NUS National University of Singapore | Infectious Diseases Translational Research Programme, Yong Loo Lin School of Medicine

Research Seminar

30 Sep 2025 **11.30-12.30pm** **MD7, 02-03 Seminar Room M9**

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Mechanistic Insights into Cell Division Regulated by the FtsEX Complex

Abstract

Bacterial cell division requires precise remodeling of the peptidoglycan layer at the septum. The conserved ATP-binding cassette transporter–like complex FtsEX has emerged as a key regulator of this process, coupling ATP hydrolysis to activation of periplasmic hydrolases. In this talk, I will present recent cryo-EM structures of FtsEX and its associated factors, combined with biochemical and functional assays, to illustrate how FtsEX orchestrates septal peptidoglycan hydrolysis in different bacterial species. These findings provide a unifying mechanistic framework for how FtsEX coordinates cell wall remodeling with cytokinesis, and highlight its potential as a target for antibacterial strategies.

Recommended Readings (4 papers on FtsEX & cell division)

1. Li J.W., He Y.T., Xu X., Alcorlo M., Shi J., Roper D.I., Hermoso J., Sham L.T., Luo M. Structural insights into peptidoglycan hydrolysis by the FtsEX system in Escherichia coli during cell division. eLife, 2024.
2. Li J., Xu X., Shi J., Hermoso J., Sham L.T., and Luo M. Regulation of the Cell Division Hydrolase RipC by the FtsEX system in Mycobacterium tuberculosis. Nature Communications, 2023.
3. Xu, X.; Li, J.; Chua, W. Z.; Pages, M. A.; Shi, J.; Hermoso, J. A.; Bernhardt, T.; Sham, L. T.; Luo, M. Mechanistic insights into the regulation of cell wall hydrolysis by FtsEX and EnvC at the bacterial division site. PNAS, 2023.
4. Alcorlo, M., Siseth M.C., Li J.W., Sham L.T., Luo M., Hermoso J.. Modulation of the lytic apparatus by the FtsEX complex within the bacterial division machinery. FEBS Letters, 2024.