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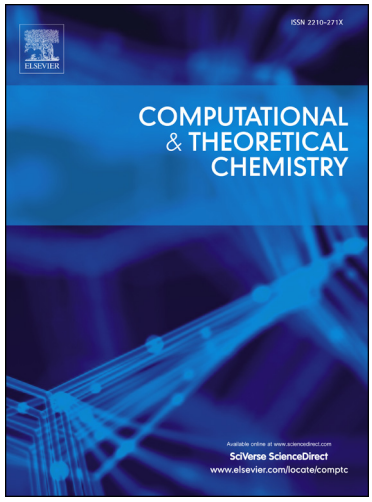

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On the interactions of indazole derivative with nucleosides - towards modeling the cytotoxic activity mechanism

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Abstract

In order to verify the previously suggested mechanism of anticancer activity of some dimeric indazole derivatives basing on the adhesion (or intercalation) to DNA, a simulation of the interactions of 5-(3,5-dimethyl-1*H*-pyrazol-1-yl)-3-[(4-methylphenyl)sulfonyl]-1*H*-indazole with guanosine, adenosine, thymidine, cytidine, and DNA was carried out computationally at the DFT level and analyzed within ONIOM approaches. Moreover, a similar simulation was executed for a DNA fragment containing the above bases. The theoretical studies have shown that the interactions may involve both strong and weak hydrogen bonding arising between the DNA bases nitrogen atoms and the tosyl oxygen and pyrazole nitrogen atoms, as well as aromatic carbons of the studied indazole derivative.

Keywords: Indazole derivatives; Interactions with nucleosides; Heterocyclic chemistry; DFT, and ONIOM calculations

Highlights

- An interaction between particular nucleosides and a new pyrazolylindazole derivative synthesized in our group was herein discussed.
- Interaction azole–nucleosides were studied by DFT, and ONIOM calculations.
- For interaction energy calculations the basis set-superposition factor (BSSE) was considered.

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