Additional Information

Dual-mode SERS-based lateral flow assay strips for simultaneous diagnosis of SARS-CoV-2 and influenza A virus

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**Fig. S1.** TEM images of (a) AuNPs and (b) SERS nanotags. (c) DLS size distributions, (d) corresponding UV-vis absorption spectra of AuNPs (black) and SERS nanotags (red).
Fig. S2. SEM images for test lines: (a) in the absence (0 PFU/mL) and presence (1000 PFU/mL) of SARS-CoV-2, and (b) in the absence (0 HAU/mL) and presence (8064 HAU/mL) of influenza A virus.
**Fig. S3.** Raman spectra of 130 mapping points before (gray) and after (blue/red) base line corrections for (a) 1000 PFU/mL SARS-CoV-2 and 8064 HAU/mL influenza A virus.
Fig. S4. Selectivity tests for five different respiratory viruses (RSV, influenza B, influenza A/H3N2, influenza A/H1N1, and SARS-CoV-2) using a SERS-LFA strip.
Table S1. SERS intensity ratios for eight different SARS-CoV-2 concentrations.

| Concentration (PFU/mL) | 1000     | 500      | 100      | 50       | 10       | 5        | 1        | 0        |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| TL1                    | 12978.3  | 10458.4  | 2879.09  | 2230.93  | 861.36   | 734.36   | 657.40   | 600.08   |
| CL                     | 9395.64  | 10036.1  | 10551.9  | 10370.2  | 8763.94  | 10694.8  | 11194.6  | 11540.2  |
| Ratio (TL1/CL)         | 1.381    | 1.042    | 0.273    | 0.215    | 0.098    | 0.068    | 0.058    | 0.052    |
Table S2. SERS intensity ratios for eight different influenza A virus concentrations.

| Concentration (HAU/mL) | 8064  | 4032  | 2016  | 1008  | 504   | 168   | 56    | 0     |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| TL2                    | 7806.26 | 7113.04 | 4748.64 | 3456.06 | 2244.07 | 1292.90 | 938.26 | 671.16 |
| CL                     | 10137.6 | 10644.36 | 2937.67 | 13607.2 | 14169.5 | 12389.7 | 11483.5 | 22906.5 |
| Ratio (TL2/CL)         | 0.770  | 0.668  | 0.367  | 0.254  | 0.158  | 0.104  | 0.082  | 0.029  |
**Table S3.** Determination of LoDs using four-parameter sigmoidal function and calculated LoD values for ELISA and dual-mode SERS-LFA.

| Methods                  | Model                  | Equation                                                                 | Term | Value    |
|--------------------------|------------------------|--------------------------------------------------------------------------|------|----------|
| ELISA (SARS-CoV-2)       | Four-parameter sigmoidal function | $y = \frac{A_1 - A_2}{1 + (x/x_0)^p} + A_2$                            | $A_1$| 0.09579  |
|                          |                        |                                                                          | $A_2$| 0.57348  |
|                          |                        |                                                                          | $x_0$| 713.13   |
|                          |                        |                                                                          | $p$  | 2.0520   |
| ELISA (Influenza A virus)|                        |                                                                          | $A_1$| 0.07502  |
|                          |                        |                                                                          | $A_2$| 0.88293  |
|                          |                        |                                                                          | $x_0$| 18502    |
|                          |                        |                                                                          | $p$  | 1.4707   |
| Dual-mode SERS-LFA       | Four-parameter sigmoidal function | $y = \frac{A_1 - A_2}{1 + (x/x_0)^p} + A_2$                            | $A_1$| 0.05980  |
| (SARS-CoV-2)             |                        |                                                                          | $A_2$| 2.51215  |
|                          |                        |                                                                          | $x_0$| 807.95   |
|                          |                        |                                                                          | $p$  | 1.0412   |
| Dual-mode SERS-LFA       |                        |                                                                          | $A_1$| 0.03143  |
| (Influenza A virus)      |                        |                                                                          | $A_2$| 1.9543   |
|                          |                        |                                                                          | $x_0$| 13759    |
|                          |                        |                                                                          | $p$  | 0.74507  |