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HtrA Protease from Bacillus subtilis Suppresses the Bacterial Fouling of the Rat Skin Injuries

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Abstract

© 2016, Springer Science+Business Media New York.The gene of serine protease HtrA from Bacillus subtilis was cloned and recombinant protein was overexpressed in E. coli and purified. The recombinant HtrA efficiently suppressed in vitro the biofilm formation by clinical isolates of Staphylococcus aureus and Staphylococcus epidermidis. While the model rat skin injuries treated with HtrA healed slower than in the case of chymotrypsin, their recovery was significantly faster compared with pure buffer. On the other hand, the number of bacterial CFUs on the injuries treated with HtrA solution was reduced five times in 8 days, similarly to chymotrypsin-treated ones, while only twofold reduction was observed in controls. By the way, the resident microflora content of protease-treated and control wounds remained almost similar within 4 days, with Enterococcus faecalis and S. epidermidis being the main resident microflora after the treatment. To the eighth day, the amount of staphylococcal cells was drastically reduced on HtrA- and chymotrypsin-treated wound surfaces, confirming that both proteases provide wound cleaning from pathogenic microflora. Thus, HtrA from B. subtilis significantly reduces the microbial fouling of the wound surface being thereby of interest for wound care.

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Keywords

Bacillus subtilis, HtrA, Serine proteases