

## SUPPORTING INFORMATION

### **Paper based lateral flow immunoassay for the enumeration of *Escherichia coli* in urine**

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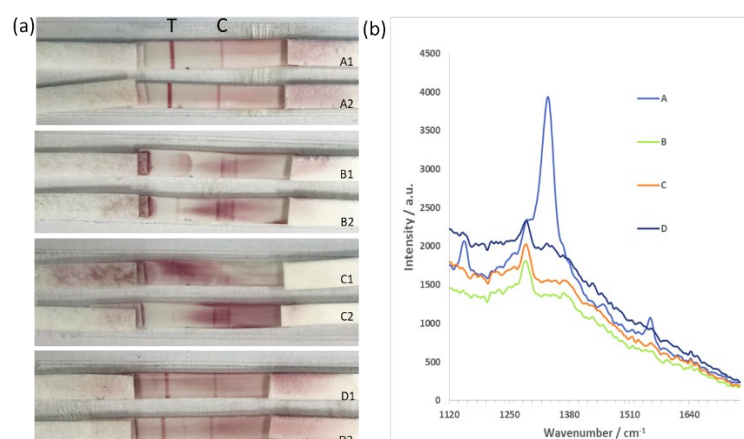
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## Selectivity study with whole living *E.coli* and cell lysates

In Figure S1, it is shown that enzymatic cell lysates prevented the lateral flow (B and C). In these strips, control lines can be observed, however, test lines were either appeared slightly or not appeared, comparing to strips with living cells (A). Using the SERS technique, it was also confirmed that there is no signal of the nitro peak of DTNB from the test line which was appeared at  $1335\text{ cm}^{-1}$  in living cell sample (A). The use of lysis caused a negative effect on the efficiency of test strips. Instead of the interaction of surface proteins with modified nanoparticles, there might be interferences from other components of *E.coli* because of the cell disruption. Due to the other protein molecules of the cell, LPS would not interact with antibodies on the test line.

The following strip (D) was evaluated with a sample of ultrasonic cell lysis and the flow completed properly and both test line and control line were observed comparing to strips B and C. However, strip A with a living cell had also better lines than the strip D which was also shown in the Raman spectra. Employment of any cell pre-treatment had negative effects on the test system, strip D had more clear lines than strips B and C, however, the Raman spectra was still not significant. In conclusion, the proposed LFIA strips were worked well with the living cell of *E.coli* not only in colorimetric responses but also in Raman responses.



**Figure S1 (a)** Digital photograph of test lines in lateral flow immunoassay strips with different samples: Living cell of *E.coli* (A), enzymatic lysis of *E.coli* cells with a concentration ratio of 1:3 (bacteria: enzyme) (B), enzymatic lysis of *E.coli* with a concentration ratio of 1:1 (bacteria: enzyme) (C), ultrasonic lysis of *E.coli* cells (D). **(b)** The Raman spectra of SERS-LFIA in four different samples of *E.coli*.