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Nota di contenuto	Final ToC tbd. 1) Description of human carbonic anhydrases (12 catalytically active human isoforms; isoforms as drug targets, enzymatic activity, catalytic mechanism, thermodynamics of protonation of the water molecule in the active site) -- 2) Thermal stabilities of all isoform CA catalytic domains -- Thermodynamics of inhibitor binding to CAs (incl. intrinsic thermodynamics - not mentioned important subject in most CA literature) -- 3) Comparison of methods to determine inhibitor binding to CAs (ITC, FTSA, enzymatic activity assays) -- 4) Chemical synthesis of CA inhibitors -- 5) X-ray crystallographic structures of CAs and their complexes with inhibitors -- 6) Antibodies against CAs.

Sommario/riassunto

This book offers deep insights into the thermodynamics and molecular structures of the twelve catalytically active isoforms of human carbonic anhydrase (CA) with a particular focus on inhibitor binding for drug design. X-ray crystallographic structures in combination with enzyme kinetic testing provide information on the interaction of CAs and their inhibitors, knowledge which is crucial for rational drug design. CAs are zinc carrying enzymes that catalyse the reversible interconversion of carbon dioxide and bicarbonate and are involved in numerous cellular processes. They are therefore a common target for drugs. The suppression of CA activities through inhibitory compounds has found application for example in diuretics and in glaucoma therapy. In this book methods used to determine binding thermodynamics of inhibitory compounds (Isothermal titration calorimetry, Fluorescent thermal shift assay/differential scanning fluorimetry and others) will be compared in detail. Also types and chemical synthesis of CA inhibitors, the use of antibodies against CAs as well as inhibitor application in animals are discussed. .