

Abstract Submitted  
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**pH Measurements Near Cellular Membrane**<sup>1</sup> MICHAEL ANDERSON, YANA RESHETNYAK, OLEG ANDREEV, University of Rhode Island — The acidity is associated with development of various pathological states such as solid tumors, ischemic stroke, neurotrauma, epileptic seizure, and others. Normal cell could be distinguished from highly glycolytic cell (e.g. metastatic cancer cell) by transmembrane pH gradient and value of pH at surface of plasma membrane. We are developing novel tool to map pH at the extracellular and intracellular surfaces of cellular membrane *in vivo*. Our strategy is based on use of peptides of pHLIP®(pH Low Insertion Peptide) family. pHLIPs are water-soluble membrane peptides, which insert and fold in lipid bilayer of membrane only at slightly acidic conditions. Since the equilibrium is strongly shifted toward membrane inserted form at low pH, pHLIP injected into blood, circulates in body and accumulates in acidic tissue of tumors and other acidic tissues. We have developed scheme of conjugation of pHLIP peptides with pH-sensitive fluorophore, SNARF. The main goal of using pHLIPs is to deliver and tether SNARF to the outer or inner leaflet of bilayer of plasma membrane. If SNARF is attached to the N-terminus of pHLIP, it will stay in the extracellular space being tethered to the cell surface. If it would be conjugated with the peptide inserting end (C-terminus), pHLIP would “flip” SNARF-1 across the bilayer and expose it to the intracellular space and keep it near the inner leaflet of membrane. Thus, we propose to identify transmembrane pH gradient across the plasma membrane. Experiments on cultures cells will be presented.

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