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# [Antibacterial activity of erythritol on periodontal pathogen]

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## Abstract

**Purpose:** To explore the effect of erythritol on the growth of Porphyromonas gingivalis (Pg), Aggregatibacter actinomycetemcomitans(Aa), Actinomices viscosus (Av), and to explore how Porphyromonas gingivalis affected by erythritol influence mRNA expression level of inflammatory in periodontal cells.

**Methods:** Pg, Aa, Av were anaerobically cultured (80%$N_2$, 10%$CO_2$, 10%$H_2$) at 37℃ in 2, 4, 8, 16, 32, 64, 128 g/L erythritol- BHI mixture groups (experimental groups) and BHI groups (control group). The lowest erythritol concentration without turbidity or precipitation was the minimum inhibitory concentration. Pg was cultured in MIC, 1/2, 1/4, 1/8 MIC erythritol- BHI mixture groups (experimental groups) and BHI groups (control group). Each kind of bacteria in each concentration group was centrifugalled and cleaned before added into DMEM. The mixed suspension was co-cultured with the periodontal ligament cells in four generations for 24 hours, the supernatan was removed , then the total RNA in cracking cells was extracted and reversing transcription. At last, the relative expression of IL-1, IL-6, TNF-a was detected real-time fluorescent quantitative PCR. The data were analyzed with SPSS19.0 software package.

**Results:** The minimum inhibitory by concentrations of erythritol on three bacteria were as followed: Pg: 64 g/L，Aa: 128 g/L，Av: 128 g/L. The ability of stimulating periodontal ligament cells to produce IL-1β, IL-6 and TNF-α was different when Pg was cultured under different concentrations of erythritol. There was no significant difference between 0 g/L of control group and 8 g/L of experimental group. As the concentration reached 16 g/L, the relative expression of IL-1β, IL-6, TNF-α was reduced, and the higher concentration was, the less inflammatory factors was. However, the inflammatory factors in all the experimental groups were always significantly higher than that in the blank control group ($P<0.05$).

**Conclusions:** Erythritol has an inhibitory effect on the growth of Pg, Aa and Av. In a certain range, higher concentration of erythritol delivers better inhibition effect. Erythritol can also reduce the periodontal pathogenicity of pathogenic bacteria in a way inhibiting the virulence of these bacteria, reducing the production of IL-1β, IL-6, and TNF-a in periodontal cells.

## Related information

MedGen
PubChem Compound (MeSH Keyword)