

Abstract

The subject of this master thesis is the improvement of cell culture vessels. There are different types of cell culture vessels, the growth zone of which can be untreated or pretreated. Compared with untreated cell culture vessels, pretreated ones show better cell adhesion and higher cell growth. The aim of this study is to find a surface modification for untreated cell culture vessels on which cells show improved adhesion and growth. Ideally, cell adhesion and growth values should be comparable with those of pretreated vessels.

Based on the results of literature research and a comparison of untreated and pretreated cell culture vessels, there are four possible ways of modifying cell culture vessels: by generating a high surface free energy, increasing its polar part, integrating functional groups into the surface and modifying the surface topography. Nine different modifications of cell culture vessel surfaces are tested for cell adhesion and cell growth. In the case of three of these surface modifications there is no cell adhesion, two result in a slight improvement in cell adhesion and cell growth. With two modifications, data analysis is not possible because the inherent fluorescence of the surface makes it impossible to count the cells using fluorescence microscopy. However, it is clear that on one of these, surface modification by means of laser treatment, there is cell growth. Two modifications lead to a considerable improvement in cell adhesion and cell growth. One of these modifications, the coating with a polysiloxane lacquer, results in a low adhesion rate, however by contrast, the cell growth is very high. The other modification, silicatisation of the surface by flame pyrolysis, results in high cell adhesion and the growth rate exceeds the values of the pretreated cell culture vessels.