

Biodegradable micro-needle for transdermal drug delivery and the 3D printing method to realize the device

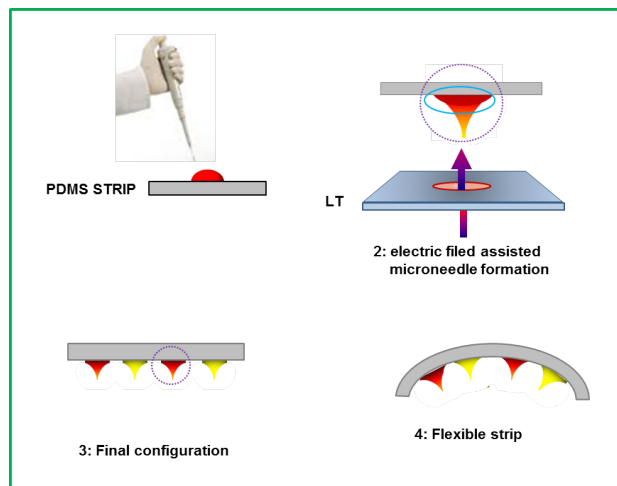


Figure 1: Fabrication process

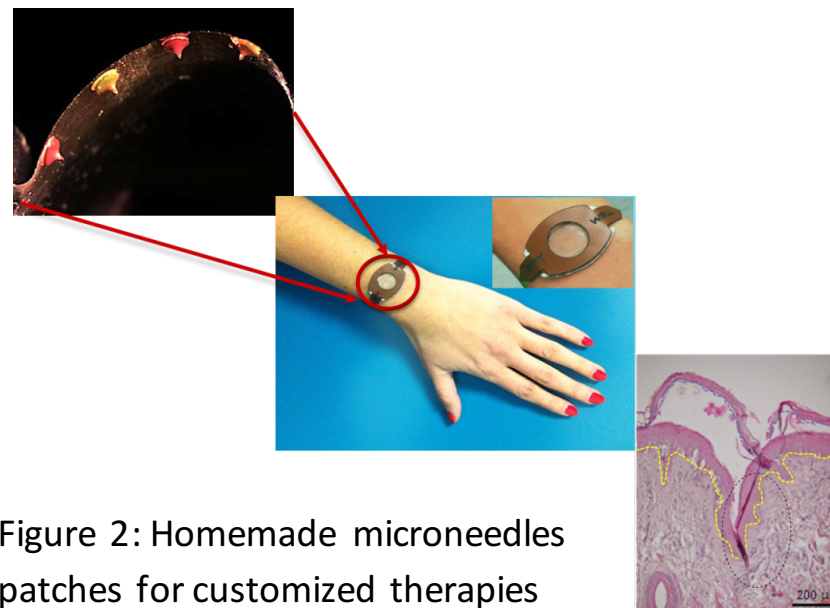


Figure 2: Homemade microneedles patches for customized therapies

Publication related to this invention

- S. Coppola, R. Vecchione, E. Esposito, C. Casale, V. Vespini, S. Grilli, P. Ferraro, P. Netti, "Electro-drawn drug-loaded biodegradable polymer microneedles as a viable route to hypodermic injection" *Advanced Functional Materials* 24, 3515-3523 (2014).
- P. Ferraro, S. Coppola, S. Grilli, M. Paturzo, V. Vespini, "Dispensing nano-pico droplets and liquid patterning by pyroelectrodynamics shooting". *Nature nanotechnology* 5, 429-435 (2010)
- S. Grilli, S. Coppola, V. Vespini, F. Merola, A. Finizio, P. Ferraro "3D lithography by rapid curing of the liquid instabilities at nanoscale" *PNAS* 37, 15106-15111 (2011)

ISASI @ CNR

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About	<p>The ISASI team, has developed recently a nanoprinting technique based on the pyroelectric effect with two unique properties in the field of EHD approaches: 1) free from external circuits; 2) free from nozzles. In fact, the EHD force able to manipulate polymers is generated by the spontaneous high electric potentials (in the range of kilovolts) originated onto the surface of pyroelectric crystals (i.e. lithium niobate, lithium tantalate).</p>