

## PROTEOMIC APPROACH TO EFFECTS OF OVARIECTOMY ON FEMALE RAT BLADDER

### Hypothesis / aims of study

In postmenopausal women or ovariectomized patients, an incidence of lower urinary tract symptoms and disease including frequency, nocturia, recurrent urinary tract infections, interstitial cystitis, and the stress incontinence is increased. The changes in bladder function are believed to be due in part to low estrogen level. In several animal studies replacement of estrogen after ovariectomy has shown changes in the contractility, blood flow and oxygen tension of detrusor tissues. Although extensive information is available on the role of ovariectomy on the urogenital system, the pathophysiological mechanisms of the bladder dysfunction in postmenopausal state are not well understood especially in molecular level. And possibility of other factors in bladder itself is not excluded. Therefore we investigated the changes of bladder in female rat following bilateral ovariectomy by proteomic approach.

### Study design, materials and methods

A total 20 female Sprague-Dawley rats were obtained at 8 weeks of age and randomly divided into 4 groups; control with 5 rats, sham operation with 5 rats and bilateral ovariectomy groups. The ovariectomy groups were divided into post-operative 4 weeks-group (group1), and 8 weeks-group (group2) with 5 rats respectively. Whole urinary bladders of the rats were excised at 4 or 8 weeks from the beginning of the experiment. Conventional proteomics was performed with high resolution 2-D gel electrophoresis followed by computational image analysis and protein identification using mass spectrometry.

### Results

The bladder weight was significantly decreased in the ovariectomy groups compared control group. A comparison of the bladder of ovariectomy group with control and sham-operative bladder showed that 11 proteins; Eukaryotic translation initiation factor 5A was over-expressed in the group1 and Chaperone grp 75 precursor was over-expressed in the group2. In addition actin, keratin complex 2, Eno1 protein, actin-depolymerizing factor, peroxiredoxin 2, phosphatidylethanolamine, contrapsin-like inhibitor 1 precursor, Guanine deaminase, putative protein kinase were under-expressed in the group1 or group2 compare to control.

### Interpretation of results

These data suggested that changes of eukaryotic translation initiation factor 5A and contrapsin-like protease inhibitor1, Eno 1, peroxiredoxin 2 mean processing of cellular apoptosis pathway in ovariectomized rat bladder. Also the changes of chaperone grp75 precursor, actin-depolymerizing factor related to the change of contractility of the muscle cell in the rat bladder after ovariectomy.

### Concluding message

Ovariectomy in the rat makes the bladder be the change of contractility of muscle by an apoptosis of muscle cell. However more information is needed in human bladder tissue for clinical usage and urodynamic study.

### References

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**ANIMAL SUBJECTS:** This study followed the guidelines for care and use of laboratory animals and was approved by IRB of Dankook University Hospital