

Multifunctional nanocarriers for the treatment of periodontitis: Immunomodulatory, antimicrobial, and regenerative strategies

Cafferata E.A.

Alvarez C.

Diaz K.T.

Maureira M.

Monasterio G.

González F.E.

Covarrubias C.

Vernal R.

Periodontitis is an inflammatory disease, in which the host immuno-inflammatory response against the dysbiotic subgingival biofilm leads to the breakdown of periodontal tissues. Most of the available treatments seem to be effective in the short-term; nevertheless, permanent periodical controls and patient compliance compromise long-term success. Different strategies have been proposed for the modulation of the host immune response as potential therapeutic tools to take a better care of most susceptible periodontitis patients, such as drug local delivery approaches. Though, maintaining an effective drug concentration for a prolonged period of time has not been achieved yet. In this context, advanced drug delivery strategies using biodegradable nanocarriers have been proposed to avoid toxicity and frequency-related problems of treatment. The versatility of distinct nanocarriers allows the improvement of their loading and release capabilities and could be potentially used for microbiological control, periodontal regeneration, and/or immunomodulation. In the present review, we revise and discuss the most frequent biodegradable nanocarrier strategies proposed for the treatment of periodontitis, including polylactic-co-glycolic acid (PLGA), chitosan, and silica-derived nanoparticles, and further suggest novel therapeutic strategies. © 2018 John Wiley & Sons A/S.

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bioactive glass

chitosan

nanoparticles

periodontitis

PLGA

regulatory T lymphocytes

antiinfective agent

chitosan nanoparticle

mesoporous silica nanoparticle

nanocarrier

polyglactin

antiinfective agent

chitosan

nanoparticle

adaptive immunity

antimicrobial activity

drug delivery system

effective concentration

human

immunomodulation

innate immunity

nonhuman

patient compliance

periodontitis

priority journal

Review

tissue regeneration

chemistry

drug delivery system

periodontitis

Anti-Bacterial Agents

Anti-Infective Agents

Chitosan

Drug Delivery Systems

Humans

Nanoparticles

Periodontitis

Polylactic Acid-Polyglycolic Acid Copolymer