Abstract Submitted
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A Label-Free, Redox Biosensor for Detection of Disease Biomarkers[1] MICHELLE M. ARCHIBALD, BINOD RIZAL, TIMOTHY CONNOLLY, MICHAEL J. BURNS, MICHAEL J. NAUGHTON, THOMAS C. CHILES, Boston College — Technologies to detect early stage cancer would provide significant benefit to cancer disease patients. Clinical measurement of biomarkers offers the promise of a noninvasive and cost effective screening for early stage detection. We have developed a novel 3-dimensional "nanocavity" array for the detection of human cancer biomarkers in serum and other fluids. This all-electronic diagnostic sensor is based on a nanoscale coaxial array architecture that we have modified to enable molecular-level detection and identification. Each individual sensor in the array is a vertically-oriented coaxial capacitor, whose dielectric impedance is measurably changed when target molecules enter the coax annulus. We are designing a nanocoaxial biosensor based on electronic response to antibody recognition of a specific disease biomarker (*e.g.* CA-125 for early-stage ovarian cancer) on biofunctionalized metal surfaces within the nanocoax structure, thereby providing an all-electronic, ambient temperature, rapid-response, label-free redox biosensor. Our results demonstrate the feasibility of using this nanocoaxial array as an ultrasensitive device to detect a wide range of target proteins, including disease biomarkers.

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