Electronic Supplementary Information for

Label-free mapping of single bacterial cells using surface-enhanced

Raman spectroscopy

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PBS for 0 minutes

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dendrites mixed with bacteria suspended in 12 mM PBS; (c) average spectra of 20 spectra randomly collected from

(a) and (b); (d) PCA spots of the SERS spectra shown in (c)

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Fig. S1 SERS spectra of the final washing solution.



Fig. S2 SERS spectra of the supernatant of the bacterial suspension after resuspending the bacterial cells in 10 mM

PBS for 0 minutes.



Fig. S3 SERS spectra of the supernatant of the bacterial suspension after resuspending the bacterial cells in 10 mM
PBS for 60 minutes. Compared with the control, no obvious peak was observed in the supernatant of SE1045, *E. coli*BL21 and LM18. Small peaks were observed for the supernatant of *L. lactis* LM0230, indicating that the detected bacterial cell signal was slightly interfered by the released compounds.



Fig. S4 (a) optical images of Ag dendrites mixed with bacteria suspended in 10 mM PBS; (b) optical images of Ag dendrites mixed with bacteria suspended in 12 mM PBS; (c) average spectra of 20 spectra randomly collected from (a) and (b); (d) PCA spots of the spectra shown in (c).



Fig. S5 SEM images of 20 μ L SE1045 (10^6 CFU/mL) mixed with 6 μ L Ag dendrites.



Fig. S6 optical image of 20 µ L SE1045 (10⁸) mixed with (a) 2 µ L, (b) 4 µ L, (c) 6 µ L, (d)8 µ L Ag dendrites.



Fig. S7 Plot of the red spots number versus the log value of bacterial concentrations.



Fig. S8 Mapping data of a mixture of SE1045 and LM18. Mapping data were created based on the intensity of the

peak at 1332 cm⁻¹. Red: SE1045 or BL21; blue: Ag dendrites.

Spot number	Class name	Distance to class	Identification result
1	SE1045	1.83	Pass
2	BL21	2.17	Pass
3	SE1045	2.84	Pass
4	SE1045	2.1	Pass
5	SE1045	2.26	Pass
6	BL21	1.63	Pass
7	SE1045	3.05	Fail
8	SE1045	2.34	Pass
9	BL21	2.03	Pass
10	BL21	1.25	Pass
11	BL21	1.37	Pass
12	BL21	0.97	Pass
13	BL21	1.41	Pass
14	BL21	1.27	Pass
15	BL21	0.59	Pass
16	BL21	1.57	Pass
17	BL21	1.43	Pass
18	BL21	1.52	Pass
19	BL21	1.82	Pass
20	BL21	1.38	Pass
21	BL21	1.7	Pass
22	BL21	1.72	Pass
23	BL21	1.58	Pass
24	BL21	1.61	Pass
25	SE1045	1.5	Pass
26	BL21	1.2	Pass
27	SE1045	1.41	Pass
28	BL21	1.59	Pass
29	BL21	1.47	Pass
30	BL21	1.15	Pass
31	BL21	1.42	Pass
32	SE1045	1.41	Pass
33	BL21	1.73	Pass
34	BL21	1.88	Pass
35	SE1045	1.21	Pass
36	BL21	1.27	Pass
37	BL21	2.19	Pass
38	SE1045	2.14	Pass
39	SE1045	1.17	Pass
40	BL21	1.98	Pass
41	BL21	1.43	Pass
42	BL21	1.26	Pass
43	SE1045	2.06	Pass
44	SE1045	1.95	Pass

Table S1 Identification of the bacterial mixture using the PCA prediction model.