

Abstract Submitted  
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**pH dependent transfer of nano-pores into membrane of cancer cells to induce apoptosis**<sup>1</sup> MOHAN MALLAWA ARACHCHIGE, DAYANJALI WIJESINGHE, ANDREW LU, YANA RESHETNYAK, OLEG ANDREEV, Department of Physics, University of Rhode Island, Kingston, RI — Proper balance of ions in intracellular and extracellular space is the key for normal cell functioning. Changes in the conductance of membranes for ions will lead to cell death. One of the main differences between normal and cancerous cells is the low extracellular pHe and the reverse pH gradient: intracellular pHi is higher than extracellular pHe. We report here pH-selective transfer of nano-pores to cancer cells for the dis-regulation of balance of monovalent cations to induce cell death at mildly acidic pHe as it is in most solid tumors. Our approach is based on pH-sensitive fusion of cellular membrane with liposomes containing gramicidin A, forming cation-conductive  $\beta$ -helix in membrane. Fusion is promoted only at low extracellular pH by pH (Low) Insertion Peptide (pHLIP) attached to liposomes. Gramicidin channels inserted into cancer cells open flux of protons into cytoplasm and disrupt balance of other monovalent cations, which induces cell apoptosis.

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