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Scanning electron microscopy of myeloma cells

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Abstract

The surface structure of myeloma cells was examined by scanning electron microscopy. The cells were collected from the pleural effusion of a multiple myeloma patient and purified by Conray-Ficoll gradient sedimentation. The cell size ranged from 8 μ to 12 μ in diameter and the microvilli were from 0.8 μ to 1.2 μ in length. The surfaces of the majority of the observed myeloma cells were more villous than lymphocytes.

— BRIEF NOTE —

SCANNING ELECTRON MICROSCOPY OF MYELOMA CELLS

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Abstract. The surface structure of myeloma cells was examined by scanning electron microscopy. The cells were collected from the pleural effusion of a multiple myeloma patient and purified by Conray-Ficoll gradient sedimentation. The cell size ranged from $8\ \mu$ to $12\ \mu$ in diameter and the microvilli were from $0.8\ \mu$ to $1.2\ \mu$ in length. The surfaces of the majority of the observed myeloma cells were more villous than lymphocytes.

Human lymphocytes consist of thymus derived (T-cell) and bone marrow derived (B-cell) lymphocytes. Each cells type has its particular functions in the immune response and different characteristic markers on the surfaces. It is, therefore, possible to distinguish between them using various markers, e.g., sheep erythrocyte rosette formation for T-cells (1) and surface immunoglobulin for B-cells (2). Recently, Polliack and his colleague demonstrated that the surface topography differs between T-cells and B-cells, i.e., the T-cell surface is smooth in contrast with the villous structure of the B-cell (3).

In the present paper, plasma cell (myeloma cell) surface structure which has not previously been reported, is shown by scanning electron microscopy (SEM).

The examined cells were from male 68-year-old multiple myeloma patient. His chief complaints were back pain and paralysis of both lower extremities. Laboratory examination revealed: RBC, 346×10^4 /cmm; WBC, 3300/cmm in peripheral blood; plasma cells, 40.6% in myelogram; total serum proteins, 11.4 g/dl; albumin, 26.9%; and globulin, 73.1%, in which γ -globulin was 64.9%. M-protein was detected as the IgG k-type by immunoelectrophoresis. Six months before admission, an abnormal lung shadow was found. A left pleural puncture revealed a bloody effusion. The infiltrated leukocytes were separated by Conray-Ficoll gradient sedimentation. Almost all leukocytes showed plasmoid cell morphology.



Fig. 1. May-Giemsa staining of myeloma cells prepared by cytocentrifugation. $\times 400$.

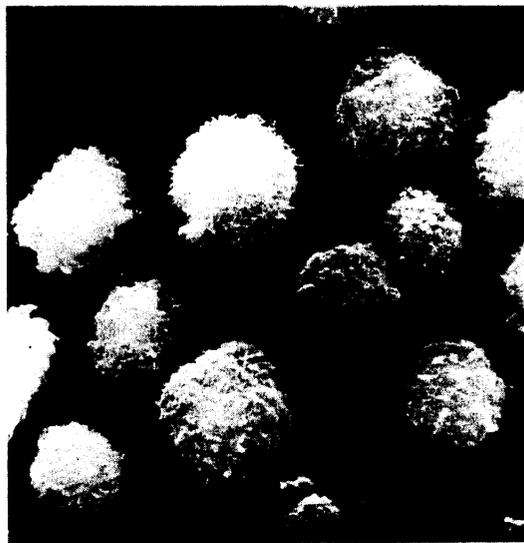


Fig. 2. Myeloma cells remarkable villous surface structures by SEM. $\times 3000$.

The cell suspension was fixed in 1% (v/v) glutaraldehyde containing 0.1 M, pH 7.2 cacodylate buffer for 30 min or more at room temperature. The fixed cells adhered to a small slide glass (5×5 mm) treated by poly-L-lysine ($40 \mu\text{g}/\text{ml}$). The preparation was then dried by the critical point drying method (4) and evaporated with Au-Pd. SEM (JSM-U3) with an accelerating voltage of 25 kv. was used for observations. The cells were $8-12 \mu$ in diameter and the surfaces were remarkably villous in comparison with lymphocytes. The microvilli were very fine and their length ranged uniformly from 0.8 to 1.2μ . Such

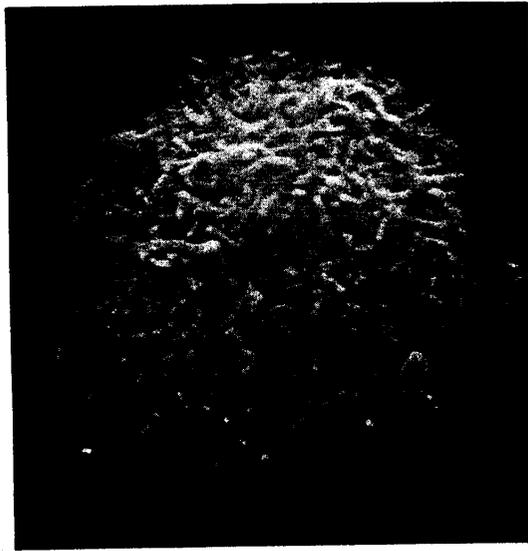


Fig. 3. Myeloma cell at high magnification. $\times 10,000$.

villous surface structures on these myeloma cells enabled their differentiation from lymphocytes and suggested characteristic features of normal plasma cells.

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