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Abstract

Female pelvic floor dysfunction includes pelvic organ prolapse (POP) due to multiple vaginal births causing elastin strength to be reduced. Several normal functions are compromised including bladder control, fecal continence, and painful urination and many other symptoms. Currently no effective treatment is known and women seek surgical mesh implants to correct these issues which are not entirely safe nor effective. The condition of POP affects women across the world and effective treatment is sought. Varying proteins including lysyl oxidase (LOX), tissue inhibitors of metalloproteinases, and matrix metalloproteinases are involved in elastin homeostasis. In this experiment, non-epithelial vaginal cells (NEVCs) retrieved from lysyl oxidase-like 1 (LOXL1) knockout (KO) mice were treated with a nanoparticle drug delivery technology loaded with pro-elastogenic transforming growth factor beta 1 protein (TGF-β1) and were analyzed for their expression of elastin homeostasis enzymes. It was predicted that treatment of NEVCs with this nanoparticle technology will promote elastin regeneration in these cells representative of vaginal cells in women with POP. Treating NEVCs with elastin generating protein of TGF-β1 is likely to increase recruitment of lysyl oxidase protein, which is responsible for elastin homeostasis.

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