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There is an ever increasing need to find surfaces that are biocompatible for applications like medical implants and microfluidics-based cell culture systems. The biocompatibility of five different surfaces with different hydrophobicity was determined using gene expression profiling as well as more conventional methods to determine biocompatibility such as cellular growth rate, morphology and the hydrophobicity of the surfaces. HeLa cells grown on polymethylmethacrylate (PMMA) or a SU-8 surface treated with HNO3-ceric ammonium nitrate (HNO3-CAN) and ethanolamine showed no differences in growth rate, morphology or gene expression profiles as compared to HeLa cells grown in cell culture flasks. Cells grown on SU-8 treated with only HNO3-CAN showed almost the same growth rate (36 ± 1 h) and similar morphology as cells grown in cell culture flasks (32 ± 1 h), indicating good biocompatibility. However, more than 200 genes showed different expression levels in cells grown on SU-8 treated with HNO3-CAN compared to cells grown in cell culture flasks. This shows that gene expression profiling is a simple and precise method for determining differences in cells grown on different surfaces that are otherwise difficult to find using conventional methods. It is particularly noteworthy that no correlation was found between surface hydrophobicity and biocompatibility.

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