

THE INTERACTION OF SOME LYSOSOMOTROPIC SUBSTANCES WITH ERYTHROCYTE MEMBRANE

HALINA KLESZCZYŃSKA¹, DOROTA BONARSKA¹, JACEK
ŁUCZYŃSKI² and STANISŁAW WITEK²

¹Department of Physics and Biophysics, Agricultural University, Norwida 25,
50-375 Wrocław, Poland, ²Department of Chemistry, Technical University of
Wrocław, Wrocław, Poland

Lysosomotropic substances are weak organic bases that can pass through biological membranes and concentrate in the cell fragments of low pH (lysosomes, vacuoles); the pK_a values of such lysosomotropic amines lie in the range of 5 to 9. After trapping a proton from the environment, they acquire a charge on their nitrogen atom. After protonation those of the compounds that have a long alkyl chain behave as typical cationic detergents and interact with the membrane, causing a change in its structure and function and at higher concentrations even its destruction.

The aim of this study was to determine the biological activity of two series of new lysosomotropic compounds. In particular, it was important to find a correlation between the chemical structure of the compounds studied and their biological activities.

A series of n-alkyl N,N-dimethylglycinates (DMG-n) and N,N-dimethyl alaninates (DMAL-n) were synthesized by amination of corresponding chloroacetates or α -bromopropionates with dimethylamine in ethereal solution and transformed into hydrochlorides. ¹H-NMR spectra (Bruker instrument 300MHz, CDCl₃, HMS as internal standard) and GLC (Shimadzu instrument GC-17A) confirmed the purity of the synthesized compounds.

In the study presented, the effect of lysosomotropic compounds on red blood cell hemolysis and erythrocyte membrane fluidity was investigated. The DMG and DMAL compounds induce erythrocyte hemolysis and change membrane fluidity.

It was found that glycine derivatives exhibited stronger biological activities than alanine derivatives. No clear relationship between activity and hydrocarbon chain length was found.

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