Letters

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Leu-19 in Myeloma—A New Role for an Old Antibody

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IN 1984 Uchida *et al.* [1] described strong natural killer (NK) cell activity in the bone marrow of myeloma patients when compared to normal bone marrow. These authors also reported that this increased activity was completely abrogated by an antibody with NK cell specificity (OKM 1 plus C'). Following these observations we were interested to know if a relationship exists between the number of NK cells and the extent of bone marrow infiltration by tumour cells in such cases. To our surprise, in four consecutive cases with myeloma admitted to our institution recently, high levels of strongly positive cells were found with the antibody Leu-19 (Becton-Dickinson). In order to classify these cells we performed double fluorescence experiments using the strong CD38 expression as a reference marker for plasma cells and a panel of other monoclonal antibodies with plasma cell reactivity. The results are shown in Table 1. It can be seen that Leu-19 is highly reactive with bone marrow cells from all four patients. Double fluorescence for strong CD38 expression and Leu-19 expression showed coexpression by the same cells. In one of our cases (No. 2) we tried another commercial antibody with NK cell specificity, the NKH-1 antibody (Coulter), using a direct fluorescence technique and found 42% positive cells. We then used the Leu-19 antibody for the sorting of bone marrow cells from a myeloma patient with 10% plasma cells in the mononuclear cell fraction after density gradient centrifugation. After sorting according to strong Leu-19 expression we found 80% cells with plasma cell morphology. This means an eight-fold enrichment compared to the 10% before sorting.

So, contrary to the expected result, namely to find the Leu-19 positive cells in a certain lympho-monocytoid subpopulation of the patient's bone marrow cells, we found practically all strongly expressed reactivity associated with the myeloma cells.

Using the monoclonal antibody PCA-1 which is included in the panel of antibodies shown in Table 1, alone and in combination with another antibody, Shimazaki *et al.* [2] demonstrated an effective removal of plasma cells from bone marrow cells. In autologous bone marrow transplantation for myeloma patients effective purging procedures are needed and we suggest that the Leu-19 antibody should be tested also for this purpose. The CD38 antibody, which is generally the most effective marker for plasma cells (Table 1), is also reactive with a wide spectrum of progenitor cells and therefore is not recommended for bone marrow purging.

Table 1. Flow cytometric analysis of bone marrow cells from four myeloma patients using a panel of antibodies with plasma cell specificity and the Leu-19 antibody

Patient No.	CD38*	R1-3†	IOB2	PCA-1	J5	Leu-19
1	25	23	11	4	3	16
2	48	34	27	3	1	35
3	46	15	29	21	0	34
4	37	20	19	14	8	24

*At high fluorescence intensity only.
†Kindly provided by Dr J. Katzmann, Rochester.
Numbers are percentage positive cells from two-colour analysis. Green fluorescence (R 1-3, IOB2, PCA-1, Leu-19) was gated on red fluorescence (CD38).

1. Uchida A, Yagita M, Sugiyama H *et al.* Strong natural killer (NK) cell activity in bone marrow of myeloma patients: accelerated maturation of bone marrow NK cells and their interaction with other bone marrow cells. *Int J Cancer* 1984, **34**, 375–381.
2. Shimazaki C, Wisniewski D, Scheinberg D *et al.* Elimination of myeloma cells from bone marrow by using monoclonal antibodies and magnetic immunobeads. *Blood* 1988, **72**, 1248–1254.

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Differential Heat Sensitivity of Tumour Microvasculature

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RECENTLY, publications from two laboratories came to our attention that address the issue of tumour-specific differences in the sensitivity of the tumour vascular system to heat. Hill *et al.* [1] compared the thermal response, expressed as the Thermal Enhancement Ratio (TER) vs. a number of physiological parameters for eight different tumours, and concluded that a higher heat dose is required for vascular shutdown in slow growing tumours, as compared with fast growing tumours. This was

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