Pushing the Limits of Neurochemical Detection

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Communication between the nervous system and immune system is vital for maintaining health yet remains difficult to probe with precise temporal and spatial resolution. Our lab develops electrochemical and microfluidic methods, to close this critical gap in measurement science. Specifically, we have developed new electrochemical methods and electrode materials for fast-scan cyclic voltammetry (FSCV) detection which have enabled us to expand these tools to new analytes involved in neuroimmune communication and other analytes previously not studied with real-time electrochemical techniques. FSCV is a classic electroanalytical technique most often used in the brain to study neurotransmitter signaling on a 100-ms timescale; however, our lab has pushed the boundaries of this technique by expanding its use to study neurochemical events in immune organs like the lymph node. In addition, combining FSCV with microengineered platforms has provided us an experimental platform to probe neurotransmitter signaling in multiple organs simultaneously ex vivo during communication. This talk will highlight some of our recent work in this area on method development and the application of these methods to study new biology.