





# Pathology of Cancer

## Editors

**M Nabil El Bolkainy**

*Professor of Pathology, NCI  
M.D. (Cairo University),  
PhD (Michigan)*

**M Akram Nouh**

*Professor of Pathology, NCI  
M.D., PhD, Cairo University*

**Iman Gouda Farahat**

*Assistant Professor of Pathology, NCI  
M.D., PhD, Cairo University*

**Tarek N El Bolkainy**

*Assistant Professor of Pathology, NCI  
M.D., PhD, Cairo University*

**Omnia M Badawy**

*Lecturer of Pathology, NCI  
M.D., PhD, Cairo University*

## **Fifth Edition 2016**

This book is a nonprofit publication, and not for sale.. The scientific material on oncologic pathology in the book is in conformity with the curriculum of the post graduate educational program of NCI.

The text, illustrative material, CD pictures (except the few reproduced with permission) is a property of the authors, and protected by copyright. No parts of this book may be reproduced in any form (printing or electronically) without prior written permission from the senior editor (2 Sherif St. Apt. 18, Lewa Building, Cairo Egypt, Email: [dr.nbolk@gmail.com](mailto:dr.nbolk@gmail.com)).

**ISBN 978-977-716-891-5**

# Preface

It has been 25 years since the publication of the first edition of General Pathology of Cancer (1991), and 18 years since the publication of Topographic Pathology of Cancer (1998). The 4th edition published in 2013 combined both previously published books in one volume. The present 5th edition is an update of the 4th edition, adding recent advances, yet keeping the compact readable size of the book.

The book includes 8 chapters on general pathology of cancer, and 18 chapters on systemic pathology of cancer at different organ sites and systems. A critical review and major additions were made in all the chapters. Notable additions in general pathology are: principles of scientific method, breakthrough molecular discoveries, recent data on cancer epidemiology, pitfalls in the diagnosis of tumors, epigenetic mechanisms, and clinical applications of basic oncology. In the systemic pathology chapters, the WHO Histologic Classification of Tumor and the TNM staging system were adopted. The molecular oncogenesis of tumors at different organ sites was presented and important differential diagnosis discussed. New sections on bone marrow, spleen and histiocytic tumors were added. The text is reinforced by 180 illustrative figures, 200 tables, 190 references and a DVD containing 960 colored pictures. These are cited in the text by the letter P, Chapter number and serial number of the picture. The appendix includes: a list of oncology websites, abbreviations, a glossary of terms, self-assessment MCQs and their answers.

This work was only possible through the help of many colleagues and assistants. We are grateful for professor Nilly Hassan Ali-Eldein, Chairman, Department of Biostatistics and Cancer

Epidemiology, NCI, for providing data on pediatric tumors. Particular thanks are due to Dr. Naglaa El-Kenaei for her valuable suggestions in molecular techniques and Dr. Nesreen Magdy for help in preparing the self-assessment MCQs. We gratefully appreciate the great contribution of time and talent of three computer experts, namely: Dr. Atef Badran for formatting the text, Dr. Sameh Mahsoub for labeling the illustrative figures and engineer Mohamed Ibrahim Amer for preparing the disc pictures.. We are indebted to Dr. Samir Shawky, Dr. Safinaz Anwar and Dr. Habiba El-Fendy for reviewing the text. We also appreciate the efforts of Mrs. Mona El-Sherbini and Mrs. Wesam Sorour in typing the text. Finally, we are thankful to: Elsevier, John Wiley and IARC publishing companies, for their kind permission to reproduce 20 pictures of their previous publication in the present book.

We hope that the present publication will serve as a useful guide to the postgraduate students, as well as the practicing clinical oncologists. These will ultimately be reflected on better care of cancer patients for whom this work is dedicated.

**M Nabil El-Bolkainy  
M Akram Nouh  
Iman Gouda Farahat  
Tarek N El-Bolkainy  
Omnia M Badawy**

**Cairo, January, 2016**



# Contents

## Part I General Pathology of Cancer

1. The scientific basis of oncology, 1
2. Epidemiology of cancer, 15
3. Etiology and prevention of cancer, 33
4. Classification of tumors, 57
5. Criteria of malignancy and diagnostic pitfalls, 83
6. Molecular oncogenesis, 95
7. Growth and spread of cancer, 125
8. Tumor host relations, 140

## Part II Systemic Pathology of Cancer

9. Tumors of the upper respiratory tract, 161
10. Tumors of the lower respiratory tract, 172
11. Tumors of the mediastinum, 180
12. Tumors of oral cavity, 188
13. Tumors of gastrointestinal tract, 197

14. Hepatobiliary and pancreatic tumors, 231
15. Tumors of the urinary system, 245
16. Tumors of the male genital organs, 263
17. Gynecologic malignancies, 277
18. Breast cancer, 298
19. Endocrine tumors, 313
20. Malignant bone tumors, 335
21. Soft tissue sarcomas, 347
22. Skin tumors, 360
23. Tumors of central nervous system, 378
24. Tumors of special senses, 397
25. Hematolymphoid malignancies, 406
26. Histiocytosis, 451

## Part III Appendix

- Oncology websites, 457
- Abbreviations, 461
- Glossary of terms, 465
- Self-assessment MCQs, 472
- Answers of MCQs, 489
- Book publications, 490
- Index, 492

