BISMUTH NANOPARTICLES INHIBIT ORAL MICROORGANISMS GROWTH AND BIOFILM FORMATION

René Hernandez-Delgadillo¹, Claudio Cabral-Romero¹

¹Facultad de Odontología, Universidad Autonoma de Nuevo Leon, Dr. Aguirre Pequeño y Silao s/n, Mitras Centro, C.P. 64460, Monterrey, México.

According to the announcement by the NIH (National Institute of Health, USA), biofilms are a major problem in the medical public health, as they represent more than 80% of microbial infections in the body. Standard antimicrobial treatments, typically fail to eradicate. Therefore, there is a growing need to develop new drugs with new and better capabilities that can control the biofilms. At the present time, the nanoterapeutics provide innovative options for controlling infectious diseases including the oral cavity, counteracting the growth of pathogens such as Streptococcus mutans, Candida albicans and herpesvirus. In medicine, some derivatives of bismuth such as subsalicylate have been employed in the medical field to counteract vomiting, nausea, diarrhea and stomach pain. In this study we determined the antimicrobial activity of nanoparticles bismuth (BiNPs) against oral pathogens. The antibacterial and antifungal activity as assessed by the MTT assay and fluorescence microscopy. BiNPs demonstrate that inhibited the growth of Streptococcus mutans in 69% effective likewise obtained 85% inhibition with Candida albicans, were also able to inhibit biofilm formation of both strains. Furthermore, we determine the antiviral activity in a model of rotavirus by immunoperoxidase assay presenting 90% infection control treatment BiNPs. Finally, the potential cytotoxicity of BiNPs was evaluated in epithelial monkey kidney cells by fluorescence microscopy and showed no evidence of cytotoxicity at 24 hours of exposure. These results suggest that bismuth nanoparticles could be a very interesting candidate as a bactericidal, fungicidal and virucidal agent to be incorporated into an oral antiseptic.

Keywords: bismuth, antimicrobials, biofilm

References:

Presenting author's email: rene.hdz.d@gmail.com