Supporting Information

Electrochemical Biosensor for Cancer Cell Detection Based on Surface 3D Micro-array

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1. SEM images of the various 3D array

No.	Shape	Depth, Z (µm)	Side length, X or	Separation, X or D
			Diameter, D (µm)	(µm)
1	squared	0.2	0.5	0.5
2	squared (intaglio) ^a	0.2	0.5	0.5
3	squared	0.1	6	6
4	squared	0.1	8	8
5	squared	0.1	10	10
6	squared	0.1	16	16
7	squared	0.2	6	6
8	squared	0.2	8	8
9	squared	0.2	10	10
10	squared	0.2	16	16
11	squared	1	6	6
12	squared	1	8	8
13	squared	1	10	10
14	squared	1	16	16
15	squared	2	6	6
16	squared	2	8	8
17	squared	2	10	10

Table S1 Size of the various 3D array

18	squared	2	16	16
19	squared	2	2	2
20	squared	2	4	4
21	cylindrical	2	2	2
22	cylindrical	2	4	4

^a All the 3D arrays were relief printing except for No. 2 array.



Figure S1. 3D arrays with the depth (Z) of 100 nm, X = Y = a) 6 μ m, b) 8 μ m, c) 10 μ m, d) 16 μ m.



Figure S2. 3D arrays with Z = 200 nm, X = Y = a) 6 µm, b) 8 µm, c) 10 µm, d) 16 µm.



Figure S3. 3D arrays with $Z = 1 \mu m$, X = Y = a) 6 μm , b) 8 μm , c) 10 μm , d) 16 μm .



Figure S4. 3D arrays with $Z = 2 \mu m$, $X = Y = a 6 \mu m$, b) 8 μm , c) 10 μm , d) 16 μm .



Figure S5. Cylindrical 3D arrays with $Z = 2 \mu m$, a) $D = 2 \mu m$, c) = 4 μm ; Squared 3D arrays with

 $Z = 2 \ \mu m \ X = Y = b) \ 2 \ \mu m, \ d) \ 4 \ \mu m.$

2. The stability of gold layer immersed in methanol



Figure S6. a) Photos of stability of gold layer immersed in $H_2O/MeOH$ for 0 h, 6 h, 12 h, 24 h; b) SEM image of the gold layer before and after immersed in $H_2O/MeOH$ for 24 h.

We investigated the stability of ultrathin sputtered gold surface upon immersing into methanol for 24 h. As shown in Figure S6a, the gold layer was not destroyed after immersed in $H_2O/MeOH$ solution for 24 h. SEM studies confirm that the Au layer remains its smooth structure even after dipping in $H_2O/MeOH$ solution for 24h (Figure S6b).

3. XPS survey spectrum



Figure S7. a) XPS survey spectrum of the modified 3D microarray. b) XPS spectra of Au 4f the modified 3D microarray.

4. The viability of the released cells



Figure S8 The proliferation of the MCF-7 cells detached from the 3D microarray. The scale bar of the images is 200 μm