Electronic Supplementary Material (ESI) for Lab on a Chip

SUPPORTING INFORMATION FOR

High Sensitivity Assays for Human Cardiac Troponin I using TiO_2 nanotube arrays

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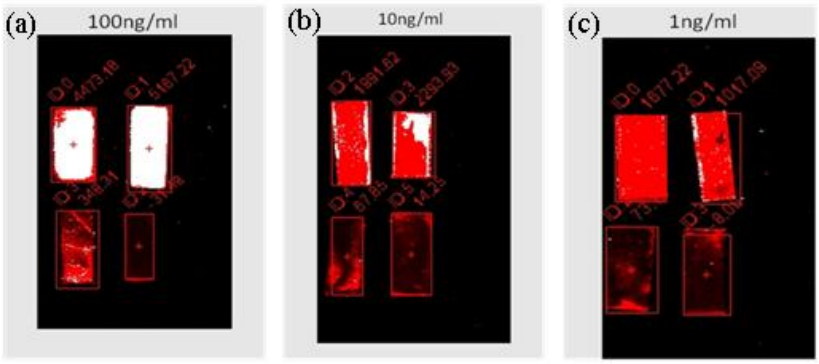

Figure S1 **:** Fluorescence microscope images (Odyssey imaging system) of assays for (a) 100 ng/ml, (b) 10 ng/ml and (c) 1 ng/ml of cTnI using nanotubes grown in aqueous electrolytes. In each image, the top two samples are the assays while the bottom two samples are controls exposed to 0 ng/ml troponin. Although the concentration is increased logarithmically, the fluorescence counts increase linearly.

Table S2: Variation of troponin concentration with fluorescence intensity for aqueous nanotube array samples (number of samples n = 48)

Troponin Concentration (ng/ml)	Average normalized intensity	Standard deviation
100	54.65	2.73
10	39.10	1.96

1	26.89	1.34
0.9	19.64	0.98
0.8	18.93	0.94
0.7	13.46	0.67
0.6	10.91	0.55
0.5	8.33	0.42
0.4	7.1	0.36
0.3	5.43	0.27
0.2	4.56	0.23
0.1	3.87	0.19

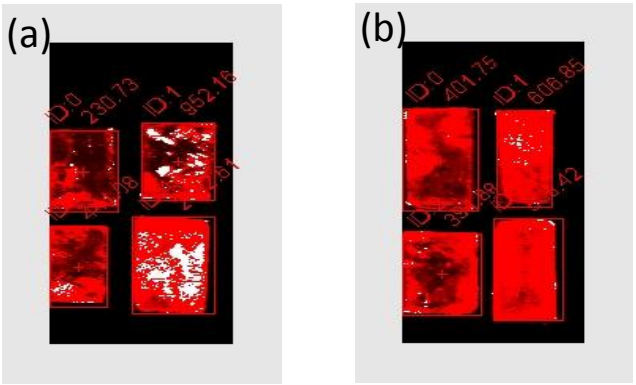

Figure S3: Fluorescence images of ethylene glycol TiO_2 NTs samples with (a) 0.05 ng/ml and (b) 0.01 ng/ml of cTnI. In each image, the two samples on the right are the assays while the two samples on the left are controls exposed to 0 ng/ml troponin. In (a) the S/N ratio is greater than the threshold of 4 set by us for detection. In (b) the S/N ratio is lower than the threshold for detection

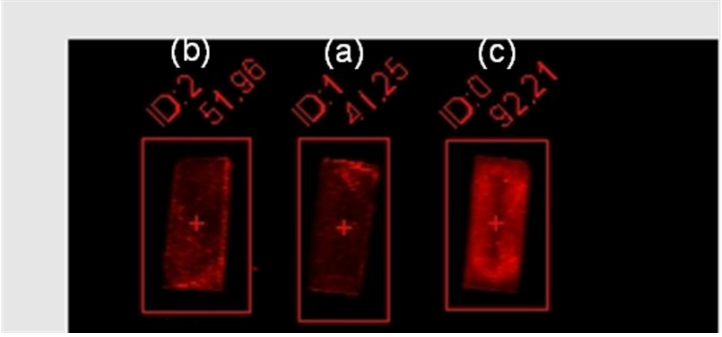

Figure S4: cTnI detection with ethanolamine+BSA blocking using TiO_2 NTs samples grown in DMSO-based electrolyte at 7.5 V (a) 0 pg/ml (b) 0.01 pg/ml and (b) 0.1 pg/ml. We see that after blocking by ethanolamine+BSA, S/N ratio > 4 is not achieved

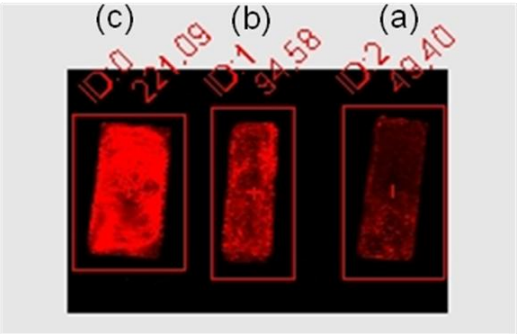

Figure S5: cTnI detection with Tween20+BSA blocking using TiO_2 NTs samples grown in DMSO-based electrolyte at 7.5 V (a) 0 pg/ml (b) 0.01 pg/ml and (b) 0.1 pg/ml. We see that after blocking by Tween20+BSA, S/N ratio > 4 is indeed achieved for 0.1 pg/ml, which forms the detection limit achieved by us in the present study.

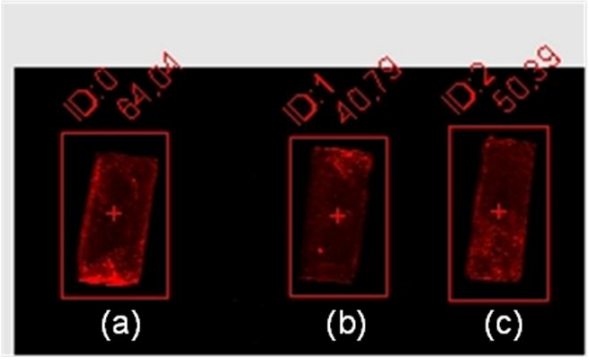

Figure S6: Zero troponin control samples using TiO_2 NTs samples grown in DMSO-based electrolyte at 7.5 V (a) BSA blocking (b) Tween20+BSA blocking and (c) ethanolamine+BSA

blocking. We see that non-specific binding flows the order : BSA > ethanolamine+BSA > Tween20+BSA.