

***Staphylococcus aureus* and ruminant mastitis: staphylococcal factors involved in the infection acuteness and ecological factors modulating virulence expression in the mammary context**

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Abstract

Staphylococcus aureus is a major pathogen involved in ruminant mastitis. Staphylococcal mastitis is remarkably variable in terms of severity ranging from subclinical to gangrenous manifestations. It is also prone to recurrence partly because of *S. aureus* ability to invade Mammary Epithelial Cells (MEC). We investigate what makes a strain more or less virulent by identifying staphylococcal factors involved in mastitis acuteness. We also take account of ecological factors (udder ecosystem) that may modulate *S. aureus* virulence expression.

S. aureus strains, isolated from gangrenous (O11) or subclinical (O46) ewe mastitis, were selected for identifying potential factors involved in mastitis acuteness. Despite a close phylogenetic relationship, these two strains reproducibly induce severe (O11) or mild (O46) symptoms in experimental ewe mastitis. Using a comprehensive omic characterization (genome, transcriptome, proteome and seroproteome), we showed dramatic differences between O11 and O46 relying on their ability to adapt and express virulence in a mammary context. The exact role of the genes identified here (exoproteins, mobile genetic elements, iron metabolism), and likely involved in mastitis acuteness and pathogen-host interactions, remains to be determined.

Besides, we investigated the inhibitory potential of the lactic acid bacterium, *Lactobacillus casei*, naturally present in the teat ecosystem, against invasion of MEC by ruminant *S. aureus* isolates. Our results indicated *L. casei* strains impaired, in a contact-dependent way, adhesion and internalization of *S. aureus* without altering viability of MEC.

Altogether, these results open avenues for the development of prevention strategies against mastitis.

Biography

Yves Le Loir is a research scientist at INRA (French National Institute for Agricultural Research). He originally studied Biochemistry (University of Rennes, France) and Agriculture (ENSA-Agrocampus Ouest, France). He completed his PhD (University of Paris XI) in Microbiology on heterologous protein secretion in *Lactococcus lactis*, the model lactic acid bacterium (LAB). His current works are focused on host adaptation (ruminants) in *Staphylococcus aureus* and interactions between *S. aureus* and LAB. He has co-authored 70 peer-reviewed papers and book chapters. He is Deputy Director of the STLO Unit in Rennes, France.