

## Effects of Gentamicin Sulfate on Enzyme Activities of Carbonic Anhydrase from Human Erythrocytes *in Vitro* and from Rat Erythrocytes *in Vivo*

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The effects of gentamicin sulfate on carbonic anhydrase (CA) enzyme activity in *in vitro* human and in *in vivo* rat erythrocytes were investigated. For *in vitro* study, human carbonic anhydrase-I and -II (HCA-I and HCA-II) were purified by affinity-column chromatography, and rats were used for *in vivo* study. *In vivo* and *in vitro* CA enzyme activity was determined colorimetrically using the CO<sub>2</sub>-hydration method of Wilbur and Anderson as modified by Rickli *et al.* Gentamicin sulfate (1.98—9.90 mM) showed *in vitro* inhibitory effects on HCA-I and HCA-II hydratase activity up to a 2 mM concentration, when determined using the CO<sub>2</sub>-hydratase method. Rat erythrocyte CA activity was significantly inhibited for up to 3 h ( $p < 0.001$ ) following intramuscular administration of gentamicin sulfate to Sprague-Dawley rats (3.2 mg/kg body weight). In conclusion, gentamicin sulfate inhibits CA enzyme activity *in vivo* and at low concentrations *in vitro*, but activated it at high concentrations ( $\geq 4$  mM) *in vitro*.

**Key words** gentamicin sulfate; carbonic anhydrase; human; rat; erythrocyte