6. NANOMEDICINE

6.2. Medical Chemistry

2.6.2.1. Impact of Ag nanoparticles on microorganisms, causative agents of purulent-inflammatory processes. /M. Mishina, A. Syrova, V. Abramenko, V. Makarov, O. Hopta/. Georgian Medical News (GMN). – 2019. – #4. – pp. 139-143. – eng.; abs.: eng., rus., geo.

Determination of the Ag nanoparticles' impact on microorganisms causative agents of purulent-inflammatory processes was carried out It was stated that the greatest significance of growth inhibition zone was found in Staphylococcus aureus and Streptococcus pyogenes with sample length from 1 to 6 mm and Escherichia coli with 5–6 mm sample length. The investigated strains in an amount 10^4–10^6 CFU/ml were sensitive to Ag nanoparticles activity, but at concentration 108 CFU/ml and more all strains were found persistent to samples of various length. The ability to form biofilms with planktonic cells of microorganisms under Ag nanoparticles activity sufficiently reduced from 3.4 (Candida albicans) to 5.5 (Klebsiella pneumonia) in investigated strains. The disorganization of daily biofilms was found in determining of Ag nanoparticles impact on formed biofilms of microorganisms. Fig. 7, Ref. 17.

Keywords: Ag nanoparticles, silver nanoparticles, antimicrobial effects, catheter-associated infections, biofilms, reference strains of microorganisms

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2.6.2.2. Formulation of biodegradable polymeric nanoparticles containing cytotoxic substance of plant origin. /L. Ebralidze, A. Tsertsvadze, E. Sanaia, D. Berashvili, A. Bakuridze/. Georgian Medical News (GMN). – 2020. – #2. – pp. 137-142. – eng.; abs.: eng., rus., geo.

Formulation of novel drug delivery system is one of the approaches for improvement of pharmacological activity of drugs. This implies encapsulation of the API into the biocompatible polymeric material. Objective of the research was the formulation of biodegradable amino acid-based polyesteramide nanoparticles composing cytotoxic substance of plant origin. The research materials and methods included: biodegradable polyesteramide (PEA), alkaloids from Vinca Minor, surfactants (Tween 80, polyvinyl pirolidone, polyvinyl alcohol, Poloxamer 188). NPs size (mean particle diameter) and size distribution (polydispersity index, PDI), and zeta-potential (ZP) were measured by dynamic light scattering (DLS) using a Zetasizer Nano ZS (Malvern Instruments, U.K.) at 25°C, UV spectrophotometer was used for %EE study. Amino acid-based PEA particles were fabricated by the modified emulsification method. Based on the studies optimal composition and fabrication condition of PEA NPs was determined. The conditions of the NPs fabrication were as follows: the O/W ratio: 1:10; the solvent: DMSO; polymer concentration in the organic phase: 50.0 mg/mL; surfactants (PVA) concentration in aqueous phase 0.5%,the stirring rate: 1000 rpm. The influence of the various factors such as organic solvents, surfactants, as well as a polymer concentration in the organic phase,surfactant concentration in the aqueous phase,the organic/water phase ratio on the NPs fabrication was studied. The NPs were characterized by size (mean particle diameter & size distribution (polydispersity index, PDI), and zeta-potential (ZP). Increase concentration of the surfactant (polyvinyl alcohol) from 0.1% to 0.5% decrease average particle size from 568±63 to 169±1.66 respectively. EE% was obtained to be around 50%. Tab. 7, Fig. 3, Ref. 8.

Keywords: Nanoparticle, entrapment, polymer, biodegradable, alkaloids

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