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The FnBPA from Methicillin-resistant *Staphylococcus aureus* Promoted the Development of Oral Squamous Cell Carcinoma

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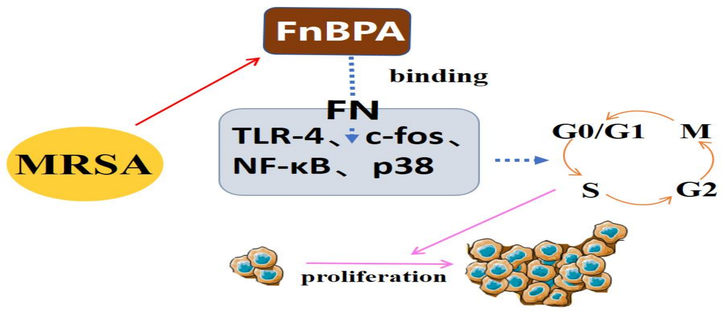
Objective

Oral squamous cell carcinoma (OSCC) is the most common tumor in oral cavity. Methicillin-resistant *Staphylococcus aureus* (MRSA) were highly detected in OSCC patients. However, the interactions and mechanisms between MRSA and OSCC are not clear. The purpose of this study was to investigate the promotion of MRSA on the development of OSCC.



Materials and Methods

In present study, OSCC cells were treated with different *Staphylococcus aureus* (*S. aureus*) strains for the investigation of proliferation rate, the change of cell cycle , as well as the cytokine and protein levels. The expresson of *fnbpA* in *S. aureus* strains were detected by qPCR. In addition, the adhesion of *S. aureus* strains to cell and FN protein was measured. The influence of *S. aureus* strains on the growth of squamous cell carcinoma *in vivo* were also explored.

Results

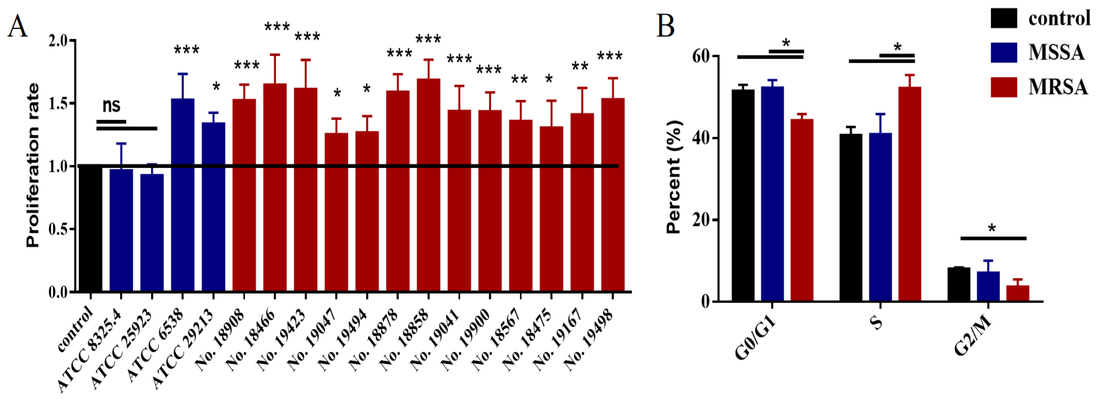
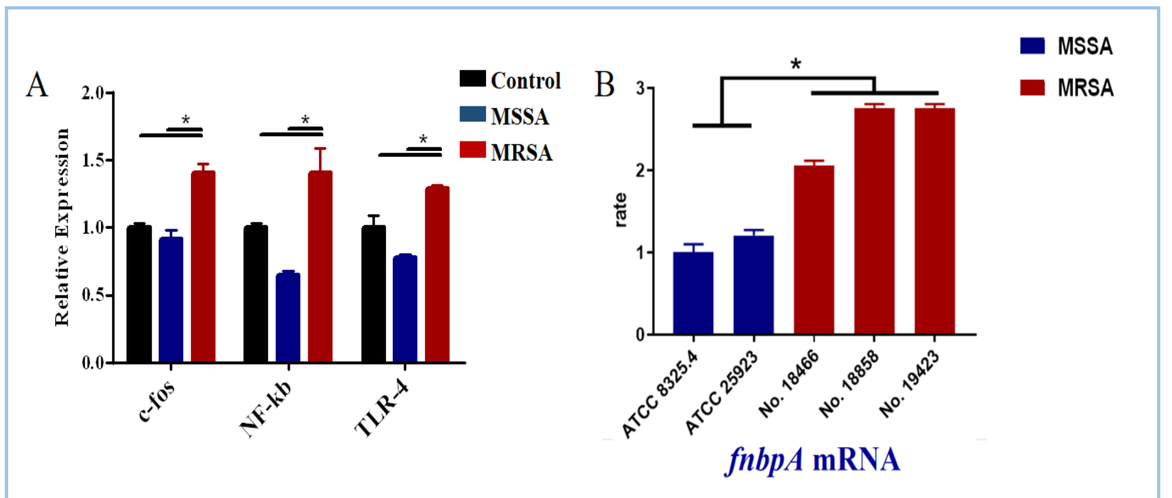


Fig. 1 MRSA strains significantly increased the proliferation of OSCC cells compared with methicillin-sensitive *S. aureus* (MSSA) (Fig. 1A) and MRSA arrested the cell cycles of OSCC cells in the S phase (Fig. 1B).



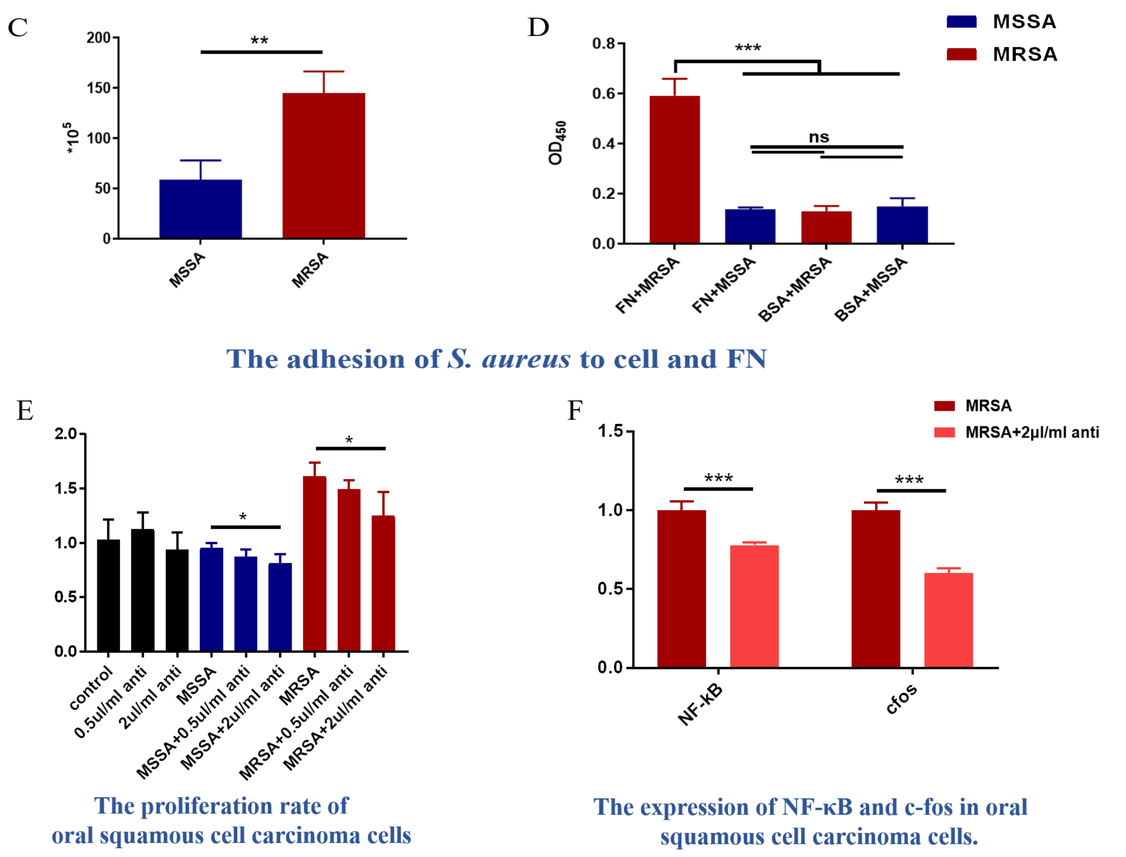


Fig. 2 MRSA was capable to activate the expression of TLR-4, NF-κB and c-fos in OSCC cells, and MRSA expressed more *fnbpA* as well as more adhesion ability to cells and FN protein (Fig. 2A-D). After antagonizing FnBPA, the proliferation rate of OSCC cells and the expression of c-fos and NF-κB reduced (Fig. 2E and 2F).

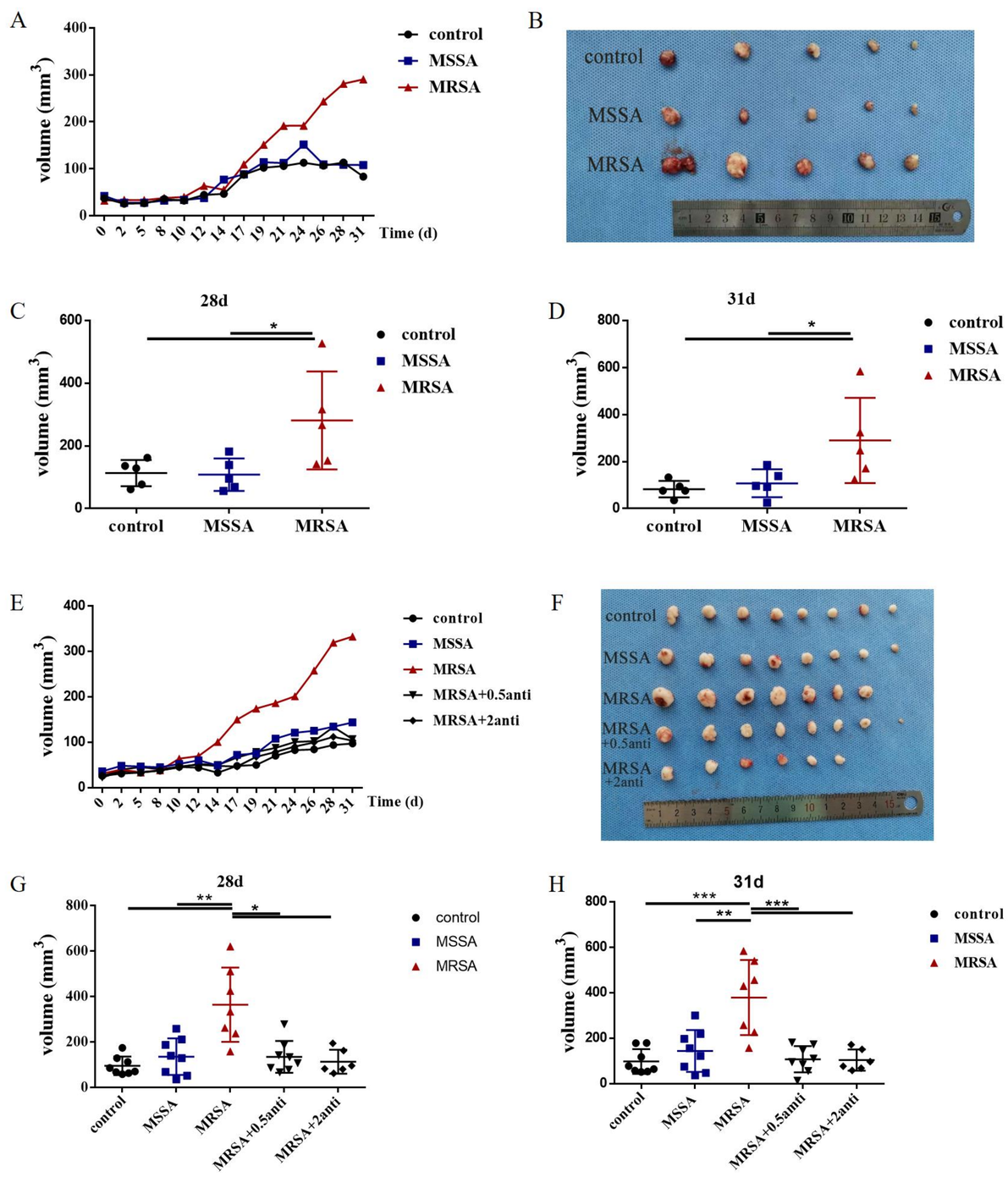


Fig. 3 MRSA promoted the development of squamous cell carcinoma *in vivo* (Fig. 3A-D). By neutralizing FnBPA, the promotions of MRSA on the development of squamous cell carcinoma were significantly decreased (Fig. 3E-H).

Conclusion

MRSA can arrested OSCC cells in the S phase and promote the proliferation of OSCC cells *in vivo and in vitro*, This mechanism is mainly due to the high expression of FnBPA in MRSA, which binds to the FN protein of OSCC cells and activates the downstream of TLR4/NF-κB/p38 MAPK/c-fos pathway.