Supporting Information

Multivalent Antibody-Nanoparticle Conjugates to Enhance the Sensitivity of SERS-based Immunoassays

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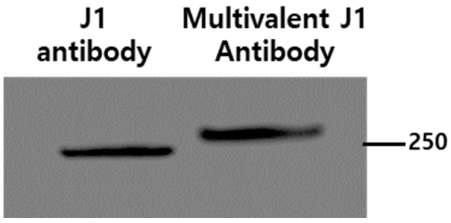

Figure S1. (a) Western blot analysis of standard J1 antibody and multivalent J1 antibody.

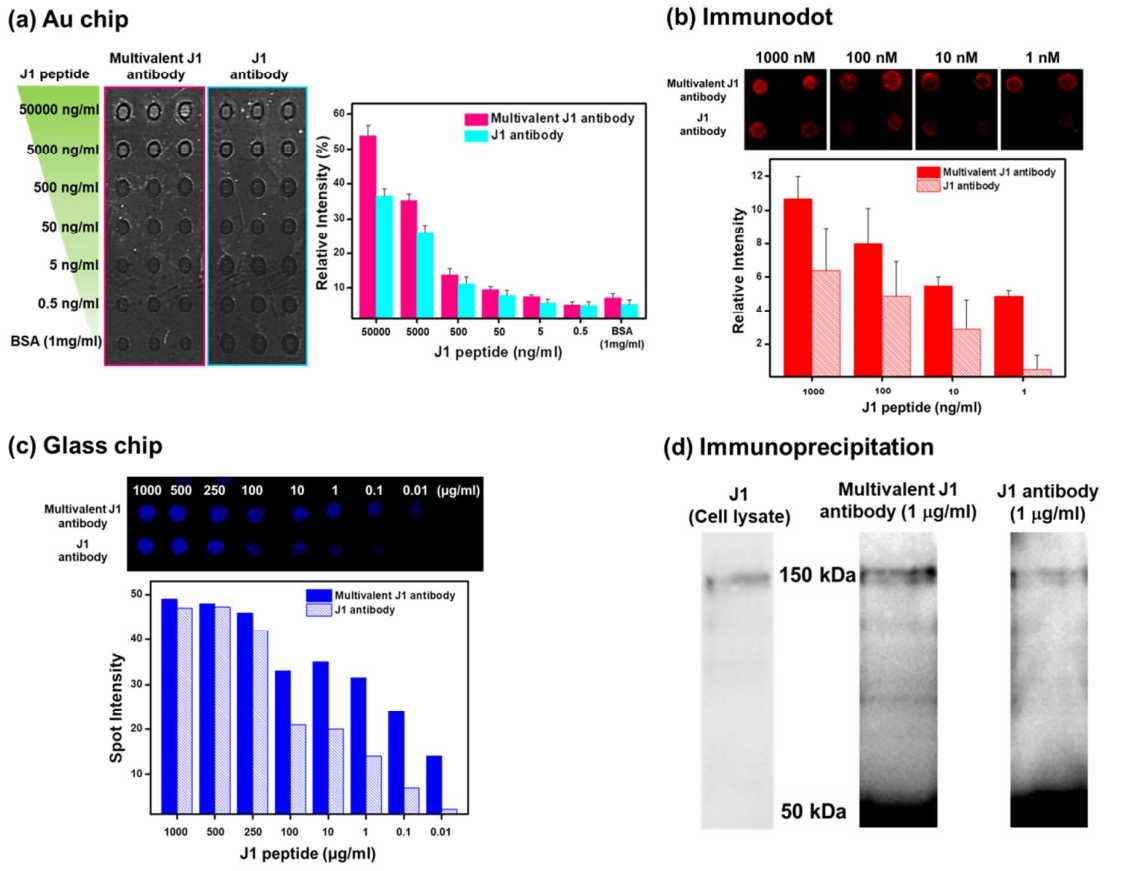

Figure S2. Application of the multivalent J1 antibody to various sensor systems. (a) Graph of the 8-bit grayscale values for the multivalent and standard J1 antibody arrays following immobilization on a Au chip at various J1 peptide concentrations (50,000, 5,000, 500, 50, 5, and 0.5 ng/mL). (b) Fluorescence imaging analysis of Cy5-labeled J1 peptide targeting a nitrocellulose membrane spotted with the multivalent or standard J1 antibody (1,000, 100, 10, and 1 ng/mL). The degree of fluorescence at 635 nm was detected. (c) Fluorescence imaging analysis of Cy3-labeled multivalent or standard J1 antibody targeting J1 peptide-spotted glass slides (1,000, 500, 250, 100, and 10 μg/mL). Fluorescence images were captured at 532 nm. (d) Immunoprecipitation of the multivalent J1 antibody/J1 peptide or standard J1 antibody/J1 peptide complex was detected by western blot analysis using horseradish peroxidase-conjugated goat anti-human IgG.

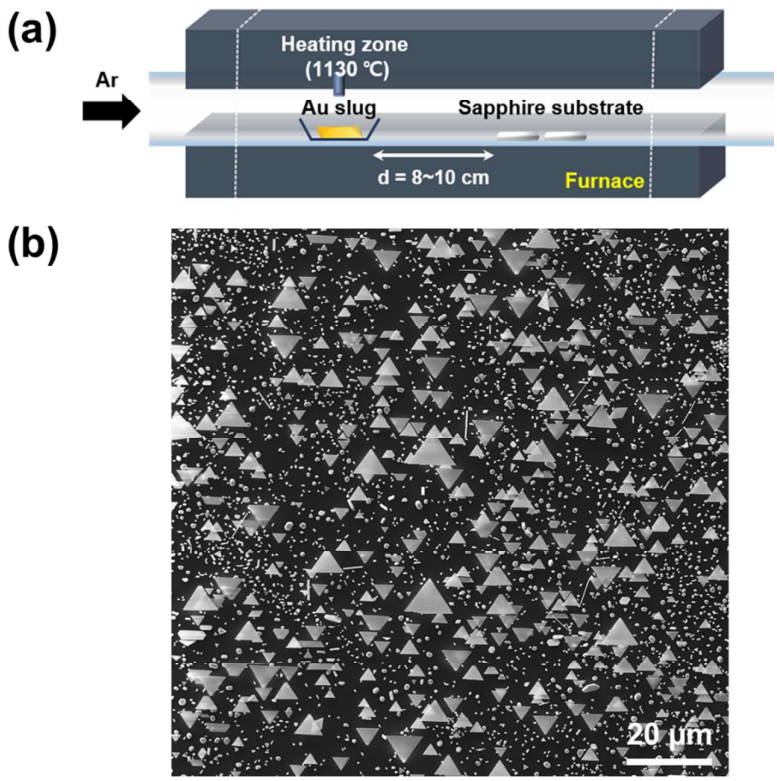

Figure S3. (a) Schematic illustration of the experimental setup for the synthesis of Au nanoplates. (b) SEM image of Au nanoplates on substrate.

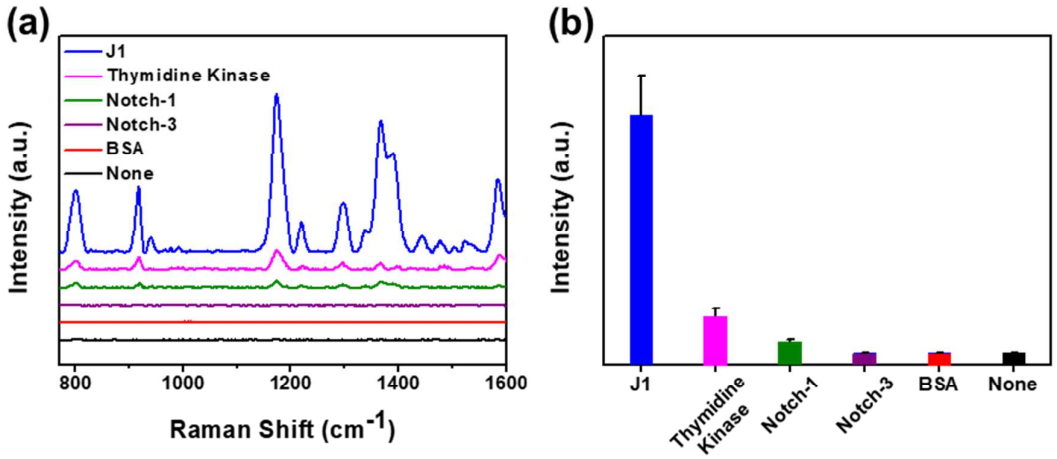

Figure S4. (a) SERS spectra of MGITC obtained from MANC-on-nanoplate structures with varying target proteins (J1, notch-1, notch-3, thymidine kinase, and BSA). (b) Plot of band intensity at 1,175 cm^{-1} versus the target protein. Data represent the mean plus standard deviation of eight measurements.

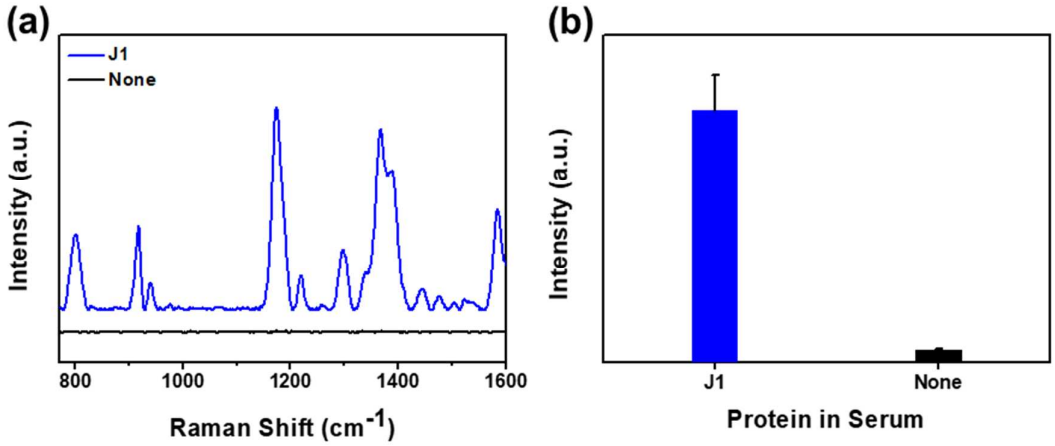

Figure S5. (a) SERS spectra of MGITC obtained from MANC-on-nanoplate structures with J1 peptide in serum sample (blue) and control serum sample (black). (b) Plot of band intensity at 1,175 cm^{-1} versus the sample. Data represent the mean plus standard deviation of eight measurements.

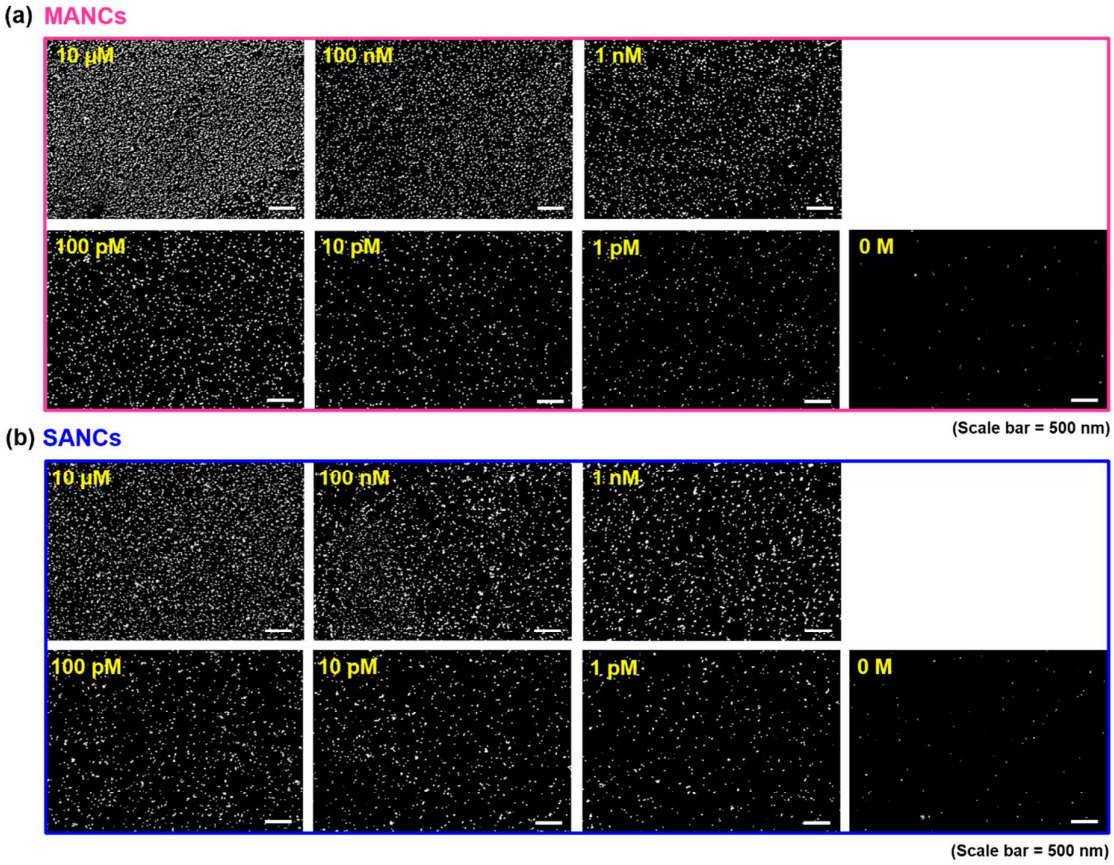

Figure S6. (a) SEM images of MANC-on-nanoplate structures with varying J1 concentrations. (b) SEM images of SANC-on-nanoplate structures with varying J1 concentrations.