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## Nano-biocomposites for biomedical application

Igor Y Denisyuk<sup>1</sup>, Natalia V Vasilyeva<sup>2</sup>, Mari Iv Fokina<sup>1</sup>, Maya V Uspenskaya<sup>1</sup>, Julia E Burunkova<sup>1</sup>, Natalia A Zulina<sup>2</sup>, Tatiana S Bogomolova<sup>2</sup>, Irina V Vybornova<sup>2</sup>, Aleksandr S Stepanov<sup>2</sup> and Elena A Orishak<sup>2</sup>

<sup>1</sup>ITMO University, Russia

<sup>2</sup>I. Metchnikov North-Western State Medical University, Russia

**S**ilver, gold, selenium and metal oxides nanoparticles in polymer matrix intensively investigated in biomedical application due to the plenty of unique properties of antimicrobial properties to Gram-positive, Gram-negative pathogens and antifungal activity is an important scientific problem to create bio-nanocomposites. Non-selective, broad spectrum antibacterial and antifungal activity against different types of microorganisms as well as the long-term effect for a few months is one of the main requirements to biopolymers. Nanocomposites with nanoparticles Ag, Au, SiO<sub>2</sub>, ZnO were prepared on the basis of two monomer compositions: (1) Acidic composition consisting of monomers: 2-Carboxyethyl and Bisphenol A glycerolate. (2) pH neutral formulation consisting of monomers: Diurethanedimethacrylate and Isodecyl acrylate and photo initiator. Methods of preparing polymer films based nanocomposites can be found in our papers. Exposure was increased 5 times from total time of polymerization for these composites; prepared samples were heated at 50°C for 12 hours to minimize the effects of residual monomers in the experiment. As test objects were used: Strains of fungi *Candida albicans* (*C. albicans* NCTC 885-653) and *Aspergillus fumigatus* (clinical isolate); strains of staphylococci Community-associated Methicillin-resistant *Staphylococcus aureus* (CA-MRSA, penicillin-binding protein (PBP2α) - positive); Healthcare-associated Methicillin-resistant *Staphylococcus aureus* (HA-MRSA, penicillin-binding protein (PBP2α) - positive); Methicillin-resistant *Staphylococcus epidermidis* (MRSE, penicillin-binding protein (PBP2α) - positive); Methicillin-resistant *Staphylococcus epidermidis* (MRSE, penicillin-binding protein (PBP2α) - negative); Methicillin-resistant *Staphylococcus aureus* (MRSA, penicillin-binding protein (PBP2α) - negative); Methicillin-susceptible *Staphylococcus aureus* (MSSA); Methicillin-susceptible *Staphylococcus epidermidis* (MSSE). The antifungal activity of ZnO nanocomposites based on polymeric matrix 2-Carboxyethyl acrylate/Bisphenol-A-glycerolate (1 glycerol/phenol) diacrylate against *C. albicans* and *A. fumigatus* was found. Pronounced suppressive effect of ZnO nanocomposites based on polymeric matrix 2-Carboxyethyl acrylate/Bisphenol-A-glycerolate (1 glycerol/phenol) diacrylate against staphylococci was identified. The antifungal activity of polymeric matrix based on 2-Carboxyethyl acrylate/Bisphenol-A-glycerolate (1 glycerol/phenol) diacrylate against *C. albicans* was found.

## Biography

Igor Y Denisyuk has his expertise in field of nanoparticles, non-linear molecular crystals, polymer material, photonics, phodegradable nanocomposites and biomedical nanocomposites.

denisiuk@mail.ifmo.ru

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