

New data processing algorithms in a laser diffractometry of red blood cells

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Red Blood Cell Distribution Width (RDW) and the distribution of the red blood cells (RBC) deformability are very important parameters for medical diagnostics. This paper is devoted to analyzing the possibility of these parameters estimation by using laser diffractometry method. The system of equations linking geometrical parameters of diffraction pattern with cells ensemble characteristics was established. We called these equations diffraction equations. Using diffraction equations new method of data processing for laser diffractometry was suggested. The experimental set up for observing and registration of diffraction patterns by different objects were developed. The diffraction patterns by fiducial object (rectangular aperture), blood smears and suspensions of RBC were registered. These diffraction patterns are of high quality and available for processing. RDW parameter was measured by two methods: laser diffractometry and microscopy. Comparison of the results obtained allows for conclusion about the possibility of laser diffractometry method application for RDW parameter estimation.