Effect of Natural and Synthetic Peptides on the Biological Function of Leukemic Cells *

B. Kazanowska 1, J. Bogusławska-Jaworska 1, and D. Konopińska 2

A. Introduction

The goal of this work was to study the influence of some naturally occurring peptides and their analogs on the impaired biological properties of blood cells derived from leukemic patients. The effect of human tuftsin and of the insect neuropeptide, proctolin, and their synthetic derivatives on the phagocytosis of granulocytes and the influence of proctolin and its analogs on the blastic transformation of lymphocytes were investigated.

B. Material and Methods

The phagocytic activity of granulocytes was determined in 30 patients with acute lymphoblastic leukemia (ALL). The lymphocyte transformation test was performed in 25 children with ALL and in a control group, consisting of 30 healthy children aged 2–12 years.

The phagocytic activity test was done according to the Steuden method, using 14C-labeled Staphylococcus aureus 519 in the presence of tuftsin and its derivatives: Arg-tuftsin, Pro-Arg-tuftsin, Lys-Pro-Arg-tuftsin, and tuftsinyl-tuftsin [2–4]. The lymphocyte transformation test was performed using 14C-thymidine in the presence of proctolin (Pr) and its derivatives: [Dopa2]-Pr, (Homo-Arg)1-Pr, [Phe(p-OMe)2]-Pr, [Phe(p-NMe2)2]-Pr, and [Phe(p-NO2)2]-Pr [1]. Both tests were performed in the initial phase of ALL and during complete remission on cytostatic therapy (Fig. 1).

A high stimulatory effect of tuftsin on the impaired PMN phagocytosis of patients in the initial phase of ALL was observed (67.4%). The influence of tuftsin on the phagocytic activity of granulocytes of ALL patients in remission was less striking. Tuftsin caused a decrease of phagocytosis of PMN in healthy children (Fig. 2).

It was found that the stimulatory effect of proctolin and its derivatives on the transformation rate of cultured lymphocytes was higher in those derived from patients who were in the initial stage of ALL than in those derived from patients in remission. Stimulation was higher in the presence of the analogs [Phe(p-NMe2)2]-Pr and (Homo-Arg)1-Pr (63% and 59%). A less striking influence

---

1 Department of Hematology, Medical Academy of Wroclaw, Poland
2 Institute of Chemistry, University of Wroclaw, Poland
* Supported by grant CPBP 06.03 from the Institute of Pharmacology of the Polish Academy of Sciences

R. Neth et al. (eds.), Modern Trends in Human Leukemia VIII
© Springer-Verlag Berlin Heidelberg 1989
Fig. 1. Influence of tuftsin on the phagocytosis of ALL-affected and healthy PMN.

Fig. 2. Stimulatory effects of tuftsin and its analogs on the phagocytosis of ALL-affected and healthy PMN.

Fig. 3. Influence of proctolin and its analogs, relative to that of tuftsin, on the phagocytic activity of ALL-affected PMN.