

Impact of the Cu(II) ions on the chemical and biological properties of goserelin : coordination pattern, DNA degradation, oxidative reactivity and *in vitro* cytotoxicity.

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Streszczenie

Goserelin acetate (Gos) as a synthetic analog of the mammalian gonadotropin-releasing hormone (GnRH) is widely used in the treatment of sex hormone-related conditions. In this paper we present the chemical and biological aspects of its interaction with Cu(II) ions. The mode of Cu(II) binding and the thermodynamic stability of the obtained complexes were characterized by potentiometry, UV-Vis and CD spectroscopic methods. The DFT calculations were applied in order to investigate and confirm the molecular structure of the studied systems. The experimental and theoretical results clearly indicated the involvement of three nitrogens from the peptide and two oxygens from the acetate moieties in the Cu(II) coordination under physiological conditions. The investigated metallopeptide caused single- and/or double cleavage of the sugar-phosphate backbone of the plasmid DNA in the reaction accompanied by endogenous substances such as hydrogen peroxide or ascorbic acid. The degradation of the DNA molecule occurred via the free radical mechanism. Calculations based on measured spectra allowed determining the kinetic parameters of $\cdot\text{OH}$ formation. The cytotoxic effects of Gos and its metallo-derivative were tested *in vitro* towards two cancer cell lines (A549—human lung adenocarcinoma, CT26—mouse colon carcinoma).

Słowa kluczowe

Goserelin, Gonadotropin-releasing hormone, copper(II) complexes

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