Table S1. Bacterial strains and plasmids

Strains and plasmids	Description	Reference
Escherichia coli		
DH5α	F-φ80dlacZ Δ(lacZYA-argF) U169 deoRsupE44ΔlacU169 (f80lacZDM15) hsdR17 recA1 endA1 (rk- mk+) supE44gyrA96 thi-1 gyrA69 relA1	(7)
BL21(DE3)*plysS*	F- ompT hsdS gal (rb- mb+) DE3(Sam7 Δnin5 lacUV5-T7 Gen1)	(7)
BL21(DE3)*plysS* pET11b-*gbaA*	For overexpression of His-tagged GbaA	This study
BL21(DE3)*plysS* pET11b-*gbaAC55S*	For overexpression of His-tagged GbaAC55S	This study
BL21(DE3)*plysS* pET11b-*gbaAC104S*	For overexpression of His-tagged GbaAC104S	This study
Staphylococcus aureus		
RN4220	restriction negative strain/MSSA cloning intermediate derived from 8325-4	(3)
COL	Archaic HA-MRSA strain	(6)
COL-Δ*gbaA*	COL *gbaA* deletion mutant	This study
COL-Δ*gbaB*	COL *gbaB* deletion mutant	This study
COL-Δ*gbaA*-pRB473-*gbaA*		This study
COL-Δ*gbaA*-pRB473-*gbaAC55S*		This study
COL-Δ*gbaA*-pRB473-*gbaAC104S*		This study
COL-Δ*gbaB*-pRB473-*gbaB*		This study
COL-Δ*SACOL2590-92*	COL *SACOL2590-92* deletion mutant	This study
Staphylococcus phage 81		(5)
pET11b	*E. coli* expression plasmid	Novagen
pRB473	pRB373-derivative, *E. coli/ S. aureus* shuttle vector, Amp^r, Cm^r	(1)
pRB473-XylR	pRB373-derivative, *E. coli/ S. aureus* shuttle vector, containing xylose-inducible P_{Xyl} promoter Amp^r, Cm^r	(4)
pET11b-*gbaA*	pET11b-derivative for overexpression of His-tagged GbaA	This study
pET11b- *gbaAC55S*	pET11b-derivative for overexpression of His-tagged GbaAC55S	This study
pET11b- *gbaAC104S*	pET11b-derivative for overexpression of His-tagged GbaAC104S	This study
pMAD-*gbaA* deletion	pMAD with up- and downstream region of *gbaA*	This study
pMAD-*gbaB* deletion	pMAD up- and downstream region of *gbaB*	This study
pMAD-*SACOL2590-92* deletion	pMAD with upstream region of *SACOL2592 and* downstream region of *SACOL2590*	This study
pRB473-XylR- *gbaA*	pRB473-derivative expressing *gbaA-His* under P_{Xyl}	This study
pRB473-XylR- *gbaAC55S*	pRB473-derivative expressing *gbaAC55S-His* under P_{Xyl}	This study
pRB473-XylR- *gbaAC104S*	pRB473-derivative expressing *gbaAC104S-His* under P_{Xyl}	This study
pRB473-XylR- *gbaB*	pRB473-derivative expressing *gbaB* under P_{Xyl}	This study

Table S2. Oligonucleotide primers

Primer name	Sequence (5' to 3')
pET-gbaA-for-NheI	CTAGCTAGCATGCGAAAAGATGCAAAAGAGA
pET-gbaA-rev-BamHI	CGCGGATCCTTAGTGATGGTGATGGTGATG-GTCATTACGTCCCACCTCAT
gbaAC55S-for	GATAAAAGCGATTTA**TCT**TACTACGTCATACAA
gbaAC55S-rev	TTGTATGACGTAGTA**AGA**TAAATCGCTTTTATC
gbaAC104S-for	AAGGCACTACTGCAA**TCT**ATTGAAGCAGGCAAC
gbaAC104S-rev	GTTGCCTGCTTCAAT**AGA**TTGCAGTAGTGCCTT
pMAD-gbaA-for-BglII	CGCAGATCTAACTGCATTACCTTGCTTCC
pMAD-gbaA-f1-rev	TAATTTCTGTACGCTTCAATTGTGCATCTTTTCGCATGATTACA
pMAD-gbaA-f2-for	TGTAATCATGCGAAAAGATGCACAATTGAAGCGTACAGAAATTA
pMAD-gbaA-rev-SalI:	CCAGTCGACGCATTGTTACTGCCGATTTAG
pRB-gbaA-for-BamHI	TAGGGATCCGAATTTTAAGTAGGTGTAATCATGCGAAAAGATGC AAAAGAGA
pRB-gbaA-His-rev-KpnI	CTCGGTACCTTAGTGATGGTGATGGTGATGGTCATTACGTCCCA CCTCAT
pMAD-gbaB-for-BglII	CGCAGATCTCAAACTTTTTGATGAAGAAGGC
pMAD-gbaB-f1-rev	TCTCCATCGCCATTAATAAATGTCTGCACTTGCATAGCCTAA
pMAD-gbaB-f2-for	TTAGGCTATGCAAGTGCAGACATTTATTAATGGCGATGGAGA
pMAD-gbaB-rev-SalI	CCAGTCGACATCCTAAATCATTGATGCAACG
pRB-gbaB-for-BamHI	TAGGGATCCATTTAGATGAGGTGGGACGTA
pRB-gbaB-rev-KpnI	CTCGGTACCCTACCAAGGCATCTCTCCAT
pMAD-SACOL2590-92-for-BglII	CGCAGATCTTTCTTGATAAAATGCGCTTTGG
pMAD- SACOL2590-92-f1-rev	GAGAATTTCATTTTAGCAGACCATAAGGTAGATGCTTCGAAATG
pMAD- SACOL2590-92-f2-for	CATTTCGAAGCATCTACCTTATGGTCTGCTAAAATGAAATTCTC
pMAD- SACOL2590-92-rev-SalI	CCAGTCGACATCAACACTTGATTCTAAGGAG
Emsa-gbaA-for	TATCAACACTCTTTTCTTTTATG
Emsa-gbaA-rev	TCTTTTGCATCTTTTCGCATGA
NB-gbaB-for	TCACAGGAGGCAATAAAGGGT
NB-gbaB-rev	CTAATACGACTCACTATAGGGAGAATTTGTAGCGCCTGGATCAG
NB-SACOL2590-for	GCAAGATTTAGAAAAGAGCGCA
NB-SACOL2590-rev	CTAATACGACTCACTATAGGGAGAACCCTTGGCTTACTGTTGGT

Restriction sites are underlined and bold bases indicate point mutations.

Supplementary References

1. Brückner R, Wagner E, Götz F. Characterization of a sucrase gene from *Staphylococcus xylosus*. *J Bacteriol* 175: 851-7, 1993.
3. Kreiswirth BN, Lofdahl S, Betley MJ, O'Reilly M, Schlievert PM, Bergdoll MS, Novick RP. The toxic shock syndrome exotoxin structural gene is not detectably transmitted by a prophage. *Nature* 305: 709-12, 1983.
4. Pöther DC, Gierok P, Harms M, Mostertz J, Hochgrafe F, Antelmann H, Hamilton CJ, Borovok I, Lalk M, Aharonowitz Y, Hecker M. Distribution and infection-related functions of bacillithiol in *Staphylococcus aureus*. *Int J Med Microbiol* 303: 114-23, 2013.
5. Rosenblum ED, Tyrone S. Serology, density, and morphology of staphylococcal phages. *J Bacteriol* 88: 1737-42, 1964.
6. Shafer WM, Iandolo JJ. Genetics of staphylococcal enterotoxin B in methicillin-resistant isolates of *Staphylococcus aureus*. *Infect Immun* 25: 902-11, 1979.
7. Studier FW, Moffatt BA. Use of bacteriophage-T7 RNA-polymerase to direct selective high-level expression of cloned genes. *J Mol Biol* 189: 113-130, 1986.