This supporting information describes colloid preparation techniques and methods for determining various, relevant properties are described in detail. (no figures or tables)
Supporting Information

Colloid Preparation and Properties: Carboxylated latex fluorescent microspheres (Magsphere, Pasadena, CA, emission = 488 nm, excitation= 528) were washed (3X) of surfactant in PBS, centrifuged (1700xg, 20 min), and sonicated for 10 min before experimentation to disperse them.

The *Escherichia coli* K-12 PHL 628 was genetically modified to constitutively express a green fluorescent protein (emission = 488 nm, excitation = 528 nm) (1). Colonization factor antigen (CFA) broth was used as a growth media (1% Casamino Acids, 0.15% yeast extract, 0.005% MgSO$_4$ and 0.0005% MnCl$_2$, v/v, pH = 7.4) (21). Cells were harvested after incubating for 16 hours at 25°C, quantified by plating in triplicate, washed 3X in autoclaved PBS, and centrifuged (1020xg, 4°C, 10 min).

PLA microspheres were synthesized by a modification of the double emulsion (oil/water/oil) solvent evaporation technique using protocols described in Luo et al. (2). Briefly, two hundred milligrams of PLA (300k polymers, Polysciences Inc., Warrington, PA) was dissolved in 3 ml methylene chloride and 100 µL of 500 µM fluorescent tagger (Alexa Fluor 488 hydrazide, Molecular Probes, excitation = 488 nm, emission = 517 nm) was slowly added while vortexing. The solution was sonicated on crushed ice for 4 intervals of 10 s and 4 mL of 1.0% polyvinyl alcohol (88 mol% hydrolyzed, MW~25,000, Polyscience, Inc., Warrington PA) was slowly added to the mixture while vortexing. The solution was subsequently sonicated on ice for 4 intervals of 10 s to form the second emulsion. The mixture was removed from ice and added to 100 ml of 0.3% poly vinyl alcohol. The solution was stirred continuously for 3 h at room temperature in a 600 ml beaker. Microspheres were collected by centrifugation (3220xg, 4 °C, 10 min), washed 3X in Milli Q, frozen overnight at -80 °C and lyophilized for 24 h to remove the
aqueous phase.

Octanol-water partitioning (repeated 5 times) was performed for microspheres to assess relative hydrophobicity (3). Five hundred µL of microspheres in PBS (~5x10^8 spheres/ml) and 500 µl of octanol was placed in a microfuge tube, mixed vigorously for 30 s and allowed to stand for 10 min. The aqueous phase was quantified by a fluorometer (Synergy HT Multi-Detection Microplate Reader Bio-tek® Instruments, excitation = 485 ± 20 nm, emission = 528 ± 20 nm). The organic phase count was estimated by mass balance of the input and aqueous fractions. Colloid and sand zeta potentials were measured 5 times using a Laser Zee meter model 501, at an applied voltage of 100V. Sand zeta potential was estimated by sonicating 15 g of sand in 30 ml PBS for 30 minutes. The aqueous phase contained suspended colloidal sized sand particles. Colloid and sand properties are summarized in Table 1. Consistent with previous reports (4), the PLA microspheres were slightly less hydrophilic than carboxylated latex microspheres (Table 1). Although we did not measure bacteria hydrophobicity, *E. coli* K-12 previous studies found *E. coli* K-12 to be hydrophilic based on the contact angle (24.7°±0.4) between water and a bacterial layer collected on a microfilter (5). Zeta potential was negative for all colloids and the magnitudes suggest that aggregation was unlikely due to high inter-particle repulsive forces.

References Cited


(4) Kiss, É.; Bertóti, I.; Butler, B. XPS and wettability characterization of modified poly(lactic acid) and poly(lactic/glycolic acid) films. *J. Colloid Sci.* **2002**, *245*, 91-98.