Impacts of Gold Nanoparticle Charge and Ligand Type on

Surface Binding and Toxicity to Gram-Negative and Gram-Positive Bacteria

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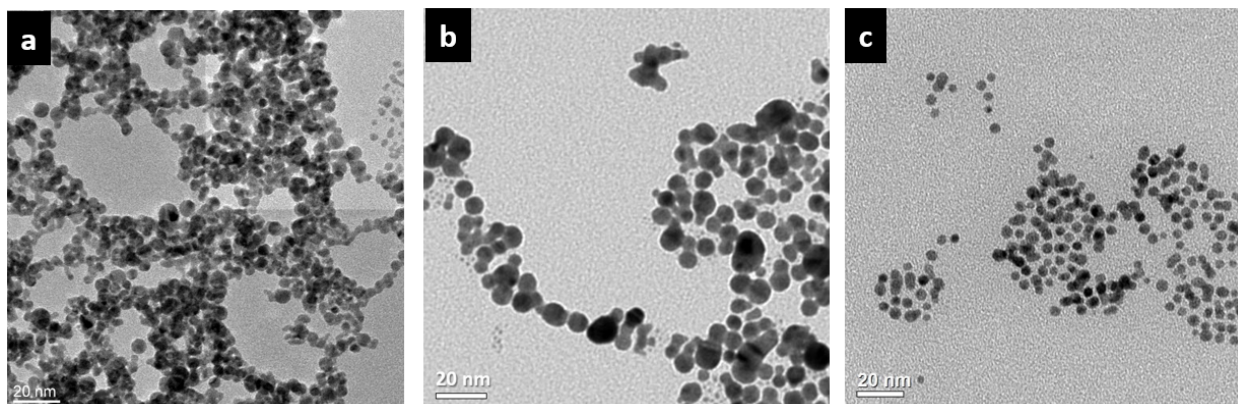## Supporting Information

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Figure S1. Representative transmission electron micrographs of (a) MPA-AuNPs, (b) MPNH$_2$-AuNPs, and (c) PAH-AuNPs.
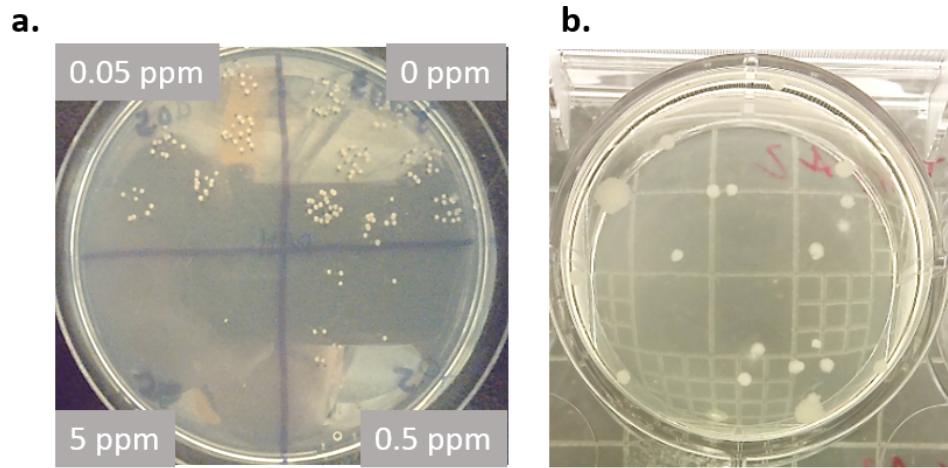
Figure S2. Representative results from plates used in colony counting methods: (a) drop plate for *Shewanella*, and (b) pour plate for *Bacillus*. The apparent variation in colony sizes in the *Bacillus* plate was due to the location of the colonies in the agar matrix, where smaller colonies were inside the matrix and the larger ones were on the surface.
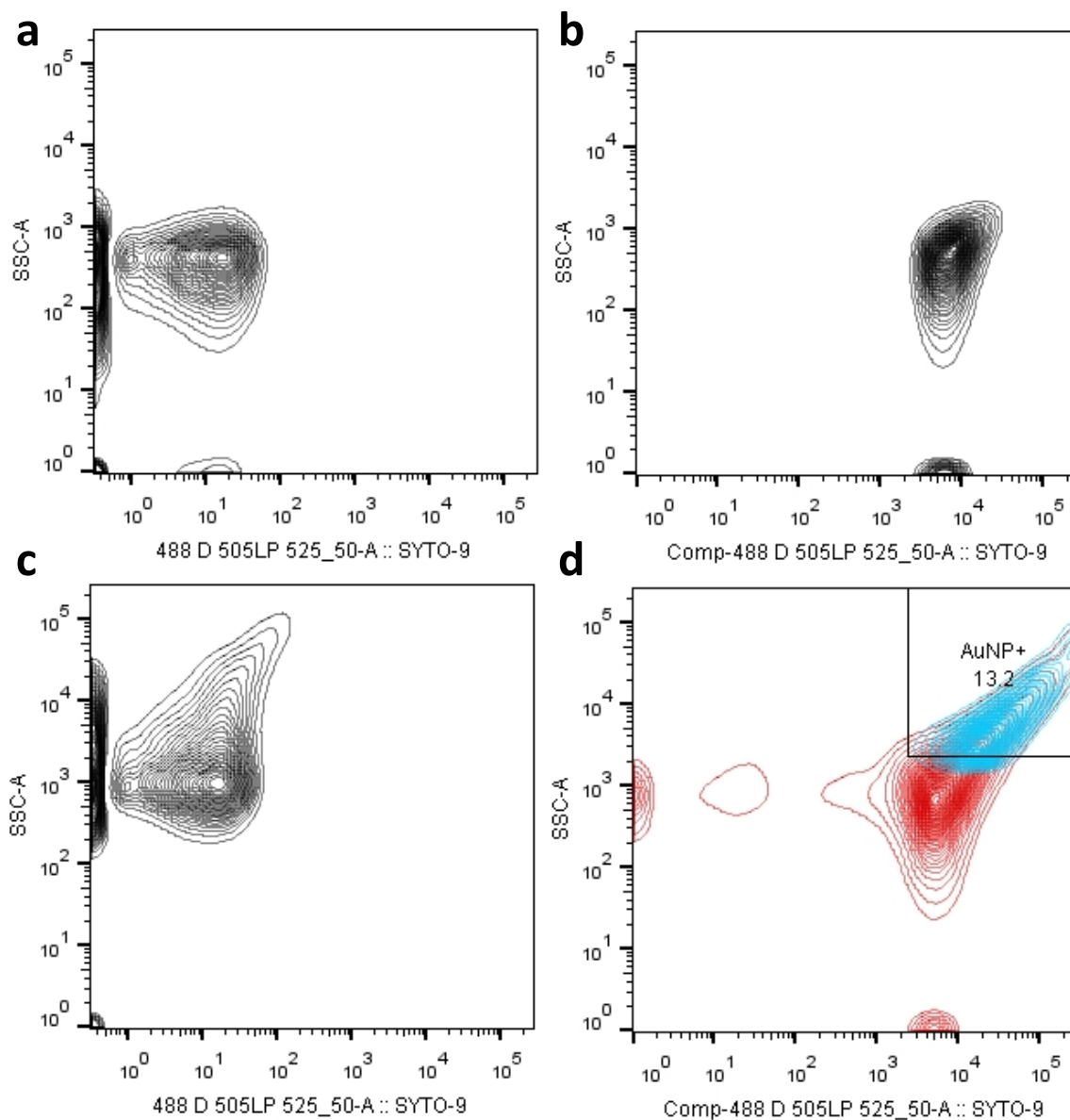
Figure S3. Sample cytograms of (a) unstained *Bacillus* cells, (b) SYTO 9-stained *Bacillus* cells, (c) AuNPs alone, and (d) SYTO 9-stained *Bacillus* with 5 μg/mL MPNH$_2$-AuNPs. Both axes are in arbitrary units corresponding to detector signals (vertical: side scattering detector at λ = 488 ± 10 nm); horizontal: fluorescence detector channel at λ = 510 ± 10 nm).

Determination of PAH-ligand concentration in 5 µg/mL 4-nm PAH-AuNPs

$AuNP diameter = 4nm$

$Volume_{AuNP} = \frac{4}{3}\pi(\frac{4}{2})^3 = 33.5nm^3 = 3.35 \times 10^{-20} cm^3$

$Density_{Au} = 19.3g / cm^3$

$Mass_{Au} = (3.35 \times 10^{-20} cm^3) \times (19.3g / cm^3) = 6.47 \times 10^{-19} g$

$\# AuNP / L = \dfrac{(5mg / L) \times (0.001g / mg)}{6.47 \times 10^{-19} g} = 7.73 \times 10^{15}$

$M_w of PAH = 15000g / mol$

$\# PAH / \# AuNP = 4$

$[PAH](\mu g / mL) = \dfrac{(15000g / mol) \times 4 \times (7.73 \times 10^{15} / L) \times (1000mg / g)}{6.02 \times 10^{23} / mol} = 0.77mg / L = 0.77 \mu g / mL$