

Estrogenic Effect of Soy Phytoestrogens on the Uterus of Ovariectomized Female Rats

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Description

Estrogen plays an important role in growth, differentiation and function of many target tissues, including tissues of the female and male reproductive system. Obstetricians and gynecologists recognized the fundamental importance of estrogen in the pathogenesis of multiple disorders of female reproductive tract, including endometriosis, endometrial cancer and pelvic floor dysfunction. Estrogen was believed to act through 2 estrogen receptor species alpha and beta (ER α and ER β). These two receptors species may interact by forming homodimers and heterodimers to alter tissue response to estrogens and selective estrogen receptor modulators (SERMs) followed by activation of target gene transcription.

Objectives: Phytoestrogens exert variety of actions involving many target tissues. The effects of dietary phytoestrogens, as hormonal replacement therapy (HRT), on the level of estradiol receptor alpha (ER α), estradiol receptor beta (ER β) and vascular endothelial growth factor (VEGF) in uterine tissues of ovariectomized female rats were studied.

Methods: Twenty mature ovariectomized female albino rats weighed (130-150 gm) were divided into two groups (G1) control group (n=10) fed on a casein based ration (phytoestrogen free) and (G2) treated group (n=10) received high phytoestrogen diet. Daily food intake (FI) and body weight gain (BWG) were recorded. After 30 days of treatment all rats were sacrificed and relative uterine weight for each female was recorded. Histological and immunohistochemical studies for ER α , ER β and VEGF expression were performed on uteri for both groups.

Results: Dietary phytoestrogens significantly (P<0.01) decreased daily FI (18.91 \pm 0.47 g versus 22.60 \pm 0.50 g and BWG (1 \pm 0.07 g versus 1.46 \pm 0.10 g). Phytoestrogens-fed group

revealed highly significant (P<0.01) increase in the relative uterine weight than control with value (0.48 \pm 0.01 g and 0.35 \pm 0.01 g, respectively). Hyperplasia in the luminal epithelium and glandular acini, connective tissue edema, as well as newly formed blood vessels was observed in G2. Dietary phytoestrogens significantly (P<0.05) increased the expression of uterine ER β and VEGF in G2 than in G1 while uterine ER α expression showed non-significant changes.

Conclusions

The current results suggest that dietary phytoestrogens induce a proliferative effect in ovariectomized rats' uteri which is mediated by estradiol receptors expression especially ER β . Also dietary phytoestrogens up regulate VEGF expression that seems to be accompanied by the changes in estrogen receptors expression, and stimulate angiogenesis and hyper permeability in blood vessels that makes soy phytoestrogens may be used as a natural HRT in case of reduction of endogenous estrogens especially after ovariectomy or during ovarian hormonal dysfunction. However the usage of these compounds should be concerned as it may predispose uterine neoplasia

References:

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