Response to Richard Epand

We appreciate Dr. Epand's interest in our study (Han and Gross, 1992) and agree that there are small differences in some cases (from no observable difference to 3–4°C) in the nadir of fluorescence anisotropy we observed and the values Dr. Epand's group obtained for the hexagonal phase transition temperature by differential scanning calorimetry (DSC). The nonmonotonic alterations in the fluorescence anisotropy of polar head group labeled fluorophores we observed are in close agreement with the hexagonal phase transition temperatures published in previous studies from many groups utilizing multiple different techniques (e.g., Marsh, 1990; Perly et al., 1985). In some cases, these values are also slightly lower than values reported by Epand and Epand (1988) determined by DSC. Assuming the stated precision of the Epand and Epand values, then in some cases, the observed nonlinearities commence just prior to the formation of hexagonal phase. This behavior is similar to a multiplicity of other pretransitional phenomena documented in many other systems. We point out that there are also a number of other potential explanations which may contribute to these small differences in addition to pretransitional phenomena including domain formation, lipid purity, and scanning rates. The major finding in the paper under discussion (Han and Gross, 1992) was that head group labeled motional freedom becomes more restricted as the temperature increases in the hexagonal phase. This observation was, and remains, unambiguously demonstrated in that report. The possibility of pretransitional phenomena or hexagonal phase domain formation just prior to the global assumption of the hexagonal phase is intriguing. It is our hope that further studies in this arena will identify the biologic importance of lipids predisposed to adopting a hexagonal phase in the regulation of membrane-associated phenomena.

Received for publication and in final form 5 October 1992.

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