Abstract

Cardioscience. 1993 Dec;4(4):257-62.

Effect of thyroid status on phosphatidylinositols in rat heart.

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OBJECTIVE: The incorporation of 32Pi into phosphatidylinositols and inositol trisphosphates was studied in Langendorff-perfused hearts from hypothyroid, euthyroid and hyperthyroid rats.

METHODS: The hearts were perfused with modified Krebs buffer containing [32P]orthophosphate and the degree of 32P-labeling of phosphatidylinositol, phosphatidylinositol 4-monophosphate, phosphatidylinositol 4,5-bisphosphate, inositol trisphosphates and phosphatidic acid was measured.

RESULTS: Hyperthyroidism was associated with increases in rates of rise and fall of left ventricular systolic pressure, sarcoplasmic reticular Ca(2+)-ATPase activity and 32P-labeling of phosphatidylinositols, inositol trisphosphates and phosphatidic acid. These measurements were significantly decreased in hypothyroid hearts. The tissue levels of inositol 1,4,5-trisphosphate isoform were found to be significantly higher in hyperthyroid hearts and lower in hypothyroid hearts than in euthyroid ones. Examination of phosphoinositide-specific phospholipase C activity in the perfused hearts revealed that hyperthyroidism was associated with an increase in the membrane-associated enzymatic activity, assayed at physiological calcium concentrations, while hypothyroidism was associated with a decrease in this activity as compared with control hearts.

CONCLUSION: These findings indicate that alterations in the thyroid state of the myocardium may be associated with changes in basal phosphoinositide turnover which may contribute to alterations in myocardial contraction.

PMID: 8298067