Rafik Karaman, Drug Design 2012, 1:2
http://dx.doi.org/10.4172/2169-0138.S1.005

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Computer Aided Drug Design & QSAR
October 29-31, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Design and synthesis of several novel prodrugs via mimicking enzymes catalysis

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Usually, the use of the term prodrug implies a covalent link between a drug and a chemical linker. Generally prodrugs can be defined as pharmacologically inactive chemical derivatives that can be converted in vivo to their parental active drug molecules, enzymatically or none enzymatically, to exert a therapeutic effect. Ideally, the prodrug should be cleaved to the parental drug as soon as the goal is achieved, followed by rapid elimination of the released linker moiety (1-3).

The prodrug approach can be useful in the optimization of the clinical application of a drug. The prodrug approach has gained attention as an approach for improving drug therapy in the early1970s. Numerous prodrugs have been designed and synthesized among those the antirheumatic agent oxindole succinate, N-Mannich base of phenylpropanolamine, an imine (Schiff base) prodrug of the anticonvulsant agent progabide, a water soluble prodrugs of the anti-inflammatory drugs valdecoxib, prednisolone and fluocinolone acetonide, a prodrug of the anti-glaucoma epinephrine (dipivefrin) (4).

The modern approach to be discussed in this presentation implies design of prodrugs based on intramolecular processes utilizing molecular orbital methods and correlations between experimental and calculated values. No enzyme needed for the catalysis of the conversion of a prodrug to the corresponding drug. The drug release rate is dependent only on the rate limiting step for the reaction by which the prodrug converts to its corresponding prodrug. (5-16).

Biography

Rafik Karaman has completed his Ph.D at the age of 29 years from the Hebrew University (Israel) and postdoctoral studies from the University of California at Santa-Barbara (USA). He is the dean of the Pharmacy College at Al-Quds University (Palestine). He has published more than 80 papers in reputed journals and serving as Lead Guest Editor Organic Chemistry International Special Issue on “Biologically Relevant Computational Chemistry - New methods and applications”. An editorial board member of Orphan Drugs: Research and Reviews and Drug designing Journal.

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