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# EFFECTS OF CHRONIC OVARIECTOMY ON CITRATE SYNTHASE AND SERCA ACTIVITY

Hypothesis / aims of study
Ovariectomy in rabbits has been shown to result in mucosal atrophy and apoptosis, reduced blood flow, decreased bladder mass and contractile function. Mitochondrial function maintains cellular metabolism and high energy phosphate levels in the cells, while the sarcoplasmic reticulum (SR) maintains calcium homeostasis; both metabolic systems are critical for proper cellular function within both the bladder muscle and mucosa. The current study was designed to determine the effects of chronic ovariectomy on mitochondrial and SR function using citrate synthase activity as a marker enzyme for mitochondrial function, and SERCA as a marker for SR function.

Study design, materials and methods
Nine virgin adult female rabbits were divided into two groups. Ovariectomies were performed on the rabbits in group 1 and sham surgeries were performed on the rabbits in group 2. Each adult female rabbit was anesthetized with Nembutal (25 mg/ kg) and under sterile conditions both ovaries were removed through a small vertical incision. The incision was closed in multiple layers. After surgery, the analgesic buphenorphine (0.1 mg /kg) was given twice per day for two days and gentamycin (4 mg/ kg) was given once daily for two days. Sham surgery was performed in a similar fashion except the ovaries were not removed. At the end of 14 weeks, the rabbits were anesthetized with pentobarbital. The bladder was exposed, cleaned of fat and connective tissue, and excised. The bladder was separated into muscle and mucosa and each compartment frozen in liquid nitrogen and stored at -70$^{o}$C until analysis. Citrate synthase and SERCA were quantitated by standard biochemical analyses.

Results
Ovariectomy resulted in a significant decrease in bladder mass in both the smooth muscle and the mucosal compartments. Citrate synthase activity of the mucosa was significantly higher than in the smooth muscle compartments in both the sham and ovariectomy groups. Interestingly, the maximal citrate synthase activity of both muscle and mucosa from the ovariectomy groups were significantly higher than the activities of the sham muscle and mucosa. The ED-50's and SERCA activity of both the sham and ovariectomy groups were similar.

Interpretation of results
In spite of the presence of detrusor and mucosal atrophy and contractile dysfunctions, the citrate synthase activity of both the smooth muscle and mucosal compartments of the bladders from the ovariectomized rabbits increased in approximately the same proportion as the bladder mass decreased indicating that the dysfunctions mediated by ovariectomy are not related to decreased mitochondrial function. Interestingly, SERCA was not affected by ovariectomy.

Concluding message
Neither mitochondrial function nor SR function (as related to the enzymes studied) were negatively affected by chronic ovariectomy.

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