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LETTER TO THE EDITOR

Can the Natural Carbonic Anhydrase Inhibitors in Trout Plasma be Used in the Treatment of Some Human Diseases?

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Carbonic anhydrase (CA) (carbonate hydrolyase, EC 4.2.1.1) is a ubiquitous zinc-containing enzyme that catalyzes the reversible hydration of CO_2 to HCO_3^- and H^+. This enzyme, which participates in crucial physiological processes, is present in most tissues including erythrocytes (1).

To date 14 different CA isozymes have been described in higher vertebrates. These include cytosolic, membrane-bound, mitochondrial and secretory forms and several acatalytic forms (2).

CA inhibitors, especially aromatic and heterocyclic sulfonamides, have been used clinically for more than 45 years in the treatment of a variety of diseases such as glaucoma, epilepsy, congestive heart failure, mountain sickness, gastric and duodenal ulcers, osteoporosis and acid-base disequilibria. It has also been reported that acetazolamide might also function as a modulator of anticancer therapies in combination with different cytotoxic agents (3).

Henry et al. (4) measured the presence of inhibitors in plasma and subcellular fractions of gill tissue in elasmobranches and teleosts. They reported that plasma CA inhibitors were highly species-specific in salmonids. Additionally, the effects of rainbow trout (*Oncorhynchus mykiss*) low molecular weight plasma inhibitors on CA enzyme activities in human CA-II in vitro and rat erythrocyte in vivo were investigated, and it was determined that rainbow trout plasma inhibitors had an inhibitory effect in in vitro and in vivo experiments (5).

It is known that many CA inhibitors used clinically are synthesized in the laboratory and so they are not natural inhibitors and may have undesired effects for living metabolism. According to recent findings, natural plasma inhibitors may be used clinically in the treatment of some of the diseases indicated above. However, further research is necessary to purify these inhibitors from the plasma and determine their precise chemical nature. After that, the dosage, duration and methods of administration of these inhibitors should also be investigated.

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