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SUPPORTING INFECTIOUS DISEASE RESEARCH

# Salmonella enterica subsp. enterica, Strain 14028s (Serovar Typhimurium) Single-Gene Deletion Mutant Library, Plate 003/004\_Cm

Catalog No. NR-29411

## For research use only. Not for human use.

#### **Contributor:**

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#### Manufacturer:

**BEI Resources** 

#### **Product Description:**

Production in the 96-well format has increased risk of crosscontamination between adjacent wells. Individual clones should be purified (e.g. single colony isolation and purification using good microbiological practices) and sequence-verified prior to use. BEI Resources does not confirm or validate individual mutants provided by the contributor.

The Salmonella enterica (S. enterica) subsp. enterica, strain 14028s (serovar Typhimurium) targeted single-gene deletion (SGD) mutant library contains a total of 3,773 individual genes deleted simultaneously across two collections of mutants differentiated by kanamycin or chloramphenicol resistance.<sup>1,2</sup> The chloramphenicol-resistant mutant collection contains 3,376 mutants distributed among eleven 96-well plates. In these mutants, a single gene is replaced by a cassette conferring the chloramphenicol resistance gene, and includes 4 double mutants that contain both kanamycin and chloramphenicol cassettes. Deletions were confirmed by the depositor.<sup>1,2</sup> The parent strain *S. enterica* subsp. *enterica*, strain 14028s is available from BEI Resources as NR-12154.

Genes were targeted for deletion by primers designed to preserve the first and last 30 bases of each deleted gene.<sup>2</sup> Gene replacement followed a modified Lambda-Red technique, with an added T7 RNA polymerase promoter positioned in plasmid <u>pCLF3</u> to generate a gene-specific transcript from the *Salmonella* genome directly downstream of each mutant.<sup>2-4</sup> Detailed information about each mutant is shown in Table 1.

## **Material Provided:**

Each inoculated well of the 96-well plate contains approximately 50  $\mu$ L of culture in Luria Bertani (LB) broth containing 20  $\mu$ g/mL chloramphenicol supplemented with 10% glycerol.

#### Packaging/Storage:

NR-29411 was packaged aseptically in a 96-well plate. The product is provided frozen and should be stored at -80°C or colder immediately upon arrival. For long-term storage, the vapor phase of a liquid nitrogen freezer is recommended. Freeze-thaw cycles should be avoided.

#### **Growth Conditions:**

Media:

LB broth or agar containing 20 µg/mL chloramphenicol Incubation:

Temperature: 37°C Atmosphere: Aerobic

Atmosphere: Aeror

Propagation:

- 1. Scrape top of frozen well with a pipette tip and streak onto agar plate.
- 2. Incubate the plates at 37°C for 24 hours.

#### Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: *Salmonella enterica* subsp. *enterica*, Strain 14028s (Serovar Typhimurium) Single-Gene Deletion Mutant Library, Plate 003/004\_Cm, NR-29411."

#### **Biosafety Level: 2**

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the following publication: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health. <u>Biosafety in Microbiological and Biomedical Laboratories</u>. 5th ed. Washington, DC: U.S. Government Printing Office, 2009; see www.cdc.gov/biosafety/publications/bmbl5/index.htm.

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#### **References:**

1. Andrews-Polymenis, H. and M. McClelland, Personal Communication.

- Porwollik, S., et al. "Defined Single-Gene and Multi-Gene Deletion Mutant Collections in *Salmonella enterica* sv Typhimurium." <u>PLoS One</u> 9 (2014): e99820. PubMed: 25007190.
- Santiviago, C. A., et al. "Analysis of Pools of Targeted Salmonella Deletion Mutants Identifies Novel Genes Affecting Fitness during Competitive Infection in Mice." <u>PLoS Pathog.</u> 5 (2009): e1000477. PubMed: 19578432.
- Datsenko, K. A. and B. L. Wanner. "One-step Inactivation of Chromosomal Genes in *Escherichia coli* K-13 Using PCR Products." <u>Proc. Natl. Acad. Sci. USA</u> 97 (2000): 6640-6645. PubMed: 10829079.

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# Table 1: S. enterica subsp. enterica, Strain 14028s (Serovar Typhimurium) Single-Gene Deletion Mutant Library, Plate 003/004\_Cm<sup>1,2</sup>

Writin Position OF Plasmid Plasmid Start End End Gene Start Gene End Gene Start Gene End Gene Start Gene End Gene Start Gene End Gene Start Gene End Start End Start <th>Wall</th> <th>Deleted Region</th> <th>Deletion</th> <th>Deletion</th> <th></th> <th>14028S</th> <th>14028S</th> <th>14028S</th> <th></th>	Wall	Deleted Region	Deletion	Deletion		14028S	14028S	14028S	
Prostrom Orr Plasmid P	Position	of Chromosome	Start	End	Locus Tag	Gene	Gene	Gene	Description
A01 plasmid_140285 10277 10300 STM14_5541 10247 10393 + Platative fimbrials schemer   A02 chr.140285 205814 208300 STM14_0705 668737 669839 + Putative fimbrials schemer   A04 chr.140285 1138752 STM14_1238 1138752 Putative crytoplasmic protein   A05 chr.140285 1408171 1401452 STM14_1701 1498730 1499419 - DNA-binding transcriptional activator OsmE   A06 chr.140285 1286347 1964109 STM14_2424 1983171 1984139 + Type III-secreted effector protein   A08 chr.140285 2287854 2283065 STM14_2423 311618 311203 STM14_2423 311618 31120 STM14_2423 311618 31120 T Translocation machinery component   A11 chr.140285 3049331 3049351 305112 + Translocation machinery component English   A12 chr.140285 138191 STM14_2423 314814 3	FUSICION	or Plasmid	Start	Enu		Start	End	Strand	
A02 chr. 14028S 205814 208300 STM14.0207 205784 208330 + Putative fimbrial usher   A03 chr. 14028S 1138622 1138732 STM14.1238 1138522 - Putative fimscriptional regulator   A04 chr. 14028S 1401171 1401452 STM14.1282 1138762 - Putative fimscriptional activator OsmE   A05 chr. 14028S 1498761 149398 STM14.1701 1498730 1498419 - Scereted effector protein   A06 chr. 14028S 2287854 228005 STM14.2481 2280271 + Sulfaethiosulfaet transport protein   A08 chr. 14028S 304381 3049311 3051132 TTM14.2992 260412 2605279 + Sulfaethiosulfaet transport protein   A10 chr. 14028S 304381 301102 STM14.4263 3711678 3712433 + Putative transport protein   A11 chr. 14028S 3189911 STM14.4254 3711678 3712433 + Putative cytoplasmic protein	A01	plasmid_14028S	10277	10900	STM14_5541	10247	10939	+	Plasmid-encoded fimbriae; chaperone
A03 chr. 140285 668767 669609 STM14_0705 668737 669603 + Putative transcriptional regulator   A04 chr. 140285 1138722 TSM14_1238 1138721 TSM14 1292 12011   A05 chr. 140285 1498760 1499389 STM14_1238 138521 138762 TSM14 22011 238762 22010 DNA-binding transcriptional activator OsmE   A06 chr. 140285 1983447 1984109 STM14_2249 22017824 2280905 Putative transcriptional regulator   A08 chr. 140285 2004212 2005249 STM14_2892 201812 Putative transcriptional regulator   A10 chr. 140285 3049381 3051102 STM14_482 2992794 Sulfate/Minisulfate transcriptional regulator   A11 chr. 140285 3189101 STM14_4996 3883911 STM14_4026 318381 319211 Putative transcriptional regulator   B10 chr. 140285 1189012 114041 323401 Putative cytoplasmic protein Putative cytoplasmic protein	A02	chr_14028S	205814	208300	STM14_0207	205784	208330	+	Putative fimbrial usher
A04 chr.140285 1138622 1138762  Putative cytoplasmic protein   A05 chr.140285 1498760 1499389 STM14 1591 149419  Secreted effector protein   A06 chr.140285 1498760 1499389 STM14 1204 1983417 1984139  Secreted effector protein   A07 chr.140285 2287554 2287572 228754 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2287572 2289752 2297573	A03	chr_14028S	668767	669609	STM14_0705	668737	669639	+	Putative transcriptional regulator
A05 chr_140285 1401111 1401422 Secreted effector protein   A06 chr_140285 198340 Stm14_2244 1963417 1964139 + Type III-secreted effector protein   A07 chr_140285 2287844 228065 Stm14_2643 2287824 2280627 + Putative transport protein   A08 chr_140285 2287824 22806412 2280279 + Suffact/filosuffate transport subunit   A10 chr_140285 3049381 3051102 Stm14_243 + Putative transport subunit   A11 chr_140285 3049381 3051102 Stm14_542 13340 + Putative transport protein   B01 plasmid_140285 138919 STM14_0328 13883 13212 - Putative eroplasmic protein   B02 chr_140285 189013 11402325 13802 140644 + Pathogenicity island-encoded protein D   B04 chr_140285 1403983 1404765 STM14_1234 1403795 - DNA-binding transcriptional regulator ChbR	A04	chr_14028S	1138622	1138732	STM14_1238	1138592	1138762	-	Putative cytoplasmic protein
A06 chr_140285 1499760 1499380 STM14_1701 1498730 1499749 - Secreted effector protein   A07 chr_140285 2287854 2289065 STM14_2643 2287824 2289095 - Putative transport protein   A08 chr_140285 2287854 2287824 STM14_2643 2287824 2289095 - Putative transport protein   A09 chr_140285 2604212 2605279 + Sulfate/functionary component   A11 chr_140285 3043831 S051102 STM14_3484 3049351 3051132 + Translocation machinery component   A11 chr_140285 3189911 STM14_5542 10932 13340 + Plasmid-encode fimbriae; usher protein   B01 plasmid_140285 10962 113310 STM14_0286 318911 STM14_0228 1403933 1404726 Putative periplasmic protein   B02 chr_140285 139012 1140421 STM14_0728 690153 690333 - Twoomponent response regulator DpiA	A05	chr_14028S	1401171	1401452	STM14_1592	1401141	1401482	-	DNA-binding transcriptional activator OsmE
A07 chr_14028S 1963447 1963419 + Type III-secreted effector protein   A08 chr_14028S 2287654 2289065 STM14_2633 2287824 228095 - Putative transport protein   A10 chr_14028S 3049381 3051102 STM14_2633 2604212 2605279 + Sulfate/thiosulfate transporter subunit   A11 chr_14028S 3049381 3051102 STM14 4533 711708 3711708 <td>A06</td> <td>chr_14028S</td> <td>1498760</td> <td>1499389</td> <td>STM14_1701</td> <td>1498730</td> <td>1499419</td> <td>-</td> <td>Secreted effector protein</td>	A06	chr_14028S	1498760	1499389	STM14_1701	1498730	1499419	-	Secreted effector protein
A08 chr_14028S 228784 228784 228784 228784 228784 228005 Putative transport protein   A09 chr_14028S 3640341 3051102 STM14 2492 2605279 + Sulfate/thiosulfate transporter subunit   A10 chr_14028S 3711708 3712403 STM14 4283 3051102 + Translocation machinery component   A11 chr_14028S 3349381 30591102 STM14 24838931 4388931 4389911 Putative transport protein   B01 plasmid_14028S 10962 13310 STM14_2654 10932 13340 + Plasmid-encoded fimbriae; usher protein   B03 chr_14028S 18919 31911 STM14_1202 138383 319221 - Putative eryophasmic protein   B03 chr_14028S 18919 319112 STM14_12021 1389821 140544 + Putative eryophasmic protein   B04 chr_14028S 1687103 1688110 STM14_14164 1680753 1408953 1405495 <td< td=""><td>A07</td><td>chr_14028S</td><td>1963447</td><td>1964109</td><td>STM14_2244</td><td>1963417</td><td>1964139</td><td>+</td><td>Type III-secreted effector protein</td></td<>	A07	chr_14028S	1963447	1964109	STM14_2244	1963417	1964139	+	Type III-secreted effector protein
A09 chr. 14028S 2604212 2605249 STM14_3484 200327 + Sulfact/hise/transporter subunit   A10 chr. 14028S 3051102 STM14_3484 3049351 3051132 + Translocation machinery component   A11 chr. 14028S 3711708 3712403 STM14_4253 3711678 3712433 + Putative cytoplasmic protein   B01 plasmid_14028S 138919 ISTM14_4996 4388931 438941 - Putative cytoplasmic protein   B02 chr_14028S 318919 STM14_0728 690153 690833 - Two-component response regulator DpiA   B03 chr_14028S 1403983 1404765 STM14_1297 1403953 1404795 DNA-binding transcriptional regulator ChbR   B04 chr_14028S 1687103 1688110 STM14_2244 2280092 228096 - Putative glycohydrolase   B06 chr_14028S 2283102 2290066 STM14_2433 2332862 233397 + Phateyl accepting chemotaxis protein II   B08	A08	chr_14028S	2287854	2289065	STM14_2643	2287824	2289095	-	Putative transport protein
A10 chr. 140285 304381 3051102 STM14, 3484 3049351 3051132 + Translocation machinery component   A11 chr. 140285 3711708 3712403 STM14, 4253 3711678 3712433 + Putative transcriptional regulator   B01 plasmid_140285 1389091 ISTM14, 4253 4388931 + Plasmid-encoded fimbriae; usher protein   B02 chr_140285 139191 STM14_0728 690153 690833 - Two-component response regulator DpiA   B03 chr_140285 1193012 I140421 STM14_0728 690153 690833 - Dtwo-component response regulator DpiA   B04 chr_140285 1183081 1687073 1403953 1404765 - DNA-binding transcriptional regulator CbR   B06 chr_140285 1687103 1688103 + Putative NADP-dependent oxidoreductase   B07 chr_140285 2289122 2290066 STM14_273 2923582 2933397 + Phase-1 flagellin repressor   B10 chr_140285 3	A09	chr_14028S	2604212	2605249	STM14_2999	2604182	2605279	+	Sulfate/thiosulfate transporter subunit
A11 chr_14028S 3711708 3711428 3711708 3711478 3712433 + Putative transcriptional regulator   A12 chr_14028S 43889011 STM14_5542 10332 13340 + Plasmid-encoded fimbriae; usher protein   B01 plasmid_14028S 139919 STM14_5542 10332 13340 + Plasmid-encoded fimbriae; usher protein   B02 chr_14028S 139919 STM14_0726 690153 690833 - Two-component response regulator DpiA   B04 chr_14028S 1130912 1140424 STM14_1597 1403953 1404795 DNA-binding transcriptional regulator ChbR   B06 chr_14028S 1687103 1688110 STM14_1924 168703 1688143 + Putative NADP-dependent oxidoreductase   B07 chr_14028S 2026190 2027719 ISTM14_2344 20281092 2290090 - Putative graphic hance coded protein I   B08 chr_14028S 233288 233367 STM14_43337 2323888 3056433 + Needle length control protein <td>A10</td> <td>chr_14028S</td> <td>3049381</td> <td>3051102</td> <td>STM14_3484</td> <td>3049351</td> <td>3051132</td> <td>+</td> <td>Translocation machinery component</td>	A10	chr_14028S	3049381	3051102	STM14_3484	3049351	3051132	+	Translocation machinery component
A12 chr_140285 4388961 4388961 STM14_4996 4388331 438941 - Putative cytoplasmic protein   B01 plasmid_140285 10962 13310 STM14_5542 10932 133401 + Plasmid-encoded fimbriae; usher protein   B02 chr_140285 318919 31919 STM14_0728 690153 690833 - Two-component response regulator DpiA   B03 chr_140285 169313 1404715 STM14_1571 1403953 1404795 Pathogenicity island-encoded protein D   B05 chr_140285 1687103 1688110 STM14_1924 1687073 1688143 + Pathogenicity island-encoded protein D   B06 chr_140285 2026190 2027191 STM14_2334 2026160 2028052 + Methyl accepting chemotaxis protein II   B08 chr_140285 2932888 293367 STM14_337 2932858 293397 + Phase-1 flagellin repressor   B10 chr_140285 385513 3056463 STM14_301 3055483 3056433 + <td>A11</td> <td>chr_14028S</td> <td>3711708</td> <td>3712403</td> <td>STM14_4253</td> <td>3711678</td> <td>3712433</td> <td>+</td> <td>Putative transcriptional regulator</td>	A11	chr_14028S	3711708	3712403	STM14_4253	3711678	3712433	+	Putative transcriptional regulator
B01 plasmid_14028S 10962 13310 STM14_5542 10932 13340 + Plasmid-encoded fimbriae; usher protein   B02 chr_14028S 18919 STM14_028 318238 319221 - Putative periplasmic protein   B03 chr_14028S 189191 STM14_028 690833 - Two-component response regulator DpiA   B04 chr_14028S 1139012 1140421 STM14_1240 1138982 1140544 + Pathogenicity island-encoded protein D   B05 chr_14028S 1687103 1688110 STM14_1924 1687073 1688143 + Putative NADP-dependent oxidoreductase   B06 chr_14028S 2026190 2027791 STM14_234 2026160 2028052 + Methyl accepting chemotaxis protein II   B08 chr_14028S 2833367 STM14_337 2932881 2933397 + Phase-1 flagellin repressor   B10 chr_14028S 3837836 3840304 STM14_337 2932881 293377 233 rRNA pseudourdine synthase F   C01	A12	chr_14028S	4388961	4389911	STM14_4996	4388931	4389941	-	Putative cytoplasmic protein
B02 chr_14028S 318919 319191 STM14_0326 318888 319221 - Putative periplasmic protein   B03 chr_14028S 690183 690183 690153 690833 - Two-component response regulator DpiA   B04 chr_14028S 1139012 1140421 STM14_0728 1403983 1404765 STM14_1240 1138982 1140544 + Pathogenicity island-encoded protein D   B05 chr_14028S 1887103 1688110 STM14_1240 1138982 1140475 DNA-binding transcriptional regulator ChbR   B06 chr_14028S 2026109 0207791 STM14_234 2026160 2028052 + Methyl accepting chemotaxis protein II   B07 chr_14028S 2289122 290066 STM14_244 2289092 290096 - Putative glycohydrolase   B09 chr_14028S 305513 3056463 STM14_3037 293286 233397 + Phase-1 flagellin repressor   B10 chr_14028S 337363 384034 STM14_3040 3837806	B01	plasmid_14028S	10962	13310	STM14_5542	10932	13340	+	Plasmid-encoded fimbriae; usher protein
B03 chr_14028S <sup>3</sup> 690183 690803 STM14_0728 690153 690833 - Two-component response regulator DpiA   B04 chr_14028S 1139012 1140421 STM14_1240 1138982 1140544 + Pathogenicity island-encoded protein D   B05 chr_14028S 1687103 1688110 STM14_1597 1403953 1404795 - DNA-binding transcriptional regulator ChbR   B06 chr_14028S 2026190 2027791 STM14_1324 1687073 1688143 + Putative NADP-dependent oxidoreductase   B07 chr_14028S 2289006 STM14_3337 2932858 2933397 + Phase-1 flagellin repressor   B09 chr_14028S 3955513 3056463 STM14_337 2932858 2933397 + Phase-1 flagellin repressor   B10 chr_14028S 3837863 3840304 STM14_4383 3837806 3840334 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 422948 4249857 STM14_0343 328415 329203	B02	chr_14028S	318919	319191	STM14_0326	318838	319221	-	Putative periplasmic protein
B04 chr_14028S 1139012 1140421 STM14_1597 1403952 1140544 + Pathogenicity island-encoded protein D   B05 chr_14028S 1403785 STM14_1597 1403953 1404795 - DNA-binding transcriptional regulator ChbR   B06 chr_14028S 12687103 1688110 STM14_1924 1887073 1688143 + Putative NADP-dependent oxidoreductase   B07 chr_14028S 2289122 2290066 STM14_2334 2028160 2028052 + Methyl accepting chemotaxis protein II   B08 chr_14028S 2283288 2933367 STM14_3431 3055483 3056493 + Needle length control protein   B11 chr_14028S 3837836 3840304 STM14_4385 3837806 3840334 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 328445 329173 STM14_0334 328415 329203 - Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 <td>B03</td> <td>chr_14028S<sup>3</sup></td> <td>690183</td> <td>690803</td> <td>STM14_0728</td> <td>690153</td> <td>690833</td> <td>-</td> <td>Two-component response regulator DpiA</td>	B03	chr_14028S <sup>3</sup>	690183	690803	STM14_0728	690153	690833	-	Two-component response regulator DpiA
B05 chr_14028S 1403983 1404765 STM14_1597 1403953 1404795 - DNA-binding transcriptional regulator ChbR   B06 chr_14028S 1687103 1688110 STM14_1224 1687073 1888143 + Putative NADP-dependent oxidoreductase   B07 chr_14028S 2026190 2027791 STM14_2344 2026160 2028052 + Methyl accepting chemotaxis protein II   B08 chr_14028S 2289122 2290066 STM14_2344 2289092 2290096 - Putative glycohydrolase   B09 chr_14028S 2932888 2933367 STM14_3337 2932858 2933397 + Phase-1 flagellin repressor   B10 chr_14028S 3837863 3840304 STM14_3549 3056493 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 3837863 384003 357M14_5560 26266 26916 + Hydrophilic protein   C02 chr_14028S 1328475 329173 STM14_1079 733733 734818 +	B04	chr_14028S	1139012	1140421	STM14_1240	1138982	1140544	+	Pathogenicity island-encoded protein D
B06 chr_14028S 1687103 1688110 STM14_1924 1687073 1688143 + Putative NADP-dependent oxidoreductase   B07 chr_14028S 2026190 2027791 STM14_2334 2026160 2028052 + Methyl accepting chemotaxis protein II   B08 chr_14028S 2293086 STM14_244 2289092 2290096 - Putative glycohydrolase   B09 chr_14028S 2932888 2933367 STM14_3431 3055483 3056493 + Needle length control protein   B10 chr_14028S 3837836 3840304 STM14_3491 3055483 3056493 + Needle length control protein   B11 chr_14028S 3837836 3840304 STM14_4385 3837806 3840334 + Long polar fimbrial outer membrane usher protein   C01 plasmid_14028S 28296 26886 STM14_5030 26266 26916 + Hydrophilic protein   C02 chr_14028S 733763 734788 STM14_0334 328203 - Putative phosphate starvation-	B05	chr_14028S	1403983	1404765	STM14_1597	1403953	1404795	-	DNA-binding transcriptional regulator ChbR
B07 chr_14028S 2026190 2027791 STM14_2334 2026160 2028052 + Methyl accepting chemotaxis protein II   B08 chr_14028S 2289122 2290066 STM14_2644 2289092 2290096 - Putative glycohydrolase   B09 chr_14028S 2932888 2933367 STM14_3337 2932858 293397 + Phase-1 flagellin repressor   B10 chr_14028S 3055513 3056463 STM14_3337 2932858 293334 + Long polar fimbrial outer membrane usher protein   B11 chr_14028S 3837836 3840304 STM14_5040 4429087 - 23S rRNA pseudouridine synthase F   C01 plasmid_14028S 282445 329173 STM14_5560 26266 26916 + Hydrophilic protein   C02 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1290 1176619 1177299 + N-acetylmanno	B06	chr_14028S	1687103	1688110	STM14_1924	1687073	1688143	+	Putative NADP-dependent oxidoreductase
B08 chr_14028S 2289122 2290066 STM14_2644 2289092 2290096 - Putative glycohydrolase   B09 chr_14028S 2932888 2933367 STM14_3337 2932888 2933397 + Phase-1 flagellin repressor   B10 chr_14028S 3055513 3056463 STM14_3491 3055483 3056493 + Needle length control protein   B11 chr_14028S 3837806 3840304 STM14_4385 3837806 3840334 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 4429048 4429877 STM14_0304 4429887 - 235 rRNA pseudouridine synthase F   C01 plasmid_14028S 26296 26886 STM14_0334 328415 329203 - Putative cytoplasmic protein   C02 chr_14028S 13763 734788 STM14_17079 733733 734818 + Putative phosphate starvation-inducible protein   C04 chr_14028S 1176649 1177269 STM14_1290 117619 1177299 +	B07	chr_14028S	2026190	2027791	STM14_2334	2026160	2028052	+	Methyl accepting chemotaxis protein II
B09 chr_14028S 2932888 2933367 STM14_3337 2932858 2933397 + Phase-1 flagellin repressor   B10 chr_14028S 3055513 3056463 STM14_3491 3055483 3056493 + Needle length control protein   B11 chr_14028S 3837836 3840304 STM14_4385 3837806 3840334 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 4429048 4429857 STM14_5560 26266 26916 + Hydrophilic protein   C02 chr_14028S 328445 329173 STM14_0334 328415 329203 - Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1632 1432774 1433487 - Hypothetical protein   C05 chr_14028S 1432804 1433457 STM14_2359 2046185 2046517 + Putative	B08	chr_14028S	2289122	2290066	STM14_2644	2289092	2290096	-	Putative glycohydrolase
B10 chr_14028S 3055513 3056463 STM14_3491 3055483 3056493 + Needle length control protein   B11 chr_14028S 3837836 3840304 STM14_4385 3837806 3840334 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 4429048 4429857 STM14_5040 4429087 - 23S rRNA pseudouridine synthase F   C01 plasmid_14028S 26296 26886 STM14_5560 26266 26916 + Hydrophilic protein   C02 chr_14028S 328445 329173 STM14_0334 328415 329203 - Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1632 1432774 1433487 - Hypothetical protein   C05 chr_14028S 1432804 1433457 STM14_14230 1702158 1703108 - Secreted effector protein </td <td>B09</td> <td>chr_14028S</td> <td>2932888</td> <td>2933367</td> <td>STM14_3337</td> <td>2932858</td> <td>2933397</td> <td>+</td> <td>Phase-1 flagellin repressor</td>	B09	chr_14028S	2932888	2933367	STM14_3337	2932858	2933397	+	Phase-1 flagellin repressor
B11 chr_14028S 3837836 3840304 STM14_4385 3837806 3840334 + Long polar fimbrial outer membrane usher protein   B12 chr_14028S 4429048 4429857 STM14_5040 4429018 4429887 - 23S rRNA pseudouridine synthase F   C01 plasmid_14028S 26296 26886 STM14_560 26266 26916 + Hydrophilic protein   C02 chr_14028S 328445 329173 STM14_0334 328415 329203 - Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1290 117619 1177299 + N-acetylmannosamine-6-phosphate 2-epimerase   C05 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 Secreted effector protein   C06 chr_14028S 2046135 2046145 2046157 + Putative inner membrane protein	B10	chr_14028S	3055513	3056463	STM14_3491	3055483	3056493	+	Needle length control protein
B12 chr_14028S 4429048 4429857 STM14_5040 4429018 442987 - 23S rRNA pseudouridine synthase F   C01 plasmid_14028S 26296 26886 STM14_5560 26266 26916 + Hydrophilic protein   C02 chr_14028S 328445 329173 STM14_0334 328415 329203 - Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1290 117619 1177299 + N-acetylmannosamine-6-phosphate starvation-inducible protein   C05 chr_14028S 1432804 1433457 STM14_1940 1702158 1703108 - Secreted effector protein   C06 chr_14028S 2046215 2046487 STM14_239 2046185 2046517 + Putative inner membrane protein   C07 chr_14028S 2366139 2367635 STM14_2739 2366109 2367665 -	B11	chr_14028S	3837836	3840304	STM14_4385	3837806	3840334	+	Long polar fimbrial outer membrane usher protein
C01 plasmid_14028S 26296 26886 STM14_5560 26266 26916 + Hydrophilic protein   C02 chr_14028S 328445 329173 STM14_0334 328415 329203 - Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1290 1176619 1177299 + N-acetylmannosamine-6-phosphate 2-epimerase   C05 chr_14028S 1432804 1433457 STM14_1632 1432774 1433487 - Hypothetical protein   C06 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 - Secreted effector protein   C07 chr_14028S 2046215 2046487 STM14_2739 2366109 2367665 - Hypothetical protein   C08 chr_14028S 2367139 STM14_350 2947037 2948089 + Secreted effector protein	B12	chr_14028S	4429048	4429857	STM14_5040	4429018	4429887	-	23S rRNA pseudouridine synthase F
C02 chr_14028S 328445 329173 STM14_0334 328415 329203 Putative cytoplasmic protein   C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative cytoplasmic protein   C04 chr_14028S 1176649 1177269 STM14_1290 1176619 1177299 + N-acetylmannosamine-6-phosphate 2-epimerase   C05 chr_14028S 1432804 1433457 STM14_1632 1432774 1433487 - Hypothetical protein   C06 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 - Secreted effector protein   C07 chr_14028S 2046215 2046487 STM14_239 2366109 2367655 - Hypothetical protein   C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367655 - Hypothetical protein   C10 chr_14028S 2947067 2948059 STM14_3350 2947037 2948089 + Secreted effector protein	C01	plasmid_14028S	26296	26886	STM14_5560	26266	26916	+	Hydrophilic protein
C03 chr_14028S 733763 734788 STM14_0779 733733 734818 + Putative phosphate starvation-inducible protein   C04 chr_14028S 1176649 1177269 STM14_1290 1176619 1177299 + N-acetylmannosamine-6-phosphate 2-epimerase   C05 chr_14028S 1432804 1433457 STM14_1632 1432774 1433487 - Hypothetical protein   C06 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 - Secreted effector protein   C07 chr_14028S 2046215 2046487 STM14_2399 2046185 2046517 + Putative inner membrane protein   C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367655 - Hypothetical protein   C09 chr_14028S 2947067 2948059 STM14_3350 2947037 2948089 + Secreted effector protein   C10 chr_14028S 3075714 STM14_3350 2947037 2948089 + Secreted effec	C02	chr_14028S	328445	329173	STM14_0334	328415	329203	-	Putative cytoplasmic protein
C04 chr_14028S 1176649 1177269 STM14_1290 1176619 1177299 + N-acetylmannosamine-6-phosphate 2-epimerase   C05 chr_14028S 1432804 1433457 STM14_1632 1432774 1433487 - Hypothetical protein   C06 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 - Secreted effector protein   C07 chr_14028S 2046215 2046487 STM14_2359 2046185 2046517 + Putative inner membrane protein   C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367665 - Hypothetical protein   C09 chr_14028S 2947067 2948059 STM14_3514 3074812 3075744 - Putative transcriptional regulator   C10 chr_14028S 3868330 3869070 STM14_423 3868300 3869100 + Transcriptional regulator   C11 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + <td< td=""><td>C03</td><td>chr_14028S</td><td>733763</td><td>734788</td><td>STM14_0779</td><td>733733</td><td>734818</td><td>+</td><td>Putative phosphate starvation-inducible protein</td></td<>	C03	chr_14028S	733763	734788	STM14_0779	733733	734818	+	Putative phosphate starvation-inducible protein
C05 chr_14028S 1432804 1433457 STM14_1632 1432774 1433487 - Hypothetical protein   C06 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 - Secreted effector protein   C07 chr_14028S 2046215 2046487 STM14_2359 2046185 204517 + Putative inner membrane protein   C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367665 - Hypothetical protein   C09 chr_14028S 2947067 2948059 STM14_350 2947037 2948089 + Secreted effector protein   C10 chr_14028S 3074863 3075714 STM14_3514 3074812 3075744 - Putative transcriptional regulator   C11 chr_14028S 3868330 3869070 STM14_423 3868300 3869100 + Transcriptional regulator   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcr	C04	chr_14028S	1176649	1177269	STM14_1290	1176619	1177299	+	N-acetylmannosamine-6-phosphate 2-epimerase
C06 chr_14028S 1702188 1703078 STM14_1940 1702158 1703108 - Secreted effector protein   C07 chr_14028S 2046215 2046487 STM14_2359 2046185 2046517 + Putative inner membrane protein   C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367665 - Hypothetical protein   C09 chr_14028S 2947067 2948059 STM14_3350 2947037 2948089 + Secreted effector protein   C10 chr_14028S 3074863 3075714 STM14_3514 3074812 3075744 - Putative transcriptional regulator   C11 chr_14028S 3868330 3869070 STM14_423 3868300 3869100 + Transcriptional regulator   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + <td< td=""><td>C05</td><td>chr_14028S</td><td>1432804</td><td>1433457</td><td>STM14_1632</td><td>1432774</td><td>1433487</td><td>-</td><td>Hypothetical protein</td></td<>	C05	chr_14028S	1432804	1433457	STM14_1632	1432774	1433487	-	Hypothetical protein
C07 chr_14028S 2046215 2046487 STM14_2359 2046185 2046517 + Putative inner membrane protein   C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367665 - Hypothetical protein   C09 chr_14028S 2947067 2948059 STM14_3350 2947037 2948089 + Secreted effector protein   C10 chr_14028S 3074863 3075714 STM14_3514 3074812 3075744 - Putative transcriptional regulator   C11 chr_14028S 3868330 3869070 STM14_423 3868300 3869100 + Transcriptional regressor   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative	C06	chr_14028S	1702188	1703078	STM14_1940	1702158	1703108	-	Secreted effector protein
C08 chr_14028S 2366139 2367635 STM14_2739 2366109 2367665 Hypothetical protein   C09 chr_14028S 2947067 2948059 STM14_3350 2947037 2948089 + Secreted effector protein   C10 chr_14028S 3074863 3075714 STM14_3514 3074812 3075744 - Putative transcriptional regulator   C11 chr_14028S 3868330 3869070 STM14_4423 3868300 3869100 + Transcriptional regressor   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	C07	chr_14028S	2046215	2046487	STM14_2359	2046185	2046517	+	Putative inner membrane protein
C09 chr_14028S 2947067 2948059 STM14_3350 2947037 2948089 + Secreted effector protein   C10 chr_14028S 3074863 3075714 STM14_3514 3075744 - Putative transcriptional regulator   C11 chr_14028S 3868330 3869070 STM14_4423 3868300 3869100 + Transcriptional regressor   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	C08	chr_14028S	2366139	2367635	STM14_2739	2366109	2367665	-	Hypothetical protein
C10 chr_14028S 3074863 3075714 STM14_3514 3074812 3075744 - Putative transcriptional regulator   C11 chr_14028S 3868330 3869070 STM14_4423 3868300 3869100 + Transcriptional regressor   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	C09	chr_14028S	2947067	2948059	STM14_3350	2947037	2948089	+	Secreted effector protein
C11 chr_14028S 3868330 3869070 STM14_4423 3868300 3869100 + Transcriptional repressor   C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	C10	chr 14028S	3074863	3075714	STM14 3514	3074812	3075744	-	Putative transcriptional regulator
C12 chr_14028S 4562749 4563408 STM14_5176 4562719 4563438 + DNA-binding transcriptional activator DcuR   D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0339 785662 786558 - Putative glycosyl transferase	C11	chr_14028S	3868330	3869070	STM14_4423	3868300	3869100	+	Transcriptional repressor
D01 plasmid_14028S 28213 29928 STM14_5562 28183 29958 + Hydrophilic protein   D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	C12	chr_14028S	4562749	4563408	STM14_5176	4562719	4563438	+	DNA-binding transcriptional activator DcuR
D02 chr_14028S 329260 329586 STM14_0335 329200 329616 - Putative periplasmic protein   D03 chr_14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	D01	plasmid_14028S	28213	29928	STM14_5562	28183	29958	+	Hydrophilic protein
D03 chr 14028S 785695 786528 STM14_0839 785662 786558 - Putative glycosyl transferase	D02	chr_14028S	329260	329586	STM14_0335	329200	329616	-	Putative periplasmic protein
	D03	chr_14028S	785695	786528	STM14_0839	785662	786558	-	Putative glycosyl transferase

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# **Product Information Sheet for NR-29411**

SUPPORTING INFECTIOUS DISEASE RESEARCH

Well Position	Deleted Region of Chromosome	Deletion Start	Deletion End	Locus Tag	14028S Gene Start	14028S Gene	14028S Gene Strand	Description
D04	chr 1/028S	1187077	1187/33	STM14 1304	11870/7	1187/63		Curli assembly protein CsaE
D04	chr 1/0285	1/00005	1/003/6	STM14_1688	1/180075	1/00376		Secreted effector protein
D05	chr 140285	1706313	1707431	STM14_1000	1706283	1707461		Putative benzoate membrane transport protein
D07	chr 140285	2070637	2071284	STM14_1344	2070607	2071314	-	Flagellar assembly protein H
D07	chr 1/0285	2300767	207 1204	STM14_2392	2300737	2071314	-	Putative phage antiterminator
D00	obr 140200	2020166	2021012	STM14_2700	2020207	2021042	- T	Secreted effector protein
D09	chr 140205	2107254	2100247	STM14_3402	2107224	2100277	+	Secreted effector protein
D10	CIII_140265	3107334	3106247	STM14_3550	3107324	3106277	-	Secreted effector protein
DTT	CNF_140285	3883401	3884222	STM14_4439	3883371	3884252	-	Putative transcriptional regulator
EUI	plasmid_140265	92403	93103	STM14_3627	92403	93193	-	Conjugative transfer. Infibilial acetylation
E02	Chr_140285	3//3/8	3/8283	STM14_0389	3//348	378313	-	Putative transcriptional regulator
E03	cnr_14028S	867315	869552	STM14_928	867285	869582	-	Leucine-rich repeat-containing protein
E04	cnr_140285	1189325	1189720	STM14_1309	1189295	1189750	-	Curlin minor subunit
E05	cnr_14028S	1493940	1494470	STM14_1694	1493910	1494500	-	I ransiocation machinery component
E06	chr_14028S	1/0/545	1708153	STM14_1945	1/0/515	1708183	+	Putative outer membrane lipoprotein
E07	chr_14028S	2074970	2075914	STM14_2397	2074940	2075944	-	Flagellar motor switch protein FliM
E08	chr_14028S	2392468	2394774	STM14_2769	2392438	2394804	+	Leucine-rich repeat-containing protein
E09	chr_14028S	3033606	3033998	STM14_3467	3033576	3034028	+	Putative cytoplasmic protein
E10	chr_14028S	3297009	3297791	STM14_3769	3296979	3297821	+	Putative transcriptional regulator
E11	chr_14028S	4038389	4039021	STM14_4616	4038359	4039051	-	DNA-binding transcriptional regulator TorR
E12	chr_14028S	4729876	4732671	STM14_5371	4729846	4732701	+	ValyI-tRNA synthetase
F01	chr_14028S⁵	24499	24981	STM14_0028	24469	25011	-	Fimbrial subunit
F02	chr_14028S	384301	385002	STM14_0395	384271	385032	+	Putative fimbrial chaperone
F03	chr_14028S	921087	922565	STM14_992	921057	922595	-	Putative ABC transporter periplasmic binding protein
F04	chr_14028S	1196138	1198621	STM14_1318	1196108	1198651	-	Glucosyltransferase MdoH
F05	chr_14028S	1495003	1496397	STM14_1696	1494973	1496427	-	Translocation machinery component
F06	chr_14028S	1731300	1732466	STM14_1974	1731270	1732496	-	Secreted effector protein
F07	chr_14028S <sup>6</sup>	2193152	2195440	STM14_2557	2193122	2195470	-	Secreted effector protein
F08	chr_14028S	2443437	2444636	STM14_2820	2443407	2444666	-	Anaerobic glycerol-3-phosphate dehydrogenase subunit B
F09	chr_14028S	3042338	3043909	STM14_3477	3042308	3043939	+	Protein tyrosine phosphatase/GTPase activating protein
F10	chr_14028S	3414671	3414979	STM14_3910	3414641	3415009	-	Putative periplasmic protein
F11	chr_14028S	4055021	4056034	STM14_4629	4054991	4056064	+	Recombination protein F
F12	chr_14028S	4748438	4749367	STM14_5387	4748408	4749397	-	Putative restriction endonuclease
G01	chr_14028S	194139	194846	STM14_0196	194109	194876	-	Putative transcriptional regulator
G02	 chr_14028S	484072	484731	STM14_0508	484042	484761	+	2-aminoethylphosphonate transport protein
G03	 chr_14028S	1012450	1013349	STM14 1098	1012420	1013379	-	SopD-like protein
G04	 chr_14028S	1218001	1219152	STM14 1348	1217971	1219182	-	Flagellar hook protein FlgE
G05	chr 14028S	1496473	1497000	STM14 1697	1496443	1497030	-	Translocation machinery component
G06	chr 14028S	1739122	1739499	STM14_1982	1738867	1739529	-	Putative SAM-dependent methyltransferase
G07	chr 14028S	2256574	2258370	STM14_2616	2256544	2258400	+	Putative assembly protein
G08	chr 14028S	2460551	2462137	STM14_2839	2460521	2462167	-	4-amino-4-deoxy-L-arabinose transferase
G09	chr 14028S	3044946	3046943	STM14_3481	3044916	3046973	+	Secreted effector protein
G10	chr 140285	3524470	3525057	STM14_4033	3524440	3525087		Stringent stanvation protein A
G11	chr 1/0285	1101777	/102322	STM14_4000	11017/7	1102352		Putative inner membrane protein
G12	chr 140200	4131777	4132322	STM14_4/17	4131747	4132332	-	Putative fimbrial usbor protein
	obr 140200	4039330	205745	STM14_0206	204606	205775	- T	Putative fimbrial usiter protein
	chr 140205	204720	200740	STM14_0200	204090	200770	+	Miner fimbriel subunit
HUZ	cnr_140285	609399	610346	STM14_0639	609369	610376	-	Minor fimbrial subunit
	CIII_140285	1090340	1099254	STIVI14_1193	1090310	1099284	-	Secreted effector protein
HU4	cnr_140285	1268037	1208987	STIVI14_1400	1208007	1209017	+	Secreted effector protein
HU/	cnr_14028S	2283079	2284065	STM14_2636	2283049	2284095	-	Pseudogene
H08	chr_14028S	2588352	2589218	STM14_2979	2588322	2589248	+	Putative transcriptional regulator
H09	chr_14028S	3047022	3047993	STM14_3482	3046992	3048023	+	Translocation machinery component
H10	chr_14028S	3680866	3681720	STM14_4225	3680836	3681750	-	Putative cytoplasmic protein
H11	chr_14028S	4195034	4195753	STM14_4781	4195004	4195783	-	TatABCE protein translocation system subunit
H12	chr 14028S	4865712	4866197	STM14 5516	4865682	4866227	+	Putative fimbrial chaperone

<sup>1</sup>All information in this table was provided by the depositor at the time of deposition.

<sup>2</sup>Construction of each listed mutant has been confirmed either by PCR or by an array indicating a functional T7 promoter in the correct location and orientation. Mutants that did not produce such a signal on the array, or did not yield the expected mutant product during PCR, are not listed.

<sup>3</sup>Deleted region also overlaps STM14\_0727 (0.1%)

<sup>4</sup>Deleted region also overlaps STM14\_0390 (9.5%)

<sup>5</sup>Deleted region also overlaps STM14\_0029 (1.3%) <sup>6</sup>Deleted region also overlaps STM14\_2556 (25.2%)

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