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Conversion to Cysteine Autotrophy of *Salmonella typhi* Ty2 by STM1490, a Putative Chloride Channel Protein

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When *S. typhi* Ty2 genes involved in cysteine biosynthesis were compared to those in *S. typhimurium* LT2, there were no much differences at the level of nucleotide sequence and amino acids. To investigate gene(s) involved in *S. typhi* Ty2 cysteine auxotrophy, *S. typhimurium* LT2 libriary constructed in pBR322 was introduced into *S. typhi* Ty2 strain (χ3769) though transduction method using bacteriophage P22. Eleven transductants forming colony on Cys media were screened and named as pCys1 to pCys11. Based on restriction enzyme digestion analyses, the plasmids were classified into 3 groups; pCys1, pCys9 and pCys11. Among them, pCys9 and pCys11 complemented cysteine auxotrophy weakly. However, the pCys1 provides apparent growth on Cys minimal media. To identify gene involved in cysteine auxotrophy in pCys1, nucleotide sequencing were performed. The pCys1 contain three *orf*s; *ynfK*, STM1490 and STM1491. Because pCys1 contains only a part of STM1491 *orf*, we eliminated STM1491 *orf* from further characterization. The genes *ynfK* and STM1490 were independently subcloned into pBR322. Results of complementation tests of using these subcloned DNA segments revealed that STM1490, a putative chloride channel protein, play a role to overcome cysteine auxotrophy of χ3769. Since the sulfate permease of *S. typhimurium* LT2 and *S. typhi* Ty2 contain *cysU*, *cysW* and *cysA*, function for sulfate and thiosulfate transport, and SBP, a periplasmic sulfate-binding protein, it is classified to osmotic shock-sensitive permease. If STM1490 originated from *S. typhimurium* LT2 leads to change ionic balance to *S. typhi* Ty2, *S. typhi* Ty2 containing STM1490 would be changed to cysteine autotrophy by indirect effects of STM1490 for cysteine biosynthesis genes or sulfate permease.