Changes in cyclic AMP dependent protein kinase and active stiffness in the rat volume overload model of heart hypertrophy

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Objective: The aim was to clarify the role of cyclic AMP dependent protein kinase (PKA) and changes in mechanical heart function during development of cardiac hypertrophy induced by volume overload. Methods: Protein and DNA contents, PKA activity, and peak systolic stress-strain relationships in hearts from animals submitted to aortocaval shunt were assessed as a function of time. Sham operated (control) rats were used as controls. Results: Heart weight to body weight ratio and cardiac protein content per heart increased from d 7 ($p<0.005$ and $p<0.01$, respectively) reaching their highest values by d 56; the same occurred with cardiac DNA content. PKA activity·g-1 tissue in soluble extracts of hearts from rats with aortocaval shunt increased by 2.7-fold on d 2 ($p<0.005$), reached a ninefold peak increase by d 7 ($p<0.0001$) and declined to fourfold by d 56 with respect to control values. The end peak systolic stress-strain relation slopes were: control, 368(SEM 14) g·cm-2 (n = 16); aortocav