عنوان مقاله:

The Effects of Nickel Oxide Nanoparticles on Tau Protein and Neuron-Like Cells: Biothermodynamics and Molecular Studies

محل انتشار:

سومین همایش بین المللی التهاب سیستم عصبی و سومین فستیوال دانشجویی علوم اعصاب (سال: 1398)

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خلاصه مقاله:

Herein, the thermodynamic parameters of tau upon interaction with NiO NPs were determined by fluorescence spectroscopy. Also, molecular docking studies were run to explore the binding affinities of NiO NPs clusters with different sizes of 30 Å and 50 Å toward tau. Also, cytotoxic activity of NiO NPs against SH-SY5Y was determined by MTT, LDH, caspase-9/3 activity, and expression of apoptotic Bax and Bcl-2genes assays. DLS study showed that NiO solution had a good colloidal stability. Fluorescence study revealed that KSV values were 2.95 ± 0.35 × 104, 3.31 ± 0.59 × 104 and 3.92 ± 0.65 × 104 at 298 K, 310 K and 315 K, respectively. Also, ΔG° (kJ/mol), ΔH° (kJ/mol) and TΔS° (kJ/mol) values were – 13.27 ± 1.57, 1.98 ± 0.14, 15.25 ± 2.01, respectively at 298 K. Theoretical studies depicted that affinity of 5O3T segment toward NiO NP (30 Å) is higher than NiO NP (50 Å) and the proportion of Lys residues are higher in the docked pose of NiO NP (30 Å)/5O3T complex than NP (50 Å)/5O3T complex. Moreover, NiO NPs demonstrated a significant increase in the mortality of SH-SY5Y cells in an apoptotic manner. This study determined that NiO NPs may mediate the formation of electrostatic interactions with tau and induction of undesired harmful effects on neurons.

کلمات کلیدی: