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Inactivation of ferric uptake regulator (Fur) attenuates *Helicobacter pylori* J99 motility by disturbing the flagellar motor switch

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Background: Flagellar motility of *Helicobacter pylori* has been shown to be important for the bacteria to establish initial colonization. The ferric uptake regulator (Fur) is a global regulator that has been identified in *H. pylori* which is involved in the processes of iron uptake and establishing colonization. However, the role of Fur in *H. pylori* motility is still unclear.

Material/methods: Wild-type and *fur* mutant J99 strains' motilities were determined by a soft-agar motility assay and direct video observation. The expression of target flagellar-related genes was determined by real-time quantitative RT-PCR. Single bacterial motility and flagellar switching were observed by phase-contrast microscopy. Autoinducer-2 (AI-2) production in bacterial culture supernatant was analyzed by a bioluminescence assay.

Results: The *fur* mutant was flagellated but showed impaired motility in the soft agar assay compared with the wild-type J99. Transcription of flagellar-related genes in the *fur* mutant was similar to that of the wild-type J99 strain. Phenotypic characterization showed reductions of the swimming speed and switching rate in the *fur* mutant. The AI-2 production of the *fur* mutant was dramatically reduced compared with wild-type J99 in log phase culture medium.

Conclusions: These results suggest that Fur positively modulates *H. pylori* J99 motility through interfering with bacterial flagellar switching.