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난소절제실험쥐에서 에스트로겐이 신장의 소디움 운반체에 미치는 효과

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Effect of Estradiol on the Expression of Renal Sodium Transporters in Ovariectomized Rats

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Although cellular and molecular functions of estrogen have been widely studied, little is known about its specific effects on the kidney. Recently, a few studies suggest that estrogen may alter renal expression of sodium transporters. However, conflicting results make its effects on the regulation of renal sodium transporters complex. In the present study, we investigated the changes of major sodium transporters' expression after the administration of estradiol in the ovariectomized rats in order to determine the effects of estrogen on those transporters.

The expressions of major renal sodium transporter proteins were determined by using semiquantitative immunoblotting of rat kidney. Kidneys were taken from ovariectomized Sprague- Dawley rats treated with (OVX) or without 17β - estradiol benzoate (E2) (14 mcg/100 g B.W.) treatment for 10 days. Body weight, fractional excretion of sodium (FeNa) and plasma aldosterone level were also measured on the day of sacrifice.

E2 led to significant decrease in the protein abundances of Na- Cl cotransporter (NCC), Na- K- 2Cl cotransporter (NKCC2), Na- K- ATPase, and α - and γ - subunits of epithelial sodium channel (ENaC) in the ovariectomized rats (66%, 32%, 52%, 59% and 49% of control, respectively; $p<0.05$). FeNa was 0.57±0.22% in E2- replaced group and 0.36±0.19% in OVX group ($p=0.14$). Although E2 decreased the level of plasma aldosterone, the difference did not reach statistical significance (E2 vs. OVX, 179±125 pmol/L vs. 315±218 pmol/L; $p=0.20$). The body weight of the estradiol- replaced rats was significantly lower than that of the ovariectomized rats (E2 vs. OVX, 310.6±15.0 g vs. 278.17±19.6 g; $p=0.028$).

Estradiol resulted in down- regulation of NCC, NKCC2, Na- K- ATPase, and ENaCs, which might be associated with reduced plasma aldosterone level.

Key Words : 에스트로겐, 소디움, 여성호르몬
Estrogen, Sodium, Sex hormone