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STRETCHABLE lab-on-chip device with impedance spectroscopy capability for mammalian cell studies (Conference Paper)

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Abstract

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This paper presents the fabrication and testing of electric cellsubstrate impedance spectroscopy (ECIS) electrodes on a stretchable membrane. This is the first time when ECIS electrodes were fabricated on a stretchable substrate and ECIS measurements on mammalian cells exposed to cyclic strain of 10% were successfully demonstrated. A chemical was used to form strong chemical bond between gold electrodes of ECIS sensor and polymer membrane, which enable the electrodes keep good conductive ability during cyclic stretch. The stretchable membrane integrated with the ECIS sensor can simulate and replicate the dynamic environment of organism and enable the analysis of the cells activity involved in cells attachment and proliferation in vitro. Bovine aortic endothelial cells (BAEC) were used to evaluate the endothelial function influenced by mechanical stimuli in this research because they undergo in vivo cyclic physiologic elongation produced by the blood circulation in the arteries. Copyright © 2016 by ASME.

Indexed keywords

Engineering controlled terms: Cardiovascular system Chip scale packages Electrodes Endothelial cells Mammals Physiology Spectroscopy

Compendex keywords: Blood circulation Bovine aortic endothelial cells Dynamic environments Endothelial function Impedance spectroscopy Lab-on-chip devices Mechanical stimulus Polymer membrane

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