LED therapy is the future gadget for vaginal atrophy in postmenopause

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Abstract

LED therapy improved to collagen regeneration in mouse model. Menopause affects all regenerative systems including urogenital tract and pelvic floor structure. It is expected that genital atrophy would opt for adequate treatment to restore in urogynecologic function and anatomical structure.
In the absence of clinical data on postmenopausal women, this provides evidence for a future approach.

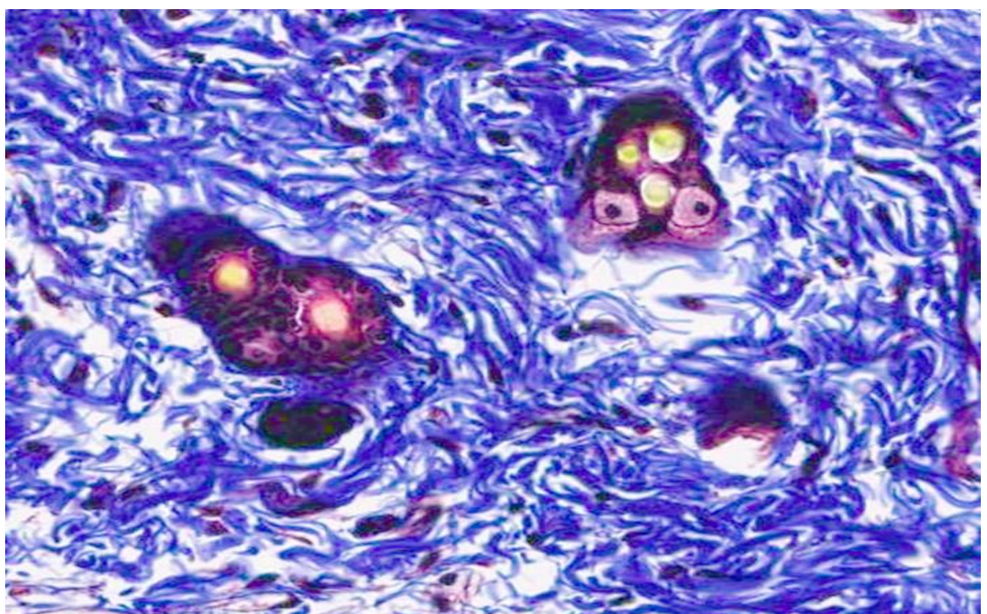
Introduction

Genital atrophy is the most important problem in postmenopausal women. It makes to decrease the quality of life including genital dryness, itching sense and female sexual function. Our study evaluate the change of collagen change using Light emitting diode (LED) treatment in mouses as a preclinical study and in postmenopausal women as a clinical study.

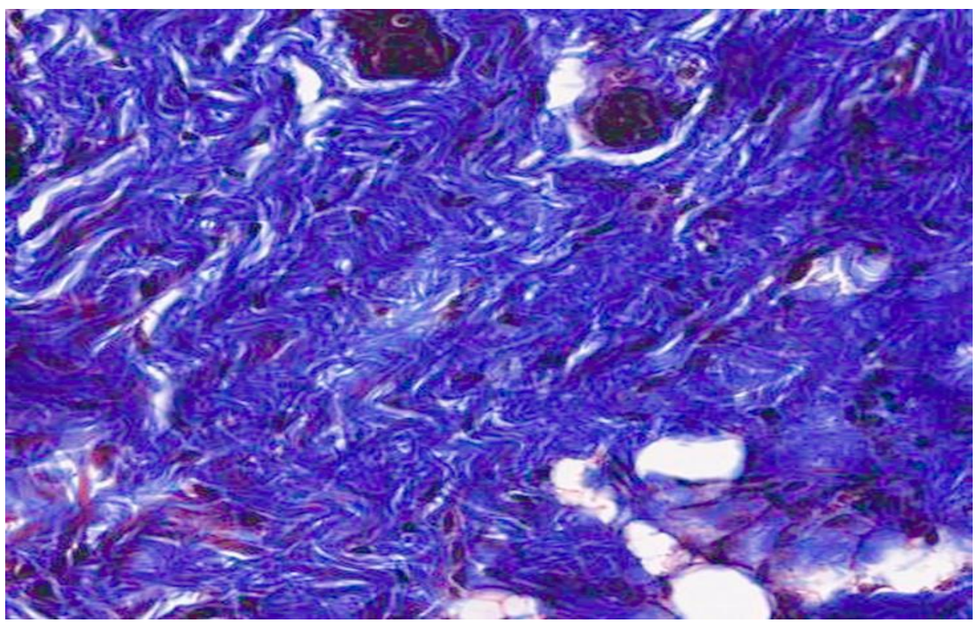
Methods and Materials

We performed a prospective evaluation of 18 postmenopausal mouses (control group; n=9, LED group; n=9) which were undergone bilateral ovariectomy from July 2021 to September 2021. We used to the mixed wavelengths of three types as the 460-nm LED (blue), the 592-nm LED (amber), the 630-nm LED (red). Each mouse got LED device (Bellalux®, Linkoptics, Gwangu, Korea) on its buttock for 20 minutes for 2weeks. We got the 1*1cm tissue on both buttock and analyzed to immunohistochemistry analysis using Masson trichrome (MT), hematoxylin and eosin (H&E), smooth muscle antibody (SMA) and vimentin stain. Our study was approved by the experimental animal institutional review board under registration number CKU-02-2021-004. Also 10 women with genital atrophy in postmenopause were enrolled to our hopspital in from June 2022 to December 2022. They used portable LED device (Luminiel Y®, Linkoptics, Gwangu, Korea) the mixed three types of wavelengths during 4 weeks. Our study was approved by the institutional review board under registration number S22SSSE0022. On surgeon evaluated to subjective symptoms and their sexual function via FSFI as validated questionairres Data were analyzed using SPSS software (version 22; IBM Corp., Armonk, NY, USA). Statistical significance was considered as P< 0.05). The paired t-test analysis was analyzed.

Figure 1. The dense comparison of tissue with LED irradiation.



(a) Before LED irradiation on M&T stain.

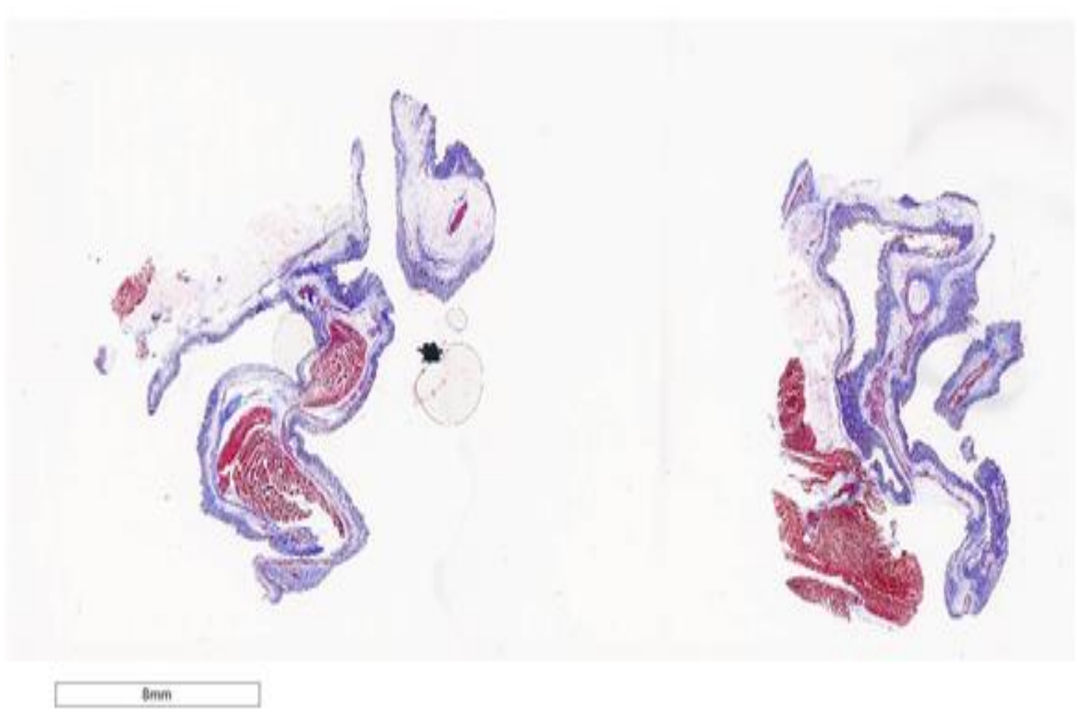


(b) After 4weeks LED irradiation on M&T stain.

Results

We compared to the result of blood test between no LED group (n=10) and LED therapy group (n=10) for 2 weeks after LED treatment. We compared to the collagen density and the fibroblast count between no LED group (n=9) and LED therapy group (n=9) for 4 weeks after LED treatment. On MT stain, mean scale of no therapy group was 127.28 ± 5.03 to be increased to 102.06 ± 6.94 of the LED therapy group ($p<0.05$). The scale range on MT stain is from 0 to 250; 0 scale means the thickest density of collagen. We check the fibroblast count by eyeball evaluation in each section. The fibroblast count was increased from 51.19 ± 14.71 (control group) to 80.22 ± 31.28 (LED therapy group) after treatment ($p<0.05$).
After 1 months later, their subjective symptoms were improved ($p<0.05$). Desire and Arousal got a good score ($p<0.05$).

Figure 2. The comparison of fibroblast with LED irradiation



(a) Before LED irradiation on M&T stain (b) After 4weeks LED irradiation on M&T stain.

Conclusions

LED was promoted collagen regeneration in mouse model. Postmenopausal atrophy is caused by collagen loss. It is expected that genital atrophy would a good option for adequate treatment to restore in urogynecologic function and anatomical structure.

References

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