
Preface

Recurring, nonrandom cytogenetic abnormalities are common in hematological malignancies, and their recognition has paved the way for the identification and therapeutic exploitation of the clonal molecular lesions that are uniquely associated with specific subtypes of myeloid leukemia. Appreciation of the prognostic importance of these cytogenetic and molecular genetic abnormalities has provided the major thrust for the emergence of new genetically based leukemia classifications.

Myeloid Leukemia: Methods and Protocols is devoted to a review of those laboratory techniques that are most likely to assist laboratory scientists and hematologists in the investigation and management of patients with myeloid malignancies. Scientists will benefit from the provision of a wide range of protocols that are documented in sufficient detail to enable their rapid implementation in a routine molecular hematology laboratory. Clinicians will also be rewarded by a concise description of the relevance of the assays, combined with recommendations for how each assay should be integrated into the overall management plan.

The early chapters deal with generally applicable techniques for molecular biology, cytogenetics, and fluorescence *in situ* hybridization. A comprehensive overview of the expanding field of real-time quantitative polymerase chain reaction is also included, so as to provide a background for the large proportion of chapters that utilize variations of this technique. The remainder of *Myeloid Leukemia: Methods and Protocols* is primarily directed toward acute myeloid leukemia (AML), with particular attention to the molecular lesions that enable prognostic stratification and facilitate monitoring for minimal residual disease. In particular, qualitative and quantitative methodologies for assessment of core binding factor leukemias and acute promyelocytic leukemia are presented. In addition to gene rearrangements, other prognostically relevant molecular lesions, such as FLT3 mutations and WT-1 overexpression, are covered. The rapidly developing field of oligonucleotide microarrays is addressed with a detailed methodological description and a review of the complex range of applicable statistical tools. This is then supplemented by another chapter that deals with a novel monoclonal antibody microarray approach for the diagnosis and classification of AML.

In addition, chapters addressing important molecular aspects of chronic myeloid leukemia, polycythemia rubra vera, essential thrombocythemia, hypereosinophilia, and myelodysplasia have also been included. Finally, a

comprehensive review of methods for the assessment of hemopoietic chimerism in the setting of nonmyeloablative stem cell transplantation has been provided, because transplantation is an important component of the overall management of patients with acute and chronic myeloid malignancies.

Although the topics covered do not include all of the molecular abnormalities associated with myeloid malignancies, they broadly encompass those assays of immediate clinical relevance, and provide helpful strategies that are adaptable now and in the future for other molecular lesions that might be considered equally relevant.

The contributions of the many authors writing in *Myeloid Leukemia: Methods and Protocols* are gratefully acknowledged; they have generously shared the techniques that have proved so successful in their own laboratories. As with other volumes in the *Methods in Molecular Medicine* series, a collection of invaluable Notes accompanies each chapter to highlight specific technical issues, with the aim of facilitating the rapid establishment of the assays in the reader's own facility. Finally, we would also like to acknowledge the helpful assistance of Amy Nixon in coordinating the assembly of this volume.

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Myeloid Leukemia

Methods and Protocols

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2006, 320 p. 69 illus., Hardcover

ISBN: 978-1-58829-485-2

A product of Humana Press