

## QUANTIFICATION OF IMAGE DATA AND A KINETIC MODEL FOR THE INTEGRIN RECEPTOR MOVEMENT ON THE SURFACE OF LIVING CELLS

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**Abstract.** Living human fibroblasts were attached on fibronectin coated surfaces and stained with FITC labeled anti- $\beta_1$  integrin monoclonal antibody. The dynamic behaviour of these integrin–antibody complexes were then observed within 2.5 hours by periodic scans using confocal laser scanning microscope. Obtained data were used for analyzing the initial  $\beta_1$  integrin reorganizations during fibroblasts spreading on fibronectin. Pursuing this aim, a specific physical model and mathematical algorithm was created that permit the corrections of the noise and the fluorescence photobleaching during the scanning. Using specific image analyzing software were defined three “regions of interest” (ROI) and the kinetic changes of integrin densities, as well as, the individual velocity of receptor clusters movement were quantified. Calculated velocities provide novel quantitative information about the centripetal movement of  $\beta_1$  integrins on the dorsal cell surface of fibroblasts upon ligand binding.

### 1. Introduction

Integrins are cell surface receptors, which play an important role for the communication of the cells with their **extracellular matrix** (ECM) [12, 30, 10]. As transmembrane heterodimers they bind to the specific adhesive proteins and link them to the cytoskeleton [7, 11, 16, 33, 35], thus accomplishing a specific “mechanical” crosstalk [10] between the cell and the surrounding adhesive matrix.