عنوان مقاله:

The effect of Micropillar Geometry on Shear Stress Gradient in Endothelium-on-a-Chip

محل انتشار:

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خلاصه مقاله:

The shear stress is responsible for some functions in biology, the dominating factor in the microenvironment. One of the significant cells in the human body, which constantly endures shear stress is endothelial cell, and it can be simulated on a chip. The use of microfluidic devices in biomedical applications enables researchers to mechanically analyze the cells, specifically the effect of shear stress in physiological and pathological ranges. Changes in geometry can lead to obtaining a range of shear stress. Here, we investigate the effect of the micropillars' geometry changes on the generated shear stress gradients in a microfluidic device with three parallel channels. Also, the shear stress of the channels with and without micropillars is plotted to determine the importance of micropillars arrays. The flow rate is fixed for each observation. It is concluded that between the hexagonal, rectangular, oval, and circular shapes of the micropillars, the most proper range of shear stress with a constant rate is associated with hexagonal. Apart from the above-mentioned issues, different inlets and outlets were tested to find the profile of the shear stress in the direction perpendicular to the walls of the channels.

کلمات کلیدی:

Shear Stress, Micropillars, Microchip,Endothelial Cells, Geometry

لینک ثابت مقاله در پایگاه سیویلیکا: