

THE EFFECTS OF ESTROGEN ON NNOS, ENOS EXPRESSION AND HISTOLOGIC COMPOSITION IN THE RAT BLADDER AND URETHRA

Hypothesis / aims of study

We investigated the effects of estrogen on neuronal nitric oxide synthase (nNOS), endothelial nitric oxide synthase (eNOS) expression, and histologic composition in the rat bladder and urethra.

Study design, materials and methods

Forty-five mature female Sprague-Dawley rats (10-11wks, 235-250gm) were randomly divided into three groups; control group (C), oophorectomy group (O) and hormone (estradiol) replacement group (H). The degree of expression of nNOS, eNOS in bladder and urethral tissues were investigated by immunohistochemical stain, and described as mucosa, smooth muscle and vessel. We also investigated the changes of histologic composition by masson's trichrome stains.

Results

In the urethra, nNOS and eNOS expression rates were significantly increased in O group, but decreased in H group ($p < 0.05$) (Fig. 1 and 2). In the bladder, eNOS expression rates were significantly increased in O group, but decreased in H group ($p < 0.05$) (Fig. 2). But, nNOS expression rates of vessel in the bladder were only significantly increased in O group and decreased in H group (Fig. 2). The relative collagen ratios significantly increased in bladder and urethra, to $121.2 \pm 12.7\%$ and $135.5 \pm 25.2\%$ in O group, but decreased to $95.6 \pm 15.2\%$ and $93.7 \pm 12.8\%$ in H group, respectively ($p < 0.05$) (Fig. 3).

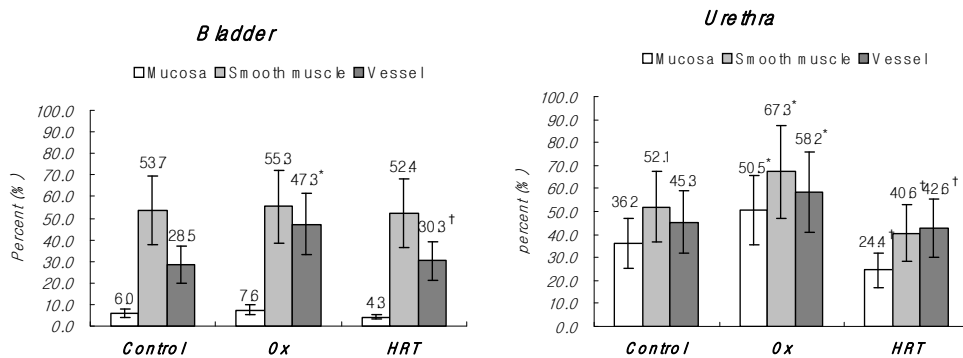


Fig. 1. The mean expression percentage of nNOS. Control; control group, Ox; oophorectomy group, HRT; hormone replacement group, *; $p < 0.05$ vs control group, †; $p < 0.05$ vs oophorectomy group.

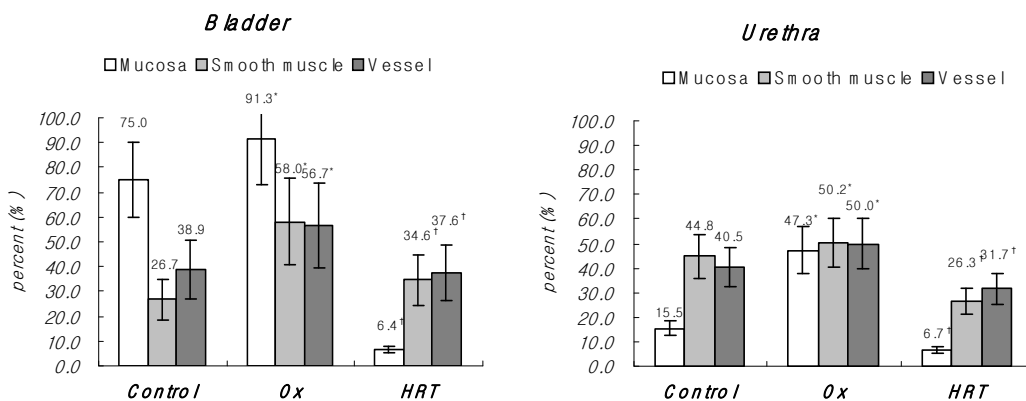


Fig. 2. The mean expression percentage of eNOS. Control; control group, Ox; oophorectomy group, HRT; hormone replacement group, *; $p < 0.05$ vs control group, †; $p < 0.05$ vs oophorectomy group.

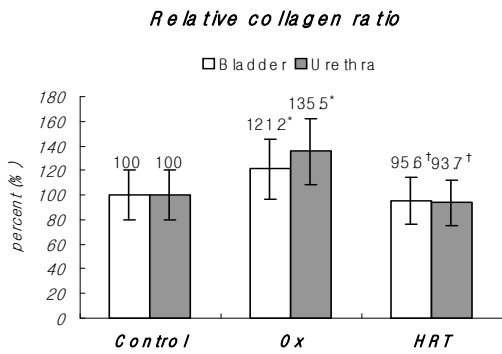


Fig. 3. Masson's trichrome stains. Relative collagen ratio was markedly increased in oophorectomy group. Control; control group, Ox; oophorectomy group, HRT; hormone replacement group, *; p<0.05 vs control group, †; p<0.05 vs oophorectomy group.

Interpretation of results

These data suggest that estrogen replacement therapy decrease nNOS, eNOS expression of urethra, and much increase collagen component of bladder and urethra in oophorectomy rats.

Concluding message

We concluded down regulation of nNOS and eNOS in the urethra and reduction of collagen component in the bladder and the urethra would be manifested in postmenopausal women.

References

FUNDING: ourself funding

ANIMAL SUBJECTS: This study followed the guidelines for care and use of laboratory animals and was approved by Pusan national university ethical committee, PNUH ethical committee