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Synthesis of Some Novel Sulfonamide Based Compounds and Investigation of Inhibition Effects on Carbonic Anhydrase Isoenzymes

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Carbonic anhydrases (CA, EC 4.2.1.1) are metalloenzymes containing a zinc ion in the active site. The enzyme is responsible for the transformation of CO_2 HCO_3^- in the respiratory. They are play a significant role in a variety of pathological and physiological effects containing fluid balance, neurological disorders, osteoporosis, bone resorption, pH regulation, carboxylation reactions, glaucoma, calcification, cancer, tumorigenicity. During the literature research, it has been encountered that sulfanilnamide compounds display CA inhibitor activity. Thus, sulfanilamide derivatives have been extensively studied to develop novel CA inhibitor.

Prompted from CA inhibitory potency of sulphonamide derivatives, in the present study ten new sulfonilamide derivatives (**1-10**) were prepared. IR, ^{1}H-NMR, ^{13}C-NMR and HRMS spectroscopic analyses were used for structure elucidations of target compounds. Purified carbonic anhydrases (hCAI and II) isozymes from human erythrocytes with yield of 31% were used to determine the *in vitro* inhibitor potentials of the compounds. Compound **6** displayed the best esterase activity against both hCA1 and hCAII. However, the highest hydratase activity against CA1 and hCAII isoenzymes was recorded for compounds **8**. In addition, MTT assay was performed to determine cytotoxic potential of compounds **6** and **8**. Both compounds did not display any cytotoxicity against NIH/3T3 cell line. All these results indicated once more that sulfanilnamide derivatives have a good potency to inhibit CAs and supported the previous studies.

Biography:

Şükrü Beydemir, Ph.D, Professor of Biochemistry in the Biochemistry Department at Faculty of Pharmacy at the University of Anadolu, Turkey. Beydemir's group have interest in purification and characterization of various enzymes, drug-enzyme interactions and designing enzyme inhibitors. Prof. Beydemir and his group have recently worked on especially carbonic anhydrase I and II isozymes, paroxonase, aldose reductase and sorbitol dehydrogenase enzymes. Prof. Beydemir has 114 manuscripts and a lot of presentation on these areas.