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Relationship Between Aging and Susceptibility to Oxidative Damage: An Assessment by Erythrocyte Membrane Proteins and Lipids

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Abstract: Contradictory results have been reported from various studies regarding the effect of age on susceptibility to oxidative damage. Using different parameters, we carried out a comparative study on the erythrocytes and erythrocyte membranes of healthy elderly and young adults to determine how resistance to oxidative damage is affected by aging. Thin layer chromatography and polyacrylamide gel electrophoresis under denaturing conditions were used to estimate changes in membrane phospholipids and cytoskeletal proteins, respectively. Our results showed that these components of intact erythrocytes incubated with cumene hydroperoxide (CumOOH), a powerful oxidising agent, remained unchanged in both age groups. However, exposure of erythrocyte membranes to CumOOH induced a reduction of protein bands 1, 2, 3, and 4.1, with the appearance of high-molecular-weight aggregates. Furthermore, our data indicate that membranes from aged subjects are more susceptible to oxidative stress than those from young subjects, since these changes are higher in the aged group. Therefore, our results suggest that the intact erythrocytes of elderly individuals are equally capable of withstanding the oxidative stress induced by CumOOH, although there is a decrease in membrane defence with aging.

Key Words: Aging, oxidative stress, erythrocyte, membrane proteins and lipids, susceptibility

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