

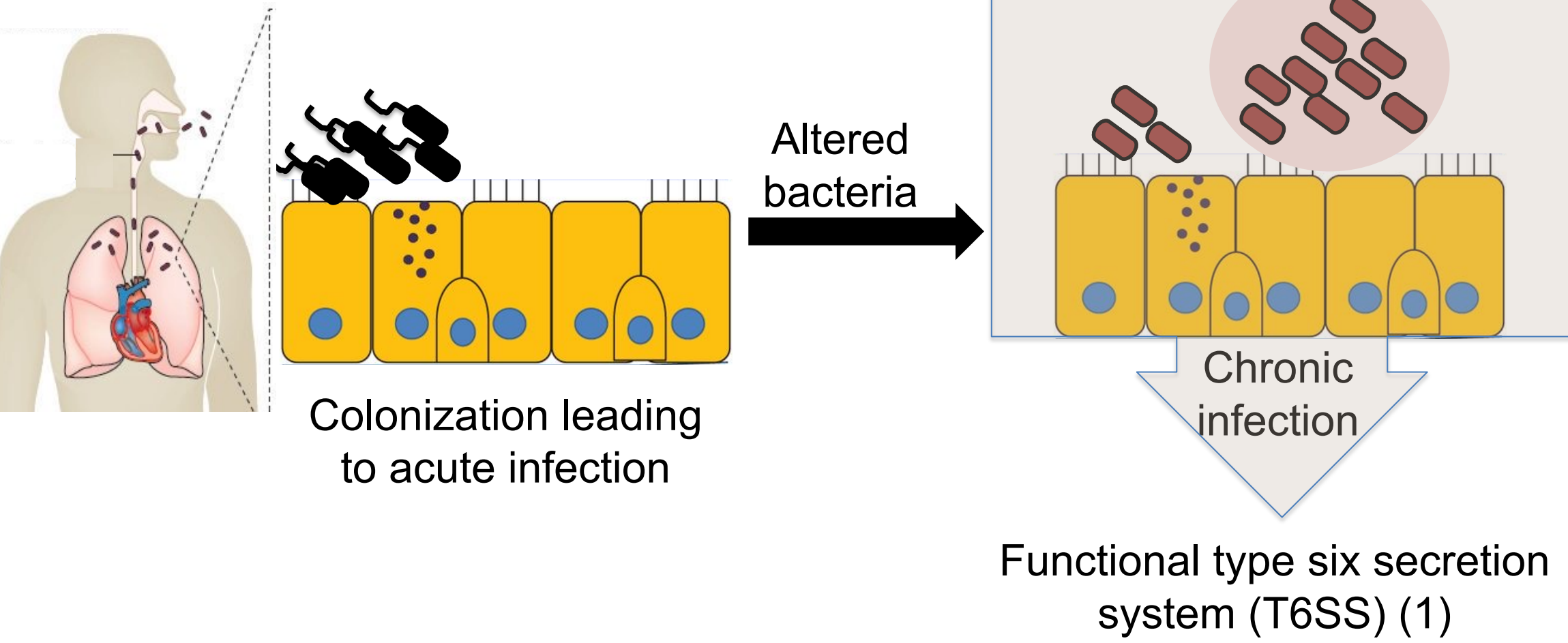
## Abstract

- Differential iron regulation of RsmY/Z sRNA in shaking versus static cultures.
- AQ dependent expression of *rsmY/Z* genes as well as HS2-T6SS genes (type six secretion system).
- AQ mediated iron regulation of RsmY/Z and HS2-T6SS genes is promoter dependent.

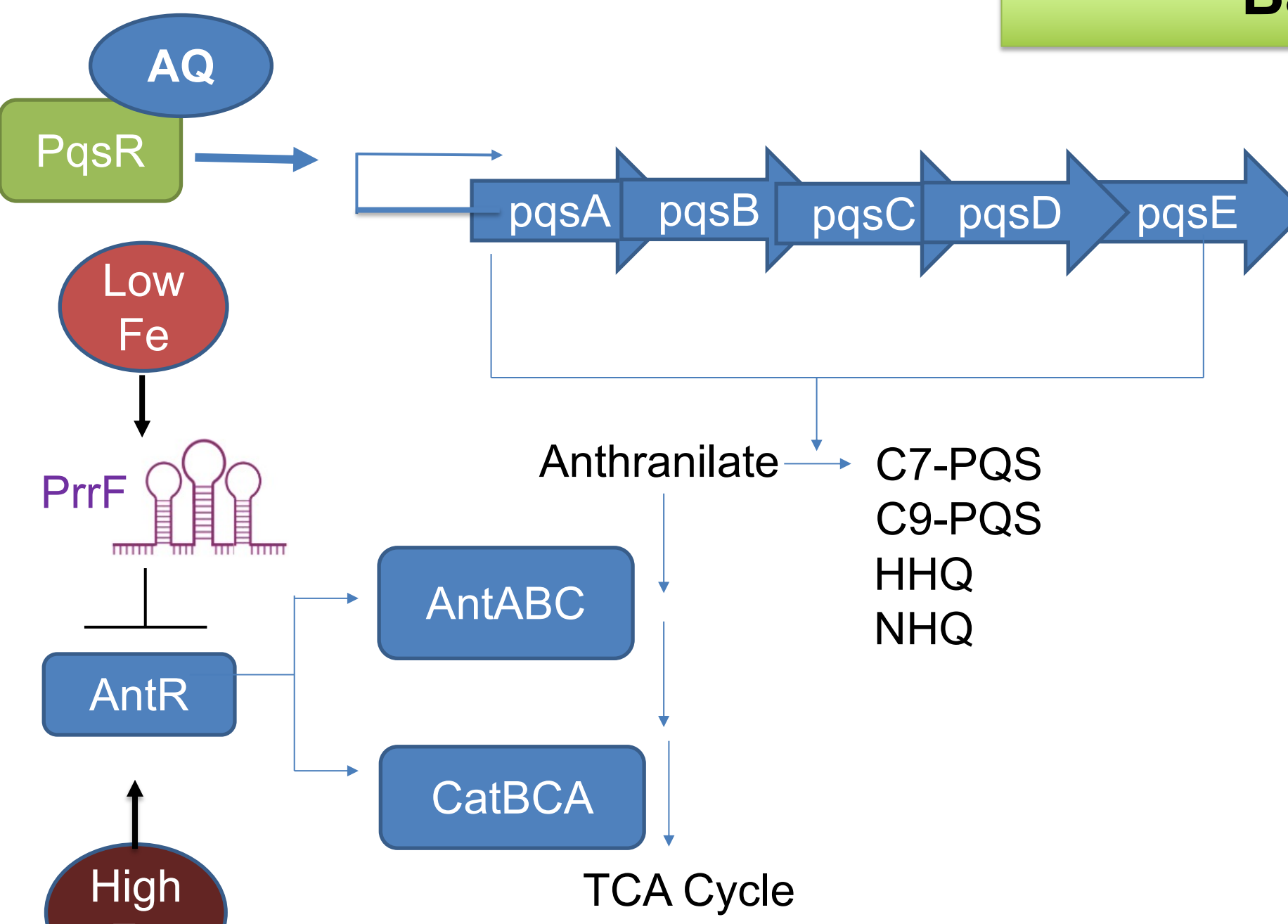
## Significance

- Non-mucoid
- Motile

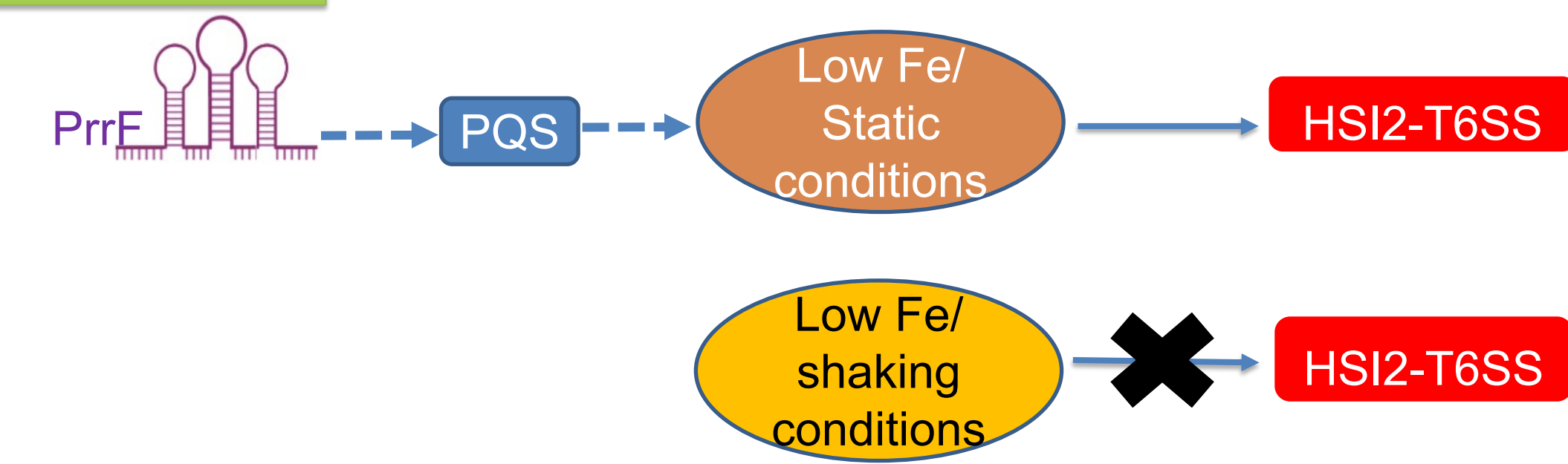
- Mucoid
- Sessile



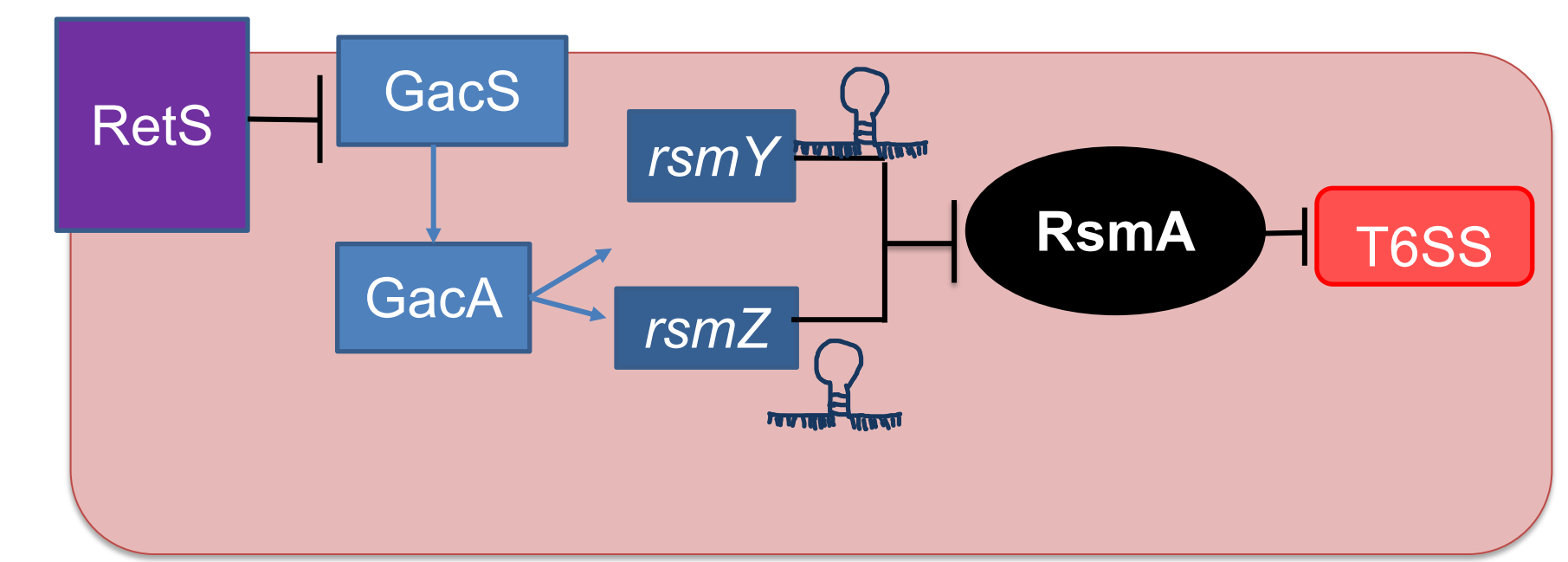
## Background



Iron starvation promotes full AQ (alkyl quinolone) production via PrrF sRNAs. (2)



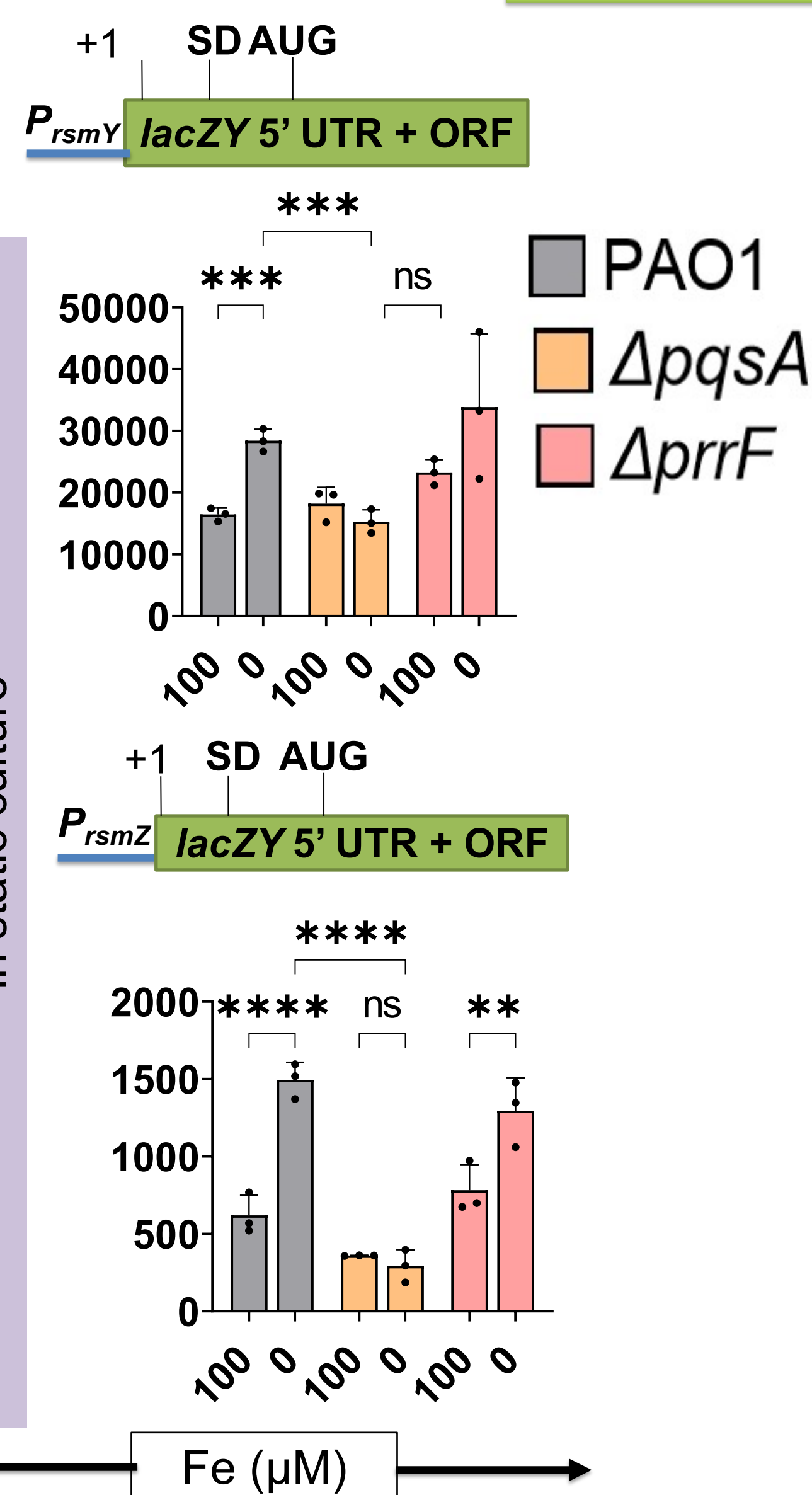
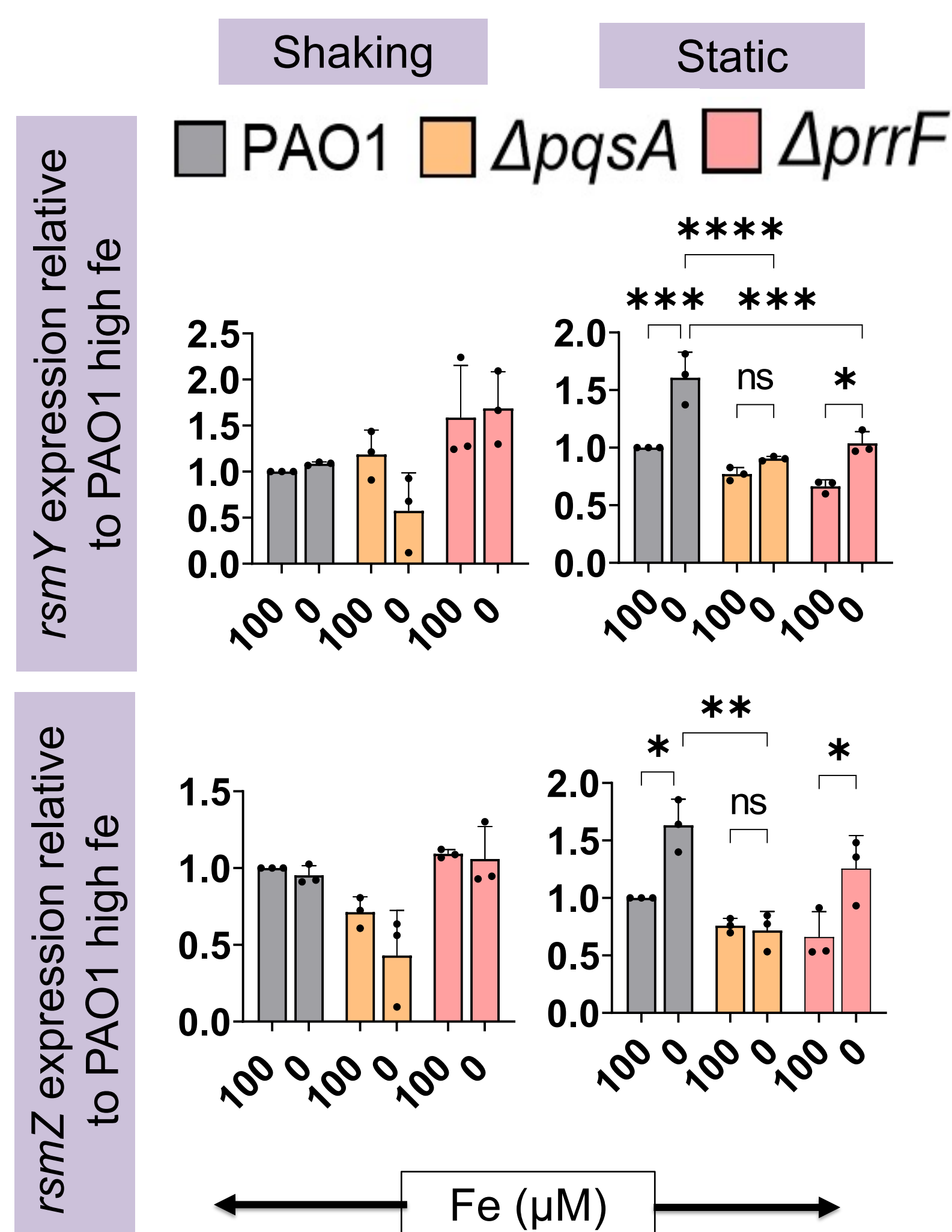
AQs mediate HSI-2 T6SS. (3)



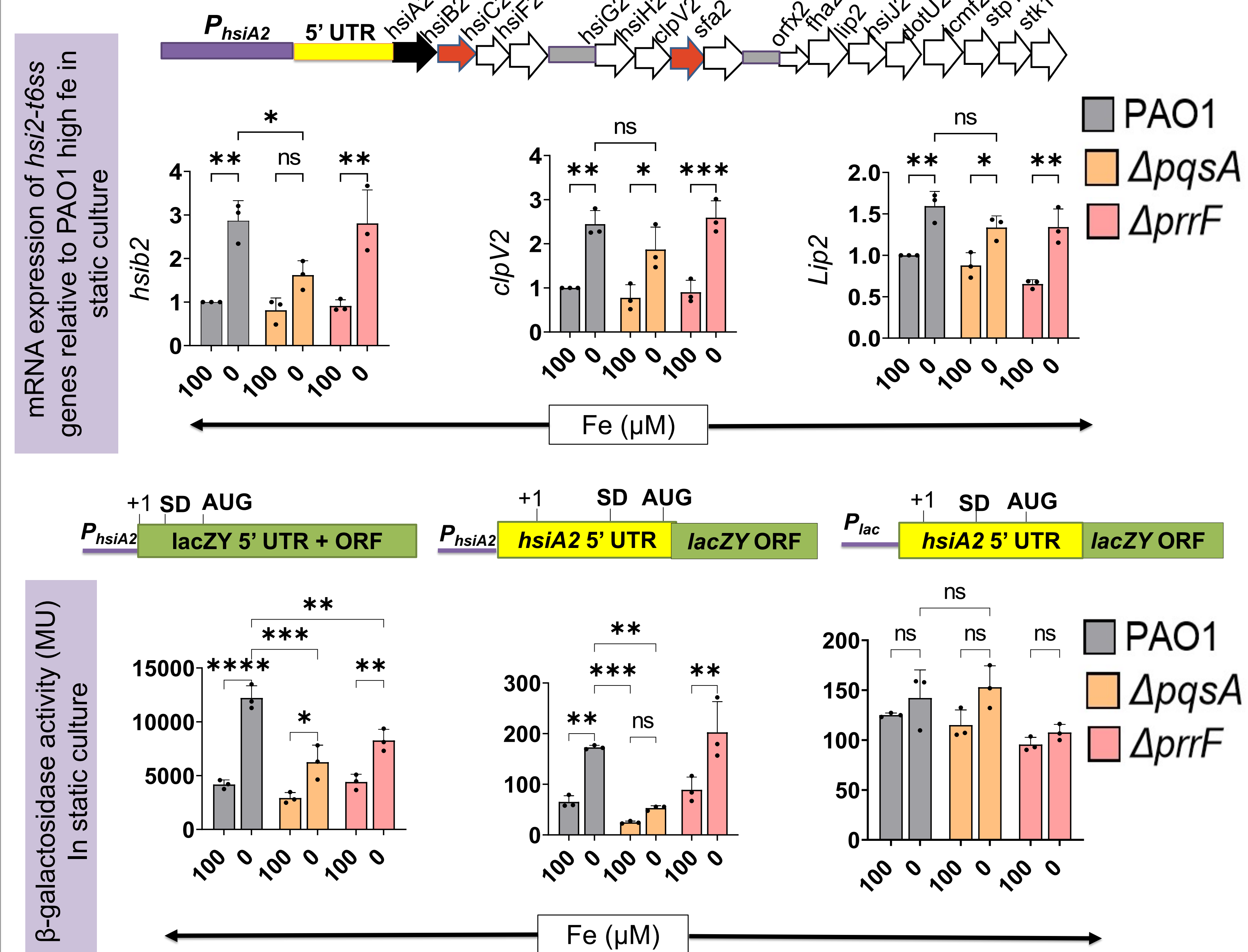
Global regulator Rsm system controls T6SS (4)

## Results

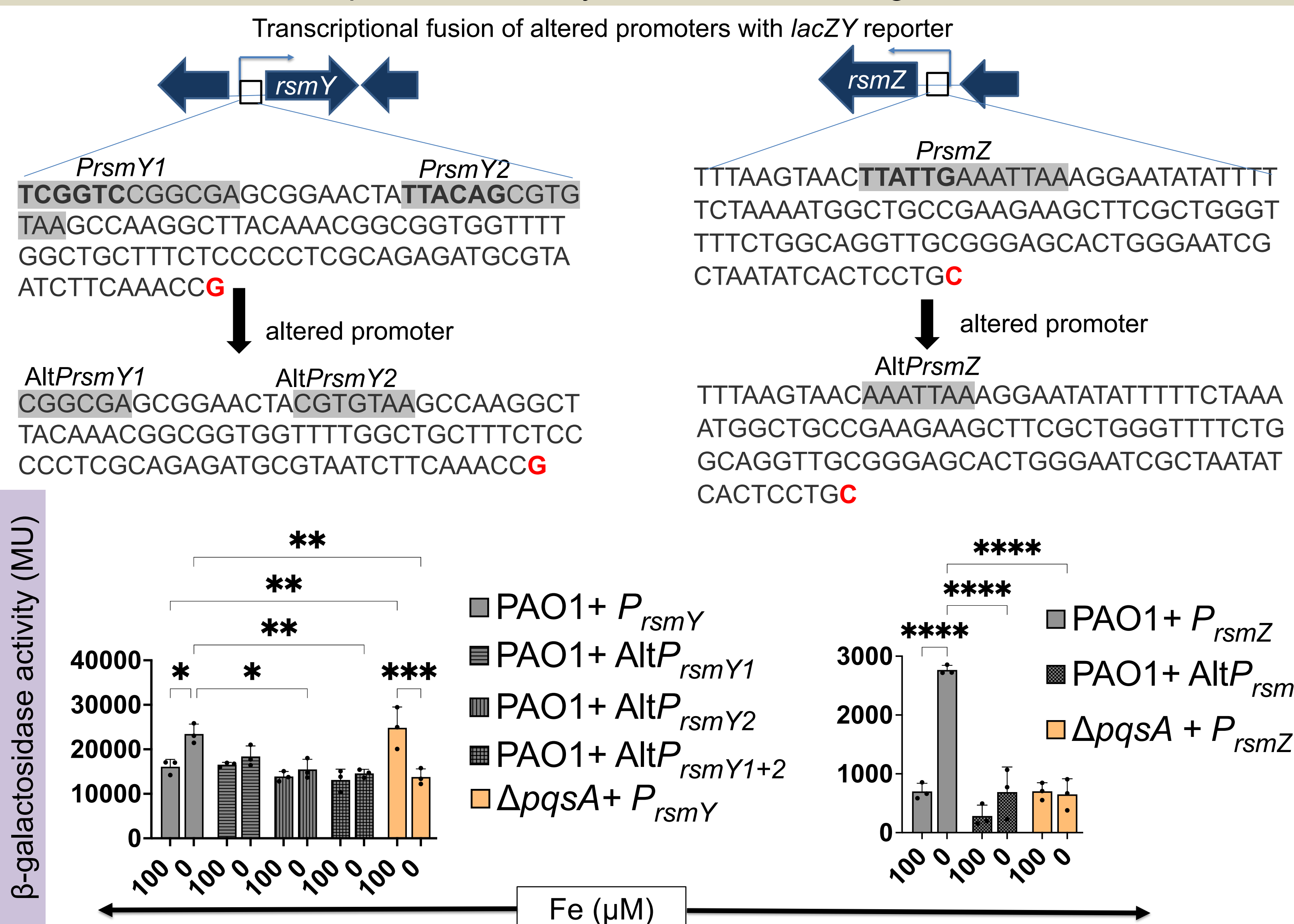
Static growth promotes iron regulation of *rsmY* and *rsmZ* in a promoter-dependent manner via PQS



Iron starvation induced expression of HSI2-T6SS genes is partially controlled by Pqs in a promoter-dependent manner

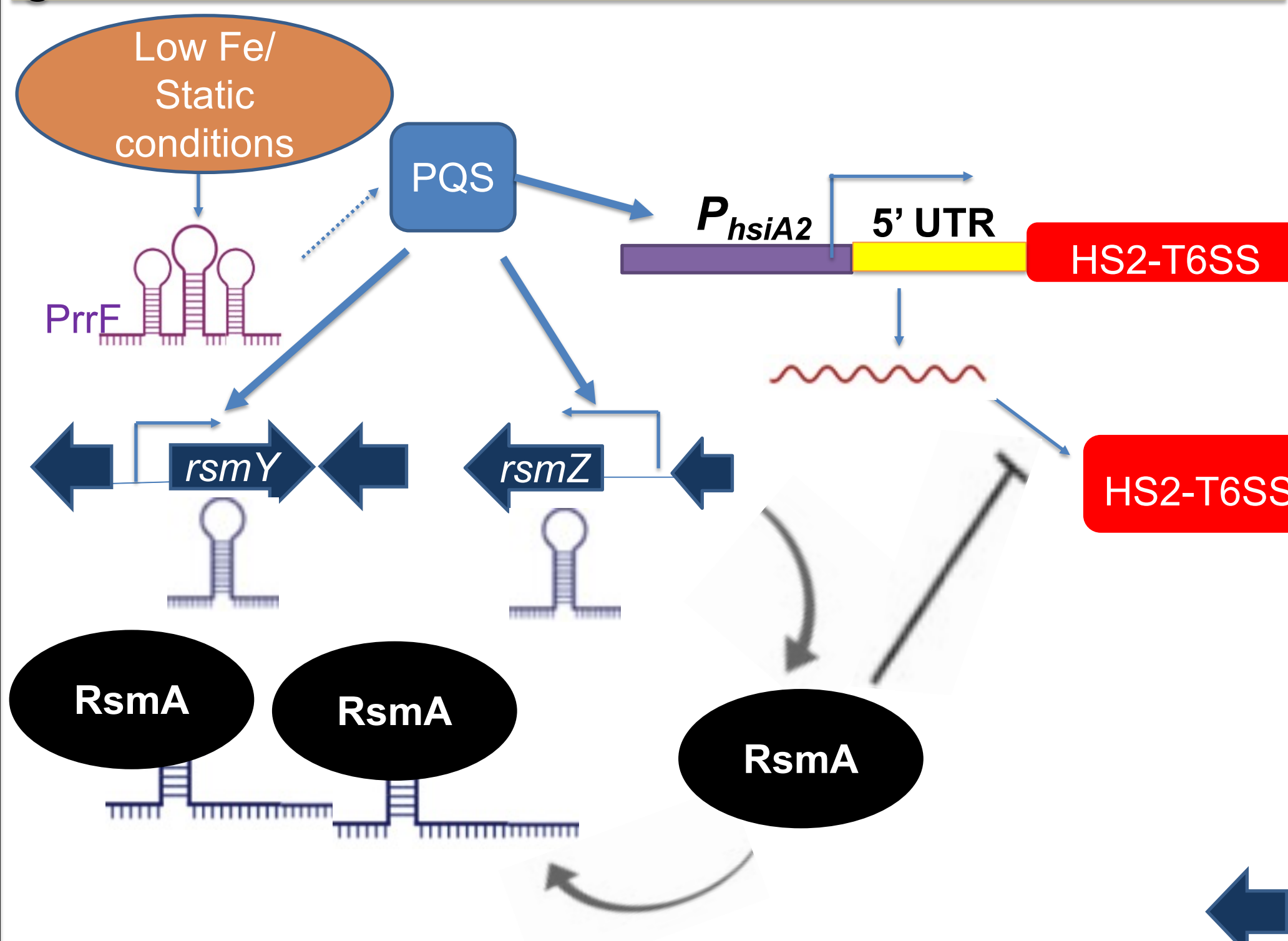


Alteration of palindromic sequences, manually predicted as PqsR binding site reduces iron starvation induced promoter activity of *rsmY* and *rsmZ* genes



## Conclusion

RsmY and RsmZ sRNAs are iron regulated under static condition  
Iron starvation controlling expression of HSI2-T6SS genes is multifactorial



## Future directions

- Analyzing RsmY/Z promoter activity in *pqsR* mutant background.
- Studying the effect of regulatory elements that are present on the promoter region upstream of *hsiA2* (HS2-T6SS) by site directed mutagenesis (SDM) and comparing the promoter activity with that of wild type construct in PAO1, *pqsR* and *pqsA* mutant strains.
- Performing electrophoretic mobility shift assay to study DNA binding of PqsR to the predicted promoter sites of  $P_{rsmY}$ ,  $P_{rsmZ}$  and  $P_{hsiA2}$ .

## References

- Mougous JD, Cuff ME, Raunser S, Shen A, Zhou M, Gifford CA, Goodman AL, Joachimiak G, Ordóñez CL, Lory S *et al*: A virulence locus of *Pseudomonas aeruginosa* encodes a protein secretion apparatus. *Science* 2006, 312(5779):1526-1530.
- Djapgne L, Panja S, Brewer LK, Gans JH, Kane MA, Woodson SA, Oglesby-Sherrouse AG. The *Pseudomonas aeruginosa* PrrF1 and PrrF2 Small Regulatory RNAs Promote 2-Alkyl-4-Quinolone Production through Redundant Regulation of the *antR* mRNA. *J Bacteriol.* 2018;200(10):e00704-17.
- Brewer LK, Huang W, Hackert BJ, Kane MA, Oglesby AG. Static Growth Promotes PrrF and 2-Alkyl-4(1H)-Quinolone Regulation of Type VI Secretion Protein Expression in *Pseudomonas aeruginosa*. *J Bacteriol.* 2020;202(24):e00416-20.
- Allsopp LP, Wood TE, Howard SA, Maggiorelli F, Nolan LM, Wettstadt S, Filloux A. RsmA and AmrZ orchestrate the assembly of all three type VI secretion systems in *Pseudomonas aeruginosa*. *Proc Natl Acad Sci U S A.* 2017;114(29):7707-7712.

## Acknowledgements

I would like to thank our Principal Investigator, Dr. Amanda Oglesby and lab members Khady Ouattara and Jacob Weiner for their suggestions. This research was supported by funding from the, and NIH grant R01AI123320 (to AOS)