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Short Talk 11, Raminta Venskutonytè - UrdA: structural characterization of a novel enzyme

Friday 11 October 2019 10:00 (20 minutes)

Urocanate reductase (UrdA) is a bacterial enzyme that was first characterized in 2012 and shown to reduce urocanic acid resulting in a product imidazole propionate (1). Unlike similar enzymes fumarate reductases, UrdA hasn't been well investigated. Besides being an interesting novel enzyme enabling bacteria to grow in anaerobic conditions with urocanic acid as electron acceptor (1), UrdA was shown to play a significant role in human gut microbiota, as imidazole propionate levels are increased in people with type 2 diabetes and it further affects glucose metabolism (2).
Two domain construct of UrdA, consisting of a FAD binding and a mobile domain were successfully expressed, purified and crystallized. Four X-ray structures were obtained depicting different states of the enzyme: ADP bound, FAD bound, substrate/FAD bound and in complex with product/FAD. The data reveals the overall structural arrangement of the enzyme as well as the substrate binding mode and conformational changes.
The role of UrdA in imidazole propionate production in relation to type 2 diabetes makes the first structure of the UrdA of particular importance to our understanding of this enzyme.

References
1. Bogachev, A. V. et al. (2012), Urocanate reductase of Shewanella. Molecular Microbiology, 86: 1452-1463.
2. Koh A. et al. (2018) Microbially Produced Imidazole Propionate Impairs Insulin Signaling through mTORC1. Cell 175: 947-961.

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