عنوان مقاله:

Study of Cis–trans Isomerization Mechanism of [3-(3-Aminomethyl) Phenylazo] Phenyl acetic Acid as a Causative Role in Alzheimer Using Density Functional Theory

محل انتشار:

مجله بین المللی تحقیقات پیشرفته زیست شناختی و زیست پزشکی, دوره 1, شماره 11 (سال: 1392)

تعداد صفحات اصل مقاله: 6

نویسندگان:

Hamid Reza Guodarzi - *Department of Chemistry, Saveh Branch, Islamic azad University, Saveh, Iran*

Mohammad. Agha Mohammadi - *Department of Chemistry, Bourojerd Branch, Islamic Azad University, Bourojerd, Iran*

Mohsen Mousavi - *Department of Chemistry, Saveh Branch, Islamic azad University, Saveh, Iran*

خلاصه مقاله:

Amyloid-β (Aβ) self-assembly into cross-β amyloidfibrils is implicated in a causative role in Alzheimer's disease pathology.Uncertainties persist regarding the mechanisms of amyloid self assembly and the role of metastable prefibrillar aggregates. Aβ fibrilsfeature a sheet-turn-sheet motif in the constituent β- strands; as such, turn nucleation has been proposed as a rate-limiting step in the self assembly pathway. Herein, we report the use of an azobenzene β-hairpin mimetic to study byUsing Density Functional Theory the role turn nucleation plays on Aβ self assembly.[3-(3-Aminomethyl) phenylazo] phenyl aceticacid (AMPP)was incorporated into the putative turn region of Aβ42 to elicit temporal control over Aβ42 turn nucleation; it was hypothesized that self-assembly would be favored in the cis-AMPP conformation if β-hairpin formation occurs during Aβ self-assembly and that the trans-AMPP conformer would display attenuated fibrillization propensity. It was unexpectedly observed that the trans-AMPP Aβ42Additionally, cis-trans photo isomerization resulted in rapid formation of native-like amyloid fibrils and trans–cis conversion in the fibril state reduced the population of native-like fibrils. Thus, temporal photo control over Aβ turn conformation providessignificant insight into Aβ self-assembly

کلمات کلیدی:

Amyloid-β, turn nucleation, Alzheimer's disease, β-turn, amyloid fibrils, azobenzene photoswitch, DFT, B3lYP