Erythrocyte membrane skeleton structure and membrane permeability for oxygen in patients with essential arterial hypertension

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AIM: To search for differences in the erythrocyte membrane skeleton structure and erythrocyte membrane permeability for oxygen between patients with essential arterial hypertension and healthy donors.

METHODS: The erythrocyte topography was mapped by using the atomic force microscope (AFM), while the content of various hemoglobin forms was detected by applying Mössbauer spectroscopy.

RESULTS: In the erythrocytes of hypertensive patients, skeleton connectivity with the membrane proteins via junctional or ankyrin complexes is modified resulting in a transformation of the honeycomb structure of the membrane skeleton network into a corncob structure. This modification has been associated with the impairment of erythrocyte membrane permeability for O₂.

CONCLUSIONS: An impaired oxygen release by Hb in RBCs of patients with hypertension may cause hypoxemia and further increase of blood pressure.

Fig. 1. AFM example images of RBC surfaces of a healthy donor (a) and a hypertensive patient (b).