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Impaired priming and increased ROS production by circulating neutrophils from patients with chronic lymphocytic leukemia

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Besides a classical role in antimicrobial functions, emerging evidence indicates that neutrophils could have an effect on chronic and progressive diseases such as leukemia. Nowadays, there is limited information about the function of circulating neutrophils in the chronic lymphocytic leukemia (CLL). The aim of the present study was to study functional properties of circulating neutrophils in CLL. 18 CLL patients and 17 healthy controls were enrolled in the study. Priming of neutrophils with LPS as well as oxidative stress capacity was analyzed using flow cytometry. Spontaneous and induced with fMLP and PMA oxidative stress was measured using dihydrorhodamine 123. Despite fMLP and PMA significantly induced ROS production by neutrophils in both healthy ($P<0.01$) and CLL groups ($P<0.01$ and $P<0.001$, respectively), stimulation with both inducers has led to a maximum ROS-release in neutrophils from CLL patients compared to healthy ones ($P<0.05$ and $P<0.01$, respectively). Spontaneous production of ROS by CLL neutrophils was also increased ($P<0.05$) compared with healthy neutrophils. LPS up-regulated TLR2 in healthy cells ($P<0.05$), and TLR2 expression was down-regulated in CLL cells ($P<0.05$). LPS exposure of isolated neutrophils from healthy group induced production of IL-1β and TNF-α ($P<0.05$). In contrast, LPS-stimulated CLL neutrophils failed to induce releasing of both cytokines. LPS-induced production of IL-1β and TNF-α in CLL group was lower than those released by neutrophils from healthy group ($P<0.05$). Taken together, circulating neutrophils in CLL patients have altered functional properties of which may account for the heightened sensitivity to bacterial infection as well as influence the disease course. Future studies are needed to prove our observations.

Biography

Gayane Manukyan is researcher in the National Academy of Sciences of the Republic of Armenia and a group leader of a Group of Molecular and Cellular Immunology Institute of Molecular Biology. Currently she is postdoctoral fellow in the Department of Immunology, Medical Faculty, Palacky University, Olomouc, Czech Republic. She has strong expertise in flow cytometry and studies focused on innate immunity and imunology of inflamatory and infectious diseases.

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