

SUPPLEMENTARY INFORMATION

Supplementary Table 1 | SaPIbov1 complementation analysis.

Strain	Phage	Plasmid expressing	No CdCl ₂		5 μM CdCl ₂	
			SaPIbov1 titre ^a	Phage titre ^b	SaPIbov1 titre ^a	Phage titre ^b
JP1794	φ11	-	2.0 × 10 ⁷	6.4 × 10 ⁷	1.0 × 10 ⁷	6.6 × 10 ⁶
JP4125	φ11 Δ <i>dut</i>	-	200	1.1 × 10 ⁹	120	1.4 × 10 ⁹
JP6789	φ11 Δ <i>dut</i>	<i>dut</i> φ11	2.4 × 10 ⁶	5.1 × 10 ⁷	3.4 × 10 ⁷	1.4 × 10 ⁷
JP6790	φ11 Δ <i>dut</i>	<i>dut</i> φ11 D81A	1.2 × 10 ⁷	8.2 × 10 ⁷	5.6 × 10 ⁷	9.5 × 10 ⁶
JP6797	φ11 Δ <i>dut</i>	<i>dut</i> 80α	550	1.7 × 10 ⁸	2.3 × 10 ⁷	5.6 × 10 ⁸
JP6791	φ11 Δ <i>dut</i>	<i>dut</i> PH15	230	4.0 × 10 ⁸	110	1.9 × 10 ⁹
JP6796	φ11 Δ <i>dut</i>	<i>dut</i> φ11 ^{fs}	300	1.6 × 10 ⁹	70	2.3 × 10 ⁹
JP6794	φ11 Δ <i>dut</i>	<i>dut</i> 80α K8R, K12E	110	9.1 × 10 ⁸	2.2 × 10 ⁷	4.9 × 10 ⁸
JP6800	φ11 Δ <i>dut</i>	<i>dut</i> 80α K12E	70	2.9 × 10 ⁹	2.1 × 10 ⁷	8.9 × 10 ⁸
JP6793	φ11 Δ <i>dut</i>	<i>dut</i> 80α K8R	140	9.0 × 10 ⁸	2.4 × 10 ⁷	8.2 × 10 ⁸
JP6795	φ11 Δ <i>dut</i>	<i>dut</i> φ11 R8K, E12K	1.3 × 10 ⁶	1.0 × 10 ⁷	4.5 × 10 ⁷	6.5 × 10 ⁶
JP6798	φ11 Δ <i>dut</i>	<i>dut</i> φ11 R8K	2.0 × 10 ⁶	3.3 × 10 ⁷	3.3 × 10 ⁷	6.7 × 10 ⁶
JP6799	φ11 Δ <i>dut</i>	<i>dut</i> φ11 E12K	1.9 × 10 ⁶	8.1 × 10 ⁷	7.4 × 10 ⁷	1.3 × 10 ⁶
JP3603	80α	-	4.0 × 10 ⁷	3.1 × 10 ⁸	3.5 × 10 ⁷	1.9 × 10 ⁸
JP6132	80α Δ <i>dut</i>	-	140	5.2 × 10 ¹⁰	120	8.2 × 10 ⁹
JP6881	80α Δ <i>dut</i>	<i>dut</i> 80α	520	4.8 × 10 ¹⁰	1.8 × 10 ⁷	1.3 × 10 ⁸
JP6879	80α Δ <i>dut</i>	<i>dut</i> 80α D95E	220	2.1 × 10 ¹⁰	180	1.3 × 10 ¹⁰

^aNo. transductants x ml of induced culture, using RN4220 as recipient strain.

^bNo. plaques x ml of induced culture, using RN4220 as recipient strain.

Supplementary Table 2 | SaPIbov2 complementation analysis.

Strain	Prophage	Plasmid	Induction ^a	SaPIbov2 titre ^b
JP6764	80 α	-		1.7 x 10 ⁷
JP6215	80 α Δ ORF15	-		5.4 x 10 ²
JP6765	80 α Δ ORF15	ORF15 80 α	+	5.5 x 10 ⁴
JP6765	80 α Δ ORF15	ORF15 80 α	+++ ^a	2.7 x 10 ⁶
JP6766	80 α Δ ORF15	ORF73 phi85	+	2.2 x 10 ²
JP6766	80 α Δ ORF15	ORF73 phi85	+++ ^a	8.3 x 10 ⁵
JP2131	ϕ 11	-		50
JP6767	ϕ 11	ORF15 80 α	+	1.4 x 10 ⁶
JP6767	ϕ 11	ORF15 80 α	+++ ^a	6.5 x 10 ⁶
JP6768	ϕ 11	ORF73 phi85	+	6.1 x 10 ²
JP6768	ϕ 11	ORF73 phi85	+++ ^a	7.0 x 10 ⁵

^a+: basal induction (without CdCl₂); +++: using 5 μ M CdCl₂ as inducer

^bNo. transductants x ml of induced culture, using RN4220 as recipient strain.

Supplementary Table 3 | dUTPase activity.

Phage	Protein ^a	Activity ^b
ϕ 11	wt	0.057
ϕ 11	D81A	0
80 α	wt	0.033
80 α	D95E	0.024
PH15	wt	0.044

^aHis(6)-Dut protein purified from JP4560 (ϕ 11 WT), JP4559 (ϕ 11 D81A), JP5359 (80 α WT), JP5358 (80 α D95E), JP5527 (PH15)

^bMeasured as Δ OD₃₆₀/min, using 0.1 μ g of purified protein. Variation was within \pm 5% in all cases.

Supplementary Table 4 | Strains and plasmids used in this study.

Strains	Description	Reference
RN4220	Restriction-defective deriviate of RN450	16
RN450	NCTC8325 cured of ϕ 11, ϕ 12 and ϕ 13	17
RN981	RN450 <i>recA</i> -mutant	18
BL21(DE3)	<i>E. coli</i> expression strain	Stratagene
RN451	RN450 ϕ 11	17
RN10359	RN450 80 α	19
JP4025	RN451 Δ <i>dut</i>	This work
JP6032	RN10359 Δ <i>dut</i>	This work
JP6022	RN10359 Δ <i>sri</i>	This work
JP6015	RN10359 Δ ORF15	This work
JP1794	RN451 SaPIbov1 <i>tst::tetM</i>	This work
JP2131	RN451 SaPIbov2 <i>bap::tetM</i>	20
JP4125	RN451 Δ <i>dut</i> SaPIbov1 <i>tst::tetM</i>	This work
JP3603	RN10359 SaPIbov1 <i>tst::tetM</i>	This work
JP6132	RN10359 Δ <i>dut</i> SaPIbov1 <i>tst::tetM</i>	This work
JP6879	JP6132 pJP685	This work
JP6881	JP6132 pJP919	This work
JP6122	RN10359 Δ <i>sri</i> SaPIbov1 <i>tst::tetM</i>	This work
JP6115	RN10359 Δ ORF15 SaPIbov1 <i>tst::tetM</i>	This work
JP6764	RN10359 SaPIbov2 <i>bap::tetM</i>	This work
JP6232	RN10359 Δ <i>dut</i> SaPIbov2 <i>bap::tetM</i>	This work
JP6222	RN10359 Δ <i>sri</i> SaPIbov2 <i>bap::tetM</i>	This work
JP6215	RN10359 Δ ORF15 SaPIbov2 <i>bap::tetM</i>	This work
JP3602	RN10359 SaPI1 <i>tst::tetM</i>	This work
JP6332	RN10359 Δ <i>dut</i> SaPI1 <i>tst::tetM</i>	This work
JP6322	RN10359 Δ <i>sri</i> SaPI1 <i>tst::tetM</i>	This work
JP6315	RN10359 Δ ORF15 SaPI1 <i>tst::tetM</i>	This work
JP6772	RN4220 SaPIbov1 <i>tst::tetM</i> Δ <i>stI</i>	This work
JP6773	RN981 SaPIbov1 <i>tst::tetM</i> pJP813	This work
JP5468	RN4220 pJP674 pJP653	This work
JP5469	RN4220 pJP674 pJP658	This work
JP6765	RN10359 Δ ORF15 SaPIbov2 <i>bap::tetM</i> pJP751	This work
JP6766	RN10359 Δ ORF15 SaPIbov2 <i>bap::tetM</i> pJP752	This work
JP6767	RN451 SaPIbov2 <i>bap::tetM</i> pJP751	This work
JP6768	RN451 SaPIbov2 <i>bap::tetM</i> pJP752	This work
JP6287	RN4220 SaPIbov2 <i>bap::tetM</i> pJP751	This work
JP6294	RN4220 SaPIbov2 <i>bap::tetM</i> pCN51 (empty)	This work
JP6760	BL21(DE3) pJP756	This work
JP6761	BL21(DE3) pJP757	This work

Strains	Description	Reference
JP6763	BL21(DE3) pJP758	This work
JP4560	BL21(DE3) pJP666	This work
JP4559	BL21(DE3) pJP667	This work
JP5357	BL21(DE3) pJP755	This work
JP5359	BL21(DE3) pJP753	This work
JP6762	BL21(DE3) pJP811	This work
JP5358	BL21(DE3) pJP754	This work
JP5527	BL21(DE3) pJP675	This work
JP6774	RN4220 Δ <i>spa</i> SaPI _{bov1} <i>tst::tetM</i>	This work
JP6789	JP6774 pJP813	This work
JP6790	JP6774 pJP814	This work
JP6791	JP6774 pJP815	This work
JP6793	JP6774 pJP817	This work
JP6794	JP6774 pJP818	This work
JP6795	JP6774 pJP819	This work
JP6796	JP6774 pJP820	This work
JP6797	JP6774 pJP821	This work
JP6798	JP6774 pJP822	This work
JP6799	JP6774 pJP823	This work
JP6800	JP6774 pJP824	This work
JP5332	JP4125 pJP661	This work
JP5333	JP4125 pJP766	This work
JP6833	JP4125 pJP813	This work
JP6834	JP4125 pJP814	This work
JP6835	JP4125 pJP815	This work
JP6836	JP4125 pJP817	This work
JP6837	JP4125 pJP818	This work
JP6838	JP4125 pJP819	This work
JP6839	JP4125 pJP820	This work
JP6840	JP4125 pJP821	This work
JP6841	JP4125 pJP822	This work
JP6842	JP4125 pJP823	This work
JP6843	JP4125 pJP824	This work

Plasmids	Description	Reference
pMAD	Vector for efficient allelic replacement	15
pCN51	Expression vector	9
pET28a	Expression vector	Novagen
pPROEX HTa	Expression vector	Invitrogen
pRN8298	Expression vector	9
pJP759	pMAD – $\Delta dut \phi 11$	This work
pJP760	pMAD – $\Delta dut 80\alpha$	This work
pJP762	pMAD – $\Delta sri 80\alpha$	This work
pJP763	pMAD – $\Delta Orf15 80\alpha$	This work
pJP653	pCN51 – $dut \phi 11$	This work
pJP658	pCN51 – $dut PH15$	This work
pJP751	pCN51 – Orf15 80 α	This work
pJP752	pCN51 – Orf73 $\phi 85$	This work
pJP766	pCN51- $dut \phi 11 \Delta$ central region	This work
pJP661	pCN51- $dut PH15$ central region $\phi 11$	This work
pJP919	pCN51- $dut 80\alpha$	This work
pJP685	pCN51- $dut 80\alpha D95E$	This work
pJP666	pET28a – $dut \phi 11$	This work
pJP667	pET28a – $dut_{D81A} \phi 11$	This work
pJP753	pET28a – $dut 80\alpha$	This work
pJP754	pET28a - $dut_{D95E} 80\alpha$	This work
pJP755	pET28a – $dut \phi 11 \Delta$ central region	This work
pJP675	pET28a – $dut PH15$	This work
pJP756	pPROEX HTa - His-Stl _{SaPIbov1} + $dut \phi 11$	This work
pJP757	pPROEX HTa - His-Stl _{SaPIbov1} + $dut \phi PH15$	This work
pJP758	pPROEX HTa - His-Orf15 + Stl _{SaPIbov2}	This work
pJP811	pPROEX HTa - $dut \phi 11$	This work
pJP674	pRN8298-clor-pInt-20-19-18blaZ	This work
pJP813	pCN51-3xflag- $dut \phi 11$	This work
pJP814	pCN51-3xflag- $dut \phi 11 D81A$	This work
pJP815	pCN51-3xflag- $dut \phi PH15$	This work
pJP817	pCN51-3xflag- $dut 80\alpha K8R$	This work
pJP818	pCN51-3xflag- $dut 80\alpha K8R, K12E$	This work
pJP819	pCN51-3xflag- $dut \phi 11 R8K, E12K$	This work
pJP820	pCN51-3xflag- $dut \phi 11$ frameshift 3 rd codon	This work
pJP821	pCN51-3xflag- $dut 80\alpha$	This work
pJP822	pCN51-3xflag- $dut \phi 11 R8K$	This work
pJP823	pCN51-3xflag- $dut \phi 11 E12K$	This work
pJP824	pCN51-3xflag- $dut 80\alpha K12E$	This work

Supplementary Table 5 | Oligonucleotides used in this study.

Plasmid	Oligonucleotides	Sequence (5'-3')
pJP653	Orf25phi11-4mS	ACGTGTCGACGAAATTGAGAATAGCGTTTGC
	Orf25phi11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
pJP658	PH15-1mB	CGCGGATCCGAGAATAGCGTTTGTACAGCTAGGGAGGA GCAGGAAAATGACTAAAGAACTAGAAATTTAA
	PH15-4cE	CCGGAATTCGTATTCTTTTAATCTCTGCTAC
pJP666	Orf25phi11-8mB	CGCGGATCCATGACTAACACATTACAAGTAAGG
	Orf25phi11-9cS	ACGCGTCCGACTTTTACACTCCGCTACTTCCG
pJP667	Orf25phi11-8mB	CGCGGATCCATGACTAACACATTACAAGTAAGG
	Orf25phi11-6m	GAAACAGGCAAGATAGCTGCAGGATATCACGGC
	Orf25phi11-7c	GCCGTGATATCCTGCAGCTATCTTGCCTGTTTC
	Orf25phi11-9cS	ACGCGTCCGACTTTTACACTCCGCTACTTCCG
pJP675	PH15-19mB	CGCGGATCCATGACTAAAGAACTAGAAATTTAA
	PH15-4cE	CCGGAATTCGTATTCTTTTAATCTCTGCTAC
pJP751	Orf15-80 α -7mB	CGCGGATCCTAATTAACCTTAGTCATGAGATGG
pJP752	Orf15-80 α -8cK	CGGGGTACCTTCAGTCATGTTCTACCTCC
pJP753	Orf32phi80 α -12mB	CGCGGATCCATGACTAACACATTACAAGTAAAC
pJP754	Orf32phi80 α -13cS	ACGCGTCCGACTCTTTTACACTCCGCTACTTCC
pJP755	Orf25phi11-8mB	CGCGGATCCATGACTAACACATTACAAGTAAGG
	Orf25phi11-23c	TTTTTCTACTGTAATATCTTTATCACCTATATTATCTGTGAT AATCCCTAAATTGCCGTGATATCC
	Orf25phi11-24m	ATCACAGATAATATAGGTGATAAAGATATTACAGTAGAAAA AGGAGACAAACTAGCTCAATTGGTT
	Orf25phi11-9cS	ACGCGTCCGACTTTTACACTCCGCTACTTCCG
pJP756	Orf25phi11-25mK	CGGGGTACCTTCACACAGGAAACAGACCATGACTAACAC ATTACAAGTAAGG
	Orf25phi11-26cH	CCCAAGCTTCTTGACTCGATCTAAGATGTC
	SaPIbov1-162mB	CGCGGATCCGATGGAAGGAGCTGGTCAAATGGC
	SaPIbov1-150cK	CGGGGTACCGATTAATTAGTGTCTTTTTCAAG
pJP757	PH15-8mK	CGGGGTACCTTCACACAGGAAACAGACCATGACTAAAGA ACTAGAAATTTAA
	PH15-9cH	CCCAAGCTTGTATTCTTTTAATCTCTGCTAC
	SaPIbov1-162mB	CGCGGATCCGATGGAAGGAGCTGGTCAAATGGC
	SaPIbov1-150cK	CGGGGTACCGATTAATTAGTGTCTTTTTCAAG
pJP758	Orf15-phi80 α -12mB	CGCGGATCCGATGAAGCAGACTGTAACCTTATC
	Orf15phi80 α -6cP	AACTGCAGTTCAGTCATGTTCTACCTCC
	SaPIbov2-orf22-5mP	AACTGCAGAATTCACACAGGAAACAGACCATGATTTTATG TACATTAATAAATTATATG
	SaPIbov2-orf22-6cH	CCCAAGCTTAAATAGTATGTATGAACTCTTAAG

Plasmid	Oligonucleotides	Sequence (5'-3')
pJP759	Orf-24- ϕ 11-1mB	CGCGGATCCTCAGGATAACGAACGAGTGCC
	Orf25- ϕ 11-1c	TTCTGATAATAGCCTTACTTG
	Orf25- ϕ 11-2m	CAAGTAAGGCTATTATCAGAATCAGAACGTGGAGAAAAAGGC
	Orf25- ϕ 11-3cE	CGGGAATTCCTTTAACCACCACTAAACACCC
pJP760	Orf32-80 α -3mB	CGCGGATCCATCGAGTTTAAAGAAGGAGCC
	Orf32-80 α -4c	CGTCTTATGATTTTCGTTCCGGG
	Orf32-80 α -5m	CCCGAACGAAATCATAAGACGCCTGAACTAAAGCAAGTGGAG
	Orf32-80 α -6cS	ACGCGTTCGACGCATCATTCTTAACATAGCCC
pJP762	Orf22-80 α -1mB	CGCGGATCCAGCAATAGAGTACGTACAAGG
	Orf22-80 α -2c	GTACATATCTGAACACTCAAG
	Orf22-80 α -3m	CTTGAGTGTTTTCAGATATGTACCTTGCAGAACGTACACACAG
	Orf21-80 α -4cE	CGGGAATTCCTCGACCATGATTTAAGTAATGG
pJP763	Orf15-80 α -1mB	CGCGGATCCTTATCACCTCCTTTCACTAGG
	Orf15-80 α -2c	TACAGTCTGCTTCATAGTGAC
	Orf15-80 α -3m	GTCATATGAAGCAGACTGTAATGTCTAAGCACAAAGCAATC
	Orf15-80 α -4cE	CGGGAATTCATTGTTTCTCCTCACTATCC
pJP766	Orf25- ϕ 11-4mS	ACGTGTCGACGAAATTGAGAATAGCGTTTGC
	Orf25- ϕ 11-23c	TTTTTCTACTGTAATATCTTTATCACCTATATTATCTGTGATAAT CCCTAAATTGCCGTGATATCC
	Orf25- ϕ 11-24m	ATCACAGATAATATAGGTGATAAAGATATTACAGTAGAAAAAG GAGACAACTAGCTCAATTGGTT
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
pJP661	PH15-1mB	CGCGGATCCGAGAATAGCGTTTGCTACAGCTAGGGAGGAGC AGGAAAATGACTAAAGAAGCTAGAAATTTAA
	PH15-2c	TGCAATAGCGTCATTCTTGATATTAATACCGATTTCTTTATTGT ATG
	Orf25- ϕ 11-22m	AATATCAAGAATGACGCTATTGCA
	PH15-4cE	CGGGAATTCGTATTCTTTAATCTCTGCTAC
pJP674	SaPIbov1-149cB	CGCGGATCCGATCAGTACCTAAATATGCG
	NY-24mK	CGGGGTACCCACTCGGTTATAACCTT
pJP813	Orf25- ϕ 11-35m	ATGGATTATAAAGATCACGATGGCGATTATAAAGATCACGATA TCGATTATAAAGATGATGATGATAAAATGACTAACACATTACA AGTAAGG
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
	Orf32-80 α -18mS	ACGCGTTCGACATTATGGCAGGTCAAGTTGTCTATAAATATGA GGAGGAATAGGAAAATGGATTATAAAGATCACGATGG
pJP814	Orf25- ϕ 11-35m	ATGGATTATAAAGATCACGATGGCGATTATAAAGATCACGATA TCGATTATAAAGATGATGATGATAAAATGACTAACACATTACA AGTAAGG
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
	Orf32-80 α -18mS	ACGCGTTCGACATTATGGCAGGTCAAGTTGTCTATAAATATGA GGAGGAATAGGAAAATGGATTATAAAGATCACGATGG

Plasmid	Oligonucleotides	Sequence (5'-3')
pJP815	PH15-10m	ATGGATTATAAAGATCACGATGGCGATTATAAAGATCACG ATATCGATTATAAAGATGATGATGATAAAATGACTAAAGAA CTAGAAATTA
	PH15-11cB	CGCGGATCCGTATTCTTTAATCTCTGCTAC
	Orf32-80 α -18mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCACGATGG
pJP817	Orf32-80 α -24m	GATGGCGATTATAAAGATCACGATATCGATTATAAAGATG ATGATGATAAAATGACTAACACATTACAAGTAAGGCTATTA TCAAAAATGCTAGAATGC
	Orf32-80 α -2cB	CGCGGATCCCTCACCAAACCTCCTTGACTC
	Orf32-80 α -23mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCAC GATGGCGATTATAAAGATCACG
pJP818	Orf32-80 α -22m	GATGGCGATTATAAAGATCACGATATCGATTATAAAGATG ATGATGATAAAATGACTAACACATTACAAGTAAGGCTATTA TCAGAAAATGCTAGAATGC
	Orf32-80 α -2cB	CGCGGATCCCTCACCAAACCTCCTTGACTC
	Orf32-80 α -23mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCACGATGGC GATTATAAAGATCACG
pJP819	Orf25- ϕ 11-43m	GATGGCGATTATAAAGATCACGATATCGATTATAAAGATG ATGATGATAAAATGACTAACACATTACAAGTAAACTATTA TCAAAAATGCTAGAATGC
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
	Orf32-80 α -23mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCACGATGGC GATTATAAAGATCACG
pJP820	Orf25- ϕ 11-49m	ATGGATTATAAAGATCACGATGGCGATTATAAAGATCACG ATATCGATTATAAAGATGATGATGATAAAATGACTACACAT TACAAGTAAGG
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
	Orf32-80 α -18mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCACGATGG
pJP821	Orf32-80 α -17m	ATGGATTATAAAGATCACGATGGCGATTATAAAGATCACG ATATCGATTATAAAGATGATGATGATAAAATGACTAACACA TTACAAGTAAAC
	Orf32-80 α -2cB	CGCGGATCCCTCACCAAACCTCCTTGACTC
	Orf32-80 α -18mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCACGATGG
pJP822	Orf25- ϕ 11-44m	GATGGCGATTATAAAGATCACGATATCGATTATAAAGATG ATGATGATAAA ATGACTAACACATTACAAGTAAACTATTATCAGAAAATGC TAGAATGC
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
	Orf32-80 α -23mS	ACGCGTCCGACATTATGGCAGGTCAAGTTGTCTATAAATAT GAGGAGGAATAGGAAAATGGATTATAAAGATCACGATGG CGATTATAAAGATCACG

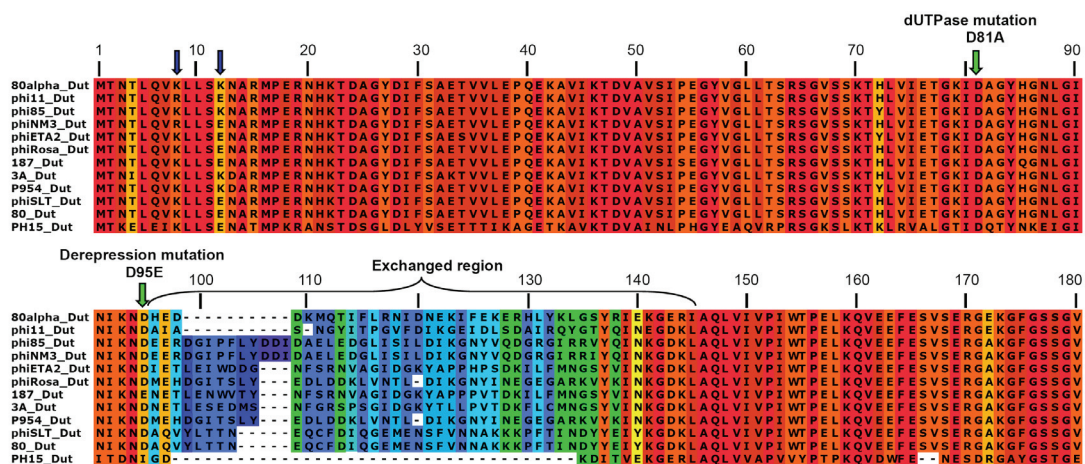
Plasmid	Oligonucleotides	Sequence (5'-3')
pJP823	Orf25- ϕ 11-45m	GATGGCGATTATAAAGATCACGATATCGATTATAAAGAT GATGATGATAAAATGACTAACACATTACAAGTAAGGCTA TTATCAAAAAATGCTAGAATGC
	Orf25- ϕ 11-5cB	CGCGGATCCCTTGACTCGATCTAAGATGTC
	Orf32-80 α -23mS	ACGCGT <u>CGAC</u> ATTATGGCAGGTCAAGTTGTCTATAAATA TGAGGAGGAATAGGAAAATGGATTATAAAGATCAC GATGGCGATTATAAAGATCACG
pJP824	Orf32-80 α -25m	GATGGCGATTATAAAGATCACGATATCGATTATAAAGAT GATGATGATAAAATGACTAACACATTACAAGTAAACTAT TATCAGAAAATGCTAGAATGC
	Orf32-80 α -2cB	CGCGGATCCTCACCAAAACCTCCTTGACTC
	Orf32-80 α -23mS	ACGCGT <u>CGAC</u> ATTATGGCAGGTCAAGTTGTCTATAAATA TGAGGAGGAATAGGAAAATGGATTATAAAGATCAC GATGGCGATTATAAAGATCACG
Probe	Oligonucleotides	Sequence (5'-3')
EMSA	19-20upbov2	ATTTCAACATTAAACATTGC
	19-20dwbov	TAAATCCTGTCCTTTCAC
SaPIbov1	SaPIbov1-112mE	CCGGA <u>ATTCA</u> ATTGCTGAGGCAAACTTC
	SaPIbov1-113cB	CGCGGATCC <u>TA</u> ATTCTCCACGTCTAAAGC
SaPIbov2	Sip-16mB	CGCGGATCCCAATCCAATCAAACGCATGCG
	Sip-10cE	CCGGA <u>ATTCT</u> TTTCAATGACTCTGTACGTT
ϕ11	Orf-24- ϕ 11-1mB	CGCGGATCC <u>TC</u> AGGATAACGAACGAGTGCC
	Orf25- ϕ 11-1c	TTCTGATAATAGCCTTACTTG

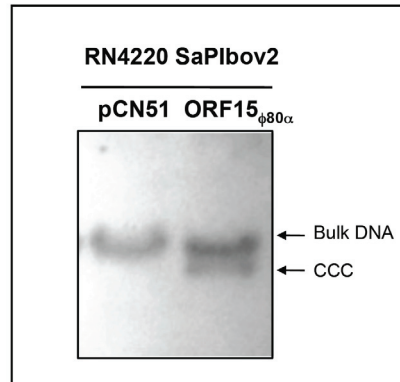
Sequences recognized by the restriction enzymes used in cloning are underlined.



Supplementary Figure 1 | SaPI StI sequence comparison.

Sequence alignment (A) and nearest neighbor tree (B) generated by ClustalW.





Supplementary Figure 3 | De-repression of SaPIbov2 replication by cloned ORF15.

Southern blot of lysates from a non-lysogenic derivative of RN4220 carrying SaPIbov2 and either vector alone (pCN51, lane 1; strain JP6294) or plasmid expressing ORF15_{φ80α} (lane 2; strain JP6287). Cultures were grown until OD₅₄₀=0.3 and 1 ml samples were collected and used to prepare standard minilysates, which were resolved on a 0.7% agarose gel, Southern blotted, and probed for SaPIbov2 *int*. CCC, covalently closed circular SaPIbov2, which migrates near to the bulk DNA as a consequence of its relatively large size (~28 kb).

```

ORF15  MKQTVTYLIKHKDENLFITNRPTEVNDTVKYSTDMDRAREFDGLDKTVIDMSKHKAIKKT 60
ORF73  MNQTVTYLIRHRDMPYITNKPTDNNSDVSYSTNRNRAREFNGMEEASINMDYHKAIKKT 60
      *:*:*:*:*:*:*:*  ::*:*:*:*: * . *.***: . *****:~::~: *:* . *****

ORF15  VTETIEYEEVEHD 73
ORF73  VTETIEYEEVEHD 73
      *****

```

Supplementary Figure 4 | Comparison of two SaPI_{bov2} inducer proteins: $\phi 80\alpha$

ORF15 and $\phi 85$ ORF73.

References

- ¹⁶ Kreiswirth, B.N. *et al.*, The toxic shock syndrome exotoxin structural gene is not detectably transmitted by a prophage. *Nature* 305 (5936), 709-712 (1983).
- ¹⁷ Novick, R., Properties of a cryptic high-frequency transducing phage in *Staphylococcus aureus*. *Virology* 33 (1), 155-166 (1967).
- ¹⁸ Wyman, L., Goering, R.V., & Novick, R.P., Genetic control of chromosomal and plasmid recombination in *Staphylococcus aureus*. *Genetics* 76 (4), 681-702 (1974).
- ¹⁹ Ubeda, C., Barry, P., Penades, J.R., & Novick, R.P., A pathogenicity island replicon in *Staphylococcus aureus* replicates as an unstable plasmid. *Proc Natl Acad Sci U S A* 104 (36), 14182-14188 (2007).
- ²⁰ Maiques, E. *et al.*, Role of staphylococcal phage and SaPI integrase in intra- and interspecies SaPI transfer. *J Bacteriol* 189 (15), 5608-5616 (2007).
- ²¹ Simossis, V.A., Kleinjung, J., & Heringa, J., Homology-extended sequence alignment. *Nucleic Acids Res* 33 (3), 816-824 (2005).