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SURIN PREAWNIM : MECHANISM OF CHANGES IN CARDIAC MYOFILAMENT ACTIVATION IN OVARIECTOMIZED RATS. THESIS ADVISORS : JONGGONNEE WATTANAPERMPOOL Ph.D., LIANGCHAI LIMLOMWONGSE Ph.D., NATEETIP KRISHNAMRA Ph.D. 132 p. ISBN 974-662-343-5

Our previous studies in 10-week ovariectomized rat hearts suggested a possible modulating effect of ovarian sex hormone deficiency on the Ca^{2+} responsiveness of cardiac myofilament activation by induction of myofibrillar Ca^{2+} 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 Ca^{2+} 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 Ca^{2+} 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 Ca^{2+} sensitivity induced by ovarian sex hormone deficiency, measurements of β-adrenergic receptors on the cardiac sarcolemmal preparations were performed using [^{3}H]-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 Ca^{2+} 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 Ca^{2+} sensitivity of cardiac myofilaments after ovariectomy.