PREFACE

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Guest Editor

The peripheral blood film and microscope have been the cornerstone of hematologic diagnosis since the inception of the science of hematology. Despite tremendous advances in technology, such as automated hematology analyzers, flow cytometry, molecular diagnostics, cytogenetics, and other diagnostic tools, the peripheral blood film remains the key initial step in the evaluation of hematologic disease.

The preparation, staining, and examination of the peripheral blood film were tasks that medical technologists took great pride in accomplishing with hard-earned skills. Those tasks and skills now are being replaced by automated technologies. Dr Houwen describes the preparation of the peripheral blood film, the characteristics of a well-made blood film, and the rapid introduction of automated blood film makers combined with automated hematology analyzers. Dr Dashkoff recounts the fascinating and complex history of the blood cell stains that began as complex mixtures of dyes prepared by a wide variety of methods resulting in blood cell stains that required skill, experience, and the practice of a few dark arts to obtain the perfect stain. The eponymic classification of these stains rivaled their chemical makeup in complexity. The introduction of computer-assisted cell identification with image processing differential systems in the 1970s accelerated the development of chemically pure, highly reproducible stains. Our interpretation of blood film morphology is based on stained blood films with their inherent standardized drying and staining artifacts. When these artifacts are changed by poor slide preparation or aberrant staining, we often are at a loss to interpret the findings.

Anemia is defined by the results of an automated hematology analyzer, but the initial classification and framework for investigation is the size, shape, and color of the red cells on a blood film. An approach to this problem is described in the article on red cell morphology. The reticulocyte is the final stage in the maturation of the red cell and its release into the peripheral blood film is a marker for the rate of red cell production and as such is an invaluable and necessary tool for the investigation of anemia. The reticulocyte count based on peripheral blood counts was of necessity a proportional count that, combined

with the analytic errors, made it a valuable but often inaccurate tool. It is being replaced by highly accurate instrumental methods that offer not only counting accuracy but also important information on the state of red cell production with parameters, such as the immature reticulocyte fraction.

I often have remarked to individuals learning peripheral blood morphology that the first things one has to learn are the common artifacts that may cause errors in interpretation. Drs Dalal and Brigden give an excellent description of the artifacts associated with all blood cell lines.

Tradition is a powerful influence in medicine and once a test becomes entrenched in usage, even for valid reasons at the time of its introduction, it is very difficult to remove from practice. The band count was popularized as an indication of infection or tissue damage at a time when only the eyecount differential was available, even before the automated total white blood cell count was introduced. Its value was trumpeted especially by surgeons, pediatricians, and infectious disease physicians. With the development of automated white cell counts and differential counts, it became evident to many that the band count was not a sensitive or specific marker of infection and many articles began to appear in the literature that showed the total white blood cell and absolute neutrophil counts were superior. Dr Cornbleet has done a remarkably complete and convincing review of the literature to support abandoning the performance of band counts, and showing that the total white blood cell count and absolute neutrophil count are better clinical indicators than the band count.

Dr Imbert discusses the features of the chronic myeloproliferative disorders found in the peripheral blood in the context of the World Health Organization (WHO) Classification of Hematologic Tumors. The peripheral blood features of these disorders are absolute requirements for the correct identification and classification of this group of disorders.

Dr Schumacher and his associates discuss the peripheral blood findings of the acute leukemias and other aspects of the disorders. They chose to retain the use of the French-American-British classification rather than the WHO classification. Critical review of the WHO classification over time should reveal which of the classifications are the most clinically relevant.

Dr Moreno and colleagues discuss the morphology of the platelet and the disorders associated with increased or decreased numbers and those associated with morphologic abnormalities of the platelets. Evaluation of platelet numbers and morphology remains an important part of the peripheral blood film review.

I decided not to include a review of lymphocytopenias and benign lymphocytosis, not because they are not important, but they would comprise an extensive subject. An extensive discussion of these subjects by the editor can be found on the http://www.upc.com website, under abnormal test results. Dr Hernandez contributes a discussion of the peripheral blood manifestations of malignant lymphomas.

Many infectious diseases may cause changes in the peripheral blood. Dr Kroft provides an excellent discussion of the specific organisms that may be found in the peripheral blood and the nonspecific changes with which they may be associated.

There is a great interest today in finding ways to decrease the number of complete blood count results that must be reviewed by preparing and examining a peripheral blood film. The preparation, staining, and review of peripheral blood films remains one of the most time-consuming tasks requiring great technical competence in the laboratory. The increasing accuracy of the parameters for all cell types, erythrocytes, leukocytes, and platelets by automated hematology analyzers and their capability of flagging specimens for abnormal

cell types has led to confidence that samples with results within certain numerical limits and the absence of certain flags do not require review. Signficant reduction in review rates can be made without compromise to the diagnostic work-up of patients, and can lead to decreased personnel needs and costs for the laboratory. This controversial subject is discussed by the guest editor.

The final two articles deal with future developments in laboratory handling of blood film examination by image processing devices and information handling. Dr Tatsumi, a recognized leading international expert in the field of laboratory automation, dicusses this subject. The final article by Dr Riley relates to the teaching of morphology by means of a virtual blood film. This exciting technique will make high-quality morphologic material, even rare abnormalities, available without the necessity of a microscope.

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