Critical Micelle Concentrations of Gangliosides†

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ABSTRACT: The micellar properties of mixed, bovine gangliosides and purified galactosyl-*N*-acetylgalactosaminyl(*N*-acetylneuraminyl)galactosylglucosylceramide were studied by gel filtration, equilibrium dialysis, and band and boundary centrifugation in sucrose gradients. The dissociation of micelles is very slow (days) in water and required us to approach equilibrium by association of monomers rather than by the dissociation of micelles. The gangliosides were therefore first converted into very low molecular weight aggregates (1–3 molecules) by dissolving them in Me_2SO. Galactosyl-*N*-acetylgalactosaminyl(*N*-acetylneuraminyl)galactosylglucosylceramide was then diluted into aqueous sucrose gradients and sedimented by the boundary centrifugation technique. This gave a sedimenting micelle and a nonsedimenting monomer concentration of $(1–2) \times 10^{-10}$ M (or less) which corresponds to the critical micelle concentration value. The mixed gangliosides revealed two micellar sizes (i.e., 10 and 4.5 S), the slower sedimenting species being formed from the larger one with time (days). The critical micelle concentration of the mixed gangliosides was found to be approximately 10^{-8} M by gel filtration, equilibrium dialysis, and band centrifugation.