PROPERTIES OF N-CHLOROAMINO ACIDS AND THEIR EFFECTS ON THE ERYTHROCYTE MEMBRANE

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Amino acids present in blood plasma may be targets for HOCl oxidation and chlorination. N-chloroaminoacids are reported to be less reactive, but more selective factors than HOCl, therefore, the may act as secondary mediators of HOCl-induced injuries.

This study was focused on determination of general properties of N-chloroamino acids (Ala-Cl, Lys-Cl, Ser-Cl, Asp-Cl, Phe-Cl) and comparison of their reactivity for erythrocyte membrane compounds with that of HOCl. Monochlorated amino acids were obtained by reaction of amino acids with HOCl in a molar ratio of 5:1 and used immediately. The N-chloroamino acids differed in the yield of formation and stability but all of them were characterized by increased molar absorption coefficient at about 250 nm. The oxidation of dihydrorhodamine 123 by the N-chloroamino acids was a linear function of time and was concentration-dependent. Both N-chloroamino acids and hypochlorous acid induced a transient decrease of total thiol group content in erythrocyte membranes, formation of protein aggregates and precipitates, and lipid peroxidation. Hypochlorous acid was the most effective factor in all cases. Our data suggest that thiol groups are an intermediate target in the effect of chlorocompounds on the erythrocyte membrane, the ultimate target being the polyunsaturated fatty acid residues of membrane lipids.