

CELLULAR MECHANOTRANSDUCTION PROCESSES STUDIED WITH OPTICAL TWEEZERS

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Cell migration is a major process taking place in every living multicellular organism. Nowadays, proteins and molecular mechanisms, responsible for the regulation of migration are being intensively studied. Cultured adherent cells, are the most frequently employed model biological organisms used during these studies. Understanding the mechanisms responsible for the regulation of the cell migration process can help find new therapies which, for example accelerate wound healing process or prevent metastasis of cancer.

Optical microscopy, especially confocal and wide field fluorescent microscopy, is one of the commonly used method in these studies. We employed another advanced optical microscopy technique- optical tweezers – in our studies. Thanks to the possibility of manipulating small objects, could be observed the response of cell to a mechanical factor and cell machanotransduction.

Polistyren beads, functionalized with specific protein, can interact with proteins located in the cell membrane. The result of such interaction can significantly affect the structure of the cellular cytoskeleton. The response could depend on the type of cells (normal or cancerous) or the length of time of interaction between the cell and a functionalized bead. The combination of two complementary methods, confocal microscopy and optical tweezers allows us to observe possible changes in the cell cytoskeleton when acting on it with a mechanical stimulus provided by the bead and optical tweezers.