

Table S3. Essential gene comparisons.

Category	NCTC gene	Essential in Both*	Non essential in JE2 (have Tn insert)^	% of ORF if hit#	Gene Name	Putative Function
DNA metabolism						
DNA replication	SAOUHSC_00001	yes				
DNA replication	SAOUHSC_00002	yes				
DNA replication	SAOUHSC_00018	yes				
DNA replication	SAOUHSC_00349	yes				
DNA replication	SAOUHSC_00442	yes				
DNA replication	SAOUHSC_00454	yes				
DNA replication	SAOUHSC_01179	yes				
DNA replication	SAOUHSC_01241	yes				
DNA replication	SAOUHSC_01470	yes				
DNA replication	SAOUHSC_01663	yes				
DNA replication	SAOUHSC_01690	yes				
DNA replication	SAOUHSC_01791	yes				
DNA replication	SAOUHSC_01792	yes				
DNA replication	SAOUHSC_01811	yes				
DNA replication	SAOUHSC_02122	NO	SAUSA300_1885	98.70%	<i>ligA</i>	DNA ligase
DNA replication	SAOUHSC_02123	yes				
DNA packaging and segregation	SAOUHSC_00005	yes				
DNA packaging and segregation	SAOUHSC_00006	NO	SAUSA300_0006	98.90%	<i>gyrA</i>	DNA gyrase; A subunit
DNA packaging and segregation	SAOUHSC_01222	yes				
DNA packaging and segregation	SAOUHSC_01351	yes				
DNA packaging and segregation	SAOUHSC_01352	NO	SAUSA300_1251	94.70%	<i>parC</i>	DNA topoisomerase IV; subunit A
DNA packaging and segregation	SAOUHSC_01490	yes				
DNA packaging and segregation	SAOUHSC_01750	yes				
DNA packaging and segregation	SAOUHSC_01751	yes				
DNA packaging and segregation	SAOUHSC_01466	yes				
DNA packaging and segregation	SAOUHSC_01720	NO	SAUSA300_1573	78%		Conserved hypothetical protein
DNA packaging and segregation	SAOUHSC_02791	NO	SAUSA300_2432	52%		Hydrolase, MutT/nudix family
RNA metabolism						
Basic transcription machinery	SAOUHSC_00524	yes				
Basic transcription machinery	SAOUHSC_00525	yes				
Basic transcription machinery	SAOUHSC_01662	yes				

Basic transcription machinery	SAOUHSC_02485	yes				
RNA modification	SAOUHSC_01035	yes				
RNA modification	SAOUHSC_01209	yes				
RNA modification	SAOUHSC_01210	yes				
RNA modification	SAOUHSC_01252	yes				
RNA modification	SAOUHSC_01474	yes				
RNA modification	SAOUHSC_01598	yes				
RNA modification	SAOUHSC_01725	yes				
RNA modification	SAOUHSC_01726	yes				
RNA modification	SAOUHSC_03053	NO	SAUSA300_2646	35.90%		tRNA modification GTPase
RNA modification	SAOUHSC_03054	yes				
RNA regulation	SAOUHSC_00020	yes				
RNA regulation	SAOUHSC_00021	yes				
RNA regulation	SAOUHSC_01243	yes				
RNA regulation	SAOUHSC_01592	NO	SAUSA300_1448	1%		Transcriptional regulator, Fur family
RNA regulation	SAOUHSC_00620	NO	SAUSA300_0605	33%	<i>sarA</i>	Staphylococcal accessory regulator A
RNA regulation	SAOUHSC_00803	NO	SAUSA300_0764	2%		Ribonuclease R; putative
RNA regulation	SAOUHSC_00934	yes				
RNA regulation	SAOUHSC_01285	yes				
RNA regulation	SAOUHSC_01361	yes				
RNA regulation	SAOUHSC_01333	yes				
RNA regulation	SAOUHSC_01714	yes				
Protein synthesis						
Ribosomal proteins	SAOUHSC_00348	yes				
Ribosomal proteins	SAOUHSC_00350	yes				
Ribosomal proteins	SAOUHSC_00518	yes				
Ribosomal proteins	SAOUHSC_00519	yes				
Ribosomal proteins	SAOUHSC_00520	yes				
Ribosomal proteins	SAOUHSC_00521	yes				
Ribosomal proteins	SAOUHSC_00527	yes				
Ribosomal proteins	SAOUHSC_00528	yes				
Ribosomal proteins	SAOUHSC_01078	yes				
Ribosomal proteins	SAOUHSC_01191	yes				
Ribosomal proteins	SAOUHSC_01208	yes				
Ribosomal proteins	SAOUHSC_01211	yes				
Ribosomal proteins	SAOUHSC_01232	yes				
Ribosomal proteins	SAOUHSC_01250	yes				
Ribosomal proteins	SAOUHSC_01678	yes				
Ribosomal proteins	SAOUHSC_01755	yes				

Ribosomal proteins	SAOUHSC_01757	yes				
Ribosomal proteins	SAOUHSC_01784	yes				
Ribosomal proteins	SAOUHSC_01785	yes				
Ribosomal proteins	SAOUHSC_01829	yes				
Ribosomal proteins	SAOUHSC_02361	yes				
Ribosomal proteins	SAOUHSC_02477	yes				
Ribosomal proteins	SAOUHSC_02478	yes				
Ribosomal proteins	SAOUHSC_02484	yes				
Ribosomal proteins	SAOUHSC_02486	yes				
Ribosomal proteins	SAOUHSC_02487	yes				
Ribosomal proteins	SAOUHSC_02488	yes				
Ribosomal proteins	SAOUHSC_02492	yes				
Ribosomal proteins	SAOUHSC_02493	yes				
Ribosomal proteins	SAOUHSC_02494	yes				
Ribosomal proteins	SAOUHSC_02495	yes				
Ribosomal proteins	SAOUHSC_02496	yes				
Ribosomal proteins	SAOUHSC_02498	yes				
Ribosomal proteins	SAOUHSC_02499	yes				
Ribosomal proteins	SAOUHSC_02500	yes				
Ribosomal proteins	SAOUHSC_02501	yes				
Ribosomal proteins	SAOUHSC_02502	yes				
Ribosomal proteins	SAOUHSC_02503	yes				
Ribosomal proteins	SAOUHSC_02504	yes				
Ribosomal proteins	SAOUHSC_02505	yes				
Ribosomal proteins	SAOUHSC_02506	yes				
Ribosomal proteins	SAOUHSC_02507	yes				
Ribosomal proteins	SAOUHSC_02508	yes				
Ribosomal proteins	SAOUHSC_02509	yes				
Ribosomal proteins	SAOUHSC_02510	yes				
Ribosomal proteins	SAOUHSC_02511	yes				
Ribosomal proteins	SAOUHSC_02512	yes				
Ribosomal proteins	SAOUHSC_03055	yes				
Ribosomal proteins	SAOUHSC_00474	yes				
tRNA synthetase	SAOUHSC_00009	yes				
tRNA synthetase	SAOUHSC_00461	yes				
tRNA synthetase	SAOUHSC_00493	yes				
tRNA synthetase	SAOUHSC_00509	NO	SAUSA300_0513	99.70%		Glutamyl-tRNA synthetase
tRNA synthetase	SAOUHSC_00511	NO	SAUSA300_0551	98%		Putative GTP cyclohydrolase
tRNA synthetase	SAOUHSC_00611	yes				
tRNA synthetase	SAOUHSC_00933	yes				
tRNA synthetase	SAOUHSC_01092	yes				
tRNA synthetase	SAOUHSC_01093	yes				
tRNA synthetase	SAOUHSC_01159	yes				
tRNA synthetase	SAOUHSC_01240	yes				

tRNA synthetase	SAOUHSC_01666	yes				
tRNA synthetase	SAOUHSC_01722	yes				
tRNA synthetase	SAOUHSC_01737	yes				
tRNA synthetase	SAOUHSC_01738	yes				
tRNA synthetase	SAOUHSC_01767	yes				
tRNA synthetase	SAOUHSC_01788	NO	SAUSA300_1629	98%		Threonyl-tRNA synthetase
tRNA synthetase	SAOUHSC_01839	yes				
tRNA synthetase	SAOUHSC_01875	yes				
tRNA synthetase	SAOUHSC_02116	yes				
tRNA synthetase	SAOUHSC_02117	yes				
tRNA synthetase	SAOUHSC_02118	yes				
tRNA Ile modification	SAOUHSC_00484	yes				
tRNA met modification	SAOUHSC_01183	yes				
Translation factors	SAOUHSC_00475	yes				
Translation factors	SAOUHSC_00529	yes				
Translation factors	SAOUHSC_00530	yes				
Translation factors	SAOUHSC_00771	yes				
Translation factors	SAOUHSC_01234	yes				
Translation factors	SAOUHSC_01236	yes				
Translation factors	SAOUHSC_01246	yes				
Translation factors	SAOUHSC_01625	yes				
Translation factors	SAOUHSC_01741	yes				
Translation factors	SAOUHSC_01786	yes				
Translation factors	SAOUHSC_02359	yes				
Translation factors	SAOUHSC_02489	yes				
Translation factors	SAOUHSC_00804	yes				
Protein folding	SAOUHSC_01682	yes				
Protein folding	SAOUHSC_01683	yes				
Protein folding	SAOUHSC_01684	yes				
Protein folding	SAOUHSC_02254	yes				
Protein folding	SAOUHSC_02255	yes				
Protein modification	SAOUHSC_00790	NO	SAUSA300_0752	10%		ATP-dependent Clp protease, proteolytic subunit ClpP
Protein modification	SAOUHSC_02102	yes				
Protein modification	SAOUHSC_01038	yes				
Protein translocation	SAOUHSC_00516	yes				
Protein translocation	SAOUHSC_00769	yes				
Protein translocation	SAOUHSC_00903	yes				
Protein translocation	SAOUHSC_01205	yes				
Protein translocation	SAOUHSC_01207	yes				

Protein translocation	SAOUHSC_01746	yes				
Protein translocation	SAOUHSC_02327	yes				
Protein translocation	SAOUHSC_02491	yes				
Cell envelope/Cell wall and associated proteins						
Lipids	SAOUHSC_00920	yes				
Lipids	SAOUHSC_00921	yes				
Lipids	SAOUHSC_00947	yes				
Lipids	SAOUHSC_01197	yes				
Lipids	SAOUHSC_01198	yes				
Lipids	SAOUHSC_01199	yes				
Lipids	SAOUHSC_01201	yes				
Lipids	SAOUHSC_01473	yes				
Lipids	SAOUHSC_01623	yes				
Lipids	SAOUHSC_01624	yes				
Lipids	SAOUHSC_01808	NO	SAUSA300_1646	99.50%		Acetyl-CoA carboxylase, carboxyl transferase, alpha subunit
Lipids	SAOUHSC_01809	yes				
Lipids	SAOUHSC_02306	yes				
Lipids	SAOUHSC_02336	yes				
Lipids	SAOUHSC_00881	NO	SAUSA300_0847	19%		Conserved hypothetical protein
Phospholipids	SAOUHSC_01238	yes				
Phospholipids	SAOUHSC_01260	yes				
Phospholipids	SAOUHSC_01837	yes				
Phospholipids	SAOUHSC_02114	NO	SAUSA300_1879	92.90%		Conserved hypothetical protein
Cell wall/amino sugar	SAOUHSC_02399	yes				
Cell wall/amino sugar	SAOUHSC_02405	NO	SAUSA300_2111	99%		Phosphoglucosamine mutase
Peptidoglycan biosynthesis	SAOUHSC_00752	yes				
Peptidoglycan biosynthesis	SAOUHSC_00954	yes				
Peptidoglycan biosynthesis	SAOUHSC_01106	yes				
Peptidoglycan biosynthesis	SAOUHSC_01146	yes				
Peptidoglycan biosynthesis	SAOUHSC_01147	yes				
Peptidoglycan biosynthesis	SAOUHSC_01237	yes				
Peptidoglycan biosynthesis	SAOUHSC_01424	yes				

Peptidoglycan biosynthesis	SAOUHSC_01467	yes				
Peptidoglycan biosynthesis	SAOUHSC_01739	NO	SAUSA300_1588	44.60%		N-acetylmuramoyl-L-alanine amidase
Peptidoglycan biosynthesis	SAOUHSC_01856	yes				
Peptidoglycan biosynthesis	SAOUHSC_02107	yes				
Peptidoglycan biosynthesis	SAOUHSC_02317	yes				
Peptidoglycan biosynthesis	SAOUHSC_02318	yes				
Peptidoglycan biosynthesis	SAOUHSC_02337	NO	SAUSA300_2055	47%		UDP-N-acetylglucosamine 1-carboxyvinyltransferase 1
Peptidoglycan biosynthesis	SAOUHSC_02527	yes				
Peptidoglycan biosynthesis	SAOUHSC_01373	yes				
Peptidoglycan biosynthesis	SAOUHSC_01374	yes				
Teichoic acid biosynthesis	SAOUHSC_00223	yes				
Teichoic acid biosynthesis	SAOUHSC_00227	yes				
Teichoic acid biosynthesis	SAOUHSC_00640	yes				
Teichoic acid biosynthesis	SAOUHSC_00641	yes				
Teichoic acid biosynthesis	SAOUHSC_00642	yes				
Teichoic acid biosynthesis	SAOUHSC_00643	NO	SAUSA300_0626	40%		Teichoic acid biosynthesis protein B
Teichoic acid biosynthesis	SAOUHSC_00645	yes				
Teichoic acid biosynthesis	SAOUHSC_00762	NO	SAUSA300_0731	97%		Glycosyl transferase
Teichoic acid biosynthesis	SAOUHSC_00869	yes				
Teichoic acid biosynthesis	SAOUHSC_00870	yes				
Teichoic acid biosynthesis	SAOUHSC_00871	yes				
Teichoic acid biosynthesis	SAOUHSC_00872	yes				
Cell division	SAOUHSC_00482	yes				
Cell division	SAOUHSC_01144	yes				
Cell division	SAOUHSC_01154	yes				
Cell division	SAOUHSC_01149	yes				
Cell division	SAOUHSC_01150	yes				
Cell division	SAOUHSC_01827	yes				
Cell division	SAOUHSC_03049	NO	SAUSA300_2643	9%		Putative chromosome partitioning protein
Cell division	SAOUHSC_01148	yes				
Cell division	SAOUHSC_01462	NO	SAUSA300_1337	80%		Conserved hypothetical protein

Cell division	SAOUHSC_01063	NO	SAUSA300_1013	98.60%		Cell division protein
Cell division	SAOUHSC_01145	yes				
Cell division	SAOUHSC_03052	NO	SAUSA300_2645	97%		Glucose-inhibited division protein A
Cell envelope - other	SAOUHSC_00998	NO	SAUSA300_0959	18%		Fmt protein, putative
Cell envelope - other	SAOUHSC_01359	NO	SAUSA300_1255	46%		Oxacillin resistance-related FmtC protein
Cell envelope - other	SAOUHSC_01501	NO	SAUSA300_1370	90%		Cell surface elastin binding protein
Carbon metabolism						
Glycolysis	SAOUHSC_00472	yes				
Glycolysis	SAOUHSC_00796	yes				
Glycolysis	SAOUHSC_00797	yes				
Glycolysis	SAOUHSC_00798	NO	SAUSA300_0759	61%		2,3-bisphosphoglycerate-independent phosphoglycerate mutase
Glycolysis	SAOUHSC_00799	yes				
Glycolysis	SAOUHSC_00900	yes				
Glycolysis	SAOUHSC_01337	yes				
Glycolysis	SAOUHSC_01806	NO	SAUSA300_1644	48%	<i>pyk</i>	Pyruvate kinase
Glycolysis	SAOUHSC_01807	NO	SAUSA300_1645	99%	<i>pfkA</i>	6-phosphofructokinase
Glycolysis	SAOUHSC_02366	NO	SAUSA300_2079	0.25%		Fructose bisphosphate aldolase
Glycolysis	SAOUHSC_00795	NO	SAUSA300_0756	98%	<i>gap</i>	glyceraldehyde-3-phosphate dehydrogenase, type I
Pentose phosphate	SAOUHSC_01189	yes				
Pentose phosphate	SAOUHSC_01599	yes				
Pentose phosphate	SAOUHSC_01605	yes				
Pentose phosphate	SAOUHSC_02612	NO	SAUSA300_2283	94%		
Intermediary metabolism	SAOUHSC_01216	NO	SAUSA300_1138	24%		Succinyl-CoA synthetase, beta subunit
Intermediary metabolism	SAOUHSC_01287	yes				
Intermediary metabolism	SAOUHSC_00788	yes				
Regulation	SAOUHSC_00781	yes				
Regulation	SAOUHSC_01028	yes				
Respiratory						

pathways						
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_00225	yes				
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_00336	NO	SAUSA300_0355	34%		Acetyl-CoA acetyltransferase
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_00577	yes				
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_00578	yes				
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_00579	yes				
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_02623	NO	SAUSA300_2292	99%		Isopentenyl-diphosphate delta-isomerase
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_02859	yes				
Isoprenoid/Mevalonate biosynthesis	SAOUHSC_02860	yes				
Menaquinone biosynthesis	SAOUHSC_00980	yes				
Thioredoxin	SAOUHSC_00785	yes				
Thioredoxin	SAOUHSC_01100	yes				
Nucleotides						
Purine biosynthesis	SAOUHSC_00375	yes				
Purine biosynthesis	SAOUHSC_01176	yes				
Purine biosynthesis	SAOUHSC_02490	yes				
Purine metabolism	SAOUHSC_01742	NO	SAUSA300_1590	77%		GTP pyrophosphokinase
Purine/Pyrimidine biosynthesis	SAOUHSC_00741	yes				
Purine/Pyrimidine biosynthesis	SAOUHSC_00742	yes				
Purine/Pyrimidine biosynthesis	SAOUHSC_00743	yes				
Pyrimidine biosynthesis	SAOUHSC_00451	yes				
Pyrimidine biosynthesis	SAOUHSC_01235	yes				
Pyrimidine biosynthesis	SAOUHSC_01435	yes				
Pyrimidine biosynthesis	SAOUHSC_01496	yes				
Pyrimidine biosynthesis	SAOUHSC_02368	yes				

Cofactors						
Acetyl CoA/CoA	SAOUHSC_00574	yes				
Acetyl CoA/CoA	SAOUHSC_01075	yes				
Acetyl CoA/CoA	SAOUHSC_01178	yes				
Acetyl CoA/CoA	SAOUHSC_01795	NO	SAUSA300_1634	94%		Dephospho-CoA kinase
Acetyl CoA/CoA	SAOUHSC_02371	yes				
Folate	SAOUHSC_00490	yes				
Folate	SAOUHSC_00549	NO	SAUSA300_0551	99.80%		Conserved hypothetical protein
Folate	SAOUHSC_01434	yes				
Folate	SAOUHSC_01766	yes				
Folate	SAOUHSC_00491	yes				
Folate	SAOUHSC_00489	yes				
NAD biosynthesis	SAOUHSC_00943	yes				
NAD biosynthesis	SAOUHSC_01697	yes				
NAD biosynthesis	SAOUHSC_02132	yes				
NAD biosynthesis	SAOUHSC_02133	yes				
SAM	SAOUHSC_01909	yes				
Fe-sulphate cluster	SAOUHSC_00847	yes				
Fe-sulphate cluster	SAOUHSC_00848	yes				
Fe-sulphate cluster	SAOUHSC_00849	yes				
Fe-sulphate cluster	SAOUHSC_00850	yes				
Fe-sulphate cluster	SAOUHSC_00851	yes				
Fe-sulphate cluster	SAOUHSC_01727	yes				
Fe-sulphate cluster	SAOUHSC_01504	yes				
Riboflavin biosynthesis	SAOUHSC_01249	yes				
Other/Unknown						
Amino acid transporter	SAOUHSC_01787	NO	SAUSA300_1628	0.06%		Lysine-specific permease
GTP binding	SAOUHSC_01214	yes				
GTP binding	SAOUHSC_01668	yes				
GTP binding	SAOUHSC_01753	yes				
GTP binding	SAOUHSC_01777	NO	SAUSA300_1620	99.50%		Probable GTP-binding protein EngB
GTP binding	SAOUHSC_01700	yes				
GTP binding	SAOUHSC_01492	yes				
Other	SAOUHSC_00510	yes				

Other	SAOUHSC_02140	yes				
Other	SAOUHSC_01040	NO	SAUSA300_0993	71%		Pyruvate dehydrogenase E1 component, alpha subunit
Other	SAOUHSC_02277	yes				
Unknown	SAOUHSC_00015	NO	SAUSA300_0014	81%		DHH subfamily 1 protein
Unknown	SAOUHSC_00226	yes				
Unknown	SAOUHSC_00728	NO	SAUSA300_0703	98.30%		Sulfatase family protein
Unknown	SAOUHSC_00760	NO	SAUSA300_0730	1%		GGDEF domain protein
Unknown	SAOUHSC_01041	yes				
Unknown	SAOUHSC_01188	NO	SAUSA300_1114	23%		Ribosome small subunit-dependent GTPase A
Unknown	SAOUHSC_01350	yes				
Unknown	SAOUHSC_01477	yes				
Unknown	SAOUHSC_01661	yes				
Unknown	SAOUHSC_01701	yes				
Unknown	SAOUHSC_01782	yes				
Unknown	SAOUHSC_01871	yes				
Unknown	SAOUHSC_01908	yes				
Unknown	SAOUHSC_01979	NO	SAUSA300_1797	42.60%		Conserved hypothetical protein
Unknown	SAOUHSC_02106	yes				
Unknown	SAOUHSC_02151	yes				
Unknown	SAOUHSC_02152	NO	SAUSA300_1911	61%		ABC transporter, ATP-binding protein
Unknown	SAOUHSC_02279	yes				
Unknown	SAOUHSC_02280	yes				
Unknown	SAOUHSC_02357	yes				
Unknown	SAOUHSC_02407	yes				
Unknown	SAOUHSC_02571	NO	SAUSA300_2249	15%		Secretory antigen precursor SsaA
Unknown	SAOUHSC_00003	yes				
Unknown	SAOUHSC_00444	yes				
Unknown	SAOUHSC_00575	yes				
Unknown	SAOUHSC_00793	NO	SAUSA300_0754	0.10%		Conserved hypothetical protein
Unknown	SAOUHSC_00892	yes				
Unknown	SAOUHSC_00957	yes				
Unknown	SAOUHSC_01036	yes				
Unknown	SAOUHSC_01050	NO	SAUSA300_1003	34%		Conserved hypothetical protein
Unknown	SAOUHSC_01077	yes				
Unknown	SAOUHSC_01190	NO	SAUSA300_1116	93%		Thiamine pyrophosphokinase
Unknown	SAOUHSC_01244	yes				

Unknown	SAOUHSC_01245	yes				
Unknown	SAOUHSC_01627	NO	SAUSA300_1492	97%		Putative lipoprotein
Unknown	SAOUHSC_01672	yes				
Unknown	SAOUHSC_01721	yes				
Unknown	SAOUHSC_01756	yes				
Unknown	SAOUHSC_01866	NO	SAUSA300_1695	55%		Conserved hypothetical protein
Unknown	SAOUHSC_01928	yes				
Unknown	SAOUHSC_01930	NO	SAUSA300_1749	57%		Conserved hypothetical protein
Unknown	SAOUHSC_02757	NO	SAUSA300_2402	32%		Conserved hypothetical protein
Unknown	SAOUHSC_00345	yes				
Unknown	SAOUHSC_01362	NO	SAUSA300_1258	10%		4-oxalocrotonate tautomerase
Unknown	SAOUHSC_02260	yes				
Unknown	SAOUHSC_02575	NO	SAUSA300_2252	47%		Conserved hypothetical protein

*Identified gene is essential in both NCTC 8325 (as defined by Chaudhuri et al) and JE2

^Those genes in JE2 that are not considered essential as they have an identified Tn insert

#If gene is inserted by a transposon in JE2, in what percentage of the ORF is the transposon insert found (i.e. 95% means transposon is inserted in far 3' end suggesting a potentially functional protein)