Reverse Micelles

NMR spectroscopy of encapsulated proteins dissolved in low-viscosity fluids is emerging as a powerful supplement to traditional solution NMR approaches. Originally developed to overcome the slow tumbling problem presented by large soluble proteins,¹ the general approach of using reverse micelles has now seen applications in the study of integral² and anchored³ membrane proteins; proteins of marginal stability,⁴ protein structure,⁵ dynamics,⁶ and hydration.⁷ Nucleic acids have also been successfully investigated in this manner.⁸ The distinguishing feature of this approach is the nature of the sample. Spontaneously formed reverse micelles are the dominant vehicle for encapsulation and the low-viscosity short-chain alkane fluids are the dominant solvent with liquid propane and ethane being the most desirable.⁹ The availability of deuterated surfactants, co-surfactants and alkane solvents avoids the complications of large unwanted ¹H resonances that would greatly interfere with multidimensional NMR of encapsulated biopolymers in low-viscosity solvents.

References