

Figure S1. Schematic representation of the relocation of the *V. cholerae* **SI from chromosome 2 to chromosome 1.** The relocation is based on the recombination of two bacteriophage attachment sites, named *attL* and *attR*. These sites are associated with fragments of a genetic marker that becomes reconstituted when they recombine (*bla* and *lacZ*), allowing for the selection of those clones where the SI has been relocated.



Figure S2. Schematic representation of the genetic region of the CTX Φ and RS1 Φ prophages in *V. cholerae* N16961. Our wild-type strain contains two copies of the RS1 Φ prophage that are composed of the *rstR*, *rstA*, *rstB*, and *rstC* genes. Only *rstR*, *rstA*, and *rstB* are present in the CTX Φ prophage genetic region.



Figure S3. Competition assays of the intermediate strains generated in the deletion of the SI. Relative fitness of *V. cholerae* WT, Δ SI, and intermediate Δ SI strains compared with *E. coli* DH5 α PcS::*gfp* was performed in LB by inoculating cells at a ratio of 1:1. Fitness values were determined from 6 independent experiments by flow cytometry. The p-values were calculated by comparing each measure with that of the WT strain using Dunnet's multiple comparison test. Ns: not significant.

Carbon sources



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Antimicrobial compounds



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Figure S4. Growth curves representation of *V. cholerae* WT compared to the Δ SI mutant in all Biolog Phenotype microarrays plates (PM1-20). The mean growth curve from two independent biological replicates of the WT strain is graphically overlaid with the mean growth curve of the mutant strain calculated from two independent replicates. If the Δ SI mutant has an impaired growth in comparison with the WT, the overlapped area in the corresponding well in the graph will be blue, whereas if the Δ SI mutant has a growth improvement in comparison with the WT, the overlapped area in the corresponding well will be red.



Figure S5. Growth curves of *V. cholerae* WT (blue) and Δ SI (red) strains in MH medium containing subinhibitory concentrations of norfloxacin, ceftriaxone, or tannic acid. Colored shading of the curves represents the standard deviation of at least three biological replicates.

Name	Genotype	Reference	Lab
			collection
8637	<i>V. cholerae</i> N16961 biovar El Tor, <i>hapR</i> + (Tn:: <i>hapR</i>) [StrepR] WT	Lab Collection, (1)	PGB
B805	8637 VC0018- <i>bla</i> 3'-attL _{HK} - <i>cat</i> -attR _λ <i>lacZ</i> -3'-VC0019	J. Bland, unpublished	PGB
B825	8637 VC0019- <i>bla</i> 3'-attL _{нк} - <i>cat</i> -attR _λ <i>lacZ</i> 3' -VC0018	J. Bland, unpublished	PGB
D282	8637 rplT-attR _{нк} - <i>bla5'-aph</i>	J. Garriss, unpublished	PGB
F854	B805 VC0018- <i>bla</i> 3'-attL _{HK} - <i>aadA7</i> -attR _λ <i>lacZ</i> 3'-VC0019	This study, replacement by natural transformation of the <i>cat</i> fragment of B805 by the <i>spec</i> fragment from pF849	PGB
F855	B825 VC0019- <i>bla</i> 3'-attL _{HK} - <i>aadA7</i> -attR _λ <i>lacZ</i> 3' - VC0018	This study, replacement by natural transformation of the <i>cat</i> fragment of B825 by the <i>spec</i> fragment from pF849	PGB
F875	F854 rplT-attR _{нк} -bla5'- aph-intlA	This study, insertion by natural transformation of the <i>aph</i> fragment from pF851	PGB
F876	F855 rplT-attR _{нк} -bla5'- aph-intlA	This study, insertion by natural transformation of the <i>aph</i> fragment from pF851	PGB
J060, J061, J183	F875 VCA0508- <i>ble-lacZ</i> 5'- attL _λ -VCA0510	(2), insertion by natural transformation of the <i>ble</i> fragment from pF912	PGB
J062, J063, J184	F876 VCA0508- <i>ble-lacZ</i> 5'- attL $_{\lambda}$ -VCA0510	(2), insertion by natural transformation of the <i>ble</i> fragment from pF912	PGB
J325, J327, J333	J060, J061 and J183 with pF930	(2), transformation of J060, J061 and J183 by pF930	PGB
J329, J331, J335	J062, J063 and J184 with pF930	(2), transformation of J062, J063 and J184 by pF930	PGB
J395, J399, J407	SCI relocated near ori1 (Chr1) betweenVC0018 and	(2), relocation by site-specific recombination of the SCI.	PGB

Table S1. Strains generated for the relocation of the superintegron

(SCI lag)	VC0019. <i>attCbs</i> carried by the lag strand template. From J329, J331, J335		
J387, J391, J403 (SCI lead)	SCI relocated near ori1 (Chr1) between VC0018 and VC0019. <i>attCbs</i> carried by the lead strand template. From J325, J327, J333	(2), relocation by site-specific recombination of the SCI.	PGB

PGB: Plasticité du Génome Bactérien Lab.

Name	Genotype	Primers LHR	Primers RHR	Reference	Lab collection
A400	ΔVCA300- 311. [Zeo ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 311 F – VCA 312 R	This study	MBA
A003	ΔVCA300- 320. [Cm ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 318 F – VCA 320 R	This study	MBA
A004	ΔVCA300- 325. [Carb ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 323 F – VCA 325 R	This study	MBA
A005	ΔVCA300- 332. [Zeo ^R]	VCA 299 F – LRHI VCA 300 R	LRHD + prom VCA 332 F – prom VCA 332 R VCA 333 F – VCA 334 R	This study	MBA
A006	ΔVCA300- 350. [Carb ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 348 F – VCA 350 R	This study	MBA
A007	ΔVCA300- 360. [Cm ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 359 F – VCA 360 R	This study	MBA
A009	ΔVCA300- 385. [Zeo ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 311 F – VCA 386 R	This study	MBA
A023	ΔVCA300- 391. [Carb ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 391 F – VCA 393 R	This study	MBA
A024	ΔVCA300-391 + VCA422- 444. [Carb ^R , Zeo ^R]	VCA 421 F – LRHI VCA 422 R	LRHD VCA 443 F – VCA 447 R	This study	MBA
A029	ΔVCA300- 470. [Cm ^R]	VCA 299 F – LRHI VCA 300 R	LRHD + prom VCA 469 F – prom VCA 469 R VCA 469 F – VCA 470 R	This study	MBA
A035	ΔVCA300-470 + VCA474- 483. [Cm ^R , Zeo ^R]	VCA 474 F – link AT/TA R / link AT/TA F – LRHI VCA 478 R	LRHD VCA 318 F – VCA 483 R	This study	MBA
A041	ΔVCA300- 483. [Carb ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 318 F – VCA 483 R	This study	MBA
A047	ΔVCA300-483 + ΔVCA495- 497. [Carb ^R , Cm ^R]	VCA 494 F – LRHI VCA 495 R	LRHD + prom VCA 497 F – prom VCA 497 R VCA 498 F – VCA 499-500 R	This study	MBA

Table S2. Strains generated with SeqDelTA

A054	ΔVCA300-483 + ΔVCA487- 505. [Carb ^R , Zeo ^R]	VCA 486 F – LRHI VCA 487 R	LRHD VCA 348 F – VCA 505 R	This study	MBA
A066	ΔVCA300- VCA505. [Zeo ^R]	VCA 299 F – LRHI VCA 300 R	LRHD VCA 348 F – VCA 505 R	This study	MBA

MBA: Molecular Basis of Adaptation Lab.

Name	Genotype	Reference	Lab Collection
A118	<i>E. coli</i> π3813, <i>ccdB</i> -resistant strain. (B410gyrA462zei::Tn10): <i>lacIQ</i> , <i>thi1</i> , <i>relA1</i> , <i>supE44</i> , <i>endA1</i> , <i>recA1</i> , <i>hsdR17</i> , <i>gyrA462</i> , <i>zei</i> 298::Tn10, Δ <i>thyA</i> ::(<i>erm-pir</i> 116) [Erm ^R].Cloning of R6K vectors.	(3)	MBA
A116	<i>E. coli</i> β3914, <i>ccdB</i> -resistant strain. <i>gyrA462</i> <i>zei298</i> ::Tn10 [Erm ^R , Km ^R , Tc ^R]. Conjugation of R6K vectors.	(3)	MBA
A097	<i>E. coli</i> β 3914 pMP7_ Δ <i>intlA attlA zeo^R</i>	This study	MBA
A631	<i>E. coli</i> π3813 pMP7- <i>rocS</i> ⁺	This study	MBA
A632	<i>E. coli</i> π3813 pMP7- <i>rpo</i> S ⁺	This study	MBA
A951	<i>E. coli</i> π3813 pMP7- <i>cry2</i> ⁺	This study	MBA
A633	<i>E. coli</i> β3914 pMP7- <i>rpoS</i> ⁺	This study	MBA
A634	<i>E. coli</i> β3914 pMP7- <i>rocS</i> ⁺	This study	MBA
A982	<i>E. coli</i> β3914 pMP7- <i>cry</i> 2 ⁺	This study	MBA
A001	<i>V. cholerae</i> N16961 biovar El Tor, <i>hapR</i> + (Tn:: <i>hapR</i>) [Strep ^R]. WT (same as 8637, but stock from MBA lab).	Lab Collection, (1)	MBA
A096	<i>V. cholerae</i> N16961 biovar El Tor <i>hapR</i> + (allele repaired <i>in situ</i>). WT	Lab Collection, (4)	MBA
A101	V. cholerae N16961 ΔSI	This study	MBA
A677	V. cholerae N16961 ΔSI rocS ⁺	This study	MBA
A684 B522	V. cholerae N16961 ΔSI rocS ⁺ rpoS ⁺ ; pMP7_rpoS ⁺ ΔSI V. cholerae N16961 ΔSI rocS ⁺ rpoS ⁺ cry2 ⁺ ; pMP7- _cry2 ⁺	This study This study	MBA MBA
B549	V. cholerae N16961 ΔVCA300-385 rocS ⁺	This study	MBA
B639	V. cholerae N16961 ΔVCA300-391 rocS ⁺	This study	MBA
B550	<i>V. cholerae</i> N16961 ΔVCA300-391 + VCA422-444 <i>rocS</i> ⁺	This study	MBA
B685	V. cholerae N16961 ΔVCA300-470 rocS ⁺	This study	MBA
A372	E. coli DH5α pSU38 P _c S::gfp	(5)	MBA
D318	<i>V. cholerae</i> N16961 ΔSI Δ <i>lacZ</i> kana ^R	Lab Collection	MBA

Table S3. Parental strains and strains generated with pMP7

MBA: Molecular Basis of Adaptation Lab.

Name	Plasmid description	Relevant properties and construction	Lab collection
pA298	pFLP3 ::aadA7	[Sp ^R] Val, unpublished	PGB
pJB6	$pSU38\Delta$::att R_{HK} -att L_{λ}	<i>ori</i> P15A, [Carb ^R] (6)	PGB
pA401	pSC101 <i>rep^{тs}:: int_{нк}-xis_{нк}</i>	<i>oripSC101rep^{TS} oriT</i> _{RP4} ; [Sp ^R] (Bland, unpublished)	PGB
pF850	pTOPO::VCA0508-ble- bla3'-attLHK-VCA0510	<i>ori</i> ColE1; [Km ^R] (2)	PGB
pF912	pTOPO-VCA0508- <i>ble- lacZ</i> 5'-attL _λ -VCA0510	Assembly of three fragments by PCR. Fragments were amplified from pF850 with o4659 and o4708 primers, from pJB6 with o4707 and o4669 and, from 8637 with o4670 and o4662.	PGB
pF851	рТОРО-rpIT-attR _{нк} -bla5'- aph-intlA	Assembly of three fragments by PCR. Fragments were amplified from 8637 with o4286 and o4672 primers, from D282 with o4671 and o4674 and, from 8637 with o4673 and o4302.	PGB
pF849	pTOPO- VC0018- bla3'attL _{HK} -aadA7-attR _λ lacZ3'-VC0019	Assembly of three fragments by PCR. Fragments were amplified from B805 with o4665 and o4666, from pA298 with o4663 and o4664 and, from B805 with o4668 and o4667.	PGB
pF930	pA401 ::Cm ^R	oripSC101rep ^{TS} ori T_{RP4} ; [Cm ^R] insertion of the Xhol/Kpnl digested cat fragment from pD060 in pA401.	PGB
pMP7	Suicide conjugative plasmid used for allelic exchange pSW23T- <i>araC</i> P _{BAD} - <i>ccdB</i>	<i>oriV</i> _{R6Kγ} , <i>oriT</i> _{RP4} ; [Cm ^R]. (7)	MBA
pMP7_Δ intIA attIA zeo ^R	pMP7-derivative used for performing the last deletion step of the superintegron (ΔVCA 291- 300)	<i>oriV</i> _{R6Ky} , <i>oriT</i> _{RP4} ; [Cm ^R]. It contains two 500-bp fragments corresponding to each side of the superintegron. Fragments were amplified from <i>V</i> . <i>cholerae</i> N16961 gDNA with primers RHI link pMP7 F and LRHI+D R for the LHR, and RHD F and RHD link pMP7 R for the RHR.	MBA
pMP7- rocS⁺	pMP7-derivative used for the correction of the <i>rocS</i> mutation	<i>oriV</i> _{R6Ky} , <i>oriT</i> _{RP4} ; [Cm ^R]. It contains a 1000-bp fragment of the <i>rocS</i> (VC0653) gene, amplified from <i>V</i> . <i>cholerae</i> N16961 gDNA with primers	MBA

Table S4. Plasmids used in this study

		<i>rocS_</i> pMP7 F and <i>rocS_</i> pMP7 R.	
pMP7- <i>rpoS</i> ⁺	pMP7-derivative used for the correction of the <i>rpoS</i> mutation	ori $V_{R6K\gamma}$, ori T_{RP4} ; [Cm ^R]. It contains a 1000-bp fragment of the <i>rpoS</i> (VC0534) gene, amplified from <i>V</i> . cholerae N16961 gDNA with primers <i>rpoS_</i> pMP7 F and <i>rpoS_</i> pMP7 R.	MBA
рМР7- <i>cry2</i> ⁺	pMP7-derivative used for the correction of the <i>cry2</i> mutation	ori $V_{R6K\gamma}$, ori T_{RP4} ; [Cm ^R]. It contains a 1000-bp fragment of the cry2 (VC01392) gene, amplified from V. cholerae N16961 gDNA with primers cry2_pMP7 F and cry2_pMP7 R.	MBA

PGB: Plasticité du Génome Bactérien Lab; MBA: Molecular Basis of Adaptation Lab.

Name	Sequence (5' \rightarrow 3')				
	Relocation of the superintegron				
4659	GAGTAAGTGTCGCTATCGAGGTGCTTCAGTCCTGCTCCTCGGCC				
4708	ACTTTTGGCGAAAATGAGACGTTGATATGCAATTGTCGGCACGT AAGAGG				
4707	CCTCTTACGTGCCGACAATTGCATATCAACGTCTCATTTTCGCCA AAAGT				
4669	CTTAGCCGACAATATCTGCCTATAAAATCAAATAATGATTTTATT TTGAC				
4670	GTCAAAATAAAATCATTATTTGATTTTATAGGCAGATATTGTCGG CTAAG				
4662	AGAAGTGCATGTTTCATCTCCCCCT				
4286	GCTGTAGCACGTATGCTTCC				
4672	ACTACTTAGATAGTATTAGTGACCTGGAATTCGTAATCATGGTCA TAGCT				
4671	AGCTATGACCATGATTACGAATTCCAGGTCACTAATACTATCTAA GTAGT				
4674	ATTATCCCGTCTTTAGCATGGGTTCCGATCTCGCAGCGGTGGTA AGCGCC				
4673	GGCGCTTACCACCGCTGCGAGATCGGAACCCATGCTAAAGACG GGATAAT				
4302	AAGGTAAGGGGGGTAAAAATCGCAC				
4665	GCCGGAAGGGCCGAGCGCAGAAGTG				
4666	TCTAACAATTCGTTCAAGCCGACGCGACAAATGATTTTATTTTGA CTAAT				
4663	ATTAGTCAAAATAAAATCATTTGTCGCGTCGGCTTGAACGAATT GTTAGA				
4664	GTGACCTGTAACAGAGCATTAGCGCCGAAACCTTGCGCTCGTTC GCCAGC				
4668	GATCACACTCGGGTGATTACGATCG				
4667	GCTGGCGAACGAGCGCAAGGTTTCGGCGCTAATGCTCTGTTACA GGTCAC				
SeqDelTA					
3083	TCTAGGGCGGCGGATTTGTC				
3327	TGCAATTGTCGGCACGTAAG				
VCA 299 F	GGGCGTTAGAGCTTTATTGG				
LRHI VCA 300 R	GACAAATCCGCCGCCCTAGAGAGCTTTATTTACTCGGACG				
LRHD VCA 311 F	CTTACGTGCCGACAATTGCAGGTAAACGCTCAATCAAAGG				
VCA 312 R	CTTTATTACGACAGCCATCGC				
LRHD VCA 318 F	CTTACGTGCCGACAATTGCATGAAACGGTTCCTATCGTGC				

Table S5. Primers used in this study

VCA 320 R	CTGCCAAATCAGCATCAAGC
LRHD VCA 323 F	CTTACGTGCCGACAATTGCACAATGATGTCTGAAATCGGC
VCA 325 R	ACCTATGAGCTGACCAATGC
LRHD + prom	CTTACGTGCCGACAATTGCAAAATATCACCTAACAAGCGC
VCA 332 F	
prom VCA 332 R	CTGAGATGATCCTGACAATACCGTGCTTTTCGAG
VCA 333 F	AAAAGCACGGTATTGTCAGGATCATCTCAGTTCGG
VCA 334 R	TCATTGACCTCATCAAGACC
LRHD VCA 348 F	CTTACGTGCCGACAATTGCAATTGAGAGATGCTTCTTCCC
VCA 350 R	GAAACCTTCAGATAGCCGTC
LRHD VCA 359 F	CTTACGTGCCGACAATTGCATCACGTAAATCGGCTTTGGC
VCA 360 R	TGACCCTGCTCATTTCTTGC
LRHD VCA 311 F	CTTACGTGCCGACAATTGCAGGTAAACGCTCAATCAAAGG
VCA 386 R	ATACGATGGACGCCATAAGC
LRHD VCA 391 F	CTTACGTGCCGACAATTGCAGACTTAAGAATTCCACCGGG
VCA 393 R	TCAAGGTTAAGTTGGCCACG
VCA 421 F	GGTGATGCGACTCAAAAAGC
LRHI VCA 422 R	GACAAATCCGCCGCCCTAGATTGTAACGCTAGAGGTGACC
LRHD VCA 443 F	CTTACGTGCCGACAATTGCATTGAACTGCTGTTGGAGTGG
VCA 447 R	ATCGAGGGAAACGCATAACC
LRHD + prom	CTTACGTGCCGACAATTGCAGCTCTTATCTGAACTAATTCTTGCC
VCA 469 F	
prom VCA 469 R	GCCGTAAATGGTTAGCAAATCACTGAGATATTCATCTCGG
VCA 469 F	CCGAGATGAATATCTCAGTGATTTGCTAACCATTTACGGC
VCA 470 R	TGGTATAGAAGTCCTGTGCC
VCA 474 F	GGGCGTTATAACCTAATGGG
link AT/TA R	GGTAGTTGTTTTTTGCGACAGCGGCCTTGGGAATATCAACGGC
link AT/TA F	GGAGCCGTTGATATTCCCAAGGCCGCTGTCGCAAAAAAAA
VCA 483 K	
LRHI VCA 495 K	
LKHD + prom	
VCA 490 F	
VCA 499-300 K	
LATIVEA 401 K	

VCA 505 R	CCTACACCGACAATGAAACC		
RHI link pMP7 F	TCTGCGAGGCTGGCCGGCGTCCGTCAGCTGCGTCCAAACG		
LRHI+D R	GCGACACTTACTCAAGCTGTCATGGGTTCTTTGCGAAATC		
RHD F	ACAGCTTGAGTAAGTGTCGC		
RHD link pMP7	TCAAGCTTATCGATACCGTCATTTGCTTTATGACTCGCGC		
R			
	Correction of mutations		
<i>rocS_</i> pMP7 F	CGATAAGCTTGATATCGAATTCCAGAAAAACCCTTGGTGTGC		
<i>rocS_</i> pMP7 R	CAGACAATTGACGGCTCTAGAATCAATCAGTTGAGGATTGC		
<i>rpoS_</i> pMP7 F	CGATAAGCTTGATATCGAATTCCGACGCGCAAGCACTTCTTT		
<i>rpoS_</i> pMP7 R	CAGACAATTGACGGCTCTAGAGTCAGCAATACCGTAACCA		
<i>сгу2_</i> рМР7 F	GATAAGCTTGATATCGAATTCGTGAATCATAAGCGCGGTT		
<i>cry2</i> _pMP7 R	CAGACAATTGACGGCTCTAGAAACTCGGTAATAGGCAGAA		
pMP7_bb_Gibso	TCTAGAGCCGTCAATTGTCTG		
n F			
pMP7_bb_Gibso	GAATTCGATATCAAGCTTATCG		
n R			
Natural transformation assay			
lacZ-FRT1	ATGCGCAACTTCTCCGATATTCTTCTTAGCC		
lacZ-FRT4	lacZ-FRT4 GAGATACCACTTATCGCCCGCCACCAACTCG		
	RT-qPCR		
gyrA_rt_F	GAGCCAAAGTTACCTTGGCC		
gyrA_rt_R	AATGTGCTGGGCAACGACTG		
aspA_rt_F	TCTGCGGCGAATGTAATGGT		
aspA_rt_R	TCCATCATGCCAGCGAAAGT		
dcuA_rt_F	TGAAATCGGTGAAGCGGTGA		
dcuA_rt_R	ACCGCATTTTCCACTTTGCC		
rimO_rt_F	TGATTGTGTACCGGATGCGG		
rimO_rt_R	TTAAAGTCTGGTCGTGCGCC		
rstA_rt_F	ATCTGGGCGCCTCTTCCTAA		
rstA_rt_R	CACCTCCAAGCGTTCCATCA		
rstC_rt_F	GTTCAGGCGCTTATACAGACGA		
rstC_rt_R	GTTGCGGATTTAGGCTTGGTG		
vc02680_rt_F	CAAAACCCAATCCCACTGCG		
vc02680_rt_R	CGTGGACTTGCAGAACTTTCG		
vca02766_rt_F	TCCGACGTTAGACAAGTGGC		
vca02766 rt R	CCTTTCATCACCGGAGCACT		

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