**Why OrfY? Crystallization of the MMOD-MMOH Complex of Soluble Methane Monooxygenase from Methylococcus capsulatus (Bath)**

Soluble methane monooxygenase (sMMO) is a three component enzyme system capable of oxidizing methane to methanol at a carboxylate bridged diiron center located in the a subunit of the hydroxylase component. In the *sMMO* operon a highly conserved open reading frame exists, *orfY*, that encodes for a forth protein component, MMOD, whose function is unknown. Efforts to characterize MMOD and investigate its role in biological oxidation of methane, have found that it inhibits hydroxylase activity, cross-links to the a subunit of MMOH, and alters the spectroscopic properties of the diiron center. To understand further the activity of MMOD, we have begun to investigate the structures of MMOD and the MMOD-MMOH complex. We report here the initial crystallization of the MMOD-MMOH. Crystals of the complex diffract to \(~9\ \text{Å}\), index with P3 symmetry, and have large unit cell dimensions of 145 x 145 x 306 Å. A Cys67Ser mutation improves the quality of the crystals. Interestingly, the Cys67Ser mutant of MMOD can not inhibit monooxygenase activity or influence the properties of the diiron center suggesting Cys 67 is essential for the function of MMOD.