Synopsis of Original Research Paper

Real-time and quantitative analysis of the effect of nanoparticles on fibroblasts in the dermis

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Recently, the effect of nanoparticles on living things has attracted much attention because of the increasing opportunities to use the nanoparticles in such areas as environmental purification, biology, medicine, cosmetology, and so on. As nanotechnology advances, the nanoparticles with desired properties have become available. On the other hand, nanoparticle-induced toxicity has been reported. Therefore, it is important to quantitatively understand risks of the nanoparticles before using them, though the effect of the nanoparticles, especially in the case of an uptake through skins, is still not yet unclear. In this study, we synthesize monodispersed titania-based nanoparticles with controlled size (70-500 nm) as a model material to investigate the nanoparticle effect. In addition, a characterization system for such effect is developed using a membrane-type surface stress sensor (MSS), which can detect surface stress applying on its surface with high sensitivity and in real-time. Taking advantage of the photoactivatable cell-culturing substrate reported before (J. Nakanish *et al*., ***J. Am. Chem. Soc.*** **129**, 6694-6695 (2007).), we demonstrate that cell-culturing only on top of the MSS is possible.