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Adhesion and receptor clustering stabilizes lateral heterogeneity in cell plasma membranes

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The thermodynamic properties of plasma membrane lipids play a vital role in many functions that initiate at the mammalian cell surface. Some functions are thought to occur, at least in part, because plasma membrane lipids have a tendency to separate into two distinct liquid phases, called liquid-ordered and liquid-disordered. We find that isolated cell plasma membranes are poised near a miscibility critical point separating these two liquid phases, and postulate that critical composition fluctuations provide the physical basis of functional membrane heterogeneity in intact cells. In this talk I will describe several possible mechanisms through which dynamic fluctuations can be stabilized in super-critical membranes, and will present some preliminary evidence suggesting that these structures can be visualized in intact cells using quantitative super-resolution fluorescence localization imaging.