Electrochemical Biosensor Array Characterization

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Abstract

Advancing our understanding of how the central nervous system works under specific conditions requires real-time, simultaneous detection of a number of key signaling molecules, like nitric oxide (NO). NO diffuses widely and rapidly, has a lifetime in milliseconds, and presents among other high concertration, interfering compounds in the nanomolar range in most biological systems. Current microelectrode-based electrochemical NO sensors have diameters in the micrometer range, much larger than biological cells which are in the micron range, and are thus insufficient for analyzing cell-to-cell interactions. A chip was fabricated using the $0.6\mu m$ CMOS process to overcome these difficulties, with a 5×5 array of sensors in the $2\mu m$ range. Characterazition results of the chip indicate sensitivity into the 20μ molar range and suggest higher-sensitivity devices can offer improvement.

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