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Supporting Information

Role of Estradiol Hormone in Human Life and Electrochemical Aptasensing of 17β-Estradiol: A Review

P. P. Waifalkar [1,2], Daegwon Noh [1,2], Poorva Derashri [3], Sagar Barage [3,4] and Eunsoon Oh [1,2,*]

[1] Department of Physics, Chungnam National University, Daejeon 34134, Republic of Korea
[2] Institute of QuanTable 34134, Republic of Korea
[3] Amity Institute of Biotechnology, Amity University, Maharashtra, Mumbai-Pune Expressway, Panvel, Maharashtra 410206, India
[4] Centre for Computational Biology and Translational Research, Amity University, Maharashtra, Mumbai-Pune Expressway, Panvel, Maharashtra 410206, India
* Correspondence: esoh@cnu.ac.kr; Tel.: +82-10-6349-5453

Table S1. Electrode materials, aptamer sequences, selectivity in different matrix and environmental sample measurements.

Electrode	Estradiol Specific Aptamer Sequence	Selectivity in a Matrix (Interference Effects from Various Materials)	Environmental Sample Measurements	References
Au/streptavidin/biotin	5'-Biotin-GCTTCCAGCTTATTGAATTACACGCAGAGG-GTAGCGGCTCTGCGCATTCAATTGCTGCGCGCTGAAG-CGCGGAAGC-3'	2-methoxynaphthalene, 1-aminoanthraquinone	N/A	(Kim et al., 2007) [34]

Electrode	Estradiol Specific Aptamer Sequence	Selectivity in a Matrix (Interference Effects from Various Materials)	Environmental Sample Measurements	References
PEDOT/AuNP /streptavidin	5′-Biotin-GCTTCCAGCTTATTGAATTACACGCAGAGGGTAGCGGCTCT GCGC ATTCAATTGCTGCGCGCTGAAGCGCGGAAGC-3′	17α-ethynlestradiol, estrone, naphthalene	N/A	(Olowu et al., 2010) [46]
Au	5'-SH-GCTTCCAGCTTATTGAATTACACGCAGAGGGTAGCGGCTCT GCGCATTCAATTGCTGCGCGCTGAAGCGCG GAAGC-3'	2-methoxynaphthalene, 1-aminoanthraquinone	Urine	(Lin et al., 2012) [37]
GCE/VS2/Au	5'-SH-$(CH2)_6$-TTT TTT TTT T GCT TCC AGC TTA TTG AAT TAC ACG CAG AGG GTA GCG GCT CTG CGC ATT CAA TTG CTG CGC GCT GAA GCG CGG AAG C-3'	Naphthalene, 1-aminoanthraquinone	Urine	(Huang et al., 2014a) [50]
BDD/Au	5′-SHGCTTCCAGCTTATTGAATTACACGCAGAGGGTAGCGGCT CT- GCGCATTCAATTGCTGCGCGCTGAAGCGCGGAAGC-3'	Estriol, bisphenol A, nonyl phenol, diethyl phthalate, resorcinol, and atrazine	Wastewater	(Ke et al., 2014) [36]
GCE/WS2 /Au	5′-SH-$(CH_2)_6$-TTT TTT TTT T GCT TCC AGC TTA TTG AAT TAC ACG CAG AGG GTA GCG GCT CTG CGC ATT CAA TTG CTG CGC GCT GAA GCG CGG AAG C-3′	Naphthalene, 1-aminoanthraquinone	Serum and Water	(Huang et al., 2014) [51]
GCE/CuS/Au/ GO/Au	5′-SH-$(CH_2)_6$-TTT TTT TTT T GCT TCC AGC TTA TTG AAT TAC ACG CAG AGG GTA GCG GCT CTG CGC ATT CAATTG CTG CGC GCT GAA GCG CGG AAG C-3′	Bisphenol A, 1-aminoanthraquinone and naphthalene	Urine	(Huang et al., 2015a) [52]

Electrode	Estradiol Specific Aptamer Sequence	Selectivity in a Matrix (Interference Effects from Various Materials)	Environmental Sample Measurements	References
GCE/AuNp/CoS	5'-SH-$(CH_2)_6$-TTT TTT TTT T GCT TCC AGC TTA TTG AAT TAC ACG CAG AGG GTA GCG GCT CTG CGC ATT CAA TTG CTG CGC GCT GAA GCG CGG AAG C-3' cDNA: 5'-GGA GGA GGA GGA GGA GGA GGA GGA GGA GGA GGA GGA GGA G G CTT CCG CGC TTC AGC GCG CAG CAA-3'	1-aminoanthraquinone, naphthalene, polychlorinated biphenyl, bisphenol A, phthalic acid ester, testosterone, and cholesterol	Urine	(Huang et al., 2015b) [42]
Au/NiHCF/Au	5′-SH-$(CH_2)_6$-GCT-TCC-AGC-TTA-TTG-AAT-TAC-ACG-CAG-AGG-GTA-GCG-GCT-CTG-CGC-ATT-CAA-TTG-CTG-CGC-GCT-GAA-GCG-CGG-AAG-C-3′ ; Random DNA sequence: 5′-(SH)-(CH_2)6-CTG-ACA-CCA-TAT-TAT-GAA-GA-3′	Ethinylestradiol, bisphenol A, estriol, polychlorinated biphenyl (PCB 101), diethyl phthalate, 4-nonyl phenol, and atrazine	Municipal wastewater	(Fan et al., 2015) [48]
GCE/poly(Py-co-PAA)	75-mer E2 aptamer: $NH_2(CH_2)_6$-ATACGAGCTTGTTCAATACGAAGGGATGCCGTTTGGGCCCAAGTTCGGCATAGTGTGGTGATAGTAAGAGCAATC 35-mer E2 aptamer: $NH_2(CH_2)_6$-AAGGGATGCCGTTTGGGCCCAAGTTCGGCATAGTG Adenosine aptamer: $NH_2(CH_2)_6$-ACCTGGGGGAGTATTGCGGAGGAAGGT	Bisphenol-A, progesterone	Urine and tap water	(Zhu et al., 2015) [39]

Electrode	Estradiol Specific Aptamer Sequence	Selectivity in a Matrix (Interference Effects from Various Materials)	Environmental Sample Measurements	References
	Non-specific ssDNA as control in urine detection: $NH_2(CH_2)_6$-AGGTATTGATCCGCCCGGCTAGCATTTTGTGGTCTCCAGGGGTACTCCCC			
GCE/ERGO	38-mer amine-functionalized ssDNA (NH_2–APT)	Estrogen and testosterone	Wastewater and pharmaceutical sample	(Rather et al., 2018) [13]
Au/MCH/ Graphene	5′-GCTTCCAGCTTATTGAATTACACGCAGAGGGTAGCGGCTCTGCGCAT TCAATTGCTGCGCGCTGAAGCGCGGAAGC-3′	Estriol, bisphenol A, nolyl phenol, polychlorinated biphenyl and atrazine	Tap water	(Liu et al., 2019) [44]
Screen printed gold electrode	5′-Thiol-TTTTTTTTTTTTTTTGCTTCCAGCTTATTGAATTACACGCAGAGGGTA-3′ (split1); 5′-GCGGCTCTGCGCATTCAATTGCTGCGCGCTGAAGCGCGGAAGCTTTTTTTTTTTT-Thiol-3′ (split2)	Estriol, progesterone, dibutyl phthalate, bovine serum albumin, testosterone, atrazine, and bisphenol A	Tap water and milk	(Nameghi et al., 2019) [49]
Carbon/NH_2-SWCNT/NMB /AuNP	5′-SH-$(CH_2)_6$-GCT-TCC-AGC-TTA-TTG-AAT-TAC-ACG-CAG-AGG-GTA-GCG-GCT-CTG-CGC- ATT-CAA-TTG-CTG-CGC-GCT-GAA-GCG-CGGAAG-C-3′	Follicle-stimulating hormone, luteinizing hormone, glutamic acid, ascorbic acid, uric acid, neuron-specific	Serum	(Ming et al., 2019) [54]

Electrode	Estradiol Specific Aptamer Sequence	Selectivity in a Matrix (Interference Effects from Various Materials)	Environmental Sample Measurements	References
		enolase, or carcinoembryonic antigen		
AuNP/thionine/MCNTs	5′-SH-$(CH_2)_6$-GCTTCCAG CTTATTGAATTACACGCAGAGGGTA GCGGCTCTGCGCATTCAATTGCTGCGCGCTGAAGCGCGGAA GC- 3′	Ascorbic acid, dopamine, uric acid, L-lysine, L-cysteine, L-tyrosine, hypoxanthine, progesterone, and cholesterol	Serum	(Liu et al., 2019) [55]
Screen-printed carbon electrode/Carbon nanodot	NH_2-5′-GCTTCCAGCTTATTGAATTACACGCAGAGGGTA GCGGCTCTGCGCATTCAATTGCT GCGCGCTGAAGCGCG GAAGC-3'	Estriol, progesterone, and bisphenol A	River water	(Mat Zaid et al., 2020) [40]
GCE and laser-scribed graphene /poly(β-CD)/AF1-ADA/ON1/AF2-Au	The sequence of 5′-amine modified AF 1 was 5′-NH_2-AAG GGA TGC CGT TTG GG-3′; the 3′ - thiol modified AF2 sequence was 5′-CCC AAG TTC GGC ATA GTG-SH-3′; the ON 1 was 5′-AAG CTT GGG CCA TGC CCA GGA AGG ACC CAA ACG G-3′ and ON 2 :5′-CCG TTT GGG TCC TTC CTG GGC ATG GCC CAA GCT T-3′.	Glucose, bisphenol A, progesterone, and bovine serum albumin	Milk	(Chang et al., 2021) [43]

Electrode	Estradiol Specific Aptamer Sequence	Selectivity in a Matrix (Interference Effects from Various Materials)	Environmental Sample Measurements	References
SPCE/poly(pyrrole-co-pyrrole-3-carboxylic acid)	NH_2-5′-ATA CGA GCT TGT TCA ATA CGA AGG GAT GCC GTT TGG GCC CAA GTT CGG CAT AGT GTG GTG ATA GTA AGA GCA ATC-3′	N/A	N/A	(Rozi et al., 2021) [53]
PEDOT-GO/Au@Pt/Apt/MCH/GCE	5-SH-$(CH_2)_6$-GCT-TCC-AGC-TTA-TTG-AAT-TAC-ACG-CAG-AGG-GTA-GCG-GCT-CTG-CGC-ATT-CAA-TTG-CTG-CGC-GCT-GAA-GCG-CGG-AAG-C-3′	Bisphenol A, estrone, estriol, and ethinylestradiol	Serum	(Zhao et al., 2022) [76]

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