Fabrication of Magnetic Microneedles Array (MMNs) containing Iron Oxide Nanoparticles (IONs) with Hyaluronic Acid

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Iron oxide is used as a contrast agent to improve MR Molecular image performance. To improve the resolution of imaging, contrast agents are often administered either orally or intravenously. In this study, we propose the use of magnetic microneedle structures containing iron oxide nanoparticles (IONs) for fabricate produce magnetic microneedles array (MMNs). Therefore, the hyaluronic acid solutions containing IONs were dispensed on the PDMS mold using a molding technique. SEM, transmission and cell viability were then measured to confirm the morphology, mechanical strength, and cytotoxicity of MMNs. Also, magnetization and magnetic hysteresis were performed using a superconducting quantum interference device (SQUID) magnetometer to investigate the magnetic properties of MMNs. Cell viability was measured and there were no abnormality in the toxicity and activity changes in the cells. In conclusion, MMNs were well fabricated and magnetic hysteresis showed a superparamagnetic curve.