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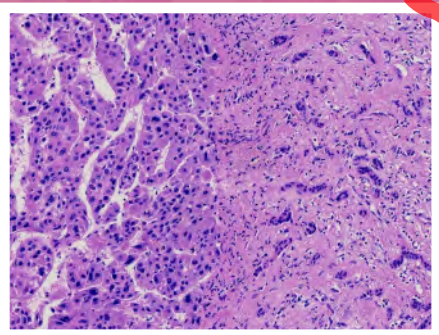
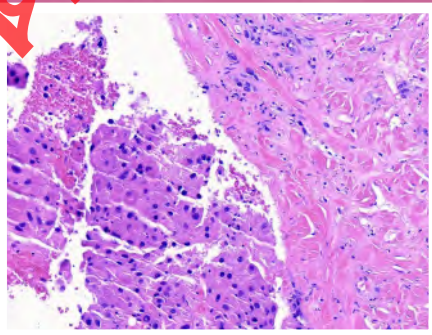
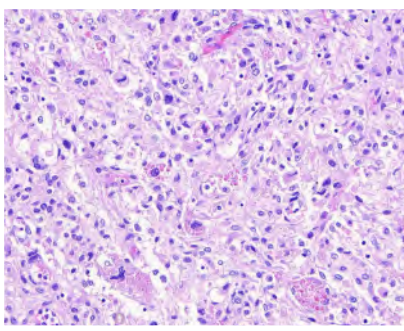
Surgical Pathology of Liver Tumors:

From Basic Insights to ChatGPT Applications

Thiyaphat Laohawetwanit

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Foreword

Surgical pathology is a foundation for accurate and cutting-edge diagnosis in the rapidly evolving and ever-expanding landscape of medicine, critically guiding clinical decisions and therapeutic strategies. This potentially innovative and transformative environment is best experienced in the domain of liver tumors – an organ in which one needs to "think out of the liver" as it is commonly involved by a complex spectrum of benign and malignant lesions of varied histogenesis that challenge and confound even the most experienced pathologists. The demand for precision, speed, and interdisciplinary collaboration has never been greater as the burden of hepatic malignancies continues to rise in tandem with global increase in risk factors such as ageing population with susceptibility for cancers, and metabolic dysfunction-associated steatotic liver disease.

This book, *Surgical Pathology of Liver Tumors: From Basic Insights to ChatGPT Applications*, is both timely and visionary. It is an "All in one" reference that is user-friendly, well-illustrated with high-resolution histological images and annotations, and easily accessible to pathology residents preparing for examinations, budding pathologists in hepatobiliary subspecialty training, and even as a refresher for the busy experienced pathologist. The histopathological insights are also beneficial to hepatologists, surgeons, radiologists, and oncologists who collaborate in the multidisciplinary care of liver tumor patients. Scientific researchers working in the realm of liver tumor pathology will also find this book a valuable resource.

The book starts off with a solid foundational knowledge of the basic histology of the liver, highlighting certain microanatomical features that would be of relevance in certain liver disorders. This is followed by an algorithmic approach based on pattern recognition for the morphological categorization of focal liver lesions. It provides the foundational principles of the spectrum of focal liver lesions comprising key histopathological features, classifications, and diagnostic criteria of the various tumors and tumor-like lesions. It then

ventures into the emerging frontier of digital pathology and generative artificial intelligence, particularly large language models like ChatGPT.

The integration of conventional diagnostic frameworks with AI-assisted tools is no longer just a novel concept; it is currently being developed and utilized in many other areas of Pathology in conjunction with digital pathology. ChatGPT is a powerful new assistive tool that promises to reshape the daily practice of the pathologist. This book explores how AI can serve as an intelligent collaborator but not replace the human expertise. It gives a glimpse of how ChatGPT can enhance the educational, diagnostic, and reporting processes in surgical pathology. The book also addresses the limitations and ethical considerations of digital pathology and AI assistive tools.

I commend the author for his foresight and endeavor in thoughtfully drafting such a comprehensive and educational piece of work. May this book guide the pathologist as he embraces the brave new world of AI technology. The intended aim by the author is for the book to serve as a meaningful collaboration between human intelligence and artificial intelligence – the so-called augmented intelligence. May this book also inspire more young pathologists to take up this subspecialty.

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Emeritus Consultant, Department of Pathology,
National University Hospital, Singapore

It is a privilege to introduce *Surgical Pathology of Liver Tumors: From Basic Insights to ChatGPT Applications*, a timely and thoughtful contribution to modern hepatobiliary pathology. Liver tumors present diagnostic challenges due to their diverse morphology, overlapping features, and evolving classification systems. This textbook addresses these complexities with clarity, integrating fundamental histopathology with practical diagnostic strategies grounded in real-world experience.

What distinguishes this work is its dual focus: it reinforces essential morphologic principles while also exploring the emerging role of artificial intelligence in pathology. The inclusion of generative AI applications reflects a forward-thinking perspective that resonates with today's rapidly evolving educational and diagnostic environment. By demonstrating how tools like ChatGPT can support learning and reasoning—without replacing the expertise of pathologists—this book bridges traditional scholarship with innovation in a responsible and academically rigorous way.

Comprehensive yet approachable, this book will serve as a valuable reference for pathologists, trainees, and medical students seeking a structured and practical guide to liver tumor pathology. It reflects both academic commitment and educational vision, making it a meaningful addition to the pathology literature.

This work stands as a testament to the author's dedication to advancing pathology education and practice.

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Mahidol University, Bangkok, Thailand

As a fellow pathologist who has continuously followed the work of Associate Professor Thiyaphat Laohawetwanit, I am deeply impressed to witness the creation of the book “Surgical Pathology of Liver Tumors: From Basic Insights to ChatGPT Applications” by an author who possesses expertise in both fields of study.

This book stands out for its systematic integration of comprehensive liver pathology content with contemporary artificial intelligence applications. The content is organized progressively from fundamental liver tissue structure and understanding, diagnostic principles in pathology, immunohistochemistry applications, to detailed descriptions of various types of liver tumors. The material is presented in a step-by-step manner that is both easily comprehensible and practically applicable in daily practice.

What is particularly fascinating is the integration of ChatGPT as a tool for pathology learning and co-analysis, which demonstrates the author’s vision and expertise in recognizing the potential of AI technology to elevate pathology education.

I believe this book will be tremendously beneficial to residents, pathologists, and those interested in studying pathology. It serves not only as a reliable reference manual but also as a source of inspiration for developing teaching and learning methodologies in the future century.

I would like to express my admiration and congratulations to the author for creating this quality work, which will benefit the field of pathology both nationally and internationally.

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Preface

The histopathology of liver tumors presents unique challenges due to the wide spectrum of benign, malignant, and borderline lesions that can mimic one another both clinically and morphologically. Accurate diagnosis requires a deep understanding of subtle histologic features, the application of ancillary studies, and careful interpretation of imaging and clinical data. These complexities make liver tumor pathology a demanding yet crucial field in surgical pathology.

This book, *Surgical Pathology of Liver Tumors: From Basic Insights to ChatGPT Applications*, provides a detailed exploration of liver tumors from foundational knowledge to the integration of generative artificial intelligence in modern pathology. It combines fundamental concepts with the evolving role of AI tools like ChatGPT in enhancing pathology practices, offering both seasoned pathologists and trainees valuable insights into diagnostic processes and innovations.

During the writing process, ChatGPT was utilized to refine the language and ensure clarity. However, the responsibility for the accuracy and reliability of the medical content lies entirely with the author. While AI has contributed to polishing the text, all scientific material is based on knowledge and research in the field.

This book serves as a comprehensive guide, aiming to bridge traditional pathology with new technological applications, ultimately supporting readers in navigating the complexities of liver tumor diagnosis.

Thiyaphat Laohawetwanit, MD
Associate Professor of Pathology
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Chapter

1 The Basics

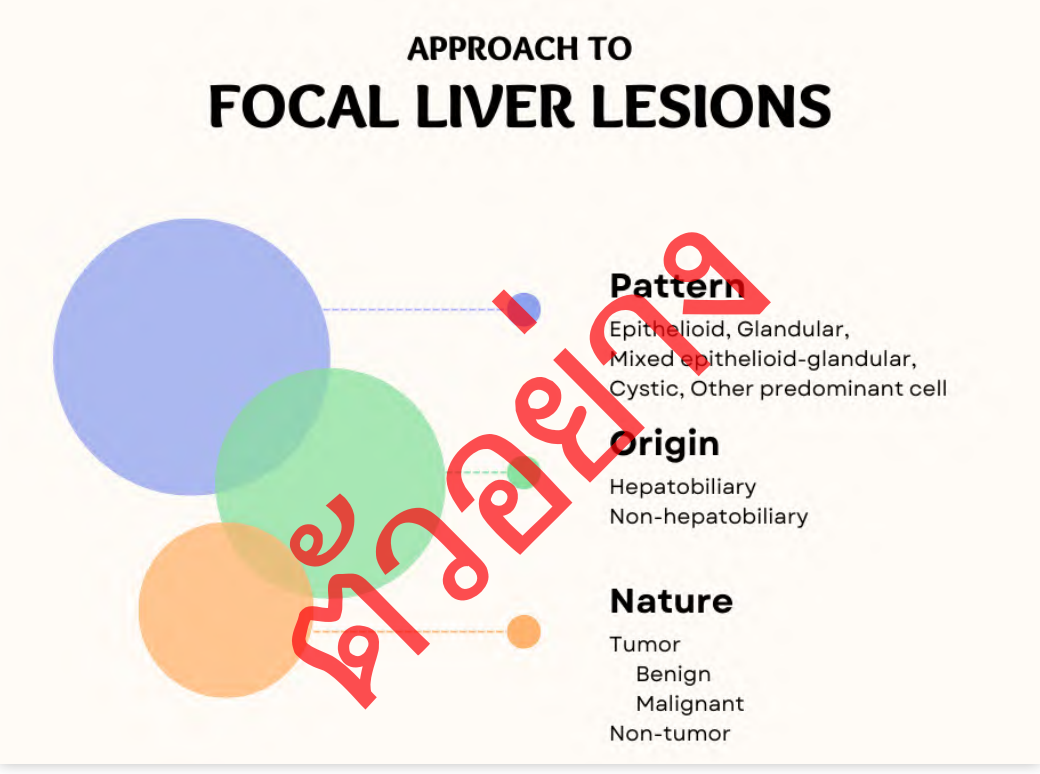
Graphical Abstract

The liver consists of various distinct cell types, including parenchymal and non-parenchymal cells. Recognizing portal tracts, which include the hepatic artery, portal vein, and bile duct, is essential for distinguishing them from well-differentiated hepatocellular lesions. Peribiliary glands, which are normal structures located near large bile ducts, should not be mistaken for biliary tumors.

Chapter

2 Morphologic Approach to Focal Liver Lesions

Graphical Abstract

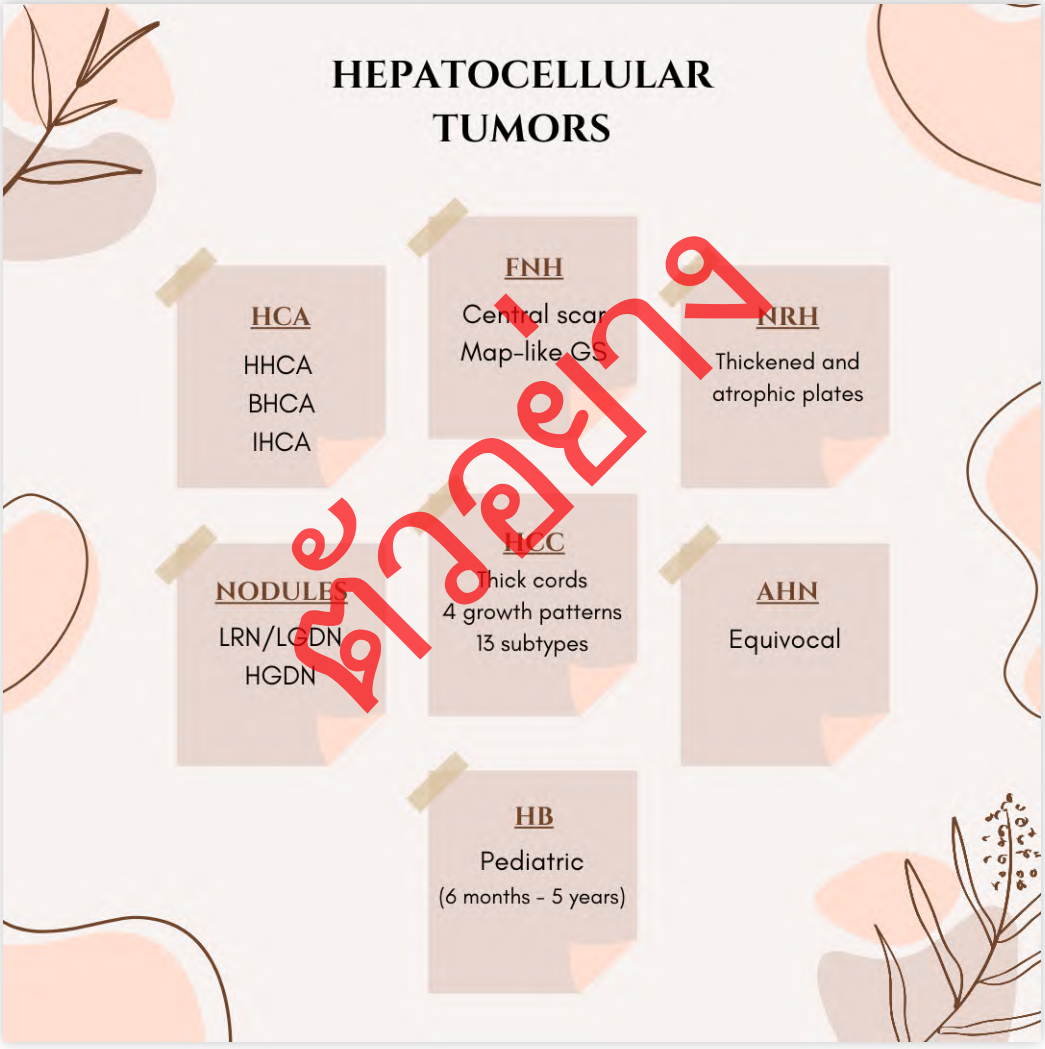


A comprehensive morphologic approach to evaluating focal liver lesions is presented, highlighting key histological patterns. The lesions are classified into five main histomorphologic categories: epithelioid, glandular, mixed epithelioid-glandular, cystic, and other predominant cell patterns. Each pattern is linked to specific diagnostic considerations.

Chapter

3 Hepatocellular Tumors

Graphical Abstract



Hepatocellular tumors range from benign to malignant, often linked to chronic liver disease, especially cirrhosis. Accurate diagnosis is essential for managing lesions like hepatocellular adenoma (HCA), focal nodular hyperplasia (FNH), and hepatocellular carcinoma (HCC). Differentiating these tumors by their pathological features and clinical presentations is key to effective treatment and improved patient outcomes.

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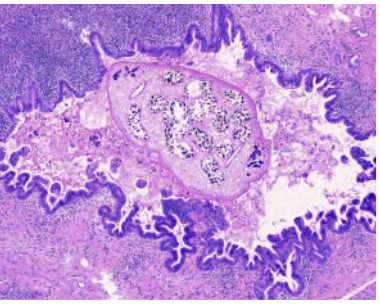
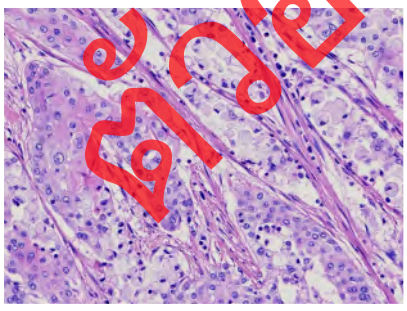
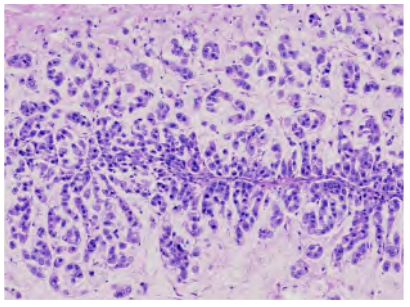
This book addresses the complexities of liver tumor pathology, offering a detailed exploration of benign, malignant, and borderline lesions and their morphologic and clinical overlaps. Bridging foundational knowledge with the innovative use of AI tools like ChatGPT, it provides valuable insights into accurate diagnosis and evolving technologies. Aimed at pathologists and trainees, this comprehensive guide combines traditional approaches with modern advancements to navigate the challenges of liver tumor diagnosis effectively.

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