MEASUREMENTS OF MELANOMA CELLS ADHESION TO DIFFERENT POLYMER SURFACES

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Introduction

Recent years brought significant increase of interest in cells behaviour on different substrates mainly due to the growing development in tissue engineering and implant technology. It is also important to investigate dependencies between substrate's chemical, and physical properties and their capability to maintain cell growth.

Methods

Atomic force microscope (AFM) used in force spectroscopy mode can bring information about adhesive properties of molecules present in cell membrane [Friedrichs, 2010]. Here, AFM was used to measure the adhesion force between a cell, used as a force probe, and polymeric surfaces.

Secondary Ion Mass Spectroscopy (SIMS) was applied to study the chemical composition of polymer surfaces.

Wetting angle measurements were used to estimate surface energy of polymer substrate.

Optical as well as fluorescence microscopes were used to investigate the cell growth on different types of polymeric surfaces.

Results

In our work, the adhesion force was studied for two melanoma (non-metastatic WM115 & metastatic WM266-4) cells lines. The cells were detached from various polymer surfaces such as polystyrene, cross-linked poly(ethylene oxide) and others are presented. Dependencies between ability to cells growth and properties of substrate [Marie, 2006; Weng, 2006] were investigated to characterize the influence of chemical composition and/or topography on cell's behaviour [Dalby, 2004]. By comparing these results with those obtained for cells growth on reference glass surface, it was possible to define polymeric substrates on which cell are willing to growth as well as non-growth surfaces. The analysis of the force spectroscopy spectra with cell as a probe revealed a differences in cell-substrate adhesion between two studied cell lines which could be correlated with cancer progression.

Discussion

The results obtained from all applied methods indicated strong correlation between the topography and chemical composition of polymeric surfaces and cells' ability to adhere and to growth. The unbinding force showed differences in adhesion capability of melanoma WM115 and WM266-4 cells.

The presented results are a part of research that are focused on the possibility to prepare surfaces with defined surface pattern that could be used to distinguish between metastatic and non-metastatic cancer cells based on adhesion properties.

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References

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