Evaluation of the efficacy of bacteriophages-derived lytic enzymes (lysins) to reduce colonization and transmission of *Streptococcus suis* in pigs

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OBJECTIVE

Streptococcus suis causes severe infections in pigs, and occasionally in humans. To control disease in pigs, large amounts of antimicrobials are used. An alternative, more pathogen specific approach could be the therapeutic use of bacteriophage lysins. Our objective was to study the effect of nasal and oral application of lysins ΔPlySs1 and PlySs2 [1] on S. *suis* serotype 9 colonization and transmission, and on clinical signs.

MATERIALS AND METHODS

Two experiments that only differed in lysins doses were performed. Each consisted of one lysins- and one placebo-treated group. In each group 5 pigs were inoculated intranasally with S. *suis*, and 6 contact-pigs were added. Pigs were monitored for two weeks, in which treatment was given to both inoculated (days 3-4 and 8-10) and contact pigs (days 1-4 and 8-10). Per treatment a pig received a combination of ΔPlySs1 and PlySs2, in low (0.8 and 0.4 mg) or high doses (1.1 and 3.5 mg) in the two experiments respectively. Saliva and nose swab samples, and tonsillar tissue samples were tested for S. *suis* by quantitative bacteriological culture.

RESULTS

Lysin-treated pigs showed a significant reduction in S. *suis* loads in saliva (1.27-1.81 ^{10}LogCFU) and nose samples (1.67 ^{10}LogCFU) on one day (high-dose group) or two days (low-dose group). Transmission rates did not differ between lysin-treated and control groups ($P_{low\text{-}dose}$=0.530; $P_{high\text{-}dose}$=0.487), and clinical signs and mortality were comparable.

CONCLUSION

Although phage lysins ΔPlySs1 and PlySs2 show a clear lytic activity against S. *suis in vitro* and strongly reduce S. *suis* colonization in a mouse model [1,2], they appeared not to be effective in pigs with the current formulation. Application did not reduce S. *suis* transmission between animals or protect against clinical signs and mortality. Reduction of mucosal colonization was only observed on some days of lysins administration.

REFERENCES

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