Gestational trophoblastic disease (GTD) deserves a special consideration in medicine. It encompasses a group of human disorders of reproduction resulting in significant morbidities in women, and is remarkable for its geographical distributions and varying frequencies in the different age and ethnic groups. In human pathology, these disorders are unique proliferative conditions with regard to their clinical setting, genetic compositions, and varying biological behaviors. Although as one of the earliest recognized human disorders in history, the biology, pathogenesis, diagnosis, and clinical management of the disease are still fascinating many of us either as a diagnostician or as a scientific investigator. My academic interest in GTD incurred at a morning pathology resident conference with Dr. Kurt Benirschke who was visiting Yale in 1997 as a grand rounds speaker. I was presenting him a placental site trophoblastic tumor, a uterine specimen processed by myself and diagnosed by my mentor, Dr. Maria Luisa Carcangiu, a few weeks earlier. Dr. Benirschke challenged me to prove that the lesion was indeed a clonal neoplastic lesion as opposed to a reactive process. His challenge eventually led to my first publication of the X chromosomal requirement by placental site trophoblastic tumor in 2000, and more importantly, opened many fascinating aspects of GTD in my academic career afterward.

With an intended broad spectrum of audience, the book starts with a general review of the medical history, epidemiology, and risk factors for GTD in Chapter 1. Chapter 2 provides a succinct review of developmental aspects of placenta with an emphasis on its early formation and molecular genetic regulation of implantation. Our current understanding of the genetic basis of GTD is given in Chapter 3. The following chapters provide a thorough review of diagnostic histopathology of each entity of GTD. Although traditional histology is the foundation for morphological recognition, ancillary studies including immunohistochemistry and molecular genotyping have become an integral part of the routine diagnostic algorithm. Each diagnostic entity is richly illustrated histologically, often with multiple examples. Chapter 9 is written to cover the diagnostic entities under the category of persistent trophoblastic neoplasia by the WHO. Invasive mole is primarily discussed here. Chapter 11 provides a thorough review of the emerging molecular diagnostic applications in GTD. Finally, a comprehensive discussion of the clinical presentation and management of GTD is given in Chapter 12.
I can never express enough gratitude to my career mentors, present and past, at Peking University, SUNY at Buffalo, MSKCC and Yale. Their wisdom and training are the major source of knowledge and professional inspirations. Special thanks are owed to many colleagues who shared their insights and/or clinical cases in the past. Finally, this book is a product that represents not only an academic commitment but also the unfettered support and enduring love of my families.

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