Poster Presentations

[MS5-P44] Trapping intermediates in biosynthetic pathways and metabolosomes

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The isolation and characterization of biochemical pathways for vitamins and coenzymes has often proved challenging, mainly because of the low abundance and kinetic labiality of the metabolic intermediates [1]. Such is the case for the intermediates generated on the pathway to the antipernicious factor adenosyl-cobalamin (vitamin B12). This biosynthesis requires around thirty enzyme-mediated steps and is one of the most intricate in nature [2,3]. Given the difficulty in characterising the labile intermediates, we were surprised that when attempting to trap a non- productive chelatase complex, we trapped an enzyme-product complex instead [4]. Following on from this we have been able to trap product complexes in the canonical and non-canonical methyltransferases and in the methylmutase thereby helping to elucidate the nature of the intermediates in this complex biosynthetic pathway [5]. In the second part of this abstract we report the trapping of substrate in the pores of a bacterial micro- compartment protein [6]. These micro-compartment proteins assemble to form a protein shell encapsulating a metabolic pathway produced in response to an external nutrient such as propanediol. Metabolosomes act to sequester reactive and liable intermediates and are in essence organised assembly lines. The result presented here clearly reveals the channel through which the substrate enters the metabolosome. Elucidating channelling in biosynthetic pathways and organisation within metabolosomes is important for engineering new pathways in synthetic biology.

Keywords: cobalamin biosynthesis; metabolosomes; channelling; pores

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