



Contribution ID: 22

Type: Oral

Investigating Molecular Power Converters

Thursday, 20 November 2014 09:45 (45 minutes)

Rotary ATPases are ubiquitous protein complexes that couple the translocation of protons through membranes to the synthesis or hydrolysis of ATP and are thus central to biological energy conversion. Eukaryotic F-type ATP synthases use energy stored in transmembrane proton gradients to synthesise the biological energy carrier ATP from ADP and inorganic phosphate. The evolutionary related V-type ATPases operate in reverse by utilising energy derived from ATP hydrolysis to build up transmembrane ion gradients thereby enabling transport processes across membranes. Most eubacteria have F-type ATPases, but some eubacteria and all known archaea have ATPases of the A-type, which are close homologues of V-ATPases. A-ATPases are simpler in design than their eukaryotic counterparts, but are bifunctional and can operate in either direction in dependence of their cellular environment (1).

We are using a combination of X-ray structure analysis, electron microscopy and other biochemical and biophysical techniques to obtain a pseudo-atomic model of an A-ATPase (2, 3). In addition, X-ray structures in different conformations along with normal mode analysis suggest a greater dynamics of the intact complex than previously envisioned. This might be important for cooperativity and regulation of intact rotary ATPases (4, 5).

1. Stewart et al. *BioArchitecture* 3 (2013)
2. Zhou, et al. *Science* 334, 380-385 (2011)
3. Lee, et al. *Nat. Struct. Mol. Biol.* 17, 373-378 (2010)
4. Stewart, et al. *Nature Communications* 3, 687 (2012)
5. Stewart et al. *Current Opinion Structural Biology* 25, 40-48 (2014)

Keywords or phrases (comma separated)

X-ray crystallography, electron microscopy, bioenergetics, ATP synthase

Primary author: Dr STOCK, Daniela (Victor Chang Cardiac Research Institute)

Co-authors: Dr STEWART, Alastair (Victor Chang Cardiac Research Institute); Dr LEE, Lawrence (Victor Chang Cardiac Research Institute)

Presenter: Dr STOCK, Daniela (Victor Chang Cardiac Research Institute)

Session Classification: Opening Session