332c Biomolecular Interfaces Using Liquid Crystalline Materials

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Synthetic liquid crystals present a substantially unexplored opportunity to engineer biomolecular interfaces suitable for use in biological sensors and for the creation of active interfaces to cells. This presentation will seek to define this opportunity through a couple of examples. First, the spontaneous assembly of phospholipids and proteins at planar interfaces between thermotropic liquid crystals and aqueous phases will be discussed. Strong and weak specific binding events involving proteins at these interfaces drive the reorganization of the phospholipids and trigger orientational transitions in the liquid crystals. Because these interfaces are fluid, processes involving the lateral organization of proteins (e.g., formation of protein and phospholipid-rich domains) are also readily imaged via the orientational response of the liquid crystal, as are stereospecific enzymatic events. Second, the possibility of creating active interfaces between live cells and synthetic liquid crystals will be discussed. The recent discovery of a class of synthetic liquid crystals that are not toxic to cells enables this promising direction of research.