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Membrane Abnormality and Its Regulatory Mechanisms in Salt-Dependent Hypertension - an Electron Paramagnetic Resonance Investigation -

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Summary

In order to assess the membrane abnormalities in salt-sensitive hypertension, we investigated membrane fluidity of erythrocytes in subjects with hypertension using the electron paramagnetic resonance and spin-labeling method. Membrane fluidity is a physicochemical feature of biomembranes and is an important factor modulating microcirculation. We demonstrated that membrane fluidity of erythrocytes was significantly lower in subjects with essential hypertension than in normotensive subjects.

The decreased membrane fluidity of erythrocytes might cause a disturbance in the blood rheologic behavior and the microcirculation, which could contribute, at least in part, to the pathophysiology of hypertension. It was also shown that both Ca- and ouabain-induced changes in membrane fluidity of erythrocytes were significantly greater in hypertensive subjects compared with normotensive subjects. Low salt-intake significantly improved membrane fluidity of erythrocytes, whereas high salt-intake lowered membrane fluidity of erythrocytes in subjects with essential hypertension. In addition, the higher the plasma endogenous digitalis-like factor (EDLF) levles, the lower the membrane fluidity of erythrocytes.

In this context, it is strongly suggested that Ca- and Na-dependent membrane abnormalities might contribute, at least in part, to the pathophysiology of salt-sensitive hypertension.