**Pharmacological Reports**
2007, 59, 580–587
ISSN 1734-1140



# Some drugs inhibit *in vitro* hydratase and esterase activities of human carbonic anhydrase-I and II

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**Abstract:**
In this study, we determined the *in vitro* inhibitory effects of ceftriaxone sodium, imipenem and ornidazole on hydratase and esterase activities of human erythrocyte carbonic anhydrase-I and II isozymes (CA I and II). Human erythrocyte CA I and II isozymes were purified by Sepharose-4B L-tyrosine affinity chromatography column with a yield of 30% and 40%, a specific activity of 920 and 8,000 EU/mg protein, respectively. In the overall purification procedure, human carbonic anhydrase (hCA)-I and (hCA)-II were purified 104 and 900-fold, respectively. In order to determine the purity of the enzymes, SDS-PAGE was performed. Inhibitory effects of the drugs on hCA-I and hCA-II were determined by using colorimetric method for $CO_2$-hydratase activity assay and spectrophotometric method for esterase activity assay. P-Nitrophenyl acetate was used as a substrate in the spectrophotometric esterase activity assay. The obtained $IC_{50}$ values (inhibitor concentrations which cause 50% inhibition of *in vitro* enzyme activity) for esterase activity were 1.900, 0.008, 0.318 mM for hCA-I and 2.542, 0.0258, 0.343 mM for hCA-II for ceftriaxone sodium, imipenem and ornidazole, respectively. $IC_{50}$ values for $CO_2$-hydratase activity were 0.864, 0.00354, 0.131 mM for hCA-I and 1.118, 0.0214, 0.263 mM for hCA-II for ceftriaxone sodium, imipenem and ornidazole, respectively. In conclusion, ceftriaxone sodium, imipenem and ornidazole showed inhibitory effects on human erythrocte carbonic anhydrase-I and II isozyme activities under *in vitro* conditions.

**Key words:**
human carbonic anhydrase, erythrocyte, drug