

CELL MARKERS IN THE RECOGNITION OF ACUTE MYELOBLASTIC LEUKAEMIA SUBTYPES

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Abstract: The diagnosis of acute myeloblastic leukaemia (AML) is based on cell morphology, cytogenetic and molecular changes, cell markers and clinical data. Our aim was to establish whether morphology and cell markers are comparable in the evaluation of AML. Bone marrow smears were analysed, and flow cytometry and monoclonal antibodies were used to determine cell type and maturity. Morphology and cell markers correlated differently in different AML subtypes.

Key Words: Acute Myeloblastic Leukaemia Subtypes, Acute Myeloblastic Leukaemia Phenotypes, Cell Markers

INTRODUCTION

The diagnosis of acute myeloblastic leukaemia (AML) is based on cell morphology, cytogenetic and molecular changes, cell markers and clinical data [1]. Immunophenotyping marker studies have demonstrated that AML cells are antigenically heterogeneous [2]. Our aim was to establish whether morphology and cell markers are comparable in the evaluation of AML.

PATIENTS AND METHODS

Tab. 1. AML immunophenotypes and antibodies used

Common positive and negative cell markers	
AML-M0	CD13+ and/or CD33+,CD34+, CD14-,MPO-, HLA-DR+
AML-M1	CD13+ and/or CD33+,CD34+, CD14-,MPO+, HLA-DR+
AML-M2	CD13+ and/or CD33+,CD34+/-, CD14-,MPO+, HLA-DR+,CD15+/-
AML-M3	CD13+ and/or CD33+,CD34-, CD14-,CD15+/-,MPO+, HLA-DR-
AML-M4	CD13+ and/or CD33+, MPO+,CD14+, HLA-DR+
AML-M5	CD13+ and/or CD33+, MPO-,CD14+, HLA-DR+
AML-M6	CD13+ and/or CD33+, MPO+, glikoforin A+
AML-M7	CD 41+, CD 33+, CD 34+, HLA-DR+

An evaluation (according to the FAB classification) was performed on stained bone marrow smears from 140 AML patients treated between January, 1995 and January, 2001. Cells were isolated by centrifuging EDTA bone marrow samples using Ficoll. Flow cytometry (cytometer Coulter XL-MLC) and monoclonal antibodies were used to determine cell markers in leukaemic cells (Tab. 1).

RESULTS

Morphology and cell markers, which can define AML subtypes, i.e. some characteristics of the leukemic clone, were compared (Fig.1). The level of accordance was different in different AML subtypes: M0 0% (7 by cell markers/0 by morphology), M1 82% (23/28), M2 90% (22/20), M3 61% (18/11), M4 60% (47/28), M5 80% (12/15), M6 87% (8/7), biphenotypic 100% (2/2), unclassified 3.4% (1/29). None of the patients had the M7 subtype.

DISCUSSION

The aim of the study was to compare the characteristics of the leukemic clone defined by morphology and immunophenotyping.

Monoclonal antibodies react with antigens on the cell surface. To identify AML, the percentage of positive reacting blast cells should be greater than 20% with one or more myeloid-associated antigens, e.g. CD 33, CD 14 [2, 3]. Antigen expression corresponds to the normal stages of myeloid and monocytic differentiation [4]. None of the currently available myeloid monoclonal antibodies identify leukaemia-specific determinants. Unlike morphologic classification, which attempts to place the predominant cell type within a defined group, cell marker studies demonstrated that AML cells are antigenically heterogeneous. They express differentiation markers asynchronously, and have lymphoid markers at the same time [2]. We believe that the panel of monoclonal antibodies, which was used, is sufficiently suitable for a basic immunophenotyping of the AML cells.

Immunophenotyping is of great use when distinguishing between AML and lymphoid leukaemia, as well as when defining hybrid and biphenotypic leukaemia where leukaemic cells are atypical. It also proves useful in AML-M0 variants [5]. The former subtype was not recognised when morphological evaluation was used (the level of evaluation accordance proved to be 0%). The level of accordance in AML-M3 and AML-M4 was the same (60%). It was quite high in AML-M2 (90%), AML-M5 (80%), AML-M6 (87%). However, the AML-M6 subtype seems difficult to recognise [1]. Due to the small number of cases, it is impossible to evaluate the results for biphenotypic leukaemias. Morphologically unclassified leukaemias represent a large number of cases, and the accordance in evaluation is quite low (3.4%). In one, an unusual coexpression of normal differentiation antigens was noticed. We believe an

asynchronous expression of normal differentiation antigens and lymphoid-associated antigens could be recognised more often if a broader panel of monoclonal antibodies was used.

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