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This paper reported an extensive characterization of childhood lymphoblastic lymphoma by evaluating cell surface markers and surface morphology using the scanning electron microscope (which did not prove useful). The cell surface markers established the heterogeneity of lymphoblastic lymphoma in children. This paper was part of the first wave of studies, mostly in adults, looking at cellular markers and trying to better define and characterize lymphomas for clinical trials. This model of collaboration has proven extremely productive for both improved clinical care and our understanding of lymphoma biology.

Jaffe ES, Braylan RC, Frank MM, Green I, Berard CW. Heterogeneity of immunologic markers and surface morphology in childhood lymphoblastic lymphoma. *Blood*. 1976;48(2):213-222.

Heterogeneity of Immunologic Markers and Surface Morphology in Childhood Lymphoblastic Lymphoma

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The neoplastic cells from seven patients with childhood lymphoblastic lymphoma were studied for cell surface markers and surface morphology in the scanning electron microscope (SEM). The cells were studied for surface immunoglobulin (SIg), complement receptors (EAC), receptors for cytophilic antibody (IgGEA), and non-immune rosette formation with sheep red blood cells (E). In one patient the cells exclusively bound E, suggesting a T-lymphocytic origin. In two patients the cells bound EAC, but demonstrated no other B-lymphocytic markers. In two patients no markers were detected, and in two patients receptors for both E and EAC were demonstrated. Additional studies in one of these patients permitted simultaneous demonstration of both markers on the same neoplastic cells. The neoplastic cells were also examined by SEM after fixation and critical point dehydration. No consistent surface morphology was observed. In four patients the cells were predominately smooth, whereas in two patients variable numbers of surface microvilli were present. A correlation of the surface features with membrane markers could not be established. A comparison of the surface markers with clinical and cytologic features revealed clinical homogeneity in spite of the heterogeneous immunologic markers. This heterogeneity was most likely a reflection of neoplastic alteration and disordered differentiation of the cells. The observation of complement receptors on the cells of four cases is a feature not previously reported in this disease and should be investigated in other presumed T-cell malignancies.

CHILDHOOD LYMPHOBLASTIC LYMPHOMA or childhood lymphosarcoma (CLSA), a morphological entity most common in children and young adults,[1] has been suggested to be of thymus-derived (T) lymphocytic origin.[2,3] The presence of an anterior mediastinal mass in many of these patients had indicated clinically a possible thymic origin for these tumors.[4] These neoplasms also seem to involve preferentially the thymic-dependent portions of the lymphoreticular system, the paracortex of lymph nodes, and the periarteriolar lymphoid sheaths of the spleen.[5] In addition, T-lymphocytic markers have been demonstrated on the neoplastic cells in some cases.[2,3] We have studied the membrane markers and scanning electron microscopic (SEM) appearance of the neoplastic cells from seven cases and have attempted to correlate these features with the presence or absence of involvement of the mediastinum, bone marrow, peripheral blood, or cerebrospinal fluid.

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