# Identification and characterization of the pathogenic potential of phenol-soluble modulin toxins in the mouse commensal *Staphylococcus xylosus*

Kunal Reshamwala, Gordon Y. C. Cheung, Roger C. Hsieh, Ryan Liu, Hwang-Soo Joo, Yue Zheng, Justin S. Bae, Thuan H. Nguyen, Amer E. Villaruz, Alfonso S. Gozalo, William R. Elkins, Michael Otto

## Supplementary Material

**Supplementary Table S1. List of bacterial isolates used in this study.**

| Bacterial and viral strains | Relevant genotype and property | Source |
|---|---|---|
| *Escherichia coli* DH5α | *endA*1 *recA*1 *gyrA*96 *thi-1* *hsdR17*($r_K^-$ $m_K^+$) *relA*1 *supE*44 (*lacZYA-argF*) U169 F-80d*lacZ*M15 *deoR phoA* | Invitrogen |
| *Staphylococcus aureus* RN4220 | Derived from NCTC8325-4; $r^-$ $m^+$ | (1) |
| *Staphylococcus aureus* LAC (*Sa*)* | Epidemic U.S. CA-MRSA clone, strain LAC, ST8, CC8 | (2) |
| *Staphylococcus aureus* LAC Δ*hld* (*Sa* Δ*hld*) | The *hld* start codon altered to abolish translation | (3) |
| *Staphylococcus xylosus* C2a | Derived from DSM20267: cured of endogenous plasmid pSX267 | (4) |
| *Staphylococcus xylosus* ATCC 29966 | Clinical isolate from human skin | ATCC |
| *Staphylococcus xylosus* isolates AG8, AG10, AG11, AG12, AG14 (*Sx*), AG15 | Clinical isolate wild-type strain from a mouse background (C57BL/6 WT or related strain) with spontaneous ulcerative dermatitis (NIAID mouse breeding facility, NIH) | This study |
| *Staphylococcus xylosus* AG14 Δ*psm*α (*Sx* Δ*psm*α) | Isogenic markerless *psm*α deletion mutant of *S. xylosus* AG14. | This study |
| *Staphylococcus xylosus* AG14 Δ*psm*β1 (*Sx* Δ*psm*β1) | Isogenic markerless *psm*β1 deletion mutant of *S. xylosus* AG14. | This study |
| *Staphylococcus xylosus* AG14 Δ*psmαpsm*β1 (*Sx* Δ*psmαpsm*β1) | Isogenic markerless *psm*α and *psm*β1 deletion mutant of *S. xylosus* AG14. | This study |
| *Staphylococcus carnosus* TM300 | | (5) |
| *Staphylococcus aureus* PS187Δ*sauUSI* Δ*hsdR* (PS187ΔΔ) | *S. aureus* strain PS187 deficient in type IV and type I restriction modification system | (6) |
| Φ187 | Siphoviridae, Serogroup L | Gift from A. Peschel |

* Names in parentheses denote abbreviated strain name used in the manuscript

**Supplementary Table S2. Sequences of the primers used for generation of isogenic *psm* deletion mutants in *S. xylosus***

| Nucleotide name | Primer used | Purpose |
|---|---|---|
| Xylpsmα1 | GGTGTATGGCAAGTGACTCCAATTAAACACGG | Allelic replacement of *psm*α |
| Xylpsmα1 (Reverse) | CTAGAAATTATTCGAGGCCGAGACATTC | Allelic replacement of *psm*α |
| Xylpsmα2 | CGAATAATTTCTAGGTATCTCACCTCGCTTTGTTTTGTTAAG | Allelic replacement of *psm*α |
| Xylpsmα2 (Reverse) | CACCTACTTGCGATTGCACATACCATCG | Allelic replacement of *psm*α |
| Xylpsmβ1 | TAATTAACCCAATGTAATCACAGCGTTCG | Allelic replacement of *psm*β1 |
| Xylpsmβ1 (Reverse) | TTTTGAATTTAAAATTAAAACATTTACTTT | Allelic replacement of *psm*β1 |
| Xylpsmβ2 | AAAGTAAATGTTTTAATTTTAAATTCAAAAAAACATATGCATTAAAAAGGCCTTTTCTAGA | Allelic replacement of *psm*β1 |
| Xylpsmβ2 (Reverse) | GGAGATTAATGTTGGGTATTGCGGCTGTTC | Allelic replacement of *psm*β1 |

## References


1. Vuong C, Gerke C, Somerville GA, Fischer ER, Otto M. Quorum-sensing control of biofilm factors in *Staphylococcus epidermidis*. J Infect Dis. 2003;188(5):706-18.
2. Centers for Disease C, Prevention. Outbreaks of community-associated methicillin-resistant *Staphylococcus aureus* skin infections--Los Angeles County, California, 2002-2003. MMWR Morb Mortal Wkly Rep. 2003;52(5):88.
3. Wang R, Braughton KR, Kretschmer D, Bach TH, Queck SY, Li M, et al. Identification of novel cytolytic peptides as key virulence determinants for community-associated MRSA. Nat Med. 2007;13(12):1510-4.
4. Gotz F, Zabielski J, Philipson L, Lindberg M. DNA homology between the arsenate resistance plasmid pSX267 from *Staphylococcus xylosus* and the penicillinase plasmid pI258 from *Staphylococcus aureus*. Plasmid. 1983;9(2):126-37.
5. Schleifer KH, Fischer U. Description of a New Species of the Genus *Staphylococcus* - *Staphylococcus carnosus*. Int J Syst Bacteriol. 1982;32(2):153-6.
6. Winstel V, Xia G, Peschel A. Pathways and roles of wall teichoic acid glycosylation in *Staphylococcus aureus*. Int J Med Microbiol. 2014;304(3-4):215-21.