Flow Cytometric Analysis of T-Cell-Rich B-Cell Lymphoma

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T-cell-rich B-cell lymphoma (TCRBCL) is a recently described unusual non-Hodgkin's lymphoma in which non-malignant T-cells predominate over a small number of large-sized neoplastic B-cells in a diffuse architecture λ - Λ . In the previous studies of TCRBCLs, flow cytometry (FCM) has been rarely employed because T-cells may obscure neoplastic cells [2]. However, we examined lymph node cells from a case of TCRBCL by FCM, and could clearly elucidate the precise immunophenotypes of both neoplastic cells and T-cells and the evaluation of cell surface antigen expressions was considered to be valuable to clarify the functional roles of the T-cells.

A 61-year-old female was admitted to our hospital because of a left cervical lymphadenopathy in October 1993. The biopsied lymph node was replaced by diffuse infiltrations of lymphoid cells. Most of the cells recognized in the lesion were morphologically small-sized lymphocytes, while large-sized lymphoid cells with both irregular-shaped nuclei and prominent nucleoli were few (fig. 1). FCM using fresh lymph node cells was performed. A small number of large-sized cells were clearly separated from an overwhelming number of small-sized cells on the cyto-gram (fig. 2). When the whole cells were analyzed, pan T-cell antigens (CD2, CD3, CD5 and CD7) were expressed on more than 70% of them (table 1). CD11b-positive cells were negligible (1%). We further divided the whole cells into large- and small-sized cell populations by gate settings. In the large-sized cell population, most of the cells

Fig. 1. Pathological feature of patient's lymph node. Rare large lymphoid cells are recognized in a background of numerous small lymphocytes. HE. x 211.

were found to be positive for CD19, CD20 and κ -chain, but few λ -chain-positive cells were observed. The T-cell antigens such as CD2, CD3, CD4, CD5, CD7 and CD8 were almost

negative, although many of the cells expressed CD45RO, which is occasionally expressed on non-Hodgkin's lymphoma (B-cell type) cells [5]. Thus, this population was considered as large neoplastic B-cells with mono-typic immunoglobulin. On the contrary, the majority of small-sized cells were positive for the pan T-cell antigens,

Whole cells

Large cells

Small cells

ap*

FSC

FSC

FSC

Total number of cells Number of gated cells

10,000 9,469

10,000 1,771

10,000 7,671

Fig. 2. Cytogram of the lymph node cells. FSC = Forward scatter; SSC = side scatter.

CD38, CD45RO and HLA-DR, but B-cell antigen-positive cells were negligible. CD4 and CD8 were expressed on 32% and 50% of the cells, respectively. CD4+CD8+ cells were almost absent (0.5%). Thus, these small-sized cells were regarded as mature T-cells. This patient was diagnosed as having TCRBCL.

To our knowledge, only one report has employed FCM to analyze TCRBCLs, but failed to detect neoplastic cells with monotypic immunoglobulin in all of the 5 cases studied [2]. Based on cell size, however, neoplastic cells could be clearly discriminated from mature T-cells in the present case.

Many aspects of TCRBCL remain unsolved. Among these are the precise immunophenotype and modulatory role of the infiltrating T-cells [3]. Various investigators have considered possible modulatory roles of the abundant T-cells recognized in TCRBCLs, but no hypothesis has been based upon precise immunophenotypes of the T-cells. In the present case, the proportions of T-cell subsets and their expressions of activation-associated markers were quite different from the ranges of normal lymph nodes [6]. The majority of the T-cells were considered as activated/memory cytotoxic suppressor T-cells (CD3+ CD8+CD11b-CD38+CD45RO+HLA-DR+ cells) [7, 8]. Thus, our results strongly suggest the role of T-cells in TCRBCLs as indicated in tumor-infiltrating T-lymphocytes [9], and are also relevant to the previous report which suggested that oligoclonal T-cells recognized

Table 1. Cell-characteristics of the lymph node cells

in TCRBCLs may be sensitized by B-neoplastic cell antigens [4].

Although this report represents only one example, further studies using FCM may provide valuable information for biological characteristics of TCRBCL.

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