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New strategy in treatments of oral infections by nanoparticles

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Oral infection is one of the world's major public health problems. It is a multifactorial disease caused by low pH for a prolonged time within plaque, leading the enamel to dissolve. Dental plaque is a natural biofilm that consists of various bacterial species and extracellular matrix with soluble and insoluble glucans. It is affected by numerous external factors such as diet, saliva composition and salivary flow rate. Acidogenic bacteria such as *Streptococcus mutans*, *Streptococcus sanguis* and Lactobacilli are considered as the contributory factors of dental caries. In a biofilm different bacterial species exist in close proximity to each other. Streptococci are the major colonizers of early enamel biofilms. Mechanical methods such as tooth brushing are impressive for plaque removal but they are directly dependent on individual skills and are problematic in disabled or traumatized patients. The use of adjunctive method such as mouthwashes has been shown to be effective for prevention of plaque accumulation. Routine mouth rinses like chlorhexidine, however, are associated with the disadvantages including enamel staining, taste disturbances and mucosal irritation. The antibiotics such as penicillin, cephalosporins and vancomycin are effective against corresponding bacteria but the side effects and highly antibiotic resistance has been observed. Therefore, searching for an alternative as antimicrobial agent with minimal side effects seems to be quite reasonable. Metal nanoparticles have long been used in medicine because of their bactericidal and bacteriostatic effects. Nanoparticles have been suggested as a useful antibacterial and antibiofilm solutions for children with dental caries and oral infections. The solution containing nanoparticles TiO₂, Ag and Fe₃O₄ showed the lowest inhibitory and antibiofilm concentration against *S. mutans* and *S. sanguis* compared to those of other nanoparticle, antibiotics and chlorhexidine thus it may be used as an alternative for person with dental caries, dental plaques and oral infections.

Biography

Farzan Modaresi has his expertise in clinical bacteriology, MIC concentration, nanoparticles treatment and drug resistance in health and medicine branch. He has completed his PhD in Medical Bacteriology. He is an Assistant Professor in Jahrom University of Medical Sciences, Iran.

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