria Rosaria Raspollini
Histopathology and Molecular Diagnostics
University Hospital Careggi
Florence, Italy

Antonio Lopez-Beltran
Pathology Service
Champalimaud Clinical Center
Lisbon, Portugal

Unit of Anatomic Pathology, Department
of Surgery
Cordoba University Medical School
Cordoba, Spain

ISBN 978-3-030-41893-9 ISBN 978-3-030-41894-6 (eBook)

ISBN 978-3-030-41895-3 (print and electronic bundle)

<https://doi.org/10.1007/978-3-030-41894-6>

© Springer Nature Switzerland AG 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Series Preface

When Denis Diderot started the first encyclopedia in the eighteenth century, it was a groundbreaking and timely event. It was the time of the Enlightenment, and knowledge was seen as something which was to be spread to many and to build upon by creating new knowledge. His ambition was to bring all available knowledge together in one series of books so that every person who could read has access to all there is to know. Nowadays, in a time of easily accessible knowledge, the question is whether there is still need of an encyclopedia. It is obvious that the amount of knowledge is such that it is not possible to bring it all together in one encyclopedia. One may argue that the Internet is the encyclopedia of today, but that misses an important point of Diderot, a point that is probably even more valid today. He created a team that valued information and selected what was worth to be presented in the encyclopedia. He recognized that science is not a democratic process where the majority decides what is true and valuable, but rather a growing body of knowledge in which radical ideas from individuals may bring about huge changes, even though most would reject these new ideas in the beginning. Indeed, the Internet lacks such authority and it is not easy to select valuable information from nonsense, especially when one is not an expert in a certain field.

It is therefore that an encyclopedia is only as good as the team that creates it. It goes without saying the team that is responsible for the Encyclopedia of Pathology consists of recognized experts in the field. Pathology is a growing medical discipline in which the amount of information is probably already more than that the whole encyclopedia of Diderot contained. For experts in subspecialties within pathology, it is already almost impossible to keep an overview on new developments and to select relevant from less relevant new information. There are plenty of textbooks for every disease group, and scientific literature is available for most pathologists through PubMed or GoogleScholar. What is lacking is a systematic overview of what we know in an alphabetical order, easily accessible to all. The encyclopedia of pathology fills that gap. It is written by experts with the general pathologist in mind and also specialist from other disciplines. It will consist of a series of volumes on subspecialties, and when it is completed there will be an online version combining these. Yearly updates from the online version is foreseen and readers are welcome to provide suggestions for improvement. These will be judged by the editorial team in order to keep the encyclopedia authoritative yet using the expertise of many.

Finally, it is my hope that the encyclopedia will grow into a reliable body of knowledge in pathology, enabling communication through a common language, and that it will grow and adapt to new developments.

Nijmegen, The Netherlands
May 2020

J. H. J. M. van Krieken
Series Editor

Volume Preface

The encyclopedia describes in a clear and concise way the diseases of the genito-urinary tract organs and provides key features for pathologic diagnosis including both histopathology and immunohistochemistry; it also provides representative histological pictures to illustrate key diagnostic features.

The encyclopedia deals with the topics of uropathology and covers the genito-urinary tract organs thus providing detailed descriptions including ranging from normal histology to histopathological expression of diseases of male genital organs and the urinary tract. Both, tumor and non-tumor lesions and diseases are described in this reference work.

The encyclopedia has been structured according to the alphabetical order of the diseases, which allows a very practical access. This alphabetical list facilitates description, in unique chapters, of the diseases with analogous name and similar histologic features arising in different organs of the genito-urinary tract. The reader is easily enticed to understand the differences and the similarities of the different lesions and diseases in a synoptic way emphasizing similar histological features in different organs of the genito-urinary tract.

This original structuring of the different lesions and diseases in alphabetical order is unusual for pathology encyclopedias yet seems to be practical and produces a unique resource that can be a valuable tool for easy access and study not only for uropathologists but also for medical students, fellows, surgeons, radiotherapists, oncologists, urologists, dermatologists, and biomedical researchers when dealing with disciplines that need the background knowledge of pathology of the male genital and urinary tracts.

The alphabetical order of the diseases and the concise description of histologic features will provide all readers the knowledge necessary for differential diagnosis of urological diseases and bestow basic skills to the clinicians and researchers dealing with disciplines which require knowledge of urological pathology.

Each entry includes the basic epidemiology and clinical signs and symptoms, gross and histological features, relevant immunohistochemical characteristics, and molecular data. Histological pictures help clarify the microscopic findings and understand the differential diagnosis for genito-urinary tract diseases. In addition, the differential diagnosis of tumor diseases of the urinary tract in both genders has also been described in the text.

Uropathology is a growing discipline, and new information from emerging molecular data that is important for diagnosis or therapy of a patient has been included in the description of the specific diseases.

Besides worldwide experts in pathology of prostate, bladder, kidney, and testis, experts from other associated disciplines have been involved in the project. Researchers from major medical centers, coming from disciplines related with uropathology such as molecular biologists, soft tissue pathologists, dermatopathologists, hematopathologists, and gynecopathologists, collaborated in order to create this unique encyclopedia.

The encyclopedia summarizes the knowledge of diagnostic uropathology and includes the most recent data from the literature.

As editors *Uropathology*, we are deeply in debt to the distinguished panel of experts who have collectively contributed to achieve the aims of this volume with personal effort and patience to write chapters according to encyclopedia template.

We also thank Professor van Krieken, Editor-in-Chief, and the editorial team at Springer for their support during the preparation of this encyclopedia.

Florence, Italy
Lisbon, Portugal
May 2020

Maria Rosaria Raspollini
Antonio Lopez-Beltran
Volume Editors

Editors Biography



Maria Rosaria Raspollini is a senior staff pathologist in the Department of Histopathology and Molecular Diagnostics at the Careggi University Hospital, Florence, Italy. She is professor and tutor of uropathology in the post-graduate School of Urology, University of Florence, School of Medicine.

Dr. Raspollini graduated from the University of Florence, School of Medicine, Florence, Italy, in 1994 summa cum laude, then trained in pathology at the Institute of Pathology of the same university in 1998, and obtained the Ph.D. degree in Human Oncological Pathology from the University of Verona Medical School, Verona, Italy, in 2005.

Her expertise and research activity has been focused on uropathology and gynecologic pathology, with competences in immunohistochemistry, cytogenetics, and molecular biology. Dr. Raspollini's expertise in pathology and close contacts with clinicians have allowed her to actively collaborate with urologists in clinical-pathological research. She is cooperating with several universities in Europe and the USA on various international projects.

In addition to her research efforts, Dr. Raspollini is devoted to post-graduate School of Urology and post-graduate School of Pathology's resident education programs. Being aware of the great importance of communication with clinicians and patients, she participates actively in multi-disciplinary study groups of her hospital for the management of cancer patients.

Dr. Raspollini has been invited as speaker to many national and international courses and congresses and has contributed to the scientific

organization of national and international courses and meetings.

Dr. Raspollini serves as referee for 25 peer-reviewed journals and has published more than 150 scientific papers in peer-reviewed journals and chapters in textbooks in the field of gynecological and genitourinary pathology.

In addition, she is editor of the following textbooks:

Gynecologic and Urologic Pathology. Similarities, Differences and Challenges for Cambridge University Press, UK – 2019

Pathology of the Prostate: An algorithmic approach for Cambridge University Press, UK – 2017

Positions in Scientific Societies

From 2019: Treasures of European Society of Pathology (ESP)

From 2019: Co-chair *ESGO-ESTRO-ESP Endometrial Cancer Clinical Practice Guidelines*, 2019–2020

From 2018: *Council* member of European Society of Gynaecological Oncology (ESGO)

2017–2019: *Council* member of European Society of Pathology (ESP)

From 2017: *Board Member* of the European Association of Urology (EAU), Uropathology section (ESUP)

From 2014: *Faculty Member* of the European Society Medical Oncology (ESMO), Gynaecopathology section

2017: Co-chair *ESGO-ESTRO-ESP Cervical Cancer Clinical Practice Guidelines - Cervix* 2017.

2016–2018: *Official Delegate* of European Society of Pathology for European Society of Gynaecological Oncology

2013–2017: Chair Gynaecopathology Working Group of European Society of Pathology (ESP)

2011–2013: Elected Chair Gynaecopathology Working Group of European Society of Pathology (ESP)

From 2010 to 2015, Dr. Raspollini served as Chair of Quality and Certification Standards of the Careggi University Hospital in Florence.



Antonio Lopez-Beltran is Professor of Anatomic Pathology and Director of the Service of Anatomic Pathology at the Champalimaud Clinical Center, Lisbon, Portugal. Prior to this role, he was Director of Anatomic Pathology for Althia Health in Barcelona and Full Professor of Anatomic Pathology at the University of Cordoba. Prior to that post, he spent 27 years at the University of Cordoba, Spain, where he created The Uro-Oncology Research Lab. Dr. Lopez-Beltran also was the director of this lab where he designed and implemented novel molecular technics to evaluate prognostic features of bladder and prostate cancer. Through the years he discovered and/or validated some biomarkers of clinical utility, mostly tissue and urine related. Studies conducted in his lab have resulted in him being awarded the title “Highly Cited Author” by the Institute of Scientific Information with h-index of 59. Also, Dr. Lopez-Beltran has been recognized as an expert in urogenital tumors (Expert-scape: Expertise in Urogenital Neoplasms Worldwide (2014/2015): Position 25 out of >75.217 experts).

Other relevant contributions in the field include the participation in producing the WHO classification of urologic tumors, with participations as: Member of the Experts Panel on Urologic Tumors who developed the 2004 WHO classification of Urologic Tumors (Book published 2004). Member of the Experts Panel on Urologic Tumors who developed the 2016 WHO classification of Urologic Tumors (Book published 2016).

During his professional life, Dr. Lopez-Beltran has participated in near 500 publications mostly in the areas of uropathology and uro-oncology.

[PubMed 496 entries (Lopez-Beltran A;Beltran AL) (accessed July 25th, 2017)]

Series Editor Biography



J. H. J. M. van Krieken is a pathologist with special expertise in the fields of hematopathology and the pathology of the gastrointestinal tract. He was Professor for tumor pathology since 1999 and kept from 2005 to 2015 the Chair of pathology at the Radboud University Nijmegen Medical Centre in Nijmegen. He furthermore served as Chairman of the Board of the Oncology Institute of the Radboud University, Nijmegen, from 2008 to 2016. Since 2016, he is the Rector Magnificus (Vice Chancellor) of the Radboud University.

He was the Treasurer/Secretary of the European Association for Hematopathology from 2000 to 2008, from 2003 to 2011 the Treasurer, from 2013 to 2015 the President of the European Society for Pathology (ESP), and from 2015 to 2017 the past-President of the ESP. Furthermore, he coordinated the ESP quality assessment program from 2008–2018 and was the chair of IQN path from 2005–2008. He is (co) author of more than 600 papers in peer-reviewed journals (H-index 86), has written chapters in books on pathology and oncology, is editor of a Dutch textbook on oncology, and serves on the editorial board of the American Journal of Surgical Pathology, was managing editor of Virchows Archive from 2009–2015, and was the chief editor of the Journal of Hematopathology from 2008–2018. Since 2011, he is member of the German Academy of Sciences Leopoldina, and since 2014 of Academia Europea and Honorary Fellow of the Royal Society of Pathology of Great Britain and Ireland.

Contributors

Ronald Araneta III Pathology and Laboratory Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

Alessia Bertolotti Department of Pathology, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milan, Italy

Anna Caliò Department of Diagnostic and Public Health, Section of Pathology, University of Verona, Verona, Italy

Rita Canas-Marques Pathology Service, Champalimaud Clinical Center, Lisbon, Portugal

Liang Cheng Department of Pathology and Laboratory Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

Alessia Cimadamore Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region (Ancona), Ancona, Italy

Maurizio Colecchia Uropathology Unit, Department of Pathology, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milan, Italy

Vincenzo De Giorgi Dermatologic Clinic, University of Florence, Florence, Italy

Andrea Doria Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region (Ancona), Ancona, Italy

Caterina Fattorini Histopathology and Molecular Diagnostics, University Hospital Careggi, Florence, Italy

Alessandro Franchi Department of Translational Research and of New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy

Raffaele Gaeta Department of Translational Research and of New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy

Antonio Galzerano Pathology Service, Champalimaud Clinical Center, Lisbon, Portugal

Silvia Gasparrini Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region (Ancona), Ancona, Italy

Pilar González-Peramato Department of Pathology, Universidad Autónoma de Madrid, Madrid, Spain

Department of Pathology, University Hospital La Paz, Madrid, Spain

Vanessa Henriques Pathology Service, Champalimaud Clinical Center, Lisbon, Portugal

Antonio Lopez-Beltran Pathology Service, Champalimaud Clinical Center, Lisbon, Portugal

Unit of Anatomic Pathology, Department of Surgery, Cordoba University Medical School, Cordoba, Spain

Guido Martignoni Department of Diagnostic and Public Health, Section of Pathology, University of Verona, Verona, Italy

Department of Pathology, Pederzoli Hospital, Peschiera del Garda, Italy

Simona Massa Uropathology Unit, Department of Pathology, Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Milan, Italy

Roberta Mazzucchelli Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region (Ancona), Ancona, Italy

Rodolfo Montironi Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region (Ancona), United Hospitals Ancona, Ancona, Italy

Manuel Nistal Department of Anatomy, Histology and Neuroscience, School of Medicine, Universidad Autónoma de Madrid, Madrid, Spain

Francesca Portelli Section of Anatomical Pathology, Department of Health Sciences, Azienda Ospedaliero-Universitaria Careggi, University of Florence, Florence, Italy

Francesca Puccio Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region, Ancona, Italy

Maria Rosaria Raspollini Histopathology and Molecular Diagnostics, University Hospital Careggi, Florence, Italy

Marina Scarpelli Institute of Pathological Anatomy and Histopathology, Polytechnic University of the Marche Region (Ancona), United Hospitals Ancona, Ancona, Italy

Diego Segala Department of Pathology, Pederzoli Hospital, Peschiera del Garda, Italy

Cecilia Taverna Department of Health Sciences, University of Florence, Florence, Italy

Chiara Trambaiolo Antonelli Departments of Anatomical Pathology and of Oncology, Ospedale Policlinico San Martino, University of Genoa, Genoa, Italy