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Topological laser speckle analyzer of differentiation and proliferation activity during morphogenesis in cell cultures



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ABSTRACT

An automated system for morpho-topological determination of cell division phases and structural differentiation of tissues during morphogenesis was implemented on the basis of topological properties of cell cultures, considered within the framework of set and manifold theories. A simple robotic hardware and software system based on Zeiss microscope with a modified stage and a Velleman manipulator KSR-1 allow to control the laser module position, carrying out the angular irradiation of samples either in transmission or in darkfield or luminescent modes and the subsequent mathematical data processing. This low-budget system can be easily assembled and programmed in any cytomorphological or histomorphological laboratory. The code for data processing in MATLAB is given at the end of the paper.



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