Apr 18th, 9:00 AM - 10:00 AM

Multidimensional Imaging of Biological Substrates with Scanning Electrochemical Microscopy

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Poster Presentation P29

MULTIDIMENSIONAL IMAGING OF BIOLOGICAL SUBSTRATES WITH SCANNING ELECTROCHEMICAL MICROSCOPY

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Scanning Electrochemical Microscopy (SECM) is a useful tool for analysis of biological samples because it is capable of detecting both the topography of the cell surface as well as release of electrochemically active neurotransmitters. We wish to develop the SECM as a tool to study the effects of oxidative damage on neurotransmitter release in PC12 cells. To that end, experiments with the PC12 cells and the fabrication of the ultramicroelectrodes were conducted. Because the chamber of the SECM is not as humid as the incubator, the media that supports the cells evaporates quickly and concentrates cellular waste products, killing the cells. A method of replenishing cell media or slowing evaporation is required to monitor cells over long periods of time (days) within the SECM chamber. A layer of mineral oil was used to slow media evaporation. PC12 cell growth and viability was observed under this layer of mineral oil. Ultramicroelectrodes of various tip sizes and geometries were also fabricated to enhance the capability of the instrument for analysis of biological samples. A protocol to generate consistent tip beveling was developed. Ultramicroelectrode tips were observed using a Scanning Electron Microscope.