SOME DRUG EFFECTS ON THE ACTIVITY OF ERYTHROCYTE HEXOKINASE AND GLUCOSE 6-PHOSPHATE DEHYDROGENASE ENZYMES IN VITRO AND IN VIVO

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Effects of theophylline, lidocaine, cyclophosphamide, hyoscine N-butyl bromide, tranexamic acid and cytarabine on hexokinase (HK) from human erythrocytes have been investigated in vitro. In addition, in vivo effects of theophylline and lidocaine were investigated in rats. HK was purified from human red blood cells by DEAE-Sephadex A50 ion exchange chromatography. HK activity was measured spectrophotometrically at 25°C in a system coupled with glucose 6-phosphate dehydrogenase, according to Beutler’s method at 340 nm. Cyclophosphamide, hyoscine N-butyl bromide, tranexamic acid and cytarabine had no effects on human erythrocyte HK activity in in vitro conditions. On the other hand, human erythrocyte HK was inhibited by theophylline, but activated by lidocaine. IC₅₀ value for theophylline was 0.013 M. In the case of in vivo studies, 6 mg kg⁻¹ of theophylline inhibited the rat HK activity by 43% at the first 1.5 h (p < 0.001). A dose of 5 mg kg⁻¹ of lidocaine activated the rat HK activity by 41% (p < 0.001), 22% (p < 0.001), and 11% (p < 0.05), at 1.5, 3 and 6 h, respectively.

Key words: hexokinase, glucose 6-phosphate dehydrogenase, erythrocyte, lidocaine, theophylline

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