

Figure S1. a) Schematic presentation of the synthesis process of SFMA. b) ^1H NMR spectra of unsubstituted SF and SFMA.

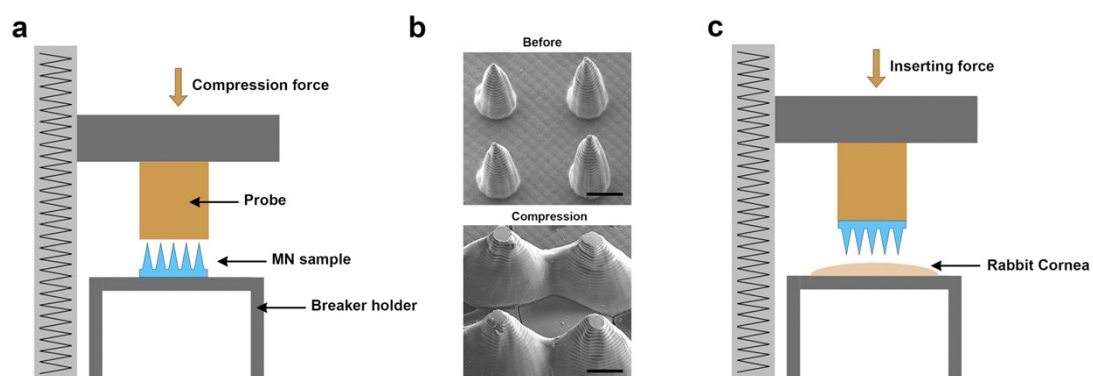


Figure S2. a) Illustration to depict testing of MN mechanical strength. b) SEM image of 20% SFMA MN before and after subjecting to compression Scale bar = 200 μm . c) Illustration to depict testing of *ex vivo* MN corneal inserting test. Cornea was placed on breaker holder, block with MN attached to probe before insertion.

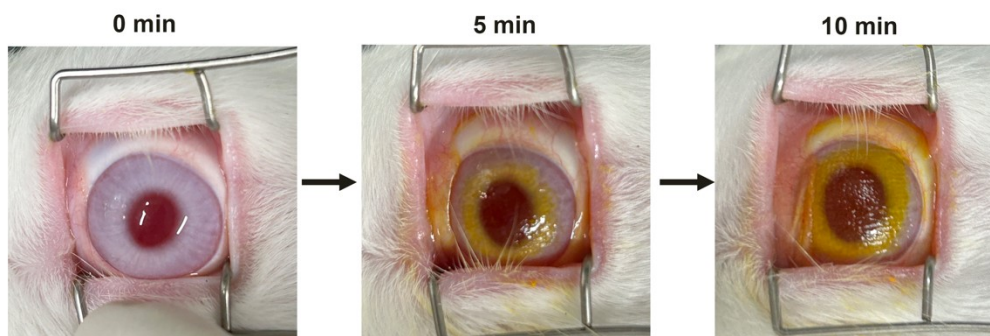


Figure S3. The photographs of the corneas after two 5-minute MN applications

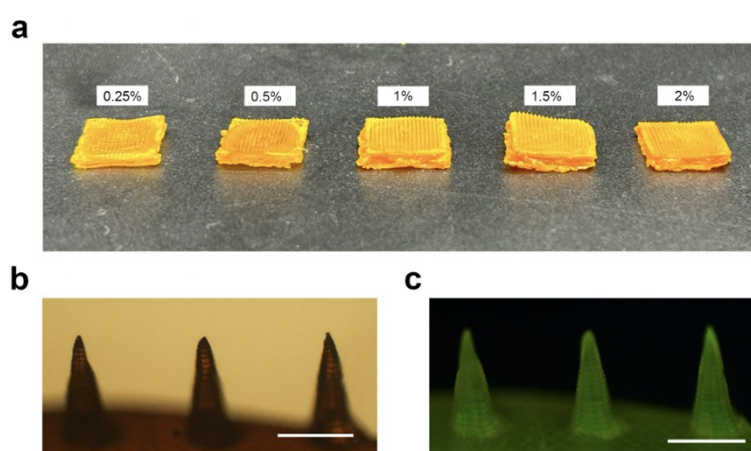


Figure S4. a) photographs of MN patches with different concentration of RF. b) The optical and c) fluorescence image of 1RF/SFMA-MN patches. Scale Bar = 200 μ m.

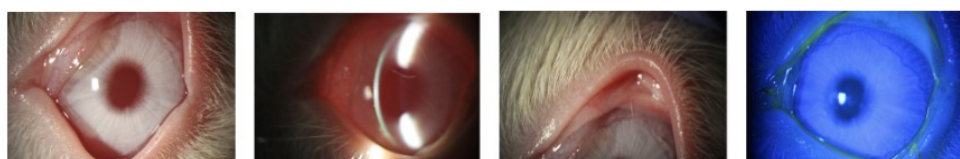


Figure S5. Representative slit-lamp images from control groups.

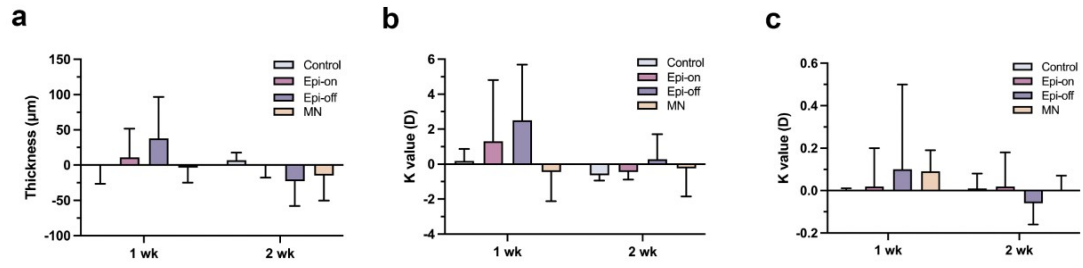


Figure S6. The change **a)** of corneal thickness, **b)** the anterior corneal surface curvature, and **c)** the posterior corneal surface curvature after different CXL surgeries.