Treatment of Porphyromonas gingivalis Induced Gingivitis in Albino Rats with Tetracycline-Loaded Nanochitosan, an Immunohistochemical Analysis

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Abstract : Background: By using nanoparticles as drug delivery, it may be possible to avoid the drawbacks of systemic antibiotic dosing, including bacterial antibiotic resistance. The goal of this study was to see how well tetracycline loaded on nanochitosan worked to treat gingival inflammation in albino rats caused by Porphyromonas gingivalis. The study analyzed immunohistochemically the localization of the pro-inflammatory cytokine Interleukin-1beta (IL-1β). Material and methods: In this study, fifty mature male albino rats weighing 150 to 180 grams each were used. They were randomly divided into five groups. We checked for weight changes in rats. Ten male albino rats were included in Group I, which served as a negative control group. Ten rats were included in Group II, where they were exposed once to Porphyromonas. Group III contained ten rats, which were treated the same as Group II plus daily injections of diluted tetracycline powder at the infection sites. Ten rats in Group IV received the same procedure as those in Group II before receiving daily injections of nanochitosan at the injection sites. Finally, Group V, which had ten rats. Following the same protocol as Group II, they received localized injections of tetracycline loaded on nanochitosan once daily. Rats' gingivae were extracted and prepared after they were anesthetized. The biopsies were examined histologically and immunohistochemically by light microscopy. Results: Groups I and V had a nearly normal histological appearance of gingival tissue. In Groups II, III, and IV, degeneration was seen because the epithelial cells were bigger, collagen fibers were pulling away from the lamina propria connective tissue, and the basement membranes had come to an end. There was no discernible difference between groups V and I when they were examined immunohistochemically. Conclusion: The use of nano chitosan as a tetracycline carrier is a novel technique to overcome the drug's rising level of resistance.