

## **Accumulating bacteriocin genes in a non-aureus *Staphylococcus* strain to make it protective against bovine mastitis pathogens**

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**Background:** Bovine mastitis is the most common and economically important disease affecting the dairy industry. Intramammary infection with *Staphylococcus aureus* is one of the leading causes of mastitis. Although antibiotics have been the main method of treating and preventing bovine mastitis, alternative treatments are required due to the emergence of antibiotic-resistant bacteria. A promising alternative is the use of bacteriocins - antimicrobial proteins produced by bacteria. Bacteriocins function through different modes of action, therefore, creating a probiotic strain which produces a cocktail of different bacteriocins, will reduce the risk of resistance against bacteriocins. **Hypothesis:** A super-probiotic non-aureus staphylococcus (NAS) strain by introducing several unique bacteriocin gene clusters will allow the inhibition of *S. aureus* intramammary infections. **Methods:** We have a large library of bovine NAS samples including some already with inhibitory effects against *S. aureus* as recipient strains for additional bacteriocin gene clusters. The recipient strains will be selected based on its ability to: persist during infection in bovine mammary glands; not cause significant increases in somatic cell count; and ability to take up external genes. After identifying a recipient NAS strain, bacteriocin gene clusters will be transferred into the recipient strain's genome. We have five donor NAS strains each with a single bacteriocin gene cluster that inhibits *S. aureus* growth, with each gene cluster belonging to a unique bacteriocin category. The modified recipient strain will be tested in a mouse mastitis model and then a heifer model to evaluate its efficacy against *S. aureus*. **Impact:** Creating a super-probiotic strain will reduce the reliance on antibiotics which are losing their efficacy as the primary treatment of mastitis. **Take home message:** With the creation of this super probiotic-strain, it will be used as an alternative for antibiotics and will reduce the heavy reliance on antibiotics, the rise of antimicrobial resistance and the current economic impact of mastitis.