ANTI-BIOFILM EFFECTS OF A FORMULATION CONTAINING METRONIDAZOL

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INTRODUCTION: Drug delivery to the oral biofilm presents several unique challenges that stem from its unique structure, biochemistry and microenvironment. In addition to biofilm barrier, factors such as washing effect of saliva, enzymatic activity of bacteria and rapid fluctuations in pH can cause impact in drug delivery. Although pharmaceutical science have been provided a wide range of formulations for antimicrobial delivery, its effect on biofilms remains unexplored.

OBJECTIVES: The aim of this work was to evaluate the effects of a drug delivery system containing metronidazol on initial biofilm.

METHODS: Streptococcus mutans UA 159 biofilms (one of the most pathogenic oral bacteria) were grown on glass slides at 37ºC, 5% CO₂. On the 3rd day biofilms were exposed to controlled drug release system (n=6) containing metronidazole (MDZ). Formulation without drug was included as negative control (NC). Biofilms were collected 24 and 48 after first exposition to the formulation. Biofilm’s pH and bacterial viability were determined.

RESULTS: The pH of culture medium was measured daily after exposition to treatments and biofilms grown in presence of MDZ delivery system rapidly increased pH in comparison to control groups at time 24 and 48 hs (p<0.05), suggesting that formulation containing antimicrobial interfered in bacterial metabolism. Bacterial viability within established biofilms was assessed and viable counts of S. mutans decrease after first 24 hours of exposition to drug delivery system containing antibiotic agent while the control groups continued to grow (p<0.05). For 48 hs after exposition, bacteria count did not differ from control group (p>0.05).

CONCLUSION: Drug delivery system evaluated presents a great anti-biofilm potential. In addition, this biofilm model could provide more information about drug delivery in biofilms since that mimicked oral cavity, which could be an approach for studies involving biochemical aspects of biofilms.

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