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Simulating the suppression of mechanism for the pathogenic *E.coli* resistance to gentamicin

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The problem of antibiotic resistance in microorganisms is frequently associated with their irrational use in medicine and agriculture, which resulted in the selection of resistant forms of pathogenic microorganisms. This was the reason for the recent outbreaks of nosocomial and gastrointestinal diseases, poorly responsive to medical control. In this regard, the search and development of new substances that could enhance susceptibility of bacteria to traditional antibiotics is a promising way to combat drug resistance of the pathogens. Computer-based analyses of structures and active sites have been carried out using Accelrys Discovery Studio software. Quantum chemical calculations of the FS-1 structure have been made by the non-empirical DFT and semi empirical PM3 procedures using GAUSSIAN09 software. During microbiological studies, an induced increase in susceptibility of *E. coli* to gentamicin has been revealed under the FS-1 effect (patent application № PCT/KZ2011/000019). As the test subject, PDB structure (ID - 2QB9) of gentamicin in combination with 30S ribosome of *E. coli* was used. The spatial structure of the complex formed by the drug FS-1 active site with gentamicin was calculated using PM3 procedure. The most donor-active antibiotic atom forms a coordination bond with the magnesium ion being a part of the drug FS-1. In silico study has shown that the antibiotic coordinates in the complex compound (adduct) with FS-1, having in its structure two organic ligands. One of the possible mechanisms to enhance the gentamicin effect on resistant *E. coli* is in preventing the enzymatic inactivation by aminoglycoside modifying enzymes (AME), returning susceptibility of *E. coli* to this antibiotic.

Biography

I S Korotetskiy has completed his PhD at the age of 29 years from Institute of Microbiology and Virology in Almaty, Kazakhstan. The title of his work was "Phylogenetic analysis of Newcastle disease virus strains isolated in Kazakhstan". He has 7 papers in peer reviewed journals. He holds the position of the Head of Laboratory of Virology at the Scientific Centre for Anti-Infectious Drugs.

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