

Multiple cases of *mecC*-MRSA in a Bavarian dairy herd



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Abstract: This is the first report about multiple cases of methicillin-resistant *Staphylococcus aureus* (MRSA) harboring the alternative methicillin resistance gene *mecC* in a single dairy herd. The detection of *mecC*-positive *S. aureus* in milk samples from 16 out of 56 cows kept in a herd in Bavaria, Germany, shows that *S. aureus* strains harboring *mecC* are able to spread among livestock, and that they are not limited only to individual cases.

Introduction: As part of a larger project that aimed to investigate antimicrobial susceptibility among *S. aureus* from bovine mastitis, quarter milk samples from a Bavarian dairy herd were taken and investigated. The herd included 56 lactating cows, the bulk milk somatic cell count (SCC) was 127,000 cells/mL of milk.

Results: *S. aureus* was found in 31 out of 213 milk samples from 16 different cows. The colony morphology was atypical for bovine *S. aureus* (nearly white, without hemolysis) and testing for affiliation to MRSA or Methicillin-sensitive *S. aureus* (MSSA) provided contradictory results:

MRSA?



31x Growth on Brilliance MRSA II agar (Oxoid)

31x Resistance to Oxacillin (microdilution)



31x



MSSA?

31x *mecA*-negative (PCR)

29x PBP2a-negative (latex test)
(2x PBP2a-positive)

Only Microarray-Technology (StaphyType Kit, Alere Technologies GmbH) could explain the contradictory results. All *S. aureus* isolates were assigned to CC130-MRSA. They were *mecA*-negative, instead harboring *mecC*. Hybridization patterns were identical. Enterotoxin genes and the bovine leukocidin *lukM/lukF-P83* have not been detected.

Discussion: The *mecA* homolog *mecC* was initially described in 2011 in human and bovine isolates. Since then, *mecC* was detected sporadically from further human and bovine cases as well as from various companion animals and wildlife. Contrary to these single detections, here we had to take into account multiple cases of *mecC*-MRSA within one dairy herd. The presence of *mecC* causes resistance to all β -lactams used in veterinary medicine. For the generally recommended dry-up therapy, not a single antimicrobial agent without a β -lactam component is available and authorized in Germany. So any intervention is restricted to infection control measures. Furthermore it has to be considered that a zoonotic potential is indicated by different studies.

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Culling of the diseased animals would be the only reasonable way to eliminate the germ. However, culling is not warranted due to an absence of a SCC elevation. The milk recording showed a median cell count of 37,000 cells/ml milk in *mecC* affected cows. Therefore, livestock monitoring with regard to *mecC* is of vital importance in order to be able to draw conclusions regarding the spread and impact of *mecC*-MRSA.

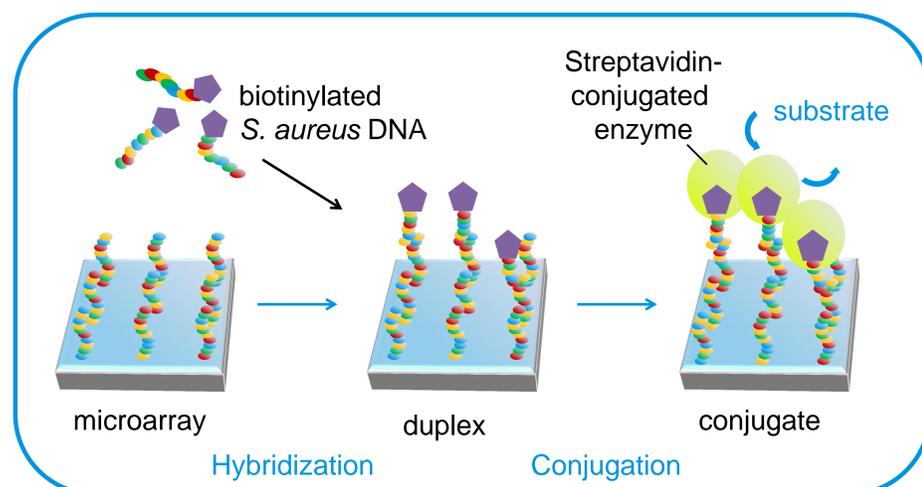


Fig.1 Diagram of the microarray procedure

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