594b Biomimetic Interfaces for Characterizing Membrane Proteins

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Cell membranes consisting predominantly of a bilayer lipid membrane (BLM) and membrane proteins efficiently perform many vital sensing, signaling, catalytic, and bioelectronic processes at the molecular scale. Although membrane proteins comprise 25-30% of the human genome and 30-50% of top drug targets, their analysis lags far behind that of soluble proteins due to difficulties in expressing, purifying, and reconstituting membrane proteins in an active conformation. Recently, Michigan State University (MSU) has developed special facilities and expertise to express recombinant membrane proteins and embed them into biomimetic interfaces in which their activities may be expressed. This paper will describe fabrication of functional and nanostructured biomimetic interfaces based on BLM and polyelectrolytes and application of the interfaces to study the medically relevant membrane proteins such as Neuropathy Target Esterase (NTE). These interfaces have outstanding potential for conducting fundamental studies of nanoscale biological processes and for developing new membrane-protein-based technologies relevant to pharmaceutical industries, including high-throughput drug screening systems and novel biosensors.