为更深入的了解UAG终止密码子通读对芽胞杆菌种属的影响，我们对枯草芽胞杆菌，苏云金芽胞杆菌和蜡状芽胞杆菌全基因组中以UAG为终止密码子的基因下游序列进行了蛋白通读分析。

附表2 枯草芽胞杆菌中UAG蛋白通读后增加的序列长度及延长的氨基酸数量

|  |  |  |
| --- | --- | --- |
| 基因名称 | 增加碱基长度（bp） | 增加氨基酸数目（个） |
| *rpmH* | 12 | 4 |
| *rnpA* | 30 | 10 |
| *jag* | 21 | 7 |
| *trmF* | 9 | 3 |
| *nocA* | 12 | 4 |
| *engD* | 48 | 16 |
| *yybD* | 78 | 26 |
| *yybE* | 93 | 31 |
| *yybJ* | 57 | 19 |
| *yybO* | 336 | 112 |
| *hypR* | 96 | 32 |
| *yycC* | 54 | 18 |
| *yydC* | 3 | 1 |
| *liaK* | 21 | 7 |
| *yydK* | 18 | 6 |
| *gntK* | 12 | 4 |
| *gntR* | 57 | 19 |
| *glxK* | 93 | 31 |
| *qdoR* | 33 | 11 |
| *yxaH* | 18 | 6 |
| *yxaJ* | 15 | 5 |
| *yxbC* | 3 | 1 |
| *yxcD* | 312 | 104 |
| *iolD* | 30 | 10 |
| *yxeN* | 6 | 2 |
| *yxiE* | 57 | 19 |
| *yxiF* | 51 | 17 |
| *yxiH* | 522 | 174 |
| *yxiK* | 15 | 5 |
| *nupG* | 9 | 3 |
| *yxjC* | 66 | 22 |
| *yxjL* | 69 | 23 |
| *yxjO* | 6 | 2 |
| *aag* | 9 | 3 |
| *licB* | 1374 | 458 |
| *licC* | 351 | 117 |
| *slrA* | 45 | 15 |
| *galT* | 6 | 2 |
| *sacA* | 342 | 114 |
| *ywdE* | 30 | 10 |
| *spsF* | 66 | 22 |
| *rocC* | 66 | 22 |
| *bacC* | 1437 | 479 |
| *bacE* | 1200 | 400 |
| *ywfO* | 42 | 14 |
| *thrZ* | 93 | 31 |
| *ywhA* | 6 | 2 |
| *ywhC* | 48 | 16 |
| *ywhL* | 33 | 11 |
| *albB* | 174 | 58 |
| *ywjA* | 534 | 178 |
| *rpoE* | 30 | 10 |
| *tdk* | 18 | 6 |
| *rpiB* | 555 | 185 |
| *atpH* | 9 | 3 |
| *atpG* | 45 | 15 |
| *spoIID* | 72 | 24 |
| *BSU\_36739* | 24 | 8 |
| *ywmE* | 81 | 27 |
| *fdhD* | 1041 | 347 |
| *usd* | 51 | 17 |
| *tkmA* | 69 | 23 |
| *uglF* | 78 | 26 |
| *ywqI* | 1827 | 609 |
| *chrA* | 39 | 13 |
| *ywrE* | 78 | 26 |
| *ywrJ* | 60 | 20 |
| *ywrK* | 60 | 20 |
| *alsS* | 90 | 30 |
| *rbsC* | 15 | 5 |
| *rbsD* | 12 | 4 |
| *capB* | 45 | 15 |
| *capB* | 45 | 15 |
| *tuaG* | 75 | 25 |
| *tuaH* | 84 | 28 |
| *degU* | 81 | 27 |
| *comFA* | 57 | 19 |
| *flgN* | 1542 | 514 |
| *flgK* | 906 | 302 |
| *fliW* | 18 | 6 |
| *yvyC* | 33 | 11 |
| *filT* | 381 | 127 |
| *yvzG* | 138 | 46 |
| *secA* | 144 | 48 |
| *hprK* | 21 | 7 |
| *lgt* | 27 | 9 |
| *yvcB* | 18 | 6 |
| *yvcD* | 3 | 1 |
| *yvcI* | 978 | 326 |
| *crh* | 765 | 255 |
| *mdxF* | 837 | 279 |
| *pbpE* | 699 | 233 |
| *racX* | 57 | 19 |
| *epsB* | 9 | 3 |
| *epsC* | 9 | 3 |
| *epsE* | 108 | 36 |
| *ganA* | 42 | 14 |
| *unkown* | 99 | 33 |
| *yvbH* | 48 | 16 |
| *opuBA* | 69 | 23 |
| *opuBD* | 108 | 36 |
| *yvaM* | 6 | 2 |
| *secG* | 57 | 19 |
| *rnr* | 78 | 26 |
| *modA* | 348 | 116 |
| *unknown* | 15 | 5 |
| *fhuG* | 825 | 275 |
| *yvrD* | 162 | 54 |
| *liaG* | 6 | 2 |
| *liaR* | 42 | 14 |
| *gerAC* | 93 | 31 |
| *yuxN* | 180 | 60 |
| *cssS* | 108 | 36 |
| *yusU* | 57 | 19 |
| *fadN* | 96 | 32 |
| *yusF* | 30 | 10 |
| *frlP* | 198 | 66 |
| *yunF* | 18 | 6 |
| *thrB* | 72 | 24 |
| *hisP* | 42 | 14 |
| *yue* | 129 | 43 |
| *bznD* | 132 | 44 |
| *yuzE* | 69 | 23 |
| *yueF* | 39 | 13 |
| *mrpD* | 27 | 9 |
| *KinB* | 39 | 13 |
| *yuzA* | 183 | 61 |
| *yugM* | 39 | 13 |
| *yugN* | 15 | 5 |
| *kbfO* | 99 | 33 |
| *yuzH* | 102 | 34 |
| *rhaE* | 24 | 8 |
| *yubD* | 72 | 24 |
| *ktrA* | 1344 | 448 |
| *cotSA* | 9 | 3 |
| *ythB* | 216 | 72 |
| *ytlA* | 795 | 265 |
| *ytzC* | 18 | 6 |
| *ytrB* | 45 | 15 |
| *ytwF* | 18 | 6 |
| *rmgP* | 198 | 66 |
| *rmgS* | 6 | 2 |
| *ytnP* | 51 | 17 |
| *ytoP* | 9 | 3 |
| *ytpQ* | 621 | 207 |
| *ytpR* | 48 | 16 |
| *brxJ* | 51 | 17 |
| *motP* | 15 | 5 |
| *refZ* | 48 | 16 |
| *hisK* | 75 | 25 |
| *ezrA* | 111 | 37 |
| *iscSB* | 1209 | 403 |
| *ppnkB* | 93 | 31 |
| *sppA* | 507 | 169 |
| *tcyK* | 741 | 247 |
| *cmoJ* | 147 | 49 |
| *ribR* | 45 | 15 |
| *nrnA* | 21 | 7 |
| *accD* | 18 | 6 |
| *mutM* | 54 | 18 |
| *araA* | 36 | 12 |
| *egsA* | 1332 | 444 |
| *araN* | 39 | 13 |
| *cstA* | 12 | 4 |
| *ysfB* | 1515 | 505 |
| *rlmBB* | 30 | 10 |
| *rnhC* | 57 | 19 |
| *rcmE* | 1215 | 405 |
| *engB* | 54 | 18 |
| *rppA* | 297 | 99 |
| *spoOB* | 12 | 4 |
| *nadA* | 84 | 28 |
| *sgpA* | 825 | 275 |
| *yrzT* | 15 | 5 |
| *csbX* | 18 | 6 |
| *bofC* | 132 | 44 |
| *comN* | 39 | 13 |
| *yrvD* | 18 | 6 |
| *cymR* | 1158 | 386 |
| *yrrD* | 93 | 31 |
| *glnP* | 51 | 17 |
| *pbpI* | 75 | 25 |
| *yrhF* | 15 | 5 |
| *bscR* | 3180 | 1060 |
| *adhR* | 81 | 27 |
| *yraI* | 27 | 9 |
| *yraJ* | 33 | 11 |
| *prpF* | 39 | 13 |
| *yrpB* | 36 | 12 |
| *yrDB* | 84 | 28 |
| *yrdDm* | 9 | 3 |
| *yrdF* | 78 | 26 |
| *azlB* | 777 | 259 |
| *yrdK* | 231 | 77 |
| *yrdN* | 105 | 35 |
| *yrdR* | 102 | 34 |
| *bltD* | 36 | 12 |
| *yekC* | 24 | 8 |
| *unknown* | 9 | 3 |
| *yrkQ* | 462 | 154 |
| *yqbC* | 27 | 9 |
| *yqbE* | 33 | 11 |
| *yqbJ* | 1398 | 466 |
| *yqbK* | 12 | 4 |
| *txpA* | 12 | 4 |
| *yqbNn* | 3 | 1 |
| *yqbR* | 438 | 146 |
| *yqcC* | 345 | 115 |
| *yqcE* | 21 | 7 |
| *yqzI* | 30 | 10 |
| *yqcK* | 3 | 1 |
| *arsB* | 96 | 32 |
| *nucB* | 3 | 1 |
| *comER* | 69 | 23 |
| *lepA* | 87 | 29 |
| *pgpH* | 474 | 158 |
| *rnrY* | 6 | 2 |
| *sigA* | 39 | 13 |
| *cshB* | 903 | 301 |
| *yqfU* | 102 | 34 |
| *pstA* | 39 | 13 |
| *pstBA* | 123 | 41 |
| *glpG* | 51 | 17 |
| *yqhB* | 72 | 24 |
| *yqxL* | 117 | 39 |
| *comGA* | 51 | 17 |
| *sinR* | 96 | 32 |
| *yqhH* | 21 | 7 |
| *yqhR* | 102 | 34 |
| *efp* | 108 | 36 |
| *spoIIIAC* | 408 | 136 |
| *nusB* | 15 | 5 |
| *folD* | 42 | 14 |
| *yqiI* | 69 | 23 |
| *glpQ* | 75 | 25 |
| *yqzF* | 93 | 31 |
| *ptb* | 87 | 29 |
| *buk* | 42 | 14 |
| *bkdAA* | 36 | 12 |
| *artR* | 78 | 26 |
| *proI* | 6 | 2 |
| *yqkB* | 252 | 84 |
| *yqkF* | 117 | 39 |
| *yqkK* | 120 | 40 |
| *fur* | 72 | 24 |
| *yqzK* | 87 | 29 |
| *ripX* | 87 | 29 |
| *deoB* | 828 | 276 |
| *sigF* | 69 | 23 |
| *spoVAA* | 138 | 46 |
| *spoVAC* | 1029 | 343 |
| *ypuB* | 156 | 52 |
| *ypuC* | 21 | 7 |
| *sipS* | 60 | 20 |
| *ribD* | 90 | 30 |
| *ribE* | 30 | 10 |
| *spcB* | 594 | 198 |
| *resB* | 15 | 5 |
| *resC* | 51 | 17 |
| *aroC* | 27 | 9 |
| *fer* | 6 | 2 |
| *ypbE* | 57 | 19 |
| *prsW* | 51 | 17 |
| *sleB* | 9 | 3 |
| *cheR* | 30 | 10 |
| *ypjD* | 36 | 12 |
| *dapB* | 12 | 4 |
| *panD* | 126 | 42 |
| *ypmA* | 12 | 4 |
| *cotD* | 21 | 7 |
| *bpsB* | 111 | 37 |
| *exnP* | 57 | 19 |
| *sspL* | 24 | 8 |
| *degR* | 132 | 44 |
| *iIvD* | 36 | 12 |
| *slip* | 96 | 32 |
| *ypmR* | 573 | 191 |
| *ypmS* | 6 | 2 |
| *aaCD* | 36 | 12 |
| *yoyK* | 18 | 6 |
| *yokH* | 12 | 4 |
| *yokI* | 12 | 4 |
| *bhlB* | 99 | 33 |
| *bhlA* | 18 | 6 |
| *BSU\_21409* | 36 | 12 |
| *yomH* | 18 | 6 |
| *yomM* | 6 | 2 |
| *yomR* | 27 | 9 |
| *yonO* | 12 | 4 |
| *yonR* | 3 | 1 |
| *yonX* | 48 | 16 |
| *yoyH* | 21 | 7 |
| *yopF* | 33 | 11 |
| *yopJ* | 15 | 5 |
| *yoqD* | 6 | 2 |
| *yoqE* | 12 | 4 |
| *yoqI* | 9 | 3 |
| *yoqK* | 732 | 244 |
| *yoqL* | 18 | 6 |
| *yorH* | 39 | 13 |
| *yorR* | 12 | 4 |
| *yorY* | 195 | 65 |
| *yosJ* | 12 | 4 |
| *yosL* | 3 | 1 |
| *yosQ* | 99 | 33 |
| *yotB* | 6 | 2 |
| *yotC* | 12 | 4 |
| *yotM* | 33 | 11 |
| *phyC* | 126 | 42 |
| *yoyG* | 33 | 11 |
| *yodS* | 54 | 18 |
| *yodQ* | 27 | 9 |
| *pgpB* | 36 | 12 |
| *yojK* | 90 | 30 |
| *yojO* | 45 | 15 |
| *yocL* | 84 | 28 |
| *yobO* | 54 | 18 |
| *yobN* | 21 | 7 |
| *yobM* | 66 | 22 |
| *yozJ* | 39 | 13 |
| *yozU* | 33 | 11 |
| *yoaZ* | 12 | 4 |
| *yoaT* | 30 | 10 |
| *yozF* | 24 | 8 |
| *yozT* | 36 | 12 |
| *yoaO* | 9 | 3 |
| *yoaM* | 3 | 1 |
| *yoaK* | 93 | 31 |
| *yozQ* | 18 | 6 |
| *yoaG* | 81 | 27 |
| *yoeD* | 12 | 4 |
| *yoeA* | 48 | 16 |
| *galM* | 1509 | 503 |
| *ppsB* | 33 | 11 |
| *ppsC* | 10836 | 3612 |
| *yngC* | 27 | 9 |
| *xynD* | 9 | 3 |
| *eglS* | 75 | 25 |
| *yneT* | 93 | 31 |
| *yneP* | 315 | 105 |
| *sspN* | 288 | 96 |
| *yneN* | 57 | 19 |
| *dink* | 672 | 224 |
| *ncrF* | 18 | 6 |
| *yndM* | 33 | 11 |
| *ynzB* | 108 | 36 |
| *tatAC* | 375 | 125 |
| *alrB* | 18 | 6 |
| *yncB* | 18 | 6 |
| *ynzI* | 15 | 5 |
| *hflX* | 33 | 11 |
| *spoVK* | 1395 | 465 |
| *cwlC* | 93 | 31 |
| *hfp* | 27 | 9 |
| *ymaF* | 57 | 19 |
| *pksN* | 21 | 7 |
| *mutL* | 12 | 4 |
| *pdeB* | 93 | 31 |
| *ymfJ* | 69 | 23 |
| *bcbE* | 129 | 43 |
| *truB* | 969 | 323 |
| *uppS* | 813 | 271 |
| *fliP* | 12 | 4 |
| *ylxF* | 9 | 3 |
| *fliJ* | 12 | 4 |
| *fliF* | 1029 | 343 |
| *fliE* | 9 | 3 |
| *flgC* | 18 | 6 |
| *clpQ* | 42 | 14 |
| *temFO* | 18 | 6 |
| *topA* | 6 | 2 |
| *ylqH* | 57 | 19 |
| *trmD* | 21 | 7 |
| *ylxM* | 24 | 8 |
| *plsX* | 972 | 324 |
| *sdaAA* | 9 | 3 |
| *sdaAB* | 36 | 12 |
| *yloV* | 39 | 13 |
| *yloU* | 1677 | 559 |
| *rsgA* | 39 | 13 |
| *fmt* | 9 | 3 |
| *rpoZ* | 3 | 1 |
| *yloC* | 3 | 1 |
| *sirB* | 75 | 25 |
| *pyrAA* | 18 | 6 |
| *IspA* | 15 | 5 |
| *ylmH* | 57 | 19 |
| *ftsA* | 21 | 7 |
| *murG* | 3 | 1 |
| *murE* | 21 | 7 |
| *ylbP* | 69 | 23 |
| *ylbM* | 465 | 155 |
| *resD* | 3 | 1 |
| *ylbG* | 6 | 2 |
| *ctaC* | 39 | 13 |
| *suhB* | 9 | 3 |
| *ktrC* | 69 | 23 |
| *mreBH* | 300 | 100 |
| *fruK* | 18 | 6 |
| *skiZ* | 36 | 12 |
| *yknU* | 15 | 5 |
| *moeA* | 84 | 28 |
| *ykuV* | 12 | 4 |
| *ykuO* | 471 | 157 |
| *ykuL* | 63 | 21 |
| *ykuG* | 12 | 4 |
| *ykvZ* | 3 | 1 |
| *stoA* | 12 | 4 |
| *ykvQ* | 18 | 6 |
| *ykvN* | 6 | 2 |
| *motB* | 69 | 23 |
| *kinD* | 9 | 3 |
| *spoOE* | 135 | 45 |
| *ykrP* | 141 | 47 |
| *ktrD* | 33 | 11 |
| *htpK* | 66 | 22 |
| *ligV* | 1839 | 613 |
| *ykoN* | 9 | 3 |
| *ykzN* | 174 | 58 |
| *proA* | 18 | 6 |
| *proB* | 15 | 5 |
| *purU* | 36 | 12 |
| *ykzH* | 36 | 12 |
| *dppC* | 1011 | 337 |
| *ykcB* | 15 | 5 |
| *xkdV* | 15 | 5 |
| *xkdR* | 42 | 14 |
| *xkdN* | 3 | 1 |
| *xpdC* | 327 | 109 |
| *yjoA* | 54 | 18 |
| *yjlA* | 21 | 7 |
| *yjhA* | 78 | 26 |
| *cotT* | 51 | 17 |
| *trnE* | 12 | 4 |
| *yjdH* | 60 | 20 |
| *yjdG* | 9 | 3 |
| *unknown* | 36 | 12 |
| *cotW* | 39 | 13 |
| *cotX* | 66 | 22 |
| *ppnKA* | 66 | 22 |
| *relP* | 819 | 273 |
| *yjbL* | 36 | 12 |
| *spxH* | 66 | 22 |
| *mecA* | 168 | 56 |
| *oppB* | 921 | 307 |
| *yjaU* | 9 | 3 |
| *argC* | 36 | 12 |
| *yitR* | 51 | 17 |
| *yitM* | 6 | 2 |
| *yitL* | 81 | 27 |
| *yitG* | 12 | 4 |
| *yitB* | 18 | 6 |
| *yisV* | 18 | 6 |
| *asnO* | 21 | 7 |
| *yisJ* | 15 | 5 |
| *addA* | 12 | 4 |
| *yhjR* | 78 | 26 |
| *yhjO* | 42 | 14 |
| *yhjN* | 27 | 9 |
| *ntdC* | 24 | 8 |
| *glcP* | 93 | 31 |
| *yhxD* | 78 | 26 |
| *comK* | 72 | 24 |
| *yhfS* | 12 | 4 |
| *yhgD* | 114 | 38 |
| *hnoB* | 48 | 16 |
| *yhaJ* | 66 | 22 |
| *yheE* | 18 | 6 |
| *yhdW* | 228 | 76 |
| *citR* | 30 | 10 |
| *nsrR* | 69 | 23 |
| *glpW* | 1557 | 519 |
| *yhcG* | 51 | 17 |
| *yhBD* | 15 | 5 |
| *trmL* | 3 | 1 |
| *ygaN* | 60 | 20 |
| *eeuB* | 21 | 7 |
| *gsaB* | 15 | 5 |
| *ygaB* | 69 | 23 |
| *yfhP* | 48 | 16 |
| *yfhO* | 39 | 13 |
| *yfhE* | 18 | 6 |
| *yfiH* | 1191 | 397 |
| *yfiC* | 66 | 22 |
| *malR* | 18 | 6 |
| *yfjB* | 15 | 5 |
| *yfjD* | 552 | 184 |
| *acoC* | 24 | 8 |
| *yfjM* | 33 | 11 |
| *yfkA* | 843 | 281 |
| *rbn* | 12 | 4 |
| *yfkT* | 27 | 9 |
| *yflA* | 48 | 16 |
| *yflD* | 411 | 137 |
| *yflK* | 126 | 42 |
| *citT* | 6 | 2 |
| *maeS* | 51 | 17 |
| *fecC* | 9 | 3 |
| *fecE* | 813 | 271 |
| *unknown* | 69 | 23 |
| *cypD* | 33 | 11 |
| *yetK* | 27 | 9 |
| *yetI* | 75 | 25 |
| *lplB* | 21 | 7 |
| *rhgX* | 9 | 3 |
| *yesN* | 18 | 6 |
| *yesF* | 375 | 125 |
| *phrH* | 96 | 32 |
| *yeeF* | 15 | 5 |
| *yezA* | 45 | 15 |
| *yeeB* | 123 | 41 |
| *yeeA* | 6 | 2 |
| *yefB* | 24 | 8 |
| *yerI* | 84 | 28 |
| *pcrB* | 3 | 1 |
| *purB* | 93 | 31 |
| *yeaD* | 12 | 4 |
| *ydjO* | 129 | 43 |
| *gutR* | 228 | 76 |
| *bsuRC* | 6 | 2 |
| *ydzV* | 21 | 7 |
| *ydzU* | 36 | 12 |
| *rex* | 195 | 65 |
| *tsaB* | 465 | 155 |
| *gmuD* | 39 | 13 |
| *ydhH* | 150 | 50 |
| *ydfF* | 114 | 38 |
| *ydeS* | 150 | 50 |
| *ydeI* | 21 | 7 |
| *ydeD* | 21 | 7 |
| *cdnL* | 33 | 11 |
| *IrpL* | 12 | 4 |
| *yddN* | 21 | 7 |
| *phrI* | 9 | 3 |
| *rapI* | 30 | 10 |
| *yddF* | 2451 | 817 |
| *conB* | 9 | 3 |
| *ydcO* | 30 | 10 |
| *ydcL* | 180 | 60 |
| *unknown* | 3 | 1 |
| *rsbT* | 69 | 23 |
| *rsbS* | 405 | 135 |
| *ndoA* | 75 | 25 |
| *acpS* | 12 | 4 |
| *ydbI* | 15 | 5 |
| *dctB* | 54 | 18 |
| *ydbA* | 114 | 38 |
| *ydaS* | 9 | 3 |
| *IrpC* | 90 | 30 |
| *lipC* | 108 | 36 |
| *pxpC* | 12 | 4 |
| *pxpI* | 30 | 10 |
| *yczO* | 48 | 16 |
| *ycnC* | 36 | 12 |
| *pbtO* | 15 | 5 |
| *yclK* | 24 | 8 |
| *yclI* | 696 | 232 |
| *gerKC* | 6 | 2 |
| *hxlB* | 51 | 17 |
| *zinU* | 36 | 12 |
| *nasA* | 48 | 16 |
| *ycgK* | 234 | 78 |
| *niaP* | 150 | 50 |
| *znuB* | 12 | 4 |
| *ycdF* | 1710 | 570 |
| *rapJ* | 81 | 27 |
| *cwlK* | 102 | 34 |
| *tatCD* | 135 | 45 |
| *cwlJ* | 837 | 279 |
| *ycbL* | 105 | 35 |
| *gltP* | 54 | 18 |
| *ybfP* | 24 | 8 |
| *pssA* | 15 | 5 |
| *cesB* | 3 | 1 |
| *ybfJ* | 12 | 4 |
| *purT* | 93 | 31 |
| *ybxH* | 30 | 10 |
| *ybdO* | 36 | 12 |
| *ybdG* | 27 | 9 |
| *skfF* | 63 | 21 |
| *ybbJ* | 6 | 2 |
| *ybbC* | 165 | 55 |
| *ecfT* | 753 | 251 |
| *ecfA* | 18 | 6 |
| *mapA* | 42 | 14 |
| *secY* | 708 | 236 |
| *rplX* | 6 | 2 |
| *rpsG* | 9 | 3 |
| *rpmGB* | 15 | 5 |
| *unknown* | 21 | 7 |
| *ispD* | 18 | 6 |
| *yazB* | 9 | 3 |
| *pabC* | 15 | 5 |
| *coaX* | 9 | 3 |
| *yabS* | 60 | 20 |
| *divIC* | 9 | 3 |
| *hslR* | 78 | 26 |
| *yabN* | 6 | 2 |
| *spoVT* | 33 | 11 |
| *yabE* | 93 | 31 |
| *dhaH* | 54 | 18 |
| *yaaR* | 36 | 12 |
| *csfB* | 6 | 2 |
| *ebfC* | 45 | 15 |
| *tadA* | 18 | 6 |
| *remB* | 39 | 13 |
| *dnaA* | 75 | 25 |

附表3 苏云金芽胞杆菌中UAG蛋白通读后增加的序列长度及延长的氨基酸数量

|  |  |  |
| --- | --- | --- |
| 基因名称 | 增加碱基长度（bp） | 增加氨基酸数目（个） |
| *dnaA* | 9 | 3 |
| *dnaN* | 21 | 7 |
| *HD73\_RS00130* | 45 | 15 |
| *HD73\_RS00180* | 27 | 9 |
| *HD73\_RS00255* | 6 | 2 |
| *HD73\_RS00310* | 6 | 2 |
| *divIC* | 15 | 5 |
| *pabC* | 18 | 6 |
| *HD73\_RS00455* | 30 | 10 |
| *radA* | 1077 | 359 |
| *rpsG* | 12 | 4 |
| *HD73\_RS00755* | 54 | 18 |
| *gerD* | 3 | 1 |
| *pdaB* | 69 | 23 |
| *glmS* | 42 | 14 |
| *HD73\_RS00925* | 3 | 1 |
| *HD73\_RS00945* | 1050 | 350 |
| *HD73\_RS01015* | 3 | 1 |
| *HD73\_RS01100* | 3 | 1 |
| *HD73\_RS01120* | 54 | 18 |
| *HD73\_RS01135* | 6 | 2 |
| *HD73\_RS33580* | 33 | 11 |
| *HD73\_RS01195* | 18 | 6 |
| *HD73\_RS01265* | 3 | 1 |
| *acpS* | 1107 | 369 |
| *alr* | 12 | 4 |
| *HD73\_RS01302* | 3 | 1 |
| *tsaB* | 45 | 15 |
| *tsaD* | 12 | 4 |
| *HD73\_RS01500* | 210 | 70 |
| *HD73\_RS33125* | 12 | 4 |
| *HD73\_RS01540* | 24 | 8 |
| *HD73\_RS01555* | 24 | 8 |
| *HD73\_RS01570* | 57 | 19 |
| *HD73\_RS01615* | 18 | 6 |
| *HD73\_RS01685* | 1509 | 503 |
| *HD73\_RS01695* | 27 | 9 |
| *HD73\_RS01790* | 9 | 3 |
| *uppP* | 30 | 10 |
| *HD73\_RS01830* | 15 | 5 |
| *istA* | 66 | 22 |
| *HD73\_RS02020* | 4287 | 1429 |
| *HD73\_RS02040* | 18 | 6 |
| *gatC* | 1473 | 491 |
| *rlmD* | 21 | 7 |
| *HD73\_RS02230* | 3 | 1 |
| *HD73\_RS02265* | 9 | 3 |
| *HD73\_RS33900* | 72 | 24 |
| *HD73\_RS02355* | 1725 | 575 |
| *HD73\_RS02390* | 15 | 5 |
| *HD73\_RS02415* | 1509 | 503 |
| *HD73\_RS02425* | 27 | 9 |
| *HD73\_RS02430* | 318 | 106 |
| *HD73\_RS02445* | 18 | 6 |
| *HD73\_RS02510* | 21 | 7 |
| *HD73\_RS02550* | 36 | 12 |
| *HD73\_RS02605* | 9 | 3 |
| *HD73\_RS02630* | 12 | 4 |
| *argR* | 21 | 7 |
| *arcA* | 9 | 3 |
| *istA* | 66 | 22 |
| *thiE* | 33 | 11 |
| *HD73\_RS02800* | 18 | 6 |
| *HD73\_RS02805* | 6 | 2 |
| *HD73\_RS02840* | 15 | 5 |
| *HD73\_RS02875* | 24 | 8 |
| *HD73\_RS02885* | 42 | 14 |
| *HD73\_RS02935* | 108 | 36 |
| *HD73\_RS02965* | 90 | 30 |
| *HD73\_RS03005* | 30 | 10 |
| *HD73\_RS03040* | 126 | 42 |
| *HD73\_RS03045* | 54 | 18 |
| *HD73\_RS03095* | 6 | 2 |
| *HD73\_RS03110* | 6 | 2 |
| *HD73\_RS03145* | 21 | 7 |
| *HD73\_RS03150* | 9 | 3 |
| *HD73\_RS03165* | 147 | 49 |
| *HD73\_RS03260* | 6 | 2 |
| *HD73\_RS03360* | 57 | 19 |
| *HD73\_RS03395* | 24 | 8 |
| *HD73\_RS03415* | 69 | 23 |
| *HD73\_RS03450* | 3 | 1 |
| *HD73\_RS03460* | 3 | 1 |
| *fdhF* | 504 | 168 |
| *HD73\_RS03695* | 66 | 22 |
| *istA* | 66 | 22 |
| *HD73\_RS03815* | 183 | 61 |
| *HD73\_RS03825* | 72 | 24 |
| *treP* | 30 | 10 |
| *HD73\_RS03890* | 864 | 288 |
| *HD73\_RS03920* | 18 | 6 |
| *HD73\_RS03945* | 81 | 27 |
| *HD73\_RS03955* | 30 | 10 |
| *HD73\_RS04080* | 12 | 4 |
| *HD73\_RS04085* | 66 | 22 |
| *HD73\_RS04205* | 6 | 2 |
| *HD73\_RS04225* | 9 | 3 |
| *HD73\_RS04235* | 45 | 15 |
| *HD73\_RS04265* | 51 | 17 |
| *HD73\_RS04270* | 15 | 5 |
| *HD73\_RS04320* | 6 | 2 |
| *HD73\_RS04330* | 174 | 58 |
| *HD73\_RS04345* | 39 | 13 |
| *HD73\_RS04350* | 6 | 2 |
| *HD73\_RS04715* | 45 | 15 |
| *HD73\_RS04740* | 21 | 7 |
| *thiO* | 219 | 73 |
| *thiF* | 852 | 284 |
| *HD73\_RS04775* | 174 | 58 |
| *kdpC* | 30 | 10 |
| *HD73\_RS04815* | 144 | 48 |
| *HD73\_RS04840* | 651 | 217 |
| *HD73\_RS04860* | 24 | 8 |
| *HD73\_RS04905* | 3 | 1 |
| *HD73\_RS04950* | 69 | 23 |
| *HD73\_RS04975* | 3 | 1 |
| *HD73\_RS04985* | 15 | 5 |
| *HD73\_RS05025* | 216 | 72 |
| *HD73\_RS05055* | 45 | 15 |
| *entC* | 30 | 10 |
| *HD73\_RS05085* | 198 | 66 |
| *HD73\_RS05120* | 66 | 22 |
| *HD73\_RS05135* | 36 | 12 |
| *HD73\_RS05140* | 78 | 26 |
| *HD73\_RS33195* | 120 | 40 |
| *HD73\_RS05180* | 69 | 23 |
| *HD73\_RS05190* | 12 | 4 |
| *HD73\_RS05200* | 1122 | 374 |
| *HD73\_RS05230* | 30 | 10 |
| *HD73\_RS05245* | 30 | 10 |
| *HD73\_RS05260* | 3 | 1 |
| *HD73\_RS05275* | 27 | 9 |
| *HD73\_RS05325* | 48 | 16 |
| *HD73\_RS05350* | 267 | 89 |
| *HD73\_RS05460* | 33 | 11 |
| *HD73\_RS05495* | 84 | 28 |
| *HD73\_RS05525* | 69 | 23 |
| *HD73\_RS05560* | 156 | 52 |
| *HD73\_RS05565* | 78 | 26 |
| *HD73\_RS05580* | 6 | 2 |
| *HD73\_RS05585* | 123 | 41 |
| *HD73\_RS33910* | 57 | 19 |
| *HD73\_RS05655* | 273 | 91 |
| *HD73\_RS05700* | 9 | 3 |
| *HD73\_RS05725* | 3 | 1 |
| *HD73\_RS05745* | 114 | 38 |
| *HD73\_RS05750* | 78 | 26 |
| *HD73\_RS05765* | 42 | 14 |
| *HD73\_RS05770* | 75 | 25 |
| *HD73\_RS05820* | 9 | 3 |
| *HD73\_RS05845* | 378 | 126 |
| *HD73\_RS05855* | 105 | 35 |
| *HD73\_RS05925* | 51 | 17 |
| *HD73\_RS05935* | 87 | 29 |
| *HD73\_RS05970* | 39 | 13 |
| *dhaK* | 6 | 2 |
| *istA* | 66 | 22 |
| *HD73\_RS06040* | 45 | 15 |
| *HD73\_RS06065* | 48 | 16 |
| *HD73\_RS06085* | 9 | 3 |
| *HD73\_RS06150* | 78 | 26 |
| *HD73\_RS33235* | 39 | 13 |
| *HD73\_RS06220* | 45 | 15 |
| *HD73\_RS06285* | 63 | 21 |
| *HD73\_RS06310* | 60 | 20 |
| *ecsA* | 60 | 20 |
| *HD73\_RS06420* | 18 | 6 |
| *HD73\_RS06460* | 18 | 6 |
| *HD73\_RS06505* | 81 | 27 |
| *HD73\_RS06515* | 54 | 18 |
| *HD73\_RS06555* | 48 | 16 |
| *HD73\_RS06585* | 30 | 10 |
| *cysT* | 45 | 15 |
| *HD73\_RS06615* | 51 | 17 |
| *HD73\_RS33250* | 192 | 64 |
| *HD73\_RS06695* | 9 | 3 |
| *HD73\_RS06720* | 36 | 12 |
| *HD73\_RS06730* | 1170 | 390 |
| *HD73\_RS06750* | 96 | 32 |
| *HD73\_RS06755* | 12 | 4 |
| *HD73\_RS06760* | 12 | 4 |
| *HD73\_RS06795* | 36 | 12 |
| *addA* | 300 | 100 |
| *HD73\_RS06865* | 78 | 26 |
| *HD73\_RS06920* | 33 | 11 |
| *HD73\_RS06940* | 33 | 11 |
| *HD73\_RS06950* | 18 | 6 |
| *HD73\_RS06965* | 21 | 7 |
| *HD73\_RS06990* | 24 | 8 |
| *HD73\_RS07035* | 27 | 9 |
| *HD73\_RS07120* | 411 | 137 |
| *HD73\_RS07145* | 123 | 41 |
| *HD73\_RS07180* | 4584 | 1528 |
| *HD73\_RS07300* | 231 | 77 |
| *HD73\_RS07335* | 75 | 25 |
| *mecA* | 69 | 23 |
| *HD73\_RS07450* | 18 | 6 |
| *HD73\_RS07515* | 12 | 4 |
| *exsF* | 3 | 1 |
| *HD73\_RS07590* | 27 | 9 |
| *HD73\_RS07595* | 84 | 28 |
| *trpA* | 33 | 11 |
| *HD73\_RS07680* | 99 | 33 |
| *HD73\_RS07690* | 153 | 51 |
| *HD73\_RS07700* | 3 | 1 |
| *HD73\_RS07720* | 48 | 16 |
| *HD73\_RS07725* | 3 | 1 |
| *HD73\_RS07745* | 6 | 2 |
| *HD73\_RS07755* | 81 | 27 |
| *HD73\_RS07795* | 30 | 10 |
| *HD73\_RS07800* | 21 | 7 |
| *HD73\_RS07810* | 27 | 9 |
| *HD73\_RS07835* | 48 | 16 |
| *HD73\_RS07860* | 15 | 5 |
| *potB* | 807 | 269 |
| *HD73\_RS07895* | 75 | 25 |
| *HD73\_RS07950* | 54 | 18 |
| *HD73\_RS07975* | 18 | 6 |
| *HD73\_RS08005* | 63 | 21 |
| *HD73\_RS08040* | 27 | 9 |
| *HD73\_RS08045* | 114 | 38 |
| *HD73\_RS08065* | 1758 | 586 |
| *HD73\_RS08325* | 1536 | 512 |
| *amaA* | 105 | 35 |
| *hisG* | 57 | 19 |
| *hisA* | 30 | 10 |
| *hisI* | 27 | 9 |
| *HD73\_RS08550* | 3 | 1 |
| *sat* | 621 | 207 |
| *HD73\_RS08585* | 30 | 10 |
| *HD73\_RS08590* | 63 | 21 |
| *HD73\_RS08695* | 633 | 211 |
| *HD73\_RS08745* | 3 | 1 |
| *HD73\_RS08805* | 60 | 20 |
| *resC* | 78 | 26 |
| *resE* | 30 | 10 |
| *HD73\_RS08875* | 36 | 12 |
| *HD73\_RS08895* | 3 | 1 |
| *HD73\_RS08905* | 81 | 27 |
| *HD73\_RS33010* | 66 | 22 |
| *HD73\_RS08980* | 15 | 5 |
| *HD73\_RS09025* | 9 | 3 |
| *menG* | 21 | 7 |
| *HD73\_RS09070* | 189 | 63 |
| *qcrA* | 675 | 225 |
| *HD73\_RS09125* | 9 | 3 |
| *HD73\_RS09200* | 3 | 1 |
| *HD73\_RS09205* | 1206 | 402 |
| *HD73\_RS09280* | 48 | 16 |
| *HD73\_RS09285* | 2076 | 692 |
| *HD73\_RS09325* | 9 | 3 |
| *HD73\_RS09390* | 33 | 11 |
| *HD73\_RS09405* | 1218 | 406 |
| *HD73\_RS09470* | 189 | 63 |
| *HD73\_RS09540* | 21 | 7 |
| *HD73\_RS09555* | 3 | 1 |
| *HD73\_RS09570* | 24 | 8 |
| *HD73\_RS09610* | 27 | 9 |
| *fliE* | 69 | 23 |
| *HD73\_RS09775* | 18 | 6 |
| *fliM* | 21 | 7 |
| *fliN* | 333 | 111 |
| *HD73\_RS09805* | 24 | 8 |
| *flhA* | 15 | 5 |
| *flhF* | 18 | 6 |
| *HD73\_RS09825* | 30 | 10 |
| *HD73\_RS09830* | 33 | 11 |
| *HD73\_RS09885* | 30 | 10 |
| *HD73\_RS09940* | 135 | 45 |
| *HD73\_RS09955* | 33 | 11 |
| *fbpA* | 159 | 53 |
| *HD73\_RS10020* | 951 | 317 |
| *HD73\_RS10095* | 189 | 63 |
| *HD73\_RS10160* | 57 | 19 |
| *malS* | 171 | 57 |
| *HD73\_RS10205* | 87 | 29 |
| *HD73\_RS10335* | 24 | 8 |
| *HD73\_RS10350* | 66 | 22 |
| *HD73\_RS10370* | 33 | 11 |
| *HD73\_RS10380* | 18 | 6 |
| *ilVC* | 15 | 5 |
| *HD73\_RS10435* | 102 | 34 |
| *HD73\_RS10440* | 879 | 293 |
| *HD73\_RS10470* | 36 | 12 |
| *HD73\_RS10485* | 36 | 12 |
| *HD73\_RS10565* | 6 | 2 |
| *HD73\_RS10590* | 21 | 7 |
| *HD73\_RS10595* | 75 | 25 |
| *HD73\_RS10610* | 75 | 25 |
| *HD73\_RS10620* | 18 | 6 |
| *HD73\_RS10630* | 30 | 10 |
| *HD73\_RS10650* | 81 | 27 |
| *HD73\_RS10720* | 27 | 9 |
| *HD73\_RS10805* | 69 | 23 |
| *HD73\_RS10820* | 3 | 1 |
| *HD73\_RS10825* | 3 | 1 |
| *HD73\_RS10830* | 39 | 13 |
| *hitS* | 141 | 47 |
| *HD73\_RS10880* | 42 | 14 |
| *HD73\_RS10945* | 702 | 234 |
| *HD73\_RS10975* | 27 | 9 |
| *istA* | 66 | 22 |
| *HD73\_RS11080* | 60 | 20 |
| *HD73\_RS11100* | 6 | 2 |
| *HD73\_RS11105* | 9 | 3 |
| *HD73\_RS11115* | 51 | 17 |
| *HD73\_RS11135* | 150 | 50 |
| *HD73\_RS11140* | 579 | 193 |
| *HD73\_RS11185* | 6 | 2 |
| *HD73\_RS11190* | 3 | 1 |
| *HD73\_RS11230* | 63 | 21 |
| *HD73\_RS11295* | 15 | 5 |
| *fosB* | 75 | 25 |
| *HD73\_RS11315* | 135 | 45 |
| *HD73\_RS11345* | 873 | 291 |
| *cls* | 168 | 56 |
| *brnQ* | 18 | 6 |
| *csaA* | 18 | 6 |
| *HD73\_RS33300* | 27 | 9 |
| *HD73\_RS11600* | 30 | 10 |
| *HD73\_RS33310* | 6 | 2 |
| *HD73\_RS11640* | 9 | 3 |
| *HD73\_RS11650* | 45 | 15 |
| *HD73\_RS11675* | 657 | 219 |
| *HD73\_RS11685* | 15 | 5 |
| *HD73\_RS11770* | 117 | 39 |
| *HD73\_RS11805* | 198 | 66 |
| *HD73\_RS11810* | 105 | 35 |
| *HD73\_RS11835* | 282 | 94 |
| *HD73\_RS11990* | 3 | 1 |
| *HD73\_RS12015* | 6 | 2 |
| *HD73\_RS12040* | 12 | 4 |
| *narJ* | 21 | 7 |
| *HD73\_RS12125* | 201 | 67 |
| *moaA* | 3 | 1 |
| *HD73\_RS12195* | 3 | 1 |
| *HD73\_RS12210* | 21 | 7 |
| *HD73\_RS12225* | 21 | 7 |
| *HD73\_RS12285* | 24 | 8 |
| *istA* | 66 | 22 |
| *HD73\_RS12370* | 3 | 1 |
| *HD73\_RS12410* | 18 | 6 |
| *HD73\_RS12595* | 12 | 4 |
| *HD73\_RS12635* | 27 | 9 |
| *HD73\_RS12685* | 12 | 4 |
| *gntK* | 75 | 25 |
| *HD73\_RS12770* | 915 | 305 |
| *HD73\_RS12805* | 30 | 10 |
| *atoD* | 6 | 2 |
| *ablB* | 138 | 46 |
| *HD73\_RS12920* | 21 | 7 |
| *HD73\_RS12925* | 27 | 9 |
| *HD73\_RS12940* | 93 | 31 |
| *HD73\_RS12955* | 15 | 5 |
| *HD73\_RS12980* | 9 | 3 |
| *HD73\_RS12990* | 72 | 24 |
| *istA* | 66 | 22 |
| *HD73\_RS13035* | 78 | 26 |
| *prpB* | 21 | 7 |
| *HD73\_RS33315* | 66 | 22 |
| *HD73\_RS13145* | 3 | 1 |
| *dhbC* | 1629 | 543 |
| *HD73\_RS13240* | 12 | 4 |
| *HD73\_RS13260* | 42 | 14 |
| *HD73\_RS13265* | 57 | 19 |
| *HD73\_RS13330* | 33 | 11 |
| *HD73\_RS13345* | 51 | 17 |
| *HD73\_RS13370* | 12 | 4 |
| *HD73\_RS13430* | 12 | 4 |
| *HD73\_RS13475* | 27 | 9 |
| *HD73\_RS33325* | 51 | 17 |
| *HD73\_RS13560* | 54 | 18 |
| *HD73\_RS13580* | 15 | 5 |
| *HD73\_RS13590* | 3 | 1 |
| *tdcB* | 75 | 25 |
| *HD73\_RS13660* | 288 | 96 |
| *HD73\_RS13665* | 87 | 29 |
| *spoIISB* | 57 | 19 |
| *HD73\_RS13740* | 6 | 2 |
| *HD73\_RS13745* | 87 | 29 |
| *HD73\_RS13770* | 84 | 28 |
| *HD73\_RS13810* | 30 | 10 |
| *HD73\_RS13820* | 24 | 8 |
| *HD73\_RS13885* | 105 | 35 |
| *HD73\_RS13890* | 15 | 5 |
| *HD73\_RS13900* | 138 | 46 |
| *HD73\_RS13910* | 30 | 10 |
| *HD73\_RS13915* | 69 | 23 |
| *istA* | 66 | 22 |
| *HD73\_RS13980* | 156 | 52 |
| *serC* | 1185 | 395 |
| *HD73\_RS14000* | 57 | 19 |
| *HD73\_RS14005* | 210 | 70 |
| *HD73\_RS14020* | 54 | 18 |
| *HD73\_RS14030* | 87 | 29 |
| *HD73\_RS14055* | 45 | 15 |
| *HD73\_RS14090* | 309 | 103 |
| *HD73\_RS14095* | 81 | 27 |
| *HD73\_RS14130* | 33 | 11 |
| *HD73\_RS14140* | 18 | 6 |
| *HD73\_RS14165* | 162 | 54 |
| *HD73\_RS14190* | 36 | 12 |
| *HD73\_RS14195* | 51 | 17 |
| *HD73\_RS14250* | 39 | 13 |
| *HD73\_RS14325* | 36 | 12 |
| *HD73\_RS14335* | 6 | 2 |
| *HD73\_RS14345* | 12 | 4 |
| *HD73\_RS14390* | 42 | 14 |
| *HD73\_RS14410* | 63 | 21 |
| *hblD* | 6 | 2 |
| *hblB* | 27 | 9 |
| *HD73\_RS14500* | 9 | 3 |
| *HD73\_RS31625* | 39 | 13 |
| *HD73\_RS14530* | 156 | 52 |
| *HD73\_RS14540* | 39 | 13 |
| *HD73\_RS14550* | 39 | 13 |
| *HD73\_RS14570* | 48 | 16 |
| *HD73\_RS14595* | 18 | 6 |
| *pxpB* | 111 | 37 |
| *HD73\_RS14605* | 774 | 258 |
| *HD73\_RS14650* | 51 | 17 |
| *HD73\_RS14755* | 15 | 5 |
| *HD73\_RS14760* | 153 | 51 |
| *HD73\_RS14785* | 15 | 5 |
| *colA* | 75 | 25 |
| *HD73\_RS14910* | 36 | 12 |
| *istA* | 66 | 22 |
| *HD73\_RS15070* | 21 | 7 |
| *lsrB* | 228 | 76 |
| *HD73\_RS15185* | 54 | 18 |
| *HD73\_RS15200* | 66 | 22 |
| *entB* | 3 | 1 |
| *HD73\_RS15240* | 18 | 6 |
| *HD73\_RS15345* | 39 | 13 |
| *HD73\_RS15360* | 3 | 1 |
| *HD73\_RS15385* | 33 | 11 |
| *ssuD* | 3 | 1 |
| *HD73\_RS15455* | 18 | 6 |
| *HD73\_RS15495* | 99 | 33 |
| *HD73\_RS32795* | 18 | 6 |
| *HD73\_RS15530* | 3 | 1 |
| *HD73\_RS15540* | 81 | 27 |
| *HD73\_RS15570* | 48 | 16 |
| *HD73\_RS15580* | 27 | 9 |
| *HD73\_RS15660* | 18 | 6 |
| *HD73\_RS15690* | 6 | 2 |
| *HD73\_RS15730* | 75 | 25 |
| *HD73\_RS15735* | 1041 | 347 |
| *HD73\_RS15750* | 27 | 9 |
| *HD73\_RS15780* | 60 | 20 |
| *HD73\_RS15870* | 15 | 5 |
| *HD73\_RS15880* | 27 | 9 |
| *HD73\_RS15910* | 30 | 10 |
| *recQ* | 138 | 46 |
| *HD73\_RS15960* | 48 | 16 |
| *HD73\_RS15975* | 60 | 20 |
| *HD73\_RS15995* | 12 | 4 |
| *HD73\_RS16015* | 24 | 8 |
| *HD73\_RS16060* | 57 | 19 |
| *HD73\_RS16175* | 45 | 15 |
| *HD73\_RS16185* | 3 | 1 |
| *HD73\_RS16190* | 18 | 6 |
| *HD73\_RS16225* | 6 | 2 |
| *HD73\_RS16230* | 18 | 6 |
| *HD73\_RS16255* | 78 | 26 |
| *sleB* | 1356 | 452 |
| *HD73\_RS16305* | 48 | 16 |
| *HD73\_RS16315* | 12 | 4 |
| *HD73\_RS16325* | 6 | 2 |
| *HD73\_RS16365* | 9 | 3 |
| *istA* | 66 | 22 |
| *HD73\_RS16445* | 39 | 13 |
| *HD73\_RS16460* | 27 | 9 |
| *HD73\_RS16510* | 15 | 5 |
| *HD73\_RS16530* | 90 | 30 |
| *HD73\_RS16560* | 9 | 3 |
| *HD73\_RS16565* | 6 | 2 |
| *HD73\_RS33365* | 33 | 11 |
| *HD73\_RS16595* | 39 | 13 |
| *HD73\_RS16680* | 18 | 6 |
| *HD73\_RS16710* | 54 | 18 |
| *HD73\_RS16720* | 63 | 21 |
| *HD73\_RS16760* | 687 | 229 |
| *HD73\_RS16790* | 15 | 5 |
| *HD73\_RS16800* | 234 | 78 |
| *HD73\_RS33020* | 33 | 11 |
| *HD73\_RS16830* | 54 | 18 |
| *HD73\_RS16835* | 96 | 32 |
| *HD73\_RS16835* | 81 | 27 |
| *HD73\_RS16840* | 9 | 3 |
| *HD73\_RS16875* | 51 | 17 |
| *HD73\_RS16905* | 9 | 3 |
| *HD73\_RS16985* | 1113 | 371 |
| *HD73\_RS17000* | 45 | 15 |
| *HD73\_RS17040* | 63 | 21 |
| *HD73\_RS17045* | 33 | 11 |
| *HD73\_RS17055* | 18 | 6 |
| *HD73\_RS17100* | 450 | 150 |
| *HD73\_RS17125* | 162 | 54 |
| *HD73\_RS17155* | 27 | 9 |
| *HD73\_RS17160* | 42 | 14 |
| *istA* | 66 | 22 |
| *HD73\_RS17200* | 21 | 7 |
| *HD73\_RS17210* | 36 | 12 |
| *HD73\_RS17230* | 63 | 21 |
| *yqeK* | 189 | 63 |
| *HD73\_RS17280* | 12 | 4 |
| *HD73\_RS17335* | 933 | 311 |
| *HD73\_RS17400* | 36 | 12 |
| *HD73\_RS33780* | 108 | 36 |
| *HD73\_RS17465* | 18 | 6 |
| *HD73\_RS17480* | 84 | 28 |
| *HD73\_RS17520* | 9 | 3 |
| *asnB* | 6 | 2 |
| *HD73\_RS17555* | 6 | 2 |
| *HD73\_RS33395* | 21 | 7 |
| *HD73\_RS33800* | 918 | 306 |
| *HD73\_RS17670* | 6 | 2 |
| *HD73\_RS17685* | 1737 | 579 |
| *HD73\_RS17745* | 75 | 25 |
| *HD73\_RS17790* | 18 | 6 |
| *HD73\_RS33805* | 33 | 11 |
| *HD73\_RS33830* | 15 | 5 |
| *HD73\_RS33855* | 9 | 3 |
| *HD73\_RS33875* | 114 | 38 |
| *HD73\_RS17935* | 12 | 4 |
| *HD73\_RS17965* | 15 | 5 |
| *HD73\_RS18010* | 9 | 3 |
| *HD73\_RS18180* | 3 | 1 |
| *HD73\_RS18215* | 57 | 19 |
| *HD73\_RS18240* | 63 | 21 |
| *HD73\_RS18260* | 15 | 5 |
| *HD73\_RS18305* | 33 | 11 |
| *HD73\_RS18350* | 417 | 139 |
| *HD73\_RS18385* | 39 | 13 |
| *HD73\_RS18415* | 15 | 5 |
| *HD73\_RS18430* | 84 | 28 |
| *HD73\_RS18435* | 72 | 24 |
| *bshB2* | 111 | 37 |
| *HD73\_RS18470* | 78 | 26 |
| *HD73\_RS18500* | 6 | 2 |
| *HD73\_RS18535* | 33 | 11 |
| *HD73\_RS18545* | 111 | 37 |
| *HD73\_RS18570* | 81 | 27 |
| *HD73\_RS18665* | 6 | 2 |
| *HD73\_RS18675* | 3 | 1 |
| *HD73\_RS18680* | 3 | 1 |
| *HD73\_RS18705* | 48 | 16 |
| *HD73\_RS18710* | 30 | 10 |
| *HD73\_RS18715* | 45 | 15 |
| *HD73\_RS18720* | 33 | 11 |
| *HD73\_RS18745* | 12 | 4 |
| *HD73\_RS18780* | 66 | 22 |
| *HD73\_RS18790* | 24 | 8 |
| *HD73\_RS18740* | 30 | 10 |
| *HD73\_RS18830* | 30 | 10 |
| *HD73\_RS18835* | 39 | 13 |
| *HD73\_RS18850* | 108 | 36 |
| *HD73\_RS18860* | 87 | 29 |
| *HD73\_RS18865* | 18 | 6 |
| *HD73\_RS18890* | 18 | 6 |
| *HD73\_RS18900* | 99 | 33 |
| *colA* | 3 | 1 |
| *HD73\_RS18925* | 6 | 2 |
| *HD73\_RS19035* | 6 | 2 |
| *panF* | 9 | 3 |
| *HD73\_RS19095* | 240 | 80 |
| *HD73\_RS19120* | 9 | 3 |
| *fdhF* | 495 | 165 |
| *gerSC* | 489 | 163 |
| *HD73\_RS19185* | 153 | 51 |
| *HD73\_RS19230* | 39 | 13 |
| *HD73\_RS19235* | 9 | 3 |
| *HD73\_RS19240* | 42 | 14 |
| *HD73\_RS19285* | 60 | 20 |
| *pdaB* | 120 | 40 |
| *HD73\_RS19425* | 99 | 33 |
| *HD73\_RS19495* | 18 | 6 |
| *HD73\_RS19510* | 12 | 4 |
| *HD73\_RS19540* | 33 | 11 |
| *hutG* | 87 | 29 |
| *HD73\_RS19620* | 153 | 51 |
| *ccdA* | 84 | 28 |
| *HD73\_RS19745* | 42 | 14 |
| *HD73\_RS19860* | 45 | 15 |
| *hfp* | 3 | 1 |
| *mlaA* | 249 | 83 |
| *entD* | 69 | 23 |
| *pfkB* | 75 | 25 |
| *HD73\_RS19945* | 9 | 3 |
| *HD73\_RS19985* | 63 | 21 |
| *HD73\_RS20030* | 51 | 17 |
| *HD73\_RS20045* | 24 | 8 |
| *mutL* | 54 | 18 |
| *pqsA* | 24 | 8 |
| *HD73\_RS20270* | 24 | 8 |
| *HD73\_RS20280* | 36 | 12 |
| *rpsO* | 39 | 13 |
| *ribF* | 24 | 8 |
| *nusA* | 6 | 2 |
| *rimP* | 21 | 7 |
| *HD73\_RS20395* | 39 | 13 |
| *dxr* | 21 | 7 |
| *upps* | 21 | 7 |
| *hslV* | 141 | 47 |
| *trmFO* | 60 | 20 |
| *HD73\_RS20535* | 1362 | 454 |
| *smc* | 1005 | 335 |
| *rpe* | 3 | 1 |
| *rsgA* | 6 | 2 |
| *rsmB* | 81 | 27 |
| *def* | 27 | 9 |
| *priA* | 30 | 10 |
| *HD73\_RS20680* | 84 | 28 |
| *HD73\_RS20685* | 18 | 6 |
| *HD73\_RS20690* | 12 | 4 |
| *HD73\_RS20710* | 384 | 128 |
| *HD73\_RS20720* | 15 | 5 |
| *HD73\_RS20750* | 21 | 7 |
| *HD73\_RS20775* | 6 | 2 |
| *HD73\_RS20805* | 3 | 1 |
| *divIB* | 183 | 61 |
| *HD73\_RS20945* | 102 | 34 |
| *HD73\_RS20995* | 12 | 4 |
| *HD73\_RS21010* | 57 | 19 |
| *HD73\_RS21115* | 228 | 76 |
| *HD73\_RS21195* | 60 | 20 |
| *HD73\_RS33420* | 60 | 20 |
| *HD73\_RS21255* | 51 | 17 |
| *HD73\_RS21290* | 39 | 13 |
| *HD73\_RS21295* | 54 | 18 |
| *nucA* | 18 | 6 |
| *HD73\_RS21440* | 147 | 49 |
| *HD73\_RS21460* | 156 | 52 |
| *HD73\_RS21485* | 54 | 18 |
| *HD73\_RS21510* | 129 | 43 |
| *gapN* | 78 | 26 |
| *ptsG* | 24 | 8 |
| *HD73\_RS21650* | 33 | 11 |
| *scpA* | 84 | 28 |
| *spoVAB* | 18 | 6 |
| *spoIIAA* | 441 | 147 |
| *dacF* | 36 | 12 |
| *deoB* | 834 | 278 |
| *HD73\_RS21850* | 1785 | 595 |
| *ribD* | 48 | 16 |
| *HD73\_RS22000* | 57 | 19 |
| *cpdB* | 54 | 18 |
| *HD73\_RS22065* | 99 | 33 |
| *HD73\_RS22070* | 903 | 301 |
| *proI* | 24 | 8 |
| *HD73\_RS22120* | 12 | 4 |
| *HD73\_RS22155* | 81 | 27 |
| *bfmBAA* | 78 | 26 |
| *HD73\_RS22255* | 24 | 8 |
| *xseB* | 3 | 1 |
| *spoIIIAE* | 645 | 215 |
| *spoIIIAB* | 36 | 12 |
| *HD73\_RS22395* | 3 | 1 |
| *HD73\_RS22400* | 129 | 43 |
| *efp* | 3 | 1 |
| *HD73\_RS22435* | 27 | 9 |
| *HD73\_RS22525* | 36 | 12 |
| *HD73\_RS22530* | 27 | 9 |
| *HD73\_RS22620* | 18 | 6 |
| *comGB* | 57 | 19 |
| *metH* | 1077 | 359 |
| *metC* | 93 | 31 |
| *HD73\_RS22720* | 9 | 3 |
| *HD73\_RS22725* | 108 | 36 |
| *HD73\_RS22750* | 48 | 16 |
| *HD73\_RS22755* | 15 | 5 |
| *HD73\_RS22765* | 219 | 73 |
| *phoU* | 6 | 2 |
| *rpoD* | 12 | 4 |
| *HD73\_RS22905* | 18 | 6 |
| *HD73\_RS22930* | 12 | 4 |
| *HD73\_RS22935* | 51 | 17 |
| *HD73\_RS23025* | 1191 | 397 |
| *rpmG* | 72 | 24 |
| *HD73\_RS23170* | 15 | 5 |
| *HD73\_RS23185* | 48 | 16 |
| *HD73\_RS23270* | 3 | 1 |
| *HD73\_RS23310* | 18 | 6 |
| *mltG* | 3 | 1 |
| *HD73\_RS23375* | 417 | 139 |
| *HD73\_RS23425* | 12 | 4 |
| *hisS* | 1788 | 596 |
| *HD73\_RS23430* | 9 | 3 |
| *HD73\_RS23470* | 6 | 2 |
| *secDF* | 9 | 3 |
| *HD73\_RS23510* | 15 | 5 |
| *HD73\_RS23565* | 54 | 18 |
| *HD73\_RS23660* | 39 | 13 |
| *spoIVFB* | 6 | 2 |
| *mreC* | 18 | 6 |
| *HD73\_RS23710* | 12 | 4 |
| *folC* | 63 | 21 |
| *HD73\_RS23820* | 93 | 31 |
| *HD73\_RS23845* | 15 | 5 |
| *HD73\_RS23880* | 123 | 41 |
| *HD73\_RS23900* | 18 | 6 |
| *uvrC* | 36 | 12 |
| *HD73\_RS23985* | 27 | 9 |
| *HD73\_RS24025* | 108 | 36 |
| *HD73\_RS24055* | 63 | 21 |
| *brnQ* | 42 | 14 |
| *HD73\_RS24125* | 132 | 44 |
| *HD73\_RS24135* | 123 | 41 |
| *rnhC* | 75 | 25 |
| *HD73\_RS24205* | 33 | 11 |
| *nrdR* | 36 | 12 |
| *mutM* | 57 | 19 |
| *phoR* | 48 | 16 |
| *fxsA* | 66 | 22 |
| *accD* | 27 | 9 |
| *HD73\_RS24455* | 108 | 36 |
| *HD73\_RS24500* | 15 | 5 |
| *HD73\_RS24590* | 408 | 136 |
| *HD73\_RS24595* | 6 | 2 |
| *HD73\_RS24635* | 3 | 1 |
| *HD73\_RS24640* | 21 | 7 |
| *HD73\_RS24665* | 15 | 5 |
| *HD73\_RS24775* | 36 | 12 |
| *HD73\_RS24795* | 87 | 29 |
| *HD73\_RS24800* | 9 | 3 |
| *HD73\_RS24855* | 90 | 30 |
| *HD73\_RS24875* | 3 | 1 |
| *HD73\_RS24910* | 45 | 15 |
| *thpR* | 117 | 39 |
| *HD73\_RS24965* | 153 | 51 |
| *moeA* | 72 | 24 |
| *HD73\_RS25080* | 3 | 1 |
| *HD73\_RS25090* | 57 | 19 |
| *HD73\_RS25120* | 48 | 16 |
| *HD73\_RS25140* | 42 | 14 |
| *HD73\_RS25145* | 9 | 3 |
| *HD73\_RS25275* | 108 | 36 |
| *HD73\_RS25285* | 3 | 1 |
| *HD73\_RS25345* | 105 | 35 |
| *HD73\_RS25350* | 15 | 5 |
| *HD73\_RS25395* | 243 | 81 |
| *HD73\_RS25405* | 18 | 6 |
| *HD73\_RS25450* | 162 | 54 |
| *HD73\_RS25475* | 120 | 40 |
| *feoB* | 78 | 26 |
| *HD73\_RS25495* | 51 | 17 |
| *HD73\_RS25535* | 72 | 24 |
| *HD73\_RS25560* | 6 | 2 |
| *HD73\_RS25575* | 33 | 11 |
| *gntP* | 213 | 71 |
| *HD73\_RS25665* | 9 | 3 |
| *HD73\_RS25685* | 72 | 24 |
| *glgC* | 18 | 6 |
| *glgB* | 57 | 19 |
| *HD73\_RS25950* | 3 | 1 |
| *HD73\_RS26000* | 57 | 19 |
| *HD73\_RS26030* | 63 | 21 |
| *HD73\_RS26035* | 18 | 6 |
| *HD73\_RS26040* | 21 | 7 |
| *HD73\_RS26095* | 129 | 43 |
| *HD73\_RS26130* | 375 | 125 |
| *HD73\_RS26150* | 117 | 39 |
| *HD73\_RS26205* | 63 | 21 |
| *HD73\_RS26235* | 15 | 5 |
| *HD73\_RS26245* | 609 | 203 |
| *HD73\_RS26270* | 45 | 15 |
| *HD73\_RS26280* | 9 | 3 |
| *HD73\_RS26300* | 6 | 2 |
| *HD73\_RS26320* | 30 | 10 |
| *HD73\_RS26430* | 45 | 15 |
| *HD73\_RS26510* | 351 | 117 |
| *HD73\_RS26515* | 60 | 20 |
| *HD73\_RS26535* | 12 | 4 |
| *HD73\_RS26540* | 93 | 31 |
| *yunB* | 6 | 2 |
| *HD73\_RS26695* | 9 | 3 |
| *HD73\_RS26750* | 105 | 35 |
| *HD73\_RS26775* | 69 | 23 |
| *HD73\_RS26795* | 21 | 7 |
| *HD73\_RS26880* | 57 | 19 |
| *HD73\_RS26895* | 3 | 1 |
| *HD73\_RS26905* | 39 | 13 |
| *HD73\_RS26935* | 150 | 50 |
| *HD73\_RS26940* | 108 | 36 |
| *HD73\_RS26965* | 33 | 11 |
| *HD73\_RS26975* | 81 | 27 |
| *HD73\_RS27045* | 27 | 9 |
| *HD73\_RS27165* | 54 | 18 |
| *speG* | 48 | 16 |
| *psiE* | 69 | 23 |
| *HD73\_RS27210* | 6 | 2 |
| *HD73\_RS27225* | 48 | 16 |
| *HD73\_RS27235* | 51 | 17 |
| *HD73\_RS27260* | 6 | 2 |
| *secG* | 6 | 2 |
| *rpoN* | 255 | 85 |
| *HD73\_RS27355* | 123 | 41 |
| *HD73\_RS27390* | 27 | 9 |
| *HD73\_RS33870* | 39 | 13 |
| *HD73\_RS27550* | 21 | 7 |
| *HD73\_RS27565* | 18 | 6 |
| *HD73\_RS27575* | 33 | 11 |
| *HD73\_RS27595* | 33 | 11 |
| *HD73\_RS33500* | 18 | 6 |
| *HD73\_RS27610* | 66 | 22 |
| *HD73\_RS27615* | 15 | 5 |
| *lgt* | 63 | 21 |
| *HD73\_RS27735* | 39 | 13 |
| *HD73\_RS27750* | 117 | 39 |
| *HD73\_RS27775* | 51 | 17 |
| *HD73\_RS27865* | 12 | 4 |
| *cspc* | 99 | 33 |
| *HD73\_RS27905* | 9 | 3 |
| *HD73\_RS27910* | 36 | 12 |
| *HD73\_RS27955* | 102 | 34 |
| *HD73\_RS33505* | 36 | 12 |
| *HD73\_RS28080* | 21 | 7 |
| *HD73\_RS33990* | 21 | 7 |
| *HD73\_RS28140* | 1392 | 464 |
| *galE* | 57 | 19 |
| *HD73\_RS28280* | 12 | 4 |
| *fabZ* | 60 | 20 |
| *spoIID* | 45 | 15 |
| *nuoN* | 3 | 1 |
| *HD73\_RS28380* | 93 | 31 |
| *nuoK* | 1893 | 631 |
| *HD73\_RS28395* | 150 | 50 |
| *HD73\_RS28415* | 6 | 2 |
| *HD73\_RS28435* | 69 | 23 |
| *HD73\_RS28440* | 3 | 1 |
| *atpG* | 6 | 2 |
| *atpH* | 6 | 2 |
| *spoIIR* | 9 | 3 |
| *rpoE* | 63 | 21 |
| *acdA* | 48 | 16 |
| *HD73\_RS28650* | 1293 | 431 |
| *cls* | 12 | 4 |
| *HD73\_RS28920* | 63 | 21 |
| *HD73\_RS28975* | 15 | 5 |
| *HD73\_RS29040* | 21 | 7 |
| *HD73\_RS29050* | 45 | 15 |
| *HD73\_RS29095* | 39 | 13 |
| *HD73\_RS29120* | 105 | 35 |
| *HD73\_RS29140* | 87 | 29 |
| *lrgB* | 3 | 1 |
| *sodA* | 12 | 4 |
| *HD73\_RS29270* | 21 | 7 |
| *walR* | 1845 | 615 |
| *HD73\_RS29370* | 27 | 9 |
| *HD73\_RS29375* | 63 | 21 |
| *rnpA* | 120 | 40 |
| *rpmH* | 75 | 25 |

附表4 蜡状芽胞杆菌中UAG蛋白通读后增加的序列长度及延长的氨基酸数量

|  |  |  |
| --- | --- | --- |
| 基因名称 | 增加碱基长度（bp） | 增加氨基酸数目（个） |
| *dnaA* | 141 | 47 |
| *dnaN* | 102 | 34 |
| *BC\_RS00130* | 45 | 15 |
| *BC\_RS00180* | 27 | 9 |
| *BC\_RS00255* | 6 | 2 |
| *BC\_RS00310* | 6 | 2 |
| *divIC* | 15 | 5 |
| *pabC* | 18 | 6 |
| *BC\_RS00515* | 30 | 10 |
| *radA* | 1077 | 359 |
| *rpsG* | 12 | 4 |
| *BC\_RS00815* | 123 | 41 |
| *pdaB* | 93 | 31 |
| *glmS* | 42 | 14 |
| *BC\_RS00990* | 3 | 1 |
| *BC\_RS01010* | 1053 | 351 |
| *BC\_RS01080* | 105 | 35 |
| *BC\_RS01115* | 57 | 19 |
| *BC\_RS01195* | 3 | 1 |
| *BC\_RS01200* | 54 | 18 |
| *BC\_RS01210* | 126 | 42 |
| *BC\_RS01245* | 18 | 6 |
| *BC\_RS01310* | 3 | 1 |
| *acpS* | 1107 | 369 |
| *alr* | 12 | 4 |
| *BC\_RS01365* | 3 | 1 |
| *tsaB* | 45 | 15 |
| *tsaD* | 12 | 4 |
| *guaA* | 9 | 3 |
| *BC\_RS01555* | 54 | 18 |
| *BC\_RS01730* | 2319 | 773 |
| *pcrA* | 66 | 22 |
| *BC\_RS01750* | 18 | 6 |
| *gatC* | 1473 | 491 |
| *BC\_RS01870* | 90 | 30 |
| *BC\_RS01880* | 69 | 23 |
| *BC\_RS01895* | 45 | 15 |
| *BC\_RS01905* | 24 | 8 |
| *BC\_RS01935* | 45 | 15 |
| *BC\_RS01955* | 39 | 13 |
| *BC\_RS02005* | 30 | 10 |
| *argR* | 21 | 7 |
| *arcA* | 9 | 3 |
| *thiE* | 126 | 42 |
| *BC\_RS02155* | 18 | 6 |
| *BC\_RS02165* | 6 | 2 |
| *BC\_RS02175* | 114 | 38 |
| *BC\_RS02200* | 15 | 5 |
| *BC\_RS02245* | 42 | 14 |
| *BC\_RS02295* | 108 | 36 |
| *BC\_RS02325* | 90 | 30 |
| *BC\_RS02365* | 30 | 10 |
| *BC\_RS02375* | 3 | 1 |
| *BC\_RS02405* | 126 | 42 |
| *BC\_RS02450* | 6 | 2 |
| *BC\_RS02465* | 6 | 2 |
| *BC\_RS02500* | 21 | 7 |
| *BC\_RS02505* | 9 | 3 |
| *BC\_RS02515* | 147 | 49 |
| *BC\_RS02525* | 15 | 5 |
| *BC\_RS02615* | 6 | 2 |
| *queG* | 27 | 9 |
| *BC\_RS02750* | 24 | 8 |
| *BC\_RS02765* | 69 | 23 |
| *BC\_RS02810* | 3 | 1 |
| *fdhF* | 504 | 168 |
| *BC\_RS02960* | 9 | 3 |
| *BC\_RS03040* | 441 | 147 |
| *BC\_RS03140* | 72 | 24 |
| *treP* | 30 | 10 |
| *BC\_RS03205* | 843 | 281 |
| *BC\_RS03245* | 3 | 1 |
| *BC\_RS03250* | 6 | 2 |
| *BC\_RS03260* | 81 | 27 |
| *sph* | 21 | 7 |
| *BC\_RS03415* | 63 | 21 |
| *BC\_RS03580* | 48 | 16 |
| *BC\_RS03715* | 45 | 15 |
| *BC\_RS03740* | 21 | 7 |
| *thiO* | 219 | 73 |
| *thiF* | 852 | 284 |
| *thiD* | 24 | 8 |
| *BC\_RS03775* | 174 | 58 |
| *kdpc* | 3 | 1 |
| *BC\_RS03815* | 81 | 27 |
| *BC\_RS03835* | 1893 | 631 |
| *BC\_RS03840* | 651 | 217 |
| *BC\_RS03855* | 45 | 15 |
| *BC\_RS03880* | 24 | 8 |
| *BC\_RS03945* | 3 | 1 |
| *BC\_RS03980* | 69 | 23 |
| *BC\_RS04005* | 3 | 1 |
| *BC\_RS04015* | 24 | 8 |
| *BC\_RS04035* | 3 | 1 |
| *BC\_RS04055* | 216 | 72 |
| *BC\_RS04085* | 45 | 15 |
| *BC\_RS04095* | 6 | 2 |
| *BC\_RS04165* | 42 | 14 |
| *BC\_RS04170* | 27 | 9 |
| *BC\_RS04175* | 30 | 10 |
| *BC\_RS04185* | 30 | 10 |
| *BC\_RS27505* | 120 | 40 |
| *BC\_RS04215* | 12 | 4 |
| *BC\_RS04225* | 1122 | 374 |
| *BC\_RS04255* | 30 | 10 |
| *BC\_RS04270* | 15 | 5 |
| *BC\_RS04285* | 3 | 1 |
| *BC\_RS04300* | 27 | 9 |
| *BC\_RS04350* | 87 | 29 |
| *BC\_RS04370* | 267 | 89 |
| *BC\_RS04460* | 117 | 39 |
| *BC\_RS04475* | 33 | 11 |
| *BC\_RS04495* | 117 | 39 |
| *BC\_RS04510* | 84 | 28 |
| *BC\_RS04550* | 6 | 2 |
| *BC\_RS04575* | 171 | 57 |
| *BC\_RS04590* | 132 | 44 |
| *BC\_RS04595* | 93 | 31 |
| *BC\_RS27835* | 198 | 66 |
| *BC\_RS04595* | 9 | 3 |
| *BC\_RS04650* | 9 | 3 |
| *BC\_RS04685* | 66 | 22 |
| *BC\_RS04705* | 30 | 10 |
| *BC\_RS04740* | 9 | 3 |
| *BC\_RS04745* | 12 | 4 |
| *BC\_RS04775* | 21 | 7 |
| *BC\_RS04780* | 30 | 10 |
| *BC\_RS04880* | 15 | 5 |
| *BC\_RS04885* | 12 | 4 |
| *dhaK* | 3 | 1 |
| *BC\_RS04935* | 27 | 9 |
| *BC\_RS04940* | 15 | 5 |
| *BC\_RS04965* | 12 | 4 |
| *BC\_RS04980* | 48 | 16 |
| *BC\_RS04995* | 9 | 3 |
| *BC\_RS05060* | 78 | 26 |
| *BC\_RS27535* | 39 | 13 |
| *BC\_RS05115* | 45 | 15 |
| *BC\_RS05125* | 111 | 37 |
| *BC\_RS05160* | 30 | 10 |
| *BC\_RS05175* | 63 | 21 |
| *BC\_RS05205* | 60 | 20 |
| *BC\_RS05220* | 12 | 4 |
| *ecsA* | 60 | 20 |
| *BC\_RS05300* | 18 | 6 |
| *BC\_RS05340* | 18 | 6 |
| *BC\_RS05395* | 78 | 26 |
| *BC\_RS05420* | 3 | 1 |
| *BC\_RS05425* | 48 | 16 |
| *BC\_RS05450* | 30 | 10 |
| *cysT* | 45 | 15 |
| *BC\_RS05480* | 51 | 17 |
| *BC\_RS05500* | 24 | 8 |
| *BC\_RS27565* | 51 | 17 |
| *BC\_RS05565* | 9 | 3 |
| *BC\_RS05590* | 36 | 12 |
| *BC\_RS05595* | 99 | 33 |
| *BC\_RS05600* | 1851 | 617 |
| *BC\_RS05620* | 84 | 28 |
| *BC\_RS05625* | 12 | 4 |
| *BC\_RS05630* | 12 | 4 |
| *BC\_RS05665* | 36 | 12 |
| *addA* | 12 | 4 |
| *asnB* | 27 | 9 |
| *hemH* | 24 | 8 |
| *BC\_RS05855* | 231 | 77 |
| *BC\_RS05890* | 75 | 25 |
| *mecA* | 69 | 23 |
| *BC\_RS05990* | 18 | 6 |
| *BC\_RS06055* | 12 | 4 |
| *exsF* | 3 | 1 |
| *BC\_RS06130* | 27 | 9 |
| *trpA* | 33 | 11 |
| *BC\_RS06215* | 72 | 24 |
| *BC\_RS06225* | 81 | 27 |
| *BC\_RS06230* | 3 | 1 |
| *BC\_RS06235* | 39 | 13 |
| *BC\_RS06240* | 3 | 1 |
| *BC\_RS06260* | 6 | 2 |
| *BC\_RS06270* | 87 | 29 |
| *BC\_RS27845* | 6 | 2 |
| *BC\_RS06305* | 30 | 10 |
| *BC\_RS06340* | 9 | 3 |
| *BC\_RS06375* | 48 | 16 |
| *BC\_RS06380* | 63 | 21 |
| *sinI* | 15 | 5 |
| *potB* | 807 | 269 |
| *BC\_RS06435* | 75 | 25 |
| *BC\_RS06515* | 18 | 6 |
| *BC\_RS06545* | 63 | 21 |
| *BC\_RS06575* | 27 | 9 |
| *BC\_RS06580* | 114 | 38 |
| *amaA* | 105 | 35 |
| *hisG* | 57 | 19 |
| *hisA* | 30 | 10 |
| *hisI* | 27 | 9 |
| *BC\_RS07035* | 3 | 1 |
| *sat* | 621 | 207 |
| *cysC* | 15 | 5 |
| *BC\_RS07070* | 30 | 10 |
| *BC\_RS07075* | 63 | 21 |
| *BC\_RS07175* | 633 | 211 |
| *BC\_RS07280* | 60 | 20 |
| *resC* | 78 | 26 |
| *resE* | 72 | 24 |
| *BC\_RS07350* | 36 | 12 |
| *BC\_RS07370* | 843 | 281 |
| *BC\_RS07380* | 81 | 27 |
| *BC\_RS07420* | 57 | 19 |
| *BC\_RS07455* | 15 | 5 |
| *BC\_RS07500* | 9 | 3 |
| *menG* | 21 | 7 |
| *BC\_RS07540* | 189 | 63 |
| *qcrA* | 675 | 225 |
| *BC\_RS07585* | 9 | 3 |
| *BC\_RS07655* | 3 | 1 |
| *BC\_RS07660* | 1206 | 402 |
| *BC\_RS07755* | 48 | 16 |
| *BC\_RS07760* | 42 | 14 |
| *BC\_RS07800* | 9 | 3 |
| *BC\_RS07875* | 33 | 11 |
| *BC\_RS07890* | 1218 | 406 |
| *BC\_RS07925* | 111 | 37 |
| *BC\_RS07955* | 189 | 63 |
| *BC\_RS08040* | 3 | 1 |
| *BC\_RS08055* | 24 | 8 |
| *BC\_RS08090* | 27 | 9 |
| *fliE* | 69 | 23 |
| *BC\_RS08265* | 18 | 6 |
| *fliM* | 21 | 7 |
| *fliN* | 333 | 111 |
| *fliR* | 24 | 8 |
| *flhA* | 15 | 5 |
| *flhF* | 18 | 6 |
| *flgG* | 30 | 10 |
| *BC\_RS08320* | 33 | 11 |
| *BC\_RS08375* | 30 | 10 |
| *BC\_RS08435* | 45 | 15 |
| *BC\_RS08445* | 33 | 11 |
| *fbpA* | 159 | 53 |
| *BC\_RS08510* | 93 | 31 |
| *BC\_RS08515* | 42 | 14 |
| *BC\_RS08580* | 42 | 14 |
| *BC\_RS08635* | 3 | 1 |
| *BC\_RS08650* | 57 | 19 |
| *malS* | 84 | 28 |
| *BC\_RS08685* | 87 | 29 |
| *BC\_RS08725* | 9 | 3 |
| *BC\_RS08785* | 24 | 8 |
| *BC\_RS08800* | 66 | 22 |
| *BC\_RS08825* | 33 | 11 |
| *BC\_RS08835* | 78 | 26 |
| *ilvC* | 15 | 5 |
| *BC\_RS08890* | 102 | 34 |
| *BC\_RS08895* | 879 | 293 |
| *BC\_RS08925* | 36 | 12 |
| *BC\_RS08940* | 36 | 12 |
| *BC\_RS08950* | 93 | 31 |
| *BC\_RS08970* | 96 | 32 |
| *BC\_RS08985* | 39 | 13 |
| *BC\_RS09065* | 6 | 2 |
| *BC\_RS09095* | 75 | 25 |
| *BC\_RS09110* | 75 | 25 |
| *BC\_RS09120* | 18 | 6 |
| *BC\_RS09130* | 72 | 24 |
| *BC\_RS09150* | 81 | 27 |
| *BC\_RS27610* | 90 | 30 |
| *BC\_RS09230* | 39 | 13 |
| *BC\_RS09250* | 528 | 176 |
| *BC\_RS09280* | 276 | 92 |
| *BC\_RS09310* | 144 | 48 |
| *BC\_RS27625* | 279 | 93 |
| *BC\_RS09350* | 18 | 6 |
| *BC\_RS09370* | 99 | 33 |
| *BC\_RS09445* | 378 | 126 |
| *BC\_RS09460* | 36 | 12 |
| *BC\_RS09485* | 9 | 3 |
| *BC\_RS09560* | 3 | 1 |
| *BC\_RS09565* | 105 | 35 |
| *BC\_RS09580* | 6 | 2 |
| *BC\_RS09620* | 27 | 9 |
| *BC\_RS09650* | 12 | 4 |
| *BC\_RS09705* | 69 | 23 |
| *BC\_RS09720* | 3 | 1 |
| *BC\_RS09725* | 3 | 1 |
| *BC\_RS09730* | 39 | 13 |
| *BC\_RS09780* | 141 | 47 |
| *BC\_RS09785* | 42 | 14 |
| *BC\_RS09845* | 702 | 234 |
| *BC\_RS09955* | 60 | 20 |
| *BC\_RS09975* | 6 | 2 |
| *BC\_RS09980* | 9 | 3 |
| *BC\_RS09990* | 51 | 17 |
| *BC\_RS10010* | 150 | 50 |
| *BC\_RS10015* | 459 | 153 |
| *BC\_RS10055* | 6 | 2 |
| *BC\_RS10060* | 3 | 1 |
| *BC\_RS10125* | 15 | 5 |
| *fosB* | 75 | 25 |
| *exsB* | 189 | 63 |
| *BC\_RS10175* | 873 | 291 |
| *cls* | 168 | 56 |
| *brnQ* | 90 | 30 |
| *csaA* | 18 | 6 |
| *BC\_RS10330* | 87 | 29 |
| *BC\_RS10340* | 105 | 35 |
| *BC\_RS10450* | 51 | 17 |
| *BC\_RS10510* | 3 | 1 |
| *BC\_RS10535* | 6 | 2 |
| *narJ* | 21 | 7 |
| *BC\_RS10635* | 339 | 113 |
| *moaA* | 3 | 1 |
| *BC\_RS10670* | 21 | 7 |
| *BC\_RS10715* | 6 | 2 |
| *BC\_RS10730* | 21 | 7 |
| *BC\_RS10750* | 84 | 28 |
| *BC\_RS10755* | 498 | 166 |
| *BC\_RS10780* | 24 | 8 |
| *BC\_RS10895* | 96 | 32 |
| *BC\_RS10920* | 69 | 23 |
| *BC\_RS10980* | 15 | 5 |
| *BC\_RS11020* | 27 | 9 |
| *BC\_RS11070* | 12 | 4 |
| *gntK* | 75 | 25 |
| *BC\_RS11150* | 915 | 305 |
| *BC\_RS11185* | 30 | 10 |
| *atoD* | 6 | 2 |
| *ablB* | 18 | 6 |
| *BC\_RS11300* | 21 | 7 |
| *BC\_RS11320* | 93 | 31 |
| *BC\_RS11335* | 15 | 5 |
| *BC\_RS11350* | 3 | 1 |
| *BC\_RS11375* | 9 | 3 |
| *BC\_RS11420* | 69 | 23 |
| *prpB* | 21 | 7 |
| *BC\_RS27645* | 207 | 69 |
| *BC\_RS11525* | 3 | 1 |
| *dhbC* | 1629 | 543 |
| *BC\_RS11620* | 12 | 4 |
| *BC\_RS11640* | 42 | 14 |
| *BC\_RS11645* | 93 | 31 |
| *BC\_RS11655* | 1002 | 334 |
| *BC\_RS11715* | 33 | 11 |
| *BC\_RS11730* | 69 | 23 |
| *BC\_RS11765* | 12 | 4 |
| *BC\_RS11870* | 51 | 17 |
| *BC\_RS11880* | 3 | 1 |
| *BC\_RS11950* | 6 | 2 |
| *BC\_RS11960* | 21 | 7 |
| *BC\_RS11985* | 3 | 1 |
| *tdcB* | 75 | 25 |
| *BC\_RS12055* | 288 | 96 |
| *BC\_RS12060* | 96 | 32 |
| *BC\_RS12065* | 66 | 22 |
| *BC\_RS12075* | 234 | 78 |
| *BC\_RS12080* | 42 | 14 |
| *BC\_RS12110* | 222 | 74 |
| *BC\_RS12125* | 24 | 8 |
| *spoIISB* | 27 | 9 |
| *BC\_RS12215* | 6 | 2 |
| *BC\_RS12220* | 87 | 29 |
| *BC\_RS12235* | 84 | 28 |
| *BC\_RS12290* | 207 | 69 |
| *BC\_RS12295* | 66 | 22 |
| *BC\_RS12310* | 27 | 9 |
| *BC\_RS12330* | 9 | 3 |
| *BC\_RS12335* | 30 | 10 |
| *BC\_RS12435* | 933 | 311 |
| *BC\_RS12465* | 36 | 12 |
| *BC\_RS12475* | 12 | 4 |
| *yqeK* | 105 | 35 |
| *mtnN* | 891 | 297 |
| *BC\_RS12540* | 36 | 12 |
| *BC\_RS12570* | 3 | 1 |
| *BC\_RS12620* | 162 | 54 |
| *BC\_RS12695* | 27 | 9 |
| *BC\_RS12700* | 48 | 16 |
| *BC\_RS12735* | 741 | 247 |
| *BC\_RS12750* | 1113 | 371 |
| *BC\_RS12810* | 30 | 10 |
| *BC\_RS12850* | 18 | 6 |
| *BC\_RS12875* | 102 | 34 |
| *BC\_RS12890* | 147 | 49 |
| *BC\_RS12995* | 75 | 25 |
| *BC\_RS13000* | 24 | 8 |
| *BC\_RS13055* | 9 | 3 |
| *BC\_RS13095* | 51 | 17 |
| *BC\_RS13145* | 21 | 7 |
| *BC\_RS13255* | 3 | 1 |
| *BC\_RS13275* | 36 | 12 |
| *BC\_RS13280* | 9 | 3 |
| *BC\_RS13285* | 81 | 27 |
| *BC\_RS13340* | 60 | 20 |
| *BC\_RS13350* | 54 | 18 |
| *BC\_RS13385* | 18 | 6 |
| *BC\_RS13470* | 39 | 13 |
| *dnaN* | 42 | 14 |
| *BC\_RS13505* | 9 | 3 |
| *BC\_RS13530* | 90 | 30 |
| *BC\_RS13635* | 27 | 9 |
| *BC\_RS13705* | 66 | 22 |
| *BC\_RS13710* | 27 | 9 |
| *BC\_RS13715* | 12 | 4 |
| *BC\_RS13725* | 48 | 16 |
| *sleB* | 1356 | 452 |
| *BC\_RS13775* | 33 | 11 |
| *BC\_RS13800* | 186 | 62 |
| *BC\_RS13840* | 3 | 1 |
| *BC\_RS13850* | 45 | 15 |
| *BC\_RS13870* | 3 | 1 |
| *BC\_RS13920* | 9 | 3 |
| *BC\_RS13950* | 57 | 19 |
| *BC\_RS13995* | 75 | 25 |
| *BC\_RS14010* | 12 | 4 |
| *BC\_RS14030* | 60 | 20 |
| *BC\_RS14045* | 48 | 16 |
| *recQ* | 138 | 46 |
| *BC\_RS14085* | 54 | 18 |
| *BC\_RS27695* | 27 | 9 |
| *BC\_RS14100* | 12 | 4 |
| *BC\_RS14110* | 15 | 5 |
| *BC\_RS14195* | 171 | 57 |
| *BC\_RS14225* | 27 | 9 |
| *BC\_RS14240* | 1041 | 347 |
| *BC\_RS14245* | 69 | 23 |
| *BC\_RS14285* | 6 | 2 |
| *BC\_RS14315* | 18 | 6 |
| *BC\_RS14400* | 27 | 9 |
| *BC\_RS14410* | 48 | 16 |
| *BC\_RS14440* | 72 | 24 |
| *BC\_RS14450* | 3 | 1 |
| *BC\_RS14470* | 18 | 6 |
| *BC\_RS14520* | 18 | 6 |
| *BC\_RS14560* | 3 | 1 |
| *ssuD* | 3 | 1 |
| *BC\_RS14585* | 117 | 39 |
| *BC\_RS14590* | 3 | 1 |
| *BC\_RS14620* | 3 | 1 |
| *BC\_RS14625* | 108 | 36 |
| *BC\_RS14700* | 63 | 21 |
| *BC\_RS14745* | 30 | 10 |
| *BC\_RS14785* | 66 | 22 |
| *BC\_RS14810* | 54 | 18 |
| *lsrB* | 51 | 17 |
| *BC\_RS14905* | 21 | 7 |
| *BC\_RS14975* | 54 | 18 |
| *BC\_RS15020* | 15 | 5 |
| *colA* | 159 | 53 |
| *BC\_RS15080* | 15 | 5 |
| *BC\_RS27855* | 12 | 4 |
| *BC\_RS15155* | 15 | 5 |
| *BC\_RS15180* | 12 | 4 |
| *BC\_RS15185* | 33 | 11 |
| *pxpB* | 87 | 29 |
| *BC\_RS15355* | 18 | 6 |
| *BC\_RS15410* | 39 | 13 |
| *ppsA* | 15 | 5 |
| *BC\_RS15485* | 6 | 2 |
| *BC\_RS15525* | 27 | 9 |
| *hblD* | 6 | 2 |
| *BC\_RS15580* | 30 | 10 |
| *BC\_RS15615* | 75 | 25 |
| *BC\_RS15625* | 63 | 21 |
| *BC\_RS15645* | 63 | 21 |
| *BC\_RS15680* | 6 | 2 |
| *BC\_RS15690* | 36 | 12 |
| *BC\_RS15745* | 255 | 85 |
| *BC\_RS15815* | 18 | 6 |
| *BC\_RS15830* | 24 | 8 |
| *BC\_RS15870* | 36 | 12 |
| *BC\_RS15890* | 27 | 9 |
| *BC\_RS15920* | 258 | 86 |
| *BC\_RS15935* | 6 | 2 |
| *BC\_RS15940* | 21 | 7 |
| *BC\_RS15985* | 9 | 3 |
| *BC\_RS16015* | 48 | 16 |
| *BC\_RS16020* | 18 | 6 |
| *BC\_RS16030* | 132 | 44 |
| *BC\_RS16055* | 54 | 18 |
| *BC\_RS16060* | 309 | 103 |
| *BC\_RS16115* | 24 | 8 |
| *BC\_RS16125* | 57 | 19 |
| *BC\_RS16155* | 18 | 6 |
| *BC\_RS16165* | 183 | 61 |
| *BC\_RS16170* | 57 | 19 |
| *hypF* | 21 | 7 |
| *hypE* | 54 | 18 |
| *BC\_RS16215* | 15 | 5 |
| *serC* | 1185 | 395 |
| *BC\_RS16240* | 156 | 52 |
| *BC\_RS16280* | 144 | 48 |
| *BC\_RS16300* | 123 | 41 |
| *BC\_RS16325* | 30 | 10 |
| *BC\_RS16330* | 3 | 1 |
| *BC\_RS16345* | 6 | 2 |
| *BC\_RS16380* | 42 | 14 |
| *BC\_RS16385* | 60 | 20 |
| *BC\_RS16415* | 180 | 60 |
| *BC\_RS16445* | 39 | 13 |
| *BC\_RS16490* | 12 | 4 |
| *BC\_RS16495* | 1854 | 618 |
| *BC\_RS16570* | 36 | 12 |
| *BC\_RS16590* | 9 | 3 |
| *BC\_RS16610* | 114 | 38 |
| *BC\_RS16665* | 12 | 4 |
| *BC\_RS16695* | 15 | 5 |
| *BC\_RS16740* | 9 | 3 |
| *BC\_RS16760* | 9 | 3 |
| *BC\_RS16945* | 6 | 2 |
| *BC\_RS16950* | 108 | 36 |
| *BC\_RS16990* | 57 | 19 |
| *BC\_RS17000* | 18 | 6 |
| *BC\_RS17035* | 27 | 9 |
| *BC\_RS17055* | 63 | 21 |
| *BC\_RS17080* | 33 | 11 |
| *BC\_RS17115* | 30 | 10 |
| *BC\_RS17145* | 417 | 139 |
| *BC\_RS17185* | 42 | 14 |
| *BC\_RS17190* | 6 | 2 |
| *BC\_RS17195* | 33 | 11 |
| *yeiL* | 42 | 14 |
| *BC\_RS17220* | 15 | 5 |
| *BC\_RS17235* | 96 | 32 |
| *bshB2* | 111 | 37 |
| *BC\_RS17275* | 69 | 23 |
| *BC\_RS17305* | 6 | 2 |
| *BC\_RS17345* | 6 | 2 |
| *BC\_RS17375* | 78 | 26 |
| *psiE* | 3 | 1 |
| *BC\_RS17475* | 63 | 21 |
| *BC\_RS17480* | 3 | 1 |
| *BC\_RS17500* | 48 | 16 |
| *BC\_RS17505* | 30 | 10 |
| *BC\_RS17515* | 24 | 8 |
| *BC\_RS17550* | 39 | 13 |
| *BC\_RS17555* | 39 | 13 |
| *BC\_RS17565* | 69 | 23 |
| *BC\_RS17580* | 99 | 33 |
| *colA* | 3 | 1 |
| *BC\_RS17605* | 6 | 2 |
| *BC\_RS17690* | 66 | 22 |
| *BC\_RS17705* | 6 | 2 |
| *panF* | 9 | 3 |
| *BC\_RS17760* | 48 | 16 |
| *BC\_RS17765* | 306 | 102 |
| *BC\_RS17790* | 9 | 3 |
| *fdhF* | 495 | 165 |
| *ferSC* | 441 | 147 |
| *BC\_RS17850* | 153 | 51 |
| *BC\_RS17895* | 39 | 13 |
| *BC\_RS17900* | 9 | 3 |
| *BC\_RS17905* | 42 | 14 |
| *BC\_RS17945* | 60 | 20 |
| *BC\_RS18015* | 15 | 5 |
| *pdaB* | 120 | 40 |
| *BC\_RS18065* | 1305 | 435 |
| *BC\_RS18080* | 105 | 35 |
| *BC\_RS18090* | 39 | 13 |
| *BC\_RS18150* | 33 | 11 |
| *hutG* | 87 | 29 |
| *ccdA* | 84 | 28 |
| *BC\_RS18295* | 180 | 60 |
| *BC\_RS18330* | 42 | 14 |
| *BC\_RS18445* | 114 | 38 |
| *BC\_RS18460* | 33 | 11 |
| *BC\_RS18495* | 45 | 15 |
| *hfq* | 3 | 1 |
| *miaA* | 249 | 83 |
| *BC\_RS18530* | 69 | 23 |
| *pfkB* | 75 | 25 |
| *BC\_RS18575* | 9 | 3 |
| *BC\_RS18615* | 150 | 50 |
| *BC\_RS18665* | 51 | 17 |
| *mutL* | 9 | 3 |
| *pqsA* | 24 | 8 |
| *BC\_RS18905* | 24 | 8 |
| *BC\_RS18915* | 36 | 12 |
| *rpsO* | 39 | 13 |
| *ribF* | 24 | 8 |
| *nusA* | 6 | 2 |
| *rimP* | 21 | 7 |
| *BC\_RS19025* | 39 | 13 |
| *dxr* | 21 | 7 |
| *upps* | 21 | 7 |
| *hslV* | 141 | 47 |
| *trmFO* | 60 | 20 |
| *BC\_RS19165* | 1362 | 454 |
| *smc* | 1005 | 335 |
| *BC\_RS19240* | 3 | 1 |
| *rsgA* | 6 | 2 |
| *rsmB* | 81 | 27 |
| *def* | 27 | 9 |
| *priA* | 30 | 10 |
| *BC\_RS19300* | 60 | 20 |
| *BC\_RS19305* | 18 | 6 |
| *BC\_RS19310* | 12 | 4 |
| *BC\_RS19320* | 15 | 5 |
| *BC\_RS19350* | 36 | 12 |
| *BC\_RS19385* | 21 | 7 |
| *BC\_RS19410* | 6 | 2 |
| *BC\_RS19440* | 3 | 1 |
| *divIB* | 183 | 61 |
| *BC\_RS19570* | 30 | 10 |
| *BC\_RS19580* | 72 | 24 |
| *BC\_RS19630* | 12 | 4 |
| *BC\_RS19645* | 57 | 19 |
| *BC\_RS19750* | 318 | 106 |
| *BC\_RS19835* | 60 | 20 |
| *BC\_RS22740* | 60 | 20 |
| *BC\_RS19890* | 51 | 17 |
| *BC\_RS19915* | 63 | 21 |
| *BC\_RS19925* | 48 | 16 |
| *nucA* | 18 | 6 |
| *BC\_RS20075* | 108 | 36 |
| *pstG* | 24 | 8 |
| *BC\_RS20200* | 33 | 11 |
| *scpA* | 84 | 28 |
| *spoVAB* | 18 | 6 |
| *spoIIAA* | 441 | 147 |
| *dacF* | 36 | 12 |
| *deoB* | 129 | 43 |
| *xerD* | 126 | 42 |
| *BC\_RS20415* | 1023 | 341 |
| *BC\_RS20475* | 3 | 1 |
| *ribD* | 48 | 16 |
| *BC\_RS20565* | 57 | 19 |
| *cpdB* | 54 | 18 |
| *BC\_RS20630* | 51 | 17 |
| *proI* | 24 | 8 |
| *BC\_RS20655* | 699 | 233 |
| *BC\_RS20685* | 12 | 4 |
| *BC\_RS20715* | 81 | 27 |
| *BC\_RS20740* | 42 | 14 |
| *bfmBAA* | 36 | 12 |
| *BC\_RS20800* | 24 | 8 |
| *xseB* | 3 | 1 |
| *spoIIIAE* | 645 | 215 |
| *spoIIIAB* | 36 | 12 |
| *BC\_RS20935* | 3 | 1 |
| *BC\_RS20940* | 129 | 43 |
| *efp* | 3 | 1 |
| *BC\_RS20975* | 27 | 9 |
| *BC\_RS21070* | 27 | 9 |
| *BC\_RS21160* | 18 | 6 |
| *BC\_RS21175* | 57 | 19 |
| *metH* | 1077 | 359 |
| *metC* | 93 | 31 |
| *BC\_RS21255* | 9 | 3 |
| *BC\_RS21260* | 108 | 36 |
| *BC\_RS21285* | 48 | 16 |
| *BC\_RS21290* | 15 | 5 |
| *BC\_RS21300* | 219 | 73 |
| *phoU* | 6 | 2 |
| *rpoD* | 12 | 4 |
| *dnaG* | 9 | 3 |
| *BC\_RS21440* | 18 | 6 |
| *BC\_RS21465* | 12 | 4 |
| *BC\_RS21470* | 42 | 14 |
| *BC\_RS21555* | 1191 | 397 |
| *BC\_RS21700* | 15 | 5 |
| *BC\_RS21715* | 48 | 16 |
| *BC\_RS21795* | 3 | 1 |
| *BC\_RS21835* | 30 | 10 |
| *BC\_RS21900* | 417 | 139 |
| *BC\_RS21950* | 12 | 4 |
| *hisS* | 1788 | 596 |
| *BC\_RS27760* | 9 | 3 |
| *BC\_RS21985* | 9 | 3 |
| *secDF* | 9 | 3 |
| *BC\_RS22025* | 42 | 14 |
| *BC\_RS22125* | 948 | 316 |
| *BC\_RS22130* | 99 | 33 |
| *BC\_RS22170* | 39 | 13 |
| *spoIVFB* | 6 | 2 |
| *minC* | 21 | 7 |
| *mreC* | 18 | 6 |
| *BC\_RS22220* | 12 | 4 |
| *BC\_RS22280* | 12 | 4 |
| *folC* | 63 | 21 |
| *hemL* | 27 | 9 |
| *BC\_RS22290* | 108 | 36 |
| *BC\_RS22405* | 45 | 15 |
| *BC\_RS22410* | 54 | 18 |
| *BC\_RS22435* | 15 | 5 |
| *BC\_RS22465* | 102 | 34 |
| *BC\_RS22480* | 123 | 41 |
| *BC\_RS22500* | 18 | 6 |
| *uvrC* | 36 | 12 |
| *BC\_RS22585* | 27 | 9 |
| *BC\_RS22625* | 3 | 1 |
| *BC\_RS27765* | 42 | 14 |
| *BC\_RS22650* | 63 | 21 |
| *brnQ* | 42 | 14 |
| *BC\_RS22715* | 132 | 44 |
| *rnhC* | 81 | 27 |
| *nrdR* | 36 | 12 |
| *mutM* | 57 | 19 |
| *phoR* | 48 | 16 |
| *BC\_RS22915* | 75 | 25 |
| *fxsA* | 63 | 21 |
| *accD* | 27 | 9 |
| *BC\_RS23020* | 276 | 92 |
| *BC\_RS23030* | 93 | 31 |
| *BC\_RS23035* | 18 | 6 |
| *BC\_RS23080* | 15 | 5 |
| *BC\_RS23140* | 27 | 9 |
| *BC\_RS23165* | 408 | 136 |
| *BC\_RS23215* | 21 | 7 |
| *BC\_RS23315* | 180 | 60 |
| *BC\_RS23385* | 3 | 1 |
| *BC\_RS23420* | 60 | 20 |
| *thpR* | 117 | 39 |
| *BC\_RS23470* | 258 | 86 |
| *moeA* | 72 | 24 |
| *BC\_RS23580* | 18 | 6 |
| *BC\_RS23585* | 102 | 34 |
| *BC\_RS23595* | 57 | 19 |
| *BC\_RS23620* | 48 | 16 |
| *BC\_RS23635* | 42 | 14 |
| *BC\_RS23640* | 18 | 6 |
| *BC\_RS23665* | 102 | 34 |
| *BC\_RS23670* | 51 | 17 |
| *BC\_RS23770* | 108 | 36 |
| *BC\_RS23780* | 3 | 1 |
| *BC\_RS23790* | 15 | 5 |
| *BC\_RS23830* | 105 | 35 |
| *BC\_RS23835* | 15 | 5 |
| *BC\_RS23885* | 243 | 81 |
| *BC\_RS23890* | 3 | 1 |
| *BC\_RS23925* | 12 | 4 |
| *BC\_RS23945* | 66 | 22 |
| *BC\_RS23975* | 21 | 7 |
| *feoB* | 78 | 26 |
| *BC\_RS23995* | 9 | 3 |
| *BC\_RS24035* | 63 | 21 |
| *BC\_RS24045* | 6 | 2 |
| *BC\_RS24075* | 30 | 10 |
| *BC\_RS24105* | 33 | 11 |
| *BC\_RS24170* | 9 | 3 |
| *BC\_RS24190* | 72 | 24 |
| *BC\_RS24210* | 90 | 30 |
| *glgC* | 18 | 6 |
| *glgB* | 57 | 19 |
| *BC\_RS24430* | 3 | 1 |
| *BC\_RS24475* | 57 | 19 |
| *BC\_RS24500* | 3 | 1 |
| *BC\_RS24505* | 18 | 6 |
| *BC\_RS24510* | 21 | 7 |
| *BC\_RS24555* | 72 | 24 |
| *BC\_RS24665* | 351 | 117 |
| *BC\_RS24690* | 813 | 271 |
| *BC\_RS24695* | 93 | 31 |
| *yunB* | 6 | 2 |
| *BC\_RS24820* | 9 | 3 |
| *BC\_RS24875* | 105 | 35 |
| *BC\_RS24920* | 21 | 7 |
| *yidC* | 57 | 19 |
| *BC\_RS25025* | 3 | 1 |
| *BC\_RS25035* | 39 | 13 |
| *BC\_RS25065* | 120 | 40 |
| *BC\_RS25070* | 108 | 36 |
| *BC\_RS25095* | 33 | 11 |
| *BC\_RS25105* | 45 | 15 |
| *BC\_RS25130* | 24 | 8 |
| *BC\_RS25175* | 27 | 9 |
| *tyrS* | 9 | 3 |
| *BC\_RS25290* | 33 | 11 |
| *speG* | 48 | 16 |
| *BC\_RS25310* | 18 | 6 |
| *BC\_RS25335* | 3 | 1 |
| *BC\_RS25340* | 12 | 4 |
| *BC\_RS25370* | 9 | 3 |
| *BC\_RS25440* | 6 | 2 |
| *BC\_RS25455* | 48 | 16 |
| *BC\_RS25485* | 51 | 17 |
| *BC\_RS25490* | 399 | 133 |
| *BC\_RS25495* | 150 | 50 |
| *BC\_RS25515* | 213 | 71 |
| *BC\_RS25545* | 27 | 9 |
| *BC\_RS25550* | 9 | 3 |
| *BC\_RS25555* | 63 | 21 |
| *secG* | 6 | 2 |
| *BC\_RS25605* | 126 | 42 |
| *BC\_RS25645* | 255 | 85 |
| *lgt* | 63 | 21 |
| *BC\_RS25760* | 39 | 13 |
| *BC\_RS25775* | 117 | 39 |
| *BC\_RS25780* | 30 | 10 |
| *BC\_RS25800* | 51 | 17 |
| *cspC* | 129 | 43 |
| *BC\_RS25905* | 9 | 3 |
| *BC\_RS25910* | 36 | 12 |
| *BC\_RS25955* | 132 | 44 |
| *BC\_RS27810* | 54 | 18 |
| *BC\_RS26080* | 21 | 7 |
| *BC\_RS26135* | 1392 | 464 |
| *BC\_RS26250* | 102 | 34 |
| *BC\_RS26265* | 15 | 5 |
| *BC\_RS26270* | 129 | 43 |
| *BC\_RS26275* | 3 | 1 |
| *galU* | 24 | 8 |
| *BC\_RS26310* | 6 | 2 |
| *fabZ* | 60 | 20 |
| *spoIID* | 36 | 12 |
| *nuoN* | 3 | 1 |
| *BC\_RS26390* | 93 | 31 |
| *nuoK* | 1893 | 631 |
| *BC\_RS26405* | 150 | 50 |
| *BC\_RS26425* | 6 | 2 |
| *BC\_RS26445* | 69 | 23 |
| *BC\_RS26450* | 60 | 20 |
| *atpG* | 6 | 2 |
| *atpH* | 6 | 2 |
| *rpoE* | 63 | 21 |
| *acdA* | 48 | 16 |
| *BC\_RS26660* | 1293 | 431 |
| *cls* | 12 | 4 |
| *BC\_RS26890* | 63 | 21 |
| *BC\_RS26945* | 15 | 5 |
| *BC\_RS27015* | 21 | 7 |
| *BC\_RS27025* | 45 | 15 |
| *BC\_RS27065* | 12 | 4 |
| *BC\_RS27070* | 39 | 13 |
| *BC\_RS27095* | 90 | 30 |
| *lrgB* | 3 | 1 |
| *sodA* | 12 | 4 |
| *BC\_RS27230* | 51 | 17 |
| *walR* | 1845 | 615 |
| *BC\_RS27315* | 150 | 50 |
| *BC\_RS27320* | 63 | 21 |
| *rnpA* | 120 | 40 |
| *rpmH* | 75 | 25 |