Impaired phagocytic function of polymorpho-nuclear neutrophils in B chronic lymphocytic leukemia.

K. Gabunia[1]
N. Gachechiladze[1]
L. Burjanadze[1]
T. Roschupkina[1]
D. Baloyan[1]
Lela Kardava[1]
D. Ghirdaladze[2]
G. Iosava[2]
Andrew P. Jewell[3]
Peter M. Lydyard[4]
Nino Porakishvili[1]

[1] Department of Immunology, Tbilisi State University, Georgia
[2] Institute of Haematology & Blood Transfusion, Tbilisi, Georgia
[3] School of Life Sciences, Kingston University, UK
[4] Department of Immunology, Royal Free & University College Medical School, London, UK

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IMPAIRED PHAGOCYTIC FUNCTION OF POLYMORPHONUCLEAR NEUTROPHILS IN B CHRONIC LYMPHOCYTIC LEUKEMIA

Gabunia K,* Gachechiladze N,* Burjanadze L,* Roschupkina T,* Baloyan D,* Kardava L,* Ghirdaladze D,# Iosava G,# Jewell AP,° Lydyard PM,‡ Porakishvili N*

**Department of Immunology, Tbilisi State University; #Institute of Haematology and Blood Transfusiology, Tbilisi, Georgia; ‡Department of Immunology, Royal Free and University College London Medical School; °School of Life Sciences, Kingston University, Surrey, UK*

Introduction. The functional activity of polymorphonuclear neutrophils (PMNs) in patients with B-cell chronic lymphocyte leukemia (B-CLL) is still controversial due to the heterogeneity of the disease and individual variability, although normal absolute numbers of PMNs have been described. We have recently shown[1] a significant ($p<0.001$) decrease in the ability to release reactive oxygen intermediates in the PMA-induced nitroblue tetrazolium test (NBT) by PMNs of B-CLL patients (37.9±19.0%, range 12-83%) compared with normal controls (81.5±12.7%, range 59-94%). Both, the number of NBT^+ PMNs and the intensity of the formation of formazan crystals were decreased.

Methods. The detection of immature PMNs was measured by the activity of leukocyte alkaline phosphatase (LAP) using a Sigma LAP kit in 10 untreated Rai staged patients (age range 48-77) and 10 age-matched controls. PMN were analyzed morphologically to determine banding. A possible overall decrease in enzymes, related to oxygen-dependent bactericidal function was evaluated by the expression of myeloperoxidase (MPO) in PMNs using a cytochemical assay (Sigma). The ability of PMNs to attach and engulf opsonized target cells was also tested. For this purpose, *Staphylococcus aureus* were opsonized with specific rabbit polyclonal IgG antibodies (Molecular Probes) and added to PMNs isolated on double Ficoll gradients. Cells were incubated for 30 minutes at 37°C, washed and stained with Giemsa. The numbers of PMNs with internalized and/or attached opsonized bacteria were evaluated per 200 PMNs.

Results: The intracellular expression of LAP by blood PMNs in B-CLL patients (67.7±13.2%, range 52-81%) did not differ from that in healthy controls (71.7±15.2, range 50-85%), excluding immaturity of the PMNs as a factor. Morphologic analysis confirmed that there were very few band-type immature PMNs in the blood of B-CLL patients. The expression of MPO by B-CLL PMNs (94.3±1.5%) was no different from that of normal controls (92.7±1.9%), suggesting that the oxygen-dependent peroxidase system was not impaired. Although attachment of the opsonized particles was similar to that in controls, there was, nevertheless, a significant decrease in internalization by B-CLL PMNs (Table 1).

Table 1. Internalization of opsonized *S.aureus*.

Source of cells	*PMN with or without S. aureus, %*			
	Attached only	*Attached and internalized*	*Internalized only*	*None*
B-CLL patients	36.0±11.1	5.6±5.9	14.3±10.9	42.3±25.3
Controls	37.5±4.0	17.4±8.6	40.2±5.9	4.9±0.8
P	> 0.05	> 0.05	< 0.001	< 0.01

**Mann-Whitney test (the data represent mean ± standard deviation).*

Conclusions. Our data are consistent with a reduced phagocytic function of PMNs of B-CLL patients which might contribute to the increased susceptibility to infection in this disease.

References

1. Gabunia Kh, Roschupkina T, Kardava L, et al. Decreased function of polymorphonuclear cells in B-cell chronic lymphocytic leukaemia is related to high white blood cell count. Blood 1999; 94:10 (Suppl 1) 40b.