Electronic Supplementary Material (ESI) for Lab on a Chip.

Supporting Information

Intensity-modulated nanoplasmonic interferometric sensor for MMP-9 detection

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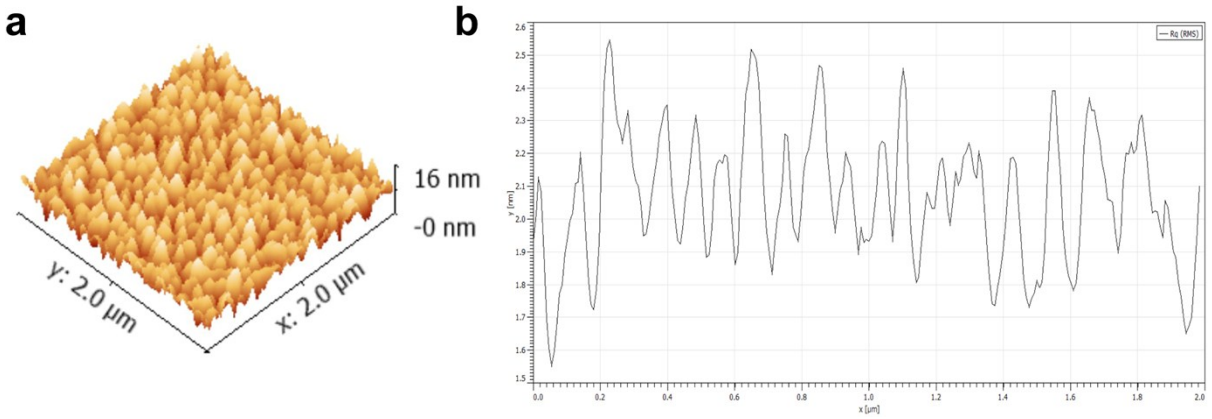

Figure S1 A typical AFM image of a 250 nm thick gold film of 2×2 µm^2 area. The root mean square roughness is 2.1 nm, measured by NT-MDT Solver NEXT AFM.

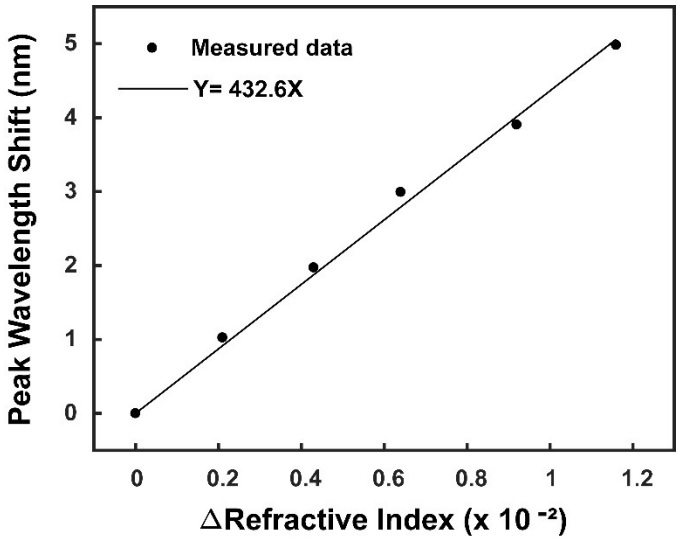

Figure S2 Peak wavelength shift (nm) corresponding to bulk refractive index change. The peak wavelength shift (λ_p≈677 nm when the sensor is exposed to water) is plotted as a function of glycerol-water mixture concentration change. The glycerol concentration ranged from 0% to 10%, corresponding to bulk refractive indices of 1.3328-1.3444. The linear fitting yields a sensitivity $S = \left|\frac{\Delta WL}{\Delta RI}\right|$ of *432.6 nm/RIU*, where ΔWL and ΔRI represent relative wavelength shift (nm) and refractive index change relative to sensor exposure in water environment, respectively. The constant item was forced to zero to match the definition of ΔWL and ΔRI.

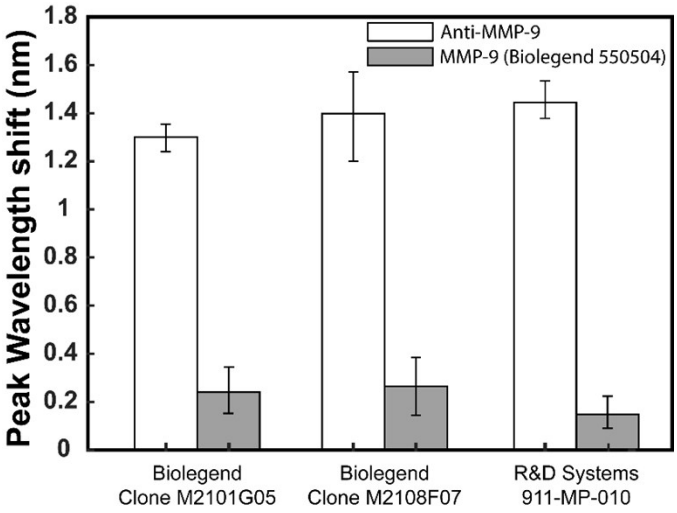

Figure S3 Antibody selection. Peak wavelength shift in response to antibodies from different manufacturers. White bars represent amount of immobilized anti-MMP-9 and grey bars represent the corresponding wavelength shift from MMP-9 binding. MMP-9 from Biolegend (Cat 550504) of 200 ng/ml was used as the antigen in all measurements. Error bars denote standard deviation from three independent repeats. Anti-MMP-9 from Biolegend Clone M2108F07 gives the greatest binding response with the MMP-9 (Biolegend 550504) and was used as the antibody in this work.

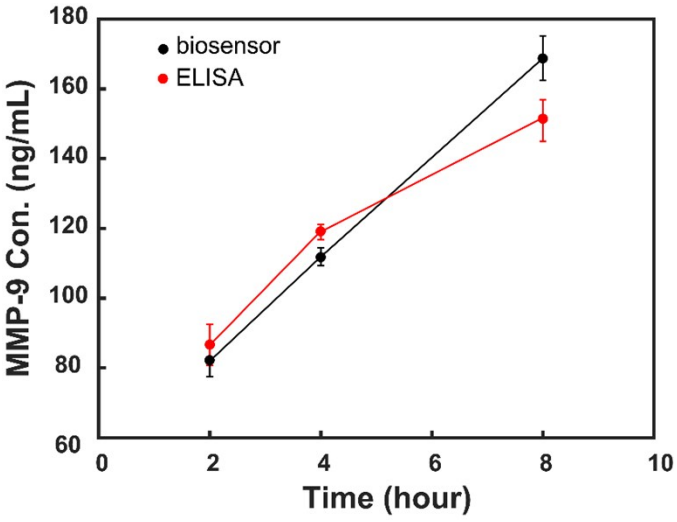

Figure S4 Detection of MMP-9 concentration by the plasmonic biosensor and ELISA test in supernatant of THP-1 cell culture after 2, 4 and 8 hours after LPS stimulation. Error bars denote three independent experiments. The device-to-device variation is comparable with results obtained from ELISA kit and the concentration matches with that tested from ELISA kit.