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Alterations in human red blood cell membrane properties in Alzheimer disease patients

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Alterations in erythrocytes from Alzheimer disease patients were examined using EPR spectroscopy. Three spin-labeled fatty acids were applied to measure lipid membrane fluidity. A decrease of membrane fluidity was found in the deeper region of lipid bilayer of erythrocytes membrane, as indicated by 12-doxylstearic acid assay. The physical state of eryth-rocyte membrane proteins was estimated using 4-maleimido-2,2,6,6-tetramethylpiperidine-1-oxyl (MSL) and 4-iodoace-tamido-2,2,6,6-tetramethylpiperidine-1-oxyl (ISL). An increase in the ratio of weakly to strongly immobilized fractions of MSL and an increase in mobility of ISL attached to the membrane in Alzheimer disease patients were found. A decrease in lipid membrane fluidity may be a consequence of lipid peroxidation or/and alterations in lipid protein interaction. The increase in membrane protein mobility can be a result of protein oxidation. It is possible that changes in the plasma membrane may be a result of membrane components oxidation or β-amyloid peptide interaction with erythrocytes.