Poster Presentations

[MS5-P33] Understanding Proline Biosynthesis in *Bacillus subtilis.*

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Bacillus species grows in environments as diverse as soil, standing water and the human gut. Consequently, it is exposed to substantial variation in environmental water availability and must employ tightly regulated responses to osmotic stress. One such response uses proline to control the osmotic potential of the cytoplasm. Proline acts as a "compatible solute" – it is highly hydrophilic and does not compromise normal cellular functions. Basal levels of cytoplasmic proline are around 16mM but can rise to about 700mM in just a few hours in response to increased environmental salinity [1]. The rapid rise in cytoplasmic proline concentration can be attributed to an osmoadaptive biosynthetic pathway, distinct from the homeostatic anabolic pathway. While the anabolic pathway uses a series of enzymes, ProB-ProA-ProI, to prevent cellular starvation of proline, the osmoadaptive pathway uses ProJ-ProA-ProH to accumulate high concentrations of proline [2].

We have initiated an investigation into the *in vitro* structure and function of the enzymes involved in proline biosynthesis in *Bacillus subtilis*. To begin, we are focussing on the enzyme common to both osmoadaptive and anabolic pathways, ProA, a γ-glutamyl phosphate reductase (E.C. 1.2.1.41).

[1] Whatmore, A.M., Chudek, J.A. & Reed, R.H. (1990). *J. Gen. Microbiol.* **136**, 2527-2535.
[2] Brill, J., Hoffmann, T., Bleisteiner, M. & Bremer, E. (2011). *J. Bacteriol.* **193(19)**, 5335-5346.