

## **The effect of age and/or ovariectomy on tissue structure and oestrogen receptor expression in rat bladder**

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Changes in bladder function in women are said to be associated with age, leading to decreased urinary function with age and in association with a reduction in oestrogen related to menopause.

Using a rat model, we have examined the hypotheses that (a) urinary structure is altered in female rats as a function of age and/or bilateral ovariectomy and (b) that oestrogen receptor (ER) expression is altered as a function of age and/or ovariectomy. We used ovariectomy, together with sham-operated animals, as a model for declining oestrogen levels and declining oestrogen function. We have also used soy and non-soy diets to examine the potential impact of exogenous ingested phyto-oestrogens.

Using real time PCR to evaluate levels of ER $\alpha$  and ER $\beta$  receptor mRNA, we found that the expression of ER $\alpha$  was reduced in mature and aged animals relative to the young group. This was most consistent in the aged group; interestingly, the level of plasma oestrogen was significantly higher in these animals perhaps associated with increased amounts of adipose tissue. The level of ER $\beta$  expression did not show a significant decrease with age.

There was no consistent, significant, effect of ovariectomy on ER $\alpha$  or ER $\beta$  receptor expression, compared to the sham-operated group, except in the case of ER $\alpha$  receptor expression which was reduced in the non-soy fed ovariectomised group as compared to the sham-operated groups.

In sections of bladder tissue, immunohistochemical analyses demonstrate detection of ER $\beta$  but not of ER $\alpha$ , which is broadly consistent with the low level of detection by ER $\alpha$  mRNA as compared to ER $\beta$  mRNA. Marked changes in the levels of ER $\alpha$  were not observed across the aged or treatment groups, with the exception of the young non-soy fed ovariectomised group.

Ultrastructural changes in the relative amounts of serosal, smooth muscle, and transitional epithelium were sought in H and E stained sections from all age and treatment groups, by determination of the areas of each tissue. No significant differences were observed across diet or age.

In conclusion, both PCR and immunohistochemical analyses indicated greater expression of ER $\beta$  than ER $\alpha$  but neither correlate consistently with ovariectomy, except for ER $\beta$  in the non-soy group. Levels of ER $\alpha$  did, however, decline with age.