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Scanning Ion Conductance Microscopy for living cell membrane potential measurement NAMUNA PANDAY, Florida Intl Univ — Recently, the existence of multiple micro-domains of extracellular potential around individual cells have been revealed by voltage reporter dye using fluorescence microscopy. One hypothesis is that these long lasting potential patterns play a vital role in regulating important cell activities such as embryonic patterning, regenerative repair and reduction of cancerous disorganization. We used multifunctional Scanning Ion Conductance Microscopy (SICM) to study these extracellular potential patterns of single cell with higher spatial resolution. To validate this novel technique, we compared the extracellular potential distribution on the fixed HeLa cell surface and Polydimethylsiloxane (PDMS) surface and found significant difference. We then measured the extracellular potential distributions of living melanocytes and melanoma cells and found both the mean magnitude and spatial variation of extracellular potential of the melanoma cells are bigger than those of melanocytes. As compared to the voltage reporter dye based fluorescence microscope method, SICM can achieve quantitative potential measurements of non-labeled living cell membranes with higher spatial resolution.

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