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The effect of RpoN on swarming in uropathogenic *Proteus mirabilis*

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Proteus mirabilis is an important pathogen of the urinary tract, especially in patients with indwelling urinary catheters. Since catheter-associated urinary tract infection is a major health concern due to the complications and recurrence, researches directed at understanding the pathogenesis are warranted. *P. mirabilis* pathogenesis is closely coupled to swarming. Previously, we found a two component system, QseEF, is involved in the swarming ability and a sRNA GlmY is under the control of QseEF in *P. mirabilis*. Many studies have shown that the RpoN, a bacterial alternative sigma factor 54, involved in the transcription of nitrogen-related genes, is also associated with motility in pathogenic bacteria. Thus, we investigated the role of RpoN in swarming motility in *P. mirabilis*. Bioinformatic analysis revealed an RpoN binding site located on the *glmY-qseEF* promoter region in *P. mirabilis*. We constructed *rpoN* mutant and performed swarming assay in wild-type and *rpoN* mutant. We found that the loss of *rpoN* inhibited swarming motility. The reporter assay and the real-time RT-PCR demonstrated transcription of GlmY is modulated by RpoN. By the real-time RT-PCR, we then showed GlmY modulates mRNA expression of master flagellar regulator *flhDC* and chemotaxis protein *cheA*, which corresponds with the finding of swarming defect in *glmY* mutant. In addition, the real-time RT-PCR data indicated RpoN modulates mRNA expression of *glnA*, a gene encoding glutamine synthetase (GlnA) essential for synthesis of a swarming signal (glutamine) in *P. mirabilis*. These data reveal the swarming regulatory network of RpoN, QseEGF, GlmY, FlhDC, CheA and GlnA in *P. mirabilis*. Altogether, this is the first report about the role of *P. mirabilis* RpoN in swarming motility and its regulatory mechanism.

Biography

Shwu-Jen Liaw has major research interests in investigating the molecular mechanisms of bacterial pathogenesis and drug resistance. She has discovered several genes and pathways that are associated with swarming and virulence of *Proteus mirabilis*, a pathogen causing urinary tract infections.

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