

## Erythrocyte Condition in the Post-Traumatic Period of Craniocerebral Trauma under the Action of Cytoflavin. Assessment by Laser Interference Microscopy

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In this study, we considered complex phase micromorphometry of red blood cells in traumatic brain injury (TBI) and in response to therapy with cytoflavin in the post-traumatic period. TBI was simulated by free fall of a weight on the parietal-occipital region of the skull. The animals of experimental group was intraperitoneally injected daily with cytoflavin (LLC "NTFF "POLISAN", St. Petersburg) in the dose 0.2 mL/kg, the control animals were injected with isotonic sodium chloride solution in the same volume for 10 days. Blood tests were performed out 1, 3, 7 and 12 days after injury. TBI caused an increase in the phase height and phase diameter, volume, area, and average diameter of red blood cells on the 1st–7th days relative to the values of the intact group. These changes were combined with echinocytic and spherocytic transformation of red blood cells and a shift in the wavelength spectrum of phase portraits towards 650 nm. The effect of cytoflavin on the morphometric parameters of red blood cells in the post-traumatic period was manifested in the restoration of the phase height, phase diameter, area, volume, perimeter of red blood cells. Restoration of erythrocyte shape, reduction of echinocyte number, sphericity of cells, wavelength of phase portraits up to 600 nm were observed from 3–7 days under cytoflavin action. The potential of laser interference microscopy for non-invasive examination of erythrocytes in traumatic brain injury and the effects of cytoflavin in the post-traumatic period has been evaluated. Analysis of interference images of red blood cells demonstrates a decrease in the oxidative processes in cells, restoration of hemoglobin state, improvement of erythrocyte metabolism of red blood cells under the action of cytoflavin in the post-traumatic period of TBI.

**Keywords:** laser interference microscopy, erythrocytes, cytoflavin, traumatic brain injury