

Identification of Salivary Antimicrobial Proteins Induced by Gargling with a Saline Solution

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Summary

[Background] Gargling with salt water has been demonstrated to be an effective method for preventing upper respiratory tract infections. However, the impact of salt water gargling on the composition of saliva secreted in the oral cavity remains poorly understood. In this study, we hypothesized that salt water gargling induces the production of antimicrobial proteins in the oral cavity.

[Methods] Twenty healthy male and female university students participated in this study. Saliva were collected before and after gargling with 2% salt water. The tap water was used for control. To clarify the short-term (within 3 hours) and medium-term (around a week) effects of salt water gargling, sampling points were pre-gargling, post-0.5, post 1, post 2, and 3 hours for the short-term. In the medium-term, sampling was conducted post 1 days gargling, post 3 days, post 5 and post 7 days, sampling was done before lunch. For gargling with salt water samples, we performed shotgun proteomic analysis of pre- and post-gargle saliva to identify salivary proteins that were modulated by salt water gargling.

[Results] We have identified a number of immune response-related factors induced by gargling salt water and several proteins with anti-inflammatory properties. From 1 hour to 7 days after gargling, the increased proteins were components of immunoglobulins, which were classified as adaptive immune response (GO:0002250) by biological process annotation in Gene Ontology. Cellular component annotation showed that most of the proteins were involved in the extracellular region (GO:0005576), plasma membrane (GO:0005886), and immunoglobulin complex (GO:0019814).

[Conclusion] In our study, we identified proteins induced by salt water gargling. The results indicate that salt water gargling modulates numerous proteins involved in immune responses both in the short and medium-term. These findings provide a detailed understanding of the effects of salt water gargling and may have practical applications in daily life.