Imaging the Topography and Monitoring the Electrochemical Activity of Biological Samples

Erica Woodall
*Illinois Wesleyan University*

Emma DeWalt, Faculty Advisor
*Illinois State University*

Melinda Baur, Faculty Advisor
*Illinois Wesleyan University*

Follow this and additional works at: [https://digitalcommons.iwu.edu/jwprc](https://digitalcommons.iwu.edu/jwprc)

Part of the Chemistry Commons

Woodall, Erica; DeWalt, Faculty Advisor, Emma; and Baur, Faculty Advisor, Melinda, "Imaging the Topography and Monitoring the Electrochemical Activity of Biological Samples" (2010). *John Wesley Powell Student Research Conference*. 34. [https://digitalcommons.iwu.edu/jwprc/2010/posters/34](https://digitalcommons.iwu.edu/jwprc/2010/posters/34)

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact digitalcommons@iwu.edu.

©Copyright is owned by the author of this document.
IMAGING THE TOPOGRAPHY AND MONITORING THE ELECTROCHEMICAL ACTIVITY OF BIOLOGICAL SAMPLES

Erica Woodall1, Emma DeWalt2 and Melinda Baur1*

1Chemistry Department, Illinois Wesleyan University
2Chemistry Department, Illinois State University

Scanning Electrochemical Microscopy (SECM) is a useful tool for the analysis of biological samples because the ultramicroelectrode tip of the probe can detect the presence of electrochemically active compounds such as neurotransmitters, particularly dopamine and norepinephrine, while simultaneously characterizing the topography of the cell. For this project, the topography of the cell was determined by maintaining a constant distance between the tip of the electrode and the surface of the cell. This distance was kept constant by measuring the impedance between the electrode tip and the reference electrode. By setting the potential of the SECM electrode to collector mode, neurotransmitter release was monitored by observing the changes in current at the tip of the electrode. A spike in current indicated the release of neurotransmitters from the cell surface. The goal of the project is to develop the SECM as a tool to study the biological effects of oxidative damage on rat pheochromocytoma cells (PC12 cells). The ultramicroelectrode probe can be used to generate the reactive oxygen species and subsequently monitor topographical changes to these cells as well as electrochemical changes on the surface of the cells.