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Effects of Memantine and Oleocanthal on Alzheimer's Disease[1]
MARIYAM HOUSTON, JASON BONACUM, GUOPING ZHANG, Indiana State Univ — Alzheimer's Disease (AD) is a neurodegenerative disorder characterized by accumulation of neuritic plaques composed of amyloid-β (Aβ) proteins and neurofibrillary tangles composed of tau proteins. Although there is no known cure for AD, the symptoms can be treated with a drug called memantine. Memantine acts an NMDAR antagonist by inhibiting the action of the NMDA receptor. Recently, Oleocanthal, a phenolic molecule that is found in extra virgin olive oil, has been linked to reduced risk of AD. Though the mechanism by which Oleocanthal plays in reducing the risk of AD is not completely understood, recent studies have shown that Oleocanthal somehow inhibits the formation of the neurofibrillary tangles and reduces the formation of Aβ senile plaques. Our first-principles calculation, based on Gaussian03 program, shows that in the M2 segment, memantine binds to serine, but ketamine binds to glycine. This may explain their different effects, despite the fact that they are both NMDAR antagonists. Using the same method, we also investigate how Oleocanthal binds to the peptides by comparing the relative energies of each of the structures. Our results may help better understand the mechanism by which Oleocanthal decreases the chances of developing AD.

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