

**P017** Selectivity in a barren landscape: the P450<sub>Biol</sub>-ACP complex

**Max J. Cryle and Ilme Schlichting**

*Max-Planck Institute for Medical Research, 69120  
Heidelberg Germany*

The Cytochromes P450 (P450s) are a superfamily of oxidative haemoproteins that are capable of catalysing a vast range of oxidative transformations, including the oxidation of unactivated alkanes, often with high stereo- and regioselectivity. Our studies have focused upon P450<sub>Biol</sub> (CYP107H1), a biosynthetic P450 found in the biotin operon of *Bacillus subtilis*. The biosynthetic function of P450<sub>Biol</sub> is the formation of pimelic acid, a biotin precursor, via a multiple-step oxidative cleavage of long chain fatty acids. P450<sub>Biol</sub> is a member of an important subgroup of P450s that accept their substrates not free in solution, but rather presented by a separate carrier protein. We have structurally characterised the P450<sub>Biol</sub>-acyl carrier protein complex for several fatty acid acylated ACPs. These crystal structures show that the fatty acid chain is forced into a U-shape above the active site haem, with the desired carbon atoms positioned appropriately for oxidation. This positioning is controlled through interactions between both ACP residues and the ACP phosphopantetheinyl moiety and residues of P450<sub>Biol</sub>. The P450<sub>Biol</sub>-ACP structure is the first such P450-carrier protein complex to be structurally characterised, with important implications for other biosynthetically intriguing P450-carrier protein complexes.