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Advancing Pharmaceutical Nanotechnology in the Treatment of Periodontitis

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Introduction: Periodontal disease is defined as bacterially induced a chronic infectious inflammatory disease that affects the tissues that support and anchor the teeth. Treating advanced periodontitis is still challenge to periodontics with very little change in treatment over last several decades. The introduction of nanoparticles in dentistry is giving new scope of application in diagnosis, treatment planning and tissue regenerative procedures. Current Treatment Options: Nonsurgical therapy which includes eliminating etiological agents, modifying risk factors, mechanical plaque controls, and chemical plaque control agents is the first line of antimicrobial therapy. Surgical therapy consists of open flap debridement either alone or as a combination with respective or regenerative procedures. Regenerative surgical therapy consists of bone replacement grafts, guided tissue regeneration (GTR), biologic modifiers like growth and differentiation factors (GDF) and extracellular matrix proteins like enamel matrix proteins (EMD). Nanodrug delivery is the recent advanced system which targets on improving controlled release, patient safety, efficient delivery agent and reducing side effects. Future Research Scope: Currently various approaches have followed in treating Periodontitis effectively. A nanocapsule loaded with antibiotics is also drawing attention. Multilayered composite nanoparticles with pH sensitive release and hydroxyapatite coating will bring tremendous scope to nonsurgical regenerative procedures. When a multilayered nanocapsule is placed by local delivery system it is then degraded layer by layer releasing drug in slow controlled manner. Due to low pH in inflamed tissue the outer coating will degrade and release antibiotic in treating localized inflammation. However, still the nanoparticle with remaining inner layer of polymer will remain intact at low pH. Once the infection subsides and pH returns to normal. Which now allows the inner polymer coat to degrades and release osteoclastic inhibition agents and osteoblastic stimulating agent to correct osseous defects. Conclusion: Further research and investigation must be done to understood the design, structure, criteria required to fabricate stimuli, responsive and biofunctional multilayered composite nanoparticles. As the Pharmaceutical drugs advanced and Drug delivery options has become more effective with these new Nanotechnology. And one such approach is layer by layer nanocapsules as a multi drug delivery option.

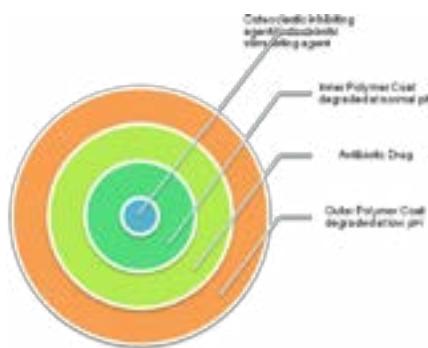


Figure: Multilayered nanocapsules

Biography

Nageswara Rao Reddy has a Ph.D in Pharmacy and had a working experience of more than 13 years in Pharmaceutical companies and CRO. He is currently working as a Sr.Project Manger at Sannova Analytical, Somerset, USA. He published nearly 14 research Article in National and International Peer review Journals.

Sujatha Padi after her graduation from dental school she practiced as an Assistant Dental Surgeon for more than 5 years in hospitals and health centers. Currently aspiring her dental research on two topics "Effect of Fluorine in younger children's Tooth paste" and "Better treatment options for Periodontitis"

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