
On This Book

Welcome to pathology. If you are reading this book, it is likely that you are either in pathology training or considering pathology as a specialty. This book is an attempt to bridge a gap between the way pathology is taught to medical students and the way you must learn to practice it as a resident. In medical school, with tacit acknowledgment that most students are not going to become pathologists, we teach pathology as it intersects with pathophysiology and pharmacology. Robbins and Cotran's *Pathologic Basis of Disease* is the most prominent example of this approach and is an excellent and comprehensive text for this purpose. However, this book does not teach the more practical aspects of pathology practice, such as differential diagnoses, special stains, biopsy interpretation, the assessment of margins, and tumor grading and staging. These are the nuts and bolts of pathology practice, the countless subtleties, shades of gray, and conventions of semantics that go into creating a patient's diagnosis. For this, the resident must turn to the huge volume of literature for practicing pathologists, from the general surgical pathology texts such as *Sternberg's Diagnostic Surgical Pathology* and *Rosai and Ackerman's Surgical Pathology* to the highly detailed organ-system texts. For the beginner, not yet fluent in the foreign dialect that is pathology, these professional-level texts are simply too much, too soon. This book, inspired by my own rocky and somewhat prolonged learning curve, is an attempt to create an intermediate step.

This book is intended to be a crash course in the basic facts that you are expected to know when you begin your surgical pathology rotations. In this book, you will find organ-based chapters that describe the approach to specimens, descriptions of common diagnoses, pitfalls, practical pearls, differential diagnoses, and key requirements of written diagnoses. The goal is for you to be able to read a chapter in 20 min and come away knowing enough about a specimen to hold an intelligent conversation with the attending at the microscope. Early in training, you do not have to get the diagnosis right to get credit—you just need to demonstrate a sound thought process and some background knowledge. If you already know the language, you can focus on asking the really practical questions, such as “How do you know it is X and not Y?” and “How do you handle this if you cannot show definite invasion?” These are the conversations that will enable you to function independently when you are finally out in the real world.

This book will also be useful to medical students rotating through pathology. Many students are given the opportunity to preview cases like a resident but will quickly find their second-year pathology course does not really help in formulating a diagnosis. This book is written at a level that should be accessible to students, enabling them to get more out of their pathology rotation by understanding the more interesting diagnostic challenges involved in even routine specimens.

On What This Book Is Not

- Complete or comprehensive: This book is a very oversimplified view of pathology and, in the interests of brevity and clarity, is deliberately scant on details in many areas. Some advanced topics have been omitted entirely.
- An atlas: Photographs have been chosen to complement some of the specimen descriptions, but you will get more out of this book if you have a good thick illustrated text, atlas, or online image database to supplement your learning.
- A grossing manual: For many organs, this chapter deals with either the biopsy or the organ resection, but not both, depending on which specimen type is more common or more illustrative. Therefore, while some grossing tips are included, this book complements, rather than replaces, your grossing manual.
- A board review book: While you do need to know just about everything in this book to pass the boards, this text is in no way sufficient for that. However, many senior residents have commented that it was a good way to begin their study, to identify any small gaps that existed in their big-picture views.

On Learning Pathology

In pathology resident education, there are two main categories of knowledge. One is factual knowledge, and the second is experiential knowledge. To understand the difference, think about how a child learns her colors. The rote question “What is the color of the sky?” and its answer “Blue!” can be taught to a child as soon as she learns to talk. She may know the colors of apples, grass, or bananas purely by repetition and games. However, when you pick up a blue block and ask her to identify the color, she may not actually know the answer. You can tell her, “This is blue,” but she does not yet understand what particular quality you are pointing out. Is it the shape of the block or the texture? Is it the wood it is made from or the letter on the side? It takes many, many repetitions of pointing out different blue things (a towel, a crayon, a book) before she finally understands the quality of blue, the thing that is similar across all those different-looking items. In the same way, an intern may know that “hyperchromatic” and “atypical” are indicators of malignant cells. However, he or she will need to see countless examples of what the professionals call atypical to really understand what qualities of the cell they are identifying. To that end, the more glass you see during your training, the better your eye will be. No book can give you that kind of experiential knowledge.

On the other hand, you can have the best eye in the world and misinterpret what you are seeing for lack of factual knowledge. Part of the goal of this book is to give you a head start on the factual knowledge. There are many examples in this book of very basic principles that are more or less assumed to be common knowledge and so are rarely, if ever, explicitly taught. I had multiple head-smacking moments in my own residency, when I thought in exasperation, “Why didn’t anyone tell me that in the beginning?” My hope is that getting these company secrets up front will smooth the learning curve for future residents.

On Teaching Pathology

This book began over the course of a 2-year experiment at the Johns Hopkins Hospital. In my fourth year of residency, I started a weekly microscope-based slide session for interns. Each session was accompanied by a handout and approximately 20 glass slides representing the most common diagnoses in that organ. The conferences were designed purely for the interns, with the intent of creating a protected didactic environment in which no question was too basic, no prior knowledge was expected, and “zebras” (unusual or exotic diagnoses) were ignored. Sitting around a large multihead scope, we began with normal histology and the mental approach to the biopsy or resection and then covered the array of non-neoplastic entities or changes that could simulate cancer. Finally, we looked at common tumor types and

their variants, comparing and contrasting normal with tumor, low grade with high grade. This book is a compilation of those handouts, with the addition of illustrations.

The intern conference was passed to a group of fourth-year residents committed to teaching and has become a self-sustaining tradition at Johns Hopkins. With the curriculum written, and the focus on common entities seen at hospitals of all sizes, this conference could easily be duplicated at other programs, either by faculty or by senior residents.

On Practicing Pathology

After 10 years in practice, including some smart moments and some very dumb moments, I have accumulated a few general guidelines on practicing pathology. Here are some suggestions for surviving the first years of practice. If you begin these habits now, in training, they will be automatic when you begin signing out cases on your own.

- Always cross-check the names and numbers on the slide with the paperwork. Make this a reflex, the first thing you do on every case.
- Look at all the levels on the slide, at least at low power.
- When looking for metastases in a lymph node, scan the slide at low power first to look for big mets and save yourself some time. But if they aren't obvious, look at every lymph node at 10×. The whole thing. Even the fatty extranodal stuff. Really.
- Write on your slides. Circles and arrows and notes and dots are really useful when you or your colleagues have to present that case at tumor board next month.
- Never make a first-time diagnosis without backup. In other words, if you personally have never signed out that particular tumor, have your diagnosis blessed by another pathologist or, if it's a real zebra, an expert. If you haven't seen it before, you may not recognize some essential feature that is incompatible with that diagnosis.
- Don't decide a strange tumor is benign or malignant until you have a name for it. There are malignant things that look benign and vice versa.
- Don't order the stain if you don't have a plan for interpreting it.
- Leave a train of thought for the next pathologist; write your thought processes down in your diagnoses, comments, or microscopic descriptions. For example, "Although the tumor has some lobular features, an e-cadherin stain is strongly positive." Or "The endometrial and ovarian tumors are considered synchronous primaries and are staged accordingly." Future reviewers of your case may agree or disagree with your interpretation, but they will not be able to say "What were you thinking?"
- Microscopic descriptions are very helpful in cases with unusual morphology. You should be able to describe a tumor well enough that a future pathologist, when presented with a new metastasis, can read your report and say, "Yeah, sounds like the same tumor."
- Pay attention to any sense that the case is "off," even if you can't put your finger on what is bothering you. Sleep on it, look at it again the next day, read the history, and show it around.
- If you can't recite the key differential diagnoses and cardinal features of an entity from memory, look it up. (Is it supposed to be well-circumscribed? Is a neutrophilic infiltrate typical? Does it ever occur in children? Does it frequently get mistaken for something else? Do I need a stain?) Yes, you may look up 20 things a day, but it will save you from rookie errors.
- You are going to make a mistake. More than one, actually. You will miss something, or see a cat and call it a dog. Everybody does, so don't let it destroy your confidence. Be transparent about your mistakes; own up to them, learn from them, and let your colleagues learn from them.

Checklist for a new malignancy

- Clerical check (name, numbers, gross description match).
- Someone else has seen it and agrees.
- Clinical picture is reasonable (demographics, radiology, etc., make sense).
- Mimickers have been excluded/lineage confirmed.
- The clinician knows about it.

Checklist for a recurrent malignancy

- Clerical check.
- The old histology matches or the new workup matches.
- Occam was only right 75% of the time—sometimes the simplest answer (a recurrence) is not the right answer (a new primary).

Checklist for a finding that seems discordant with the clinical information

- Clerical check.
- Is the gross description and number of pieces right?
- Does the printed label match what was handwritten on the slide?
- Does the tissue match the block?
- Was the clinical information presented correctly? Call the clinician.
- Were there any other (liver, breast, prostate) biopsies grossed that day that are also discordant? Could they have been switched?
- Could it be a floater? As a last resort, DNA fingerprinting may be able to establish an identity mismatch.

On the Second Edition

The second edition is a 10-years-on update. I have now been in general practice for 10 years, at a midsize community hospital, where I see everything from Pap smears to autopsy and where my time is split between AP and CP. There have been many advances in nomenclature, classification, and our understanding of tumor progression over the last 10 years, and many aspects of the book were desperately in need of an update. In addition, the thymus and spleen finally got some coverage, and bone and soft tissue tumors each got their own expanded chapters. The potential downside of an update was that my fund of knowledge is no longer cutting edge, as I no longer sit at the scope daily with the leaders of the field. I now have to rely on conferences and the literature, as well as my colleagues, to keep me current. My role as jack--of-all-trades is still a useful perspective in pathology education, I hope, but it is nerve-wracking to publish as a master-of-none. If I have slipped up and included outdated nomenclature or concepts in this edition, please let me know. This book continues to be an experiment in teaching, and feedback is welcome.

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