Biomolecules in Organic Solvents by Armando Gomez-Puyou, Alberto Darszon, and Marietta T. de Gomez-Puyou, editors

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Biomolecules in Organic Solvents has 11 chapters, most of which describe many phenomena promoted by enzymology in organic solvent, organic cosolvent-water, and reverse micelle systems. The book has 32 authors, half of whom are from Spain or Mexico. Two chapters describe how whole cells (bacteria and yeast) and organelles (especially mitochondria) carry out metabolism and organic compound conversion reactions in microemulsions and in micelles.

The first chapter by Savage and Finney: "New Approaches in Studying Biomolecule-Water Interactions" has an orientation quite different from most of the other chapters. Finney and Savage review water biophysical behavior and how water fits what might be called newer views of protein hydrophobicity. For about 25 years the "hydrophobic interior" of proteins in the absence of detailed structural information was assumed to be either entirely dry or only trivially wet in which case there should be a small impact on protein interior folding. More recently a few or sometimes many water molecules are found in the interior of even well-folded proteins. Water still is excluded from very tight "knot" hydrophobic domains. But a continuum from strictly nonpolar to only moderately nonpolar protein interiors is recognized now. A new and important direction is that discrete water molecules and small clusters of water molecules inside proteins currently are seen to be structure and folding determinants that may be modulated by solvents outside proteins. This gives new perspectives on the diversity possible for water outside, on, and inside proteins. The Savage-Finney chapter is a timely addition to the landmark review by E. Baker and R. Hubbard in 1984, *Progress in Biophysics and Molecular Biology*, and is also a good addition to some of Felix Frank's reviews.

The older lore still often repeated, that water is the biocompatible solvent and that organic solvents usually denature, is being turned upside down in many examples. Numerous enzymes and proteins denature much more readily in neat water than in several organic cosolvent-water mixtures. Organic solvents and cosolvents are often able to stabilize or protect proteins against denaturation, especially when comparison is made at higher temperatures. Together with major shifts of equilibrium constants in esterification, in transesterification, and peptide hydrolysis versus peptide synthesis, new opportunities are aborning for enzymes in (formerly) weird solvent mixtures. There are many industrial applications for enzymes if they can work in both directions, catalyzing reactions running backward (peptide synthesis) as well as forward (peptide hydrolysis). Academic and industrial biotechnology researchers will see much to explore and exploit. Reverse micelles (enzymes cocooned inside detergent and lipid agglomerates) are described in four chapters. Reverse micelles protect enzymes and generate many peculiarities in kinetics of substrate conversion reactions which are difficult to quantitate or deal with in an orderly framework. Accordingly, many anecdotes are described pertaining to reverse micelle-encapsulated enzymes to illustrate the wide scope of newer techniques and technologies. These are perhaps as broad as for enzymes in conventional homogeneous, aqueous solution. As often happens with multi-authored books, the index is rather scanty compared to the contents. However the full titles are given for all papers referred to, enabling readers to conveniently scan this rapidly developing field.