

Supporting Information

Dielectrophoretic monitoring and inter-strain separation of intact *Clostridium difficile* based on their S (Surface)-layers

Yi-Hsuan Su¹, Cirle Warren², Richard L. Guerrant² and Nathan S. Swami^{1,*}

1 – Electrical and Computer Engineering, University of Virginia

2 – Infectious Diseases, School of Medicine, University of Virginia

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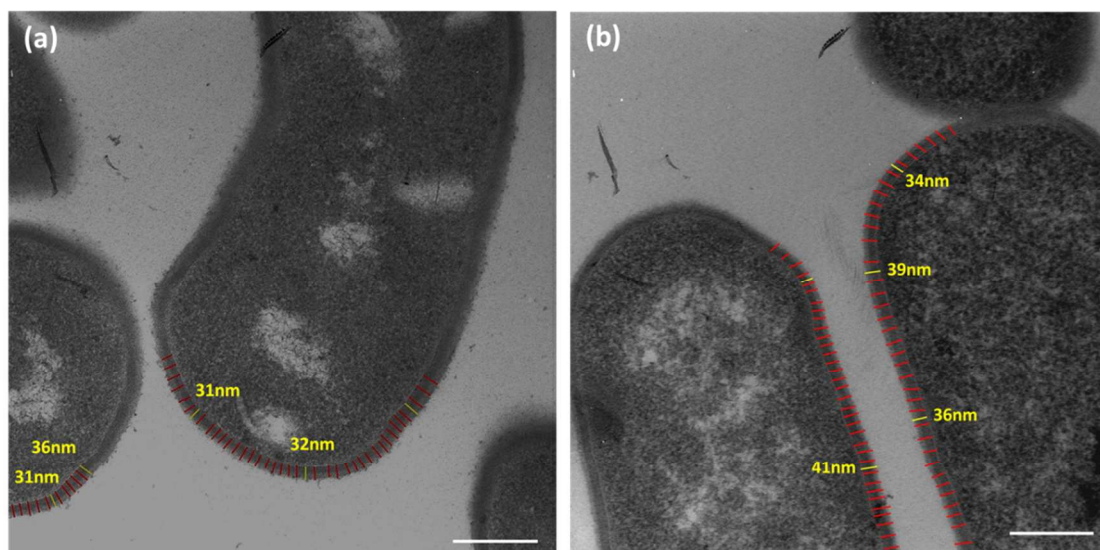
* Corresponding Author. Fax: +1-434-924-8818.

Email: nswami@virginia.edu

Viability Measurement: *C.difficile* is an anaerobic microbe, which is poisoned by oxygen upon exposure to the atmosphere or dissolved oxygen in the fluid. The following results from the viability test (**Table S1**), performed by Colony-Forming Unit assay, is used to confirm that all three strains used herein can survive up to 3 hours under the aerobic conditions of the microfluidic electrode-less DEP device, with occasional AC field ($<300 V_{pp}/cm$ in the 0.1-5 MHz range swept over 5 minutes), as per the following viability count (“+” represents more than 10 Colony Forming Units) results.

	HTCD	LTCD	NTCD
0 hour	+	+	+
1 hour	+	+	+
2 hour	+	+	+
3 hour	+	+	+
4 hour	-	-	-

Cell wall thickness measurement



Supplementary Figure S1: Representative measurements of cell wall thickness from images of: (a) HTCD with an average of 33.2 ± 4.1 nm; and (b) NTCD with an average of 36.9 ± 4.3 nm. The thickness measurement for each cell is indicated at various points (approximately 1 point over every 30nm length). Note the out-of-focus regions are not analyzed in order to avoid any ambiguity in the measurements. Scale bar: 200 nm

Supplementary Movie 1: Dielectrophoretic separation of the HTCD strain versus the NTCD strain from mixed samples at 400 kHz, wherein HTCD shows pDEP and NTCD shows nDEP. All movies are time-lapse recordings with 10 frame per second with time stamp in min:sec. Video speed: 20 frame per second (fps)

Supplementary Movie 2: Positive Dielectrophoretic response of pure HTCD strain sample at 400 kHz as control.

Supplementary Movie 3: Dielectrophoretic separation at 400 kHz of viable versus deactivated HTCD after vancomycin treatment for 20 minutes. At early vancomycin treatment times, the heterogeneous sample has a subpopulation of viable HTCD that shows pDEP versus a majority population of deactivated HTCD that shows nDEP.

Supplementary Movie 4: Negative Dielectrophoretic response of fully vancomycin treated HTCD strain sample (4 hours treatment) at 400 kHz as control.