EFFECTS OF CATHELICIDIN ANTIMICROBIAL PEPTIDES AGAINST LIVESTOCK-ASSOCIATED METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS*

S. Blodkamp[1], K. Kadlec[2], H.Y. Naim[1], S. Schwarz[2], M. von Köckritz-Blickwede[1]

[1]Department of Physiological Chemistry, University of Veterinary Medicine Hannover, Foundation, Hannover, Germany, [2]Institute of Farm Animal Genetics, Friedrich-Loeffler-Institut, Neustadt Mariensee, Germany

Livestock-associated methicillin-resistant *Staphylococcus aureus* (LA-MRSA) is a colonizer but also an important zoonotic pathogen which is readily exchanged between different animal species and humans. Its - in part - expanded antimicrobial resistance presents a challenge in the control of infections caused by LA-MRSA. One way to overcome this problem is to boost the host immune system against the infection. Possible targets are the endogenous antimicrobial peptides (AMPs) of the host cells. AMPs, such as the cathelicidins, are an essential part of the innate immune system, as they act as signal molecules but also kill pathogens directly.

The aim of this study was to characterize the antimicrobial activities of five different cathelicidins derived from different animal species (LL-37, CRAMP, CAP18, BMAP-27 and BMAP-28) against livestock-associated methicillin-resistant *S. aureus* (LA-MRSA).

For this purpose the minimal inhibitory concentrations (MICs) of 153 field isolates were determined. Moreover, the impact of 14 antimicrobial resistance genes, which specify different resistance mechanisms, on the MICs of cathelicidins was investigated. Therefore, the plasmids carrying different known antimicrobial resistance genes were transferred into S. aureus NewmanΔdlt, a prototype strain that is relatively susceptible for the tested AMPs, to see if the MICs increase.

The results demonstrated that the lowest MIC values were obtained for the bovine cathelicidins, BMAP-27 and BMAP-28 (4-16 µg/ml and 2-16 µg/ml, respectively). The human and mouse cathelicidins, LL-37 and CRAMP, showed the highest MICs (both ≥ 128 µg/ml). These differences of the cathelicidin activities correlate with their hydrophobicity. Interestingly, an effect of antimicrobial resistance genes on the MICs could not be detected.

Since bovine cathelicidins, as revealed in this study, exhibit lower MICs against LA-MRSA compared to cathelicidins of other species, they might be a promising target for pharmacological boosting, especially since none of the tested antimicrobial resistance genes altered the MIC values. Further experiments that clarify the molecular and biochemical basis of the interaction of cathelicidins with bacteria are currently performed.