Cytochemistry of Leukaemic Lymphoid Cells

Pages with reference to book, From 263 To 265

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The characterization of leukaemic lymphoid cells has improved considerably with the development of cytochemical techniques. Morphology alone has not been sufficient to allow the recognition of different lymphocyte populations. Indeed in the case of acute leukaemias it may not even help in establishing the lymphoid or myeloid nature of undifferenciated blasts cells. Cytochemistry at light microscopy aids in the recognition àf leukaemic lymphocytes and their sub-populations. The most widely ufted cytochemical reactions performed in lymphoid cells at light microscopy are Acid phosphatase (AP, PAS and Esterases.

There are several cytochemical techniques to demonstrate acid phosphatase activity in blood and bone marrow films[1,2]. The reaction has been of value in distinguishing different types of acute and chronic lymphoproliferative disorders. In acute leukaemia it is of most value where a characteristic strong localised reaction in 1-Acute lyrnphoblastic leukaemia (T-ALL) has been observed .Another study reported a 90% positivity in cases of T-ALL, 2% in common ALL and 10% in Null-ALL. Most chronic B-lymphoproliferative disorders B-cell chronic lymphocytic Leukaemia (B-CLL) and B-CellProlymorphocytic leukaemia B-CLL have only a weak or moderate acid phosphatase reaction in a small proportion of cells[3]. This contrasts with the findings in chronic T-cell disorders T-Cell chronic lymphocytes leukaemia (T-CLL), T-Cell prolymphocytic leukaemia and Sezary syndrome in which there is a strong AP activity in majority of the cell[3,7-9] The cells in Hairy cell leukaemia (HCL) which have been widely shown to be B-lymphocytes[10-13] also show AP positivity. However AP in HCL is not inhibited by tartrate[14,15] positivity. However AP in HCL is not inhibited by tartrate.

Enzymes Esterases are named according to the substrate use for their cytochemical identification. The substrates used in identification of lymphoid cells are alpha-Napthyl Acetate (ANAE) and Napthol As or AS-D acetate (NASA).[16,19] ANAE when reacted at an acid PH has shown a strong localised positivity in T-Lymphocytes[20,21] Using human lymphocytes from blood and Tonsils two specific patterns of positivity have been demonstrated[21]. The 1-like reaction was strong and localised and seen in majority of 1-lymphocytes. The Thymus like reaction was a weak localised reaction seen in one third thymocytes. Thymus like activity was seen in T-ALL while common ALL was negative. B-lymphocytes and B-CLL were negative for ANAE[22]. Recent studies show that (helper) lymphocytes are positive for ANAE while T (suppressor) lymphocytes are nagative[23]. The ANAE reaction is thus of further value in characterization of 1-cell disorders. T-CLL with majority of 1-suppressor cells confirmed by immunological tests are negative for ANAE while in cases of T-PLL with majority of 1-helper cells ANAE shows localised activity[9].

A positive PAS reaction in blood cells usually denotes glycogen and this can be confirmed by its sensitivity to diastase[2]. The cells in CLL have an increased amount glycogen and shown PAS positivity[24]. This reaction is more striking in B-PLL than T-PLL. PAS reaction seen as coarse granuoles or blocks against a negative cytoplasm back ground is generally regarded as characteristic of A-LL.[18] However some cases of A-LL are negative[8,25] and positive reaction have been shown in cases of AML[19,26] - Thus PAS is not specific for ALL. Different degrees of PAS positivity is shown between subgroups of ALL defined by Immunological membrane markers.

The reaction is stronger in common torm 01 ALL (Non-B, Non-T) than in T-ALL[27]. Generally B-cells leukaemias, chronic and prolymphocytic, majority of the cells are PAS positive as contrast to T-PLL

and T-CLL[3].
In conclusion at cytochemical level ANAE is of value in further characterization of lymphocytes as B or T cells and in the recognition of sub populations of T-lymphocytes T-helper and T-süppressor. Acid phosphatase has a definitive roll in the diagnosis of acute and chronic T-CelI leukaemias. PAS is conformative test for B-cell chronic and prolymphocytic leukaemias in the absence of ANAE or Acid phosphatase.

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