Data Mining and Quantitative Structure-Activity Relationships of Inhibitors for Treating Alzheimer's Disease

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Abstract

Amyloid cleaving enzyme-1 (BACE1) is a target of interest for treating patients with Alzheimer's disease (AD). As of 2007, more than 37 million people worldwide are afflicted with the disease. Incidence of the disease keeps increasing as the population ages and fewer people die of other diseases. ß-Amyloid precursor protein (APP) is a natural protein associated with neurons of the brain. In Alzheimer's disease, APP is cleaved by BACE1 at the beta-site, resulting in short 42 amino acid segments called amyloid-ß (Aß). Aggregation of Aß into plaques results in the death of neurons and is associated with AD. Inhibition of the BACE1 enzyme may prevent Aß formation and prevent the development or progression of AD. Known BACE1 inhibitors are analyzed using computational chemistry techniques, and quantitative structure-activity relationships (QSAR) are developed.