

Electrochemical Sensor Array Chips for Multiple Gene Detection

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Electrochemical gene sensor array chips were prepared on the basis of photolithographically fabricated nine-channel gold electrode arrays modified with synthesized probe peptide nucleic acids (PNAs). The dimensions and cleanliness of the electrode array were defined by topographical and electrochemical methods. The prepared sensors, whose working principle is based on ion-channel sensing, detected the target DNAs with sequences complementary to those of the probe PNAs distinctively, selectively, and reproducibly. Multichannel responses to the DNAs were measured by cyclic voltammetry and were expressed on a gray scale. While this investigation for label-free multiple gene sensors with a simple detection mechanism is still preliminary, the studied technique helps to distinguish the presence or absence of the target DNAs in sample solutions, and is expected to supersede conventional DNA microarrays for diagnosis of gene expression.

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