EFFECT OF BIPHOSPHONATES (SODIUM ALENDRONATE AND DISODIUM ETIDRONATE) ON THE FLUIDITY AND OTHER PARAMETERS OF HUMAN ERYTHROCYTES MEMBRANE

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In this study, we continued our investigations on the effect of the bisphosphonates on human erythrocytes and now we concentrated on the effect of these compounds on the fluidity of erythrocyte membranes and membrane proteins. The fluorimetric method and fluorescent probes ANS, DPH and TMA-DPH were used to estimate the fluidity of erythrocyte membranes. Additionally, analysis of disturbances of erythrocyte shape and size by flow cytometry and microscopic inspection, were undertaken.

Bisphosphonates (sodium alendronate and disodium etidronate) belong to a new group of compounds that revolutionized the treatment of osteoporosis. These compounds are used in the form of orally administrated drugs. Their absorption from intestines is low, therefore they have to be used in high daily doses to achieve the desired effect.

Administration of bisphosphonates in the form of intravenous injections semms to be the best solution. Such form of therapy may provide a successful treatment of osteoporosis in the future. However, it is difficult to predict whether such form of drug administration will not produce side effects. Therefore, it is necessary to perform studies on the effects of bisphosphonates on human erythrocytes.

We observed that bisphosphonates induced changes in membrane fluidity. Using three fluorescent probes we not found different changes in membrane fluidity on different depth of the lipid bilayer depending on the structure, concentration of the compound and time of incubation. Both compounds induced an increase in carbonyl group content. Using flow cytometry we did not observe alterations in the shape and size of erythrocytes incubated with sodium alendronate and disodium etidronate.