



**MECHANISM OF CHANGES IN CARDIAC MYOFILAMENT
ACTIVATION IN OVARIECTOMIZED RATS**

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Our previous studies in 10-week ovariectomized rat hearts suggested a possible modulating effect of ovarian sex hormone deficiency on the Ca²⁺ responsiveness of cardiac myofilament activation by induction of myofibrillar Ca²⁺ hypersensitivity and suppression of maximum myofibrillar ATPase activity. To test whether the body weight gain after ovariectomy contributes to the changes in myofibrillar functions, relations of pCa (-log free Ca²⁺ concentration) to actomyosin adenosine triphosphatase (ATPase) activity of isolated myofibrillar preparations from pair-fed ovariectomized hearts were compared to those from sham-operated hearts. Induction of myofilament Ca²⁺ hypersensitivity and suppression of maximum myofibrillar ATPase activity were still demonstrated in pair-fed ovariectomized hearts as compared to controls. These results thus confirm the effects of ovarian sex hormone deficiency on the cardiac myofilament functions.

To investigate a possible mechanism of changes in myofibrillar Ca²⁺ sensitivity induced by ovarian sex hormone deficiency, measurements of β-adrenergic receptors on the cardiac sarcolemmal preparations were performed using [³H]-dihydroalprenolol binding assay. Density (B_{max}) and dissociation constant (K_d) of the receptors were determined from Scatchard plot of saturation binding analysis. As compared to sham-operated controls, membrane preparations from ovariectomized hearts demonstrated an increase in receptor density with a decrease in binding affinity (1/K_d) of the receptors. Neither estrogen nor progesterone supplements to the ovariectomized rats could restore these changes in β-adrenergic receptors. On the other hand, pair-fed ovariectomized hearts, in which the myofilament Ca²⁺ hypersensitivity was still observed, demonstrated no change in receptor density as compared to those of sham control hearts.

These results imply a possible modulating effect of ovarian sex hormone deficiency on β-adrenergic receptor of cardiac membrane which can not be reversed by hormonal supplements. The possible changes in β-adrenergic receptor, however, seem not to have any direct correlation with the change in Ca²⁺ sensitivity of cardiac myofilaments after ovariectomy.

