Electronic Supplementary Material (ESI) for Analyst.

Rapid screening and quantitative detection of Salmonella using a quantum dot nanobead based biosensor

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S1. Evaluating the fluorescence of QDNS

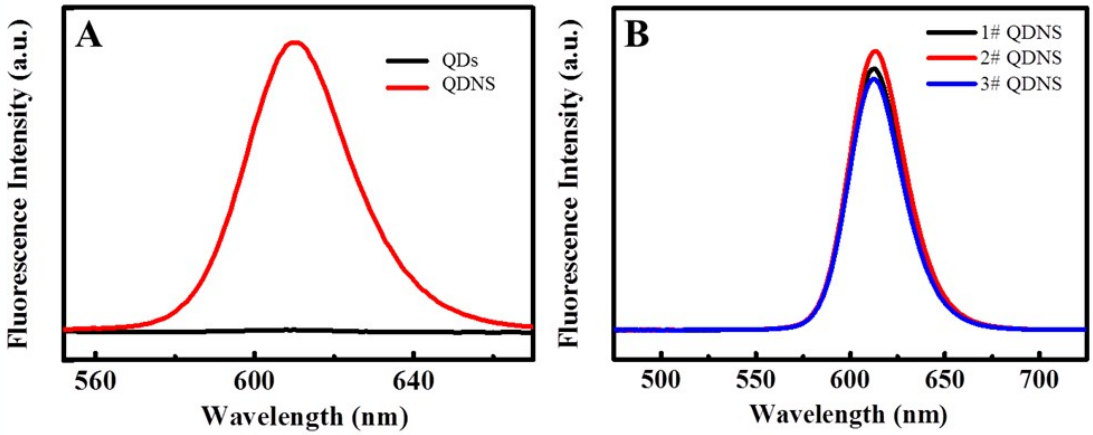

Fig. S1 (A) Fluorescence intensity of QDNS (read line, fabricated by layer-by-layer assembly method), quantum dots (black line) at the same particle concentrations. (B) Fluorescence intensity of the three batches of QDNS.

S2. Verification of the fabrication of antibody conjugation

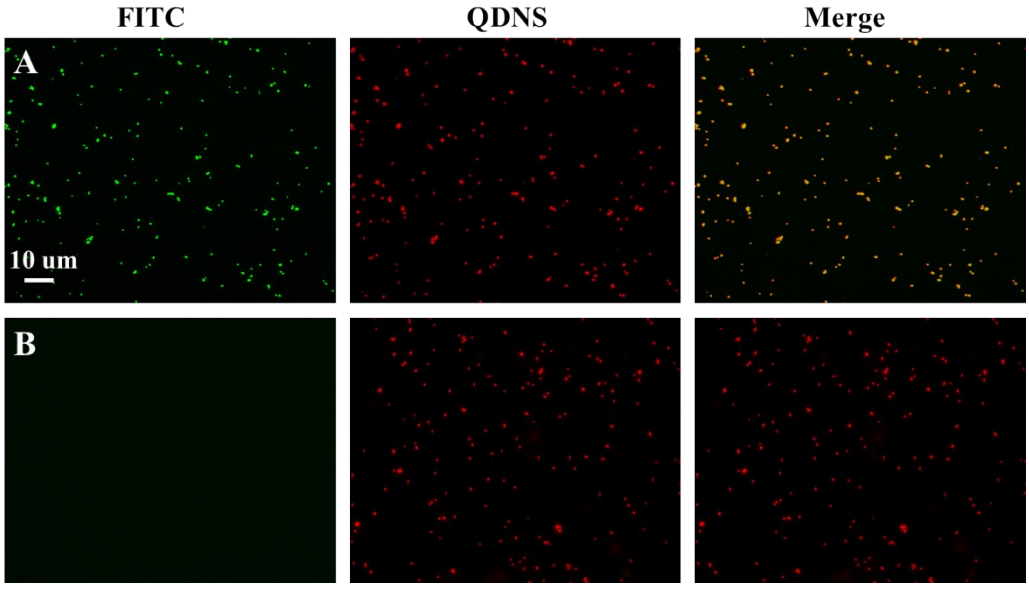

Fig. S2 The fluorescence response of IQDNS (A) and QDS (B) after reacted with FITC-goat anti-mouse IgG, respectively.

S3. Optimization of the detection conditions

In order to realize highly sensitive detection of *Salmonella typhimurium*, the amount of QDNS was optimized. As we know, the signal of positive sample was increased with the amounts of QDNS within a certain range. Then, the signal was decreased due to the hook effect. As shown in Figure S2, the fluorescence intensity of

test line was the highest at 30 μg QDNS. Hence, 30 μg QDNS was ascertained as the optimal dose of one test.

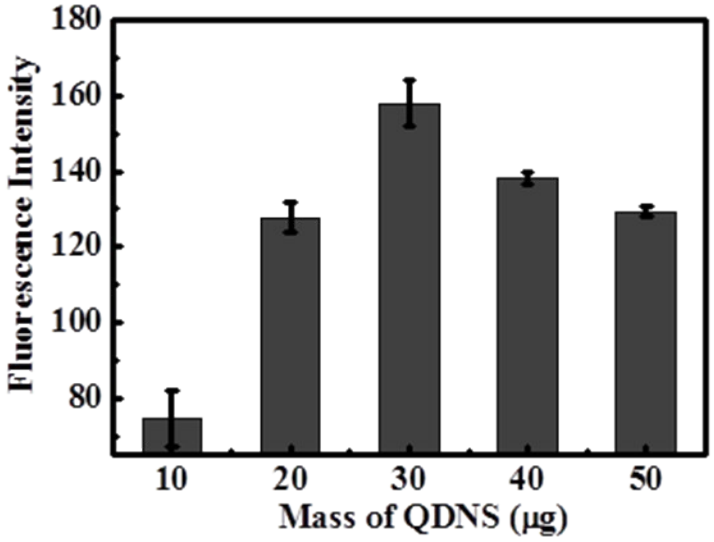

Fig. S3 Histogram of fluorescence intensity of test line with different amount of QDNS for the detection of *Salmonella typhimurium* (The *Salmonella typhimurium* concentrations were 10^7 CFU/mL).

S4. **Reproducibility analysis of the QDNS based biosensor**

For practical application, good precision and reproducibility are very important. Different concentrations of *S. typhi* broth samples were used to evaluate the reproducibility. As shown in Table S1, the intra-assay and inter-assay variability was calculated to be 4.99% and 7.15%, respectively. The results suggested that the QDNS based biosensor exhibited high reproducibility.

Table S1. Reproducibility analysis of the QDNS based biosensor

	Intra-assay			Inter-assay		
S. typhi concentration (CFU/mL)	mean[a]	SD[b]	CV[c] (%)	mean[a]	SD[b]	CV[c] (%)
5×10^4	45.8	2.59	5.66	41.2	3.95	9.59
1×10^5	60.8	4.10	6.74	69	5.23	7.58
5×10^5	135.2	4.86	3.59	138.6	8.02	5.79
1×10^6	164.2	6.53	3.98	163.4	9.18	5.62
	Intra-assay variability			Inter-assay variability		
	4.99			7.15		

[a]Values represent the average of detected fluorescence intensity of parallel samples (n=5). [b]Values represent the standard deviation of parallel results (n=5). [c]CV=SD/mean.