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Facile screening of potential xenoestrogens by an estrogen receptor-based reusable optical biosensor

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Abstract: The apparent increase in hormone-induced cancers and disorders of the reproductive tract has led to a growing demand for new technologies capable of screening xenoestrogens. We reported an estrogen receptor (ER)-based reusable fiber biosensor for facile screening estrogenic compounds in environment. The bioassay is based on the competition of xenoestrogens with 17 β -estradiol (E₂) for binding to the recombinant receptor of human estrogen receptor α (hER α) protein, leaving E₂ free to bind to fluorophore-labeled anti-E₂ monoclonal antibody. Unbound anti-E₂ antibody then binds to the immobilized E₂-protein conjugate on the fiber surface, and is detected by fluorescence emission induced by evanescent field. As expected, the stronger estrogenic activity of xenoestrogen would result in the weaker fluorescent signal. Three estrogen-agonist compounds, diethylstilbestrol (DES), 4-n-nonylphenol (NP) and 4-n-octylphenol (OP), were chosen as a paradigm for validation of this assay. The rank order of estrogenic potency determined by this biosensor was DES>OP>NP, which were consistent with the published results in numerous studies. Moreover, the

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