B-Cell Lymphoma Lacking Fc- and C3d-Receptors*

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Summary. Various cell surface markers were studied in a patient with lymphosarcoma cell leukemia. The B-cell derived feature of the neoplastic cells could be identified by demonstration of monoclonal surface immunoglobulin of IgM-kappa type of high density synthesized by the cells. Interestingly, there were no Fc- nor C3d-receptors demonstrable using various techniques. Only 22% of the leukemic cells expressed C3b receptors. The failure of rosette formation with mouse erythrocytes was an additional surface feature distinguishing from ordinary chronic lymphatic leukemia of the B cell type. The phenotype of the leukemia cells is discussed as corresponding to that of a less differentiated B lymphocyte.

Key words: Lymphosarcoma — Surface immunoglobulins — B-lymphocytes — Fc-Receptors — Complement receptors.


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Human lymphocytes comprise several subpopulations which can be identified by various membrane markers. Currently, B cells are characterized by easily detectable membrane-bound immunoglobulins, membrane receptors for human Fc and rabbit IgG, and receptors for the third and fourth components of complement, and a binding characteristic for mouse red blood cells [2,4,5,9,12,17,19]. Recent reports using double marking assays clearly showed that only a part of the Ig-bearing lymphocytic fraction – by definition the B cells – express Fc-receptors or mouse erythrocyte receptors [3,8,11,14,18]. In correlation to that we describe a lymphoproliferative disorder with the clonal expansion of an Ig bearing B cell type lacking Fc-receptors, C3d-receptors and mouse erythrocyte binding.

Case Report

A 61-year-old man was transferred to the Medical Clinic III Großhadern, University of Munich, in May 1976. The diagnosis of a malignant non-Hodgkin lymphoma was already made outside by histological examination of a tumor in the epipharynx region. Explorative laparatomy and splenectomy in June 1976 revealed extensive befall of subphrenic lymphatic tissue. During intensive chemotherapy according to the COP-protocol including methotrexate and later Velbe, the patient developed a leukocytosis of 25,000/μl in November 1977. The leukocyte count raised again to 300,000/μl in February 1978 despite treatment according to the ABVD-therapy protocol. The differential blood count showed over 90% mononuclear cells of polymorph atypical lymphoid appearance with marked nucleoli. Cytochemistry revealed fine granular deposits of a PAS-positive material, acid phosphatase was weakly positive, peroxidase was negative and NAS was very weak and not suppressed by sodium fluoride. A marked hepatomegaly, an epigastric tumor and severe bone pains complicated the further course of the disease. A moderate diminution of the lymphomatous lymphnodes resulted from repeated treatment with vincristine, prednisone and later adriblastine, bleomycine and dacarbacin, but chemotherapy had to be stopped due to deterioration of his general condition. A marked thrombopenia prevented a leukapheresis therapy. At last, the patient was only substituted by blood transfusions and was discharged accordingly to his own decision.

Material and Methods

Lymphocyte suspensions for surface marker studies were prepared from heparinized venous blood by Ficoll-Isopaque density gradient centrifugation. Surface membrane bound immunoglobulins (SmIg) were studied by a direct immunofluorescence method as described [21] using heavy chain specific (anti-IgM, anti-IgG, anti-IgG) and light chain specific (anti-kappa, anti-lambda) reagents of our own production or of commercial origin (Dakopats, Behring, Meloy). Antibody preparation and specificity testing was performed as described including agar diffusion tests, immunoelectrophoresis, passive hemagglutination of Ig-coated erythrocytes and reaction with fixed myeloma cells [20]. The antibodies were conjugated with fluorescin isothiocyanate (FITC), the F/P ratio being 2.0. Resynthesis of SmIg was studied after incubation of 10^7 cell/ml for 30 min at 37°C in serum free medium containing 0.25 mg/ml bovine α-chymotrypsin (Merck), dissolved in phosphate buffered salt solution (PBS). After washing, aliquots of cells were resuspended in medium containing 24% added fetal calf serum and...