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Abstract

Synthesis, Docking Studies and Acetylcholinesterase Inhibition of Open-Chain Carbohydrate Amides †

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Abstract: Alzheimer's disease (AD) is the most common age-related cause of dementia among elderly people. AD is a severe neurodegenerative disorder characterized by progressive memory and cognition loss that leads to disability and inevitably to death and is considered as an urgent public health problem. It is the third leading cause of death after cancer and heart disease. According to an update in 2020 of the estimates given in the World Alzheimer Report 2015, there are over 50 million people worldwide living with dementia in 2020. This number will almost double every 20 years, reaching 152 million in 2050. AChE inhibitors are the mainstay drugs for early disease stages. In this work we report on the development of a synthetic route to yield open chain sugar amides from commercially available carbohydrates. The synthetic pathway starts with diacetone glucose (DAG), which is converted into perbenzyl d-glucono-1,4-lactone in six steps. Reaction with aromatic or aliphatic amines in dichloromethane under reflux (0.5 h to 2 h) afforded the corresponding amides in high yield (80–95%). Bis(amidation) of a diamine was also accessed by this procedure in 3 h but the reaction product was isolated in a very low yield (13%). Docking studies and evaluation of acetylcholinesterase inhibition were carried out and the results will be disclosed.

Keywords: sugar amides; synthesis; acetylcholinesterase inhibitors; docking studies; Alzheimer's disease

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