INFLUENCE OF THYROID HORMONES ON ECTONUCLEOTIDASES IN THE CARDIAC TISSUE

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ATP, ADP, and AMP as well as adenosine are important molecules in the cardiovascular system under physiological/physiopathological conditions. E-NTPDases and 5'-NT are ectonucleotidases able to regulate the concentration of these nucleotides in the extracellular environment through ATP/ADP/AMP hydrolysis until adenosine which has a potent vasodilator and cardioprotective effect. Thyroid hormones (T3/T4) promote intense effects on cardiovascular system as cardiac hypertrophy and vasodilatation. Data obtained in our laboratory demonstrated in cultures of cardiomyocytes the influence of HT in the specific activity (AE) and gene expression of ectonucleotidases. In this study we investigated the ectonucleotidase activity in soluble (FS) and microsomal (FM) fractions after induction of hyper and hypothyroidism. Adult male Wistar rats were treated with T4 or T3 for 14 days (T4-10, T4-25, T4-50 and T3-10, being 10μg, 25μg, 50μg of T4 and 3,5μg of T3/100g body weight, respectively). In another group, the animals were thyroidectomized (Hypo) or also the Hypo rats received the hormonal replacement by T4 injections. FS and FM were obtained after successive centrifugations. Enzymatic activities were determined by measuring the release of inorganic phosphate, using malachite green. Hemodynamic parameters confirmed the efficacy of experimental models. In the FS, T4 promoted increase on ATP (T4-50) and reduction on AMP (T4-25 and T4-50) hydrolysis. Hypo group showed increased ATP and AMP hydrolysis in FS and also in the FM. After hormonal replacement the hydrolysis of AMP in the FS and ADP in the FM was reverted. However, ATP and ADP hydrolysis in the FS was significantly higher compared to hypo and control groups. These results demonstrate that HT levels influence the enzymes involved to degradation from ATP to adenosine. In the hyperthyroidism, the adenosine levels in cardiac tissue were diminished and contrarily increased in the hypothyroidism, perhaps contributing to maintenance of cardiac function under HT privation.

Key words: Ectonucleotidases, Thyroid Hormones, Cardiovascular System.