PLATELETS ARE THE SMALLEST OF THE CELLULAR ELEMENTS of human blood, and their combined volume in a healthy subject occupies approximately 0.25% of the total blood volume. Their small size, however, belies their importance for the maintenance of good health. Platelets are enucleated cells but contain granules and mitochondria and are derived from giant megakaryocytes in the marrow and lung, mostly the marrow. The most recognized role for platelets is in maintenance of hemostasis, and the clinical presentation of platelet disorders is typically abnormal bleeding, either spontaneous or provoked, most often from a mucocutaneous surface. However, in recent years it is becoming increasingly clear that platelets have inflammatory functions and can influence both innate and adaptive immune responses. Platelet disorders are typically classified as quantitative or qualitative, but an overlap between the two may be present. The quantitative disorders are divided into the hypoproliferative thrombocytopenias and thrombocytopenias of platelet distribution or survival. Harvesting of platelets from healthy human subjects (blood donors) using either whole blood or apheresis donations is performed primarily to generate platelet concentrates in order to prevent or treat bleeding in patients with thrombocytopenia or, less commonly, in patients with compromised platelet function. The hypoproliferative thrombocytopenias account for the great majority of such platelet transfusions.

There is evidence of an increase in platelet transfusion in the past few decades in many economically developed countries, and the volume of platelet transfusion in a nation can be used as a crude surrogate for identifying more developed and sophisticated health-care systems. This is because platelet transfusion occurs in the context of the supportive care of patients undergoing more complex (and expensive) medical interventions, such as treatment for hematologic malignancies, stem cell transplants, and complicated surgical procedures. It is likely that growth in platelet transfusion will level off (or is leveling off) in the developed countries, but a secondary surge will likely occur, driven by an increase
in the sophistication of health-care systems in economically developing countries, particularly in Asia; hence, the importance and timeliness of this book, which seeks to examine the source, manufacturing practices, storage conditions, modifications, and clinical aspects of platelet transfusion.

The book is constructed so that individual chapters identify one particular aspect; it is not intended to be read from cover to cover: commonly a reader seeks up to date and authoritative information on one specific aspect. On account of this, there is some overlap and repetition of information between chapters.

The book can be divided into two main sections—those chapters dealing with platelet collection, storage, or processing (Chapters 1-6), and those chapters related to clinical indications, dosing, adverse effects, and alternatives (Chapters 7-19). However, these are interrelated because manufacturing processes or storage conditions may alter potency or enhance safety and, hence, have an impact on the clinical efficacy or adverse events associated with the product. The manufacturing and processing chapters explore methods to minimize the platelet storage lesion while improving safety, and the clinical chapters explore the controversial aspects of clinical appropriateness. It is clear that there remain many gaps in the current understanding of many aspects of platelet transfusion, and these will require very carefully designed clinical trials or larger observational studies to clarify.

We intentionally did not include cryopreserved platelets or autologous platelet-rich plasma (gel), or platelet substitutes, but some information on the latter is provided in Chapter 19. Cryopreserved platelets have not come into common use; there is ongoing controversy regarding the efficacy of platelet-rich plasma; and a platelet substitute has not yet entered the clinical testing phase, let alone approval. All of these products have been available for decades as prototypes but have not developed beyond the experimental stage or are of unknown efficacy. Readers interested in these products can access specific information via the Internet and scientific journals.

Furthermore, we recognize that platelets were originally counted manually in small-volume hemocytometers, and the results expressed as a number of platelets/cu.mm (mm$^3$). This is more commonly expressed currently as (number) platelets/µL (1 µL = 1 cu.mm), but the SI unit (International System of Units) is (number) platelets × 10$^9$/L. Both conventions are used in this book, and we have resisted standardization.

This is a multiauthor book because we have considered it the best strategy to ensure that all aspects of platelet transfusion therapy are dis-
Preface

cussed to the extent and depth required with the current level of knowledge. The authors are leading specialists in each of the areas discussed, from both sides of the Atlantic, and it is with their expertise that we have succeeded in producing an informative and comprehensive book. The editors are deeply grateful to all of them for their extraordinary contributions. We would like to also acknowledge the excellent and patient work of Jay Pennington, the support of AABB Press staff members Jennifer Boyer and Laurie Munk, and the encouragement of the AABB Press Editorial Board members.

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