

E0025

The First Reported Crystal Structure of a Plant 5-enolpyruvylshikimate 3-phosphate synthase (EPSPS) – Petunia EPSPS. T.J. Rydel, G.S. Bild[#], J.R. Borgmeyer[#], Q.K. Huynh[#], N. Leimgruber, H.S. Shieh[#], R.A. Stegeman[#], and W.C. Stallings[#], Monsanto, Chesterfield, MO, [#]current affiliation: Pfizer Global R&D, Chesterfield, MO.

The enzyme 5-enolpyruvylshikimate 3-phosphate synthase (EPSPS) is a key component of aromatic amino acid biosynthesis in plants and bacteria, and is the target of glyphosate, the active ingredient in Monsanto's flagship herbicide product, Roundup®. Expression of the glyphosate-tolerant CP4 EPSPS enzyme in soybeans, corn, cotton, and canola is the basis behind Monsanto's Roundup Ready® technology for weed control of these commercial crops.

All EPSPS crystal structures that have been documented in the literature to date have been from bacterial sources – *E. coli*^{1,2}, *P. aeruginosa*³, and *S. pneumoniae*⁴. Here we report the crystal structure of the first plant EPSPS – petunia EPSPS (pEPSPS). The structure was solved by molecular replacement methods using a room temperature pEPSPS X-ray data set, the all-atom Monsanto *E. coli* EPSPS crystallographic coordinates, and the AMoRe program. The 20-3.15 Å resolution two-domain structure is unliganded, and adopts an open conformation, as has been observed in other unliganded EPSPS crystal structures. This poster will review the pEPSPS structure determination, the noteworthy pEPSPS structural features, including disulfide linkages found within each domain which are not observed in the known bacterial structures, and how the pEPSPS structure compares with the other relevant EPSPS structures.

¹Stallings, W.C. *et al.* (1991) *Proc. Natl. Acad. Sci. USA* **88**, 5046-5050.

²Schönbrunn, E. *et al.* (2001) *Proc. Natl. Acad. Sci. USA* **98**, 1376-1380.

³Saunders, J.E. *et al.* (2002) *Acta Cryst. A* **58**(Supplement), C112.

⁴Park, H. *et al.* (2004) *Molecular Microbiology* **51**, 963-971.