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


# Supporting Information

## Rapid imaging, detection, and quantification of *Nosema ceranae* spores in honey bees using mobile phone based fluorescence microscopy

*Jonathan W. Snow*[1*], *Hatice Ceylan Koydemir*[2,3,4], *Doruk Kerim Karinca*[5], *Kyle Liang*[5], *Derek Tseng*[2], *Aydogan Ozcan*[2,3,4*],

[1]Department of Biology, Barnard College, New York, NY, 10027, USA;

[2] Electrical and Computer Engineering Department, University of California at Los Angeles, Los Angeles, CA, 90095, USA

[3]Bioengineering Department, University of California at Los Angeles, Los Angeles, CA, 90095, USA

[4]California NanoSystems Institute (CNSI), University of California at Los Angeles, Los Angeles, CA, 90095, USA

[5]Computer Science Department, University of California at Los Angeles, Los Angeles, CA, 90095, USA

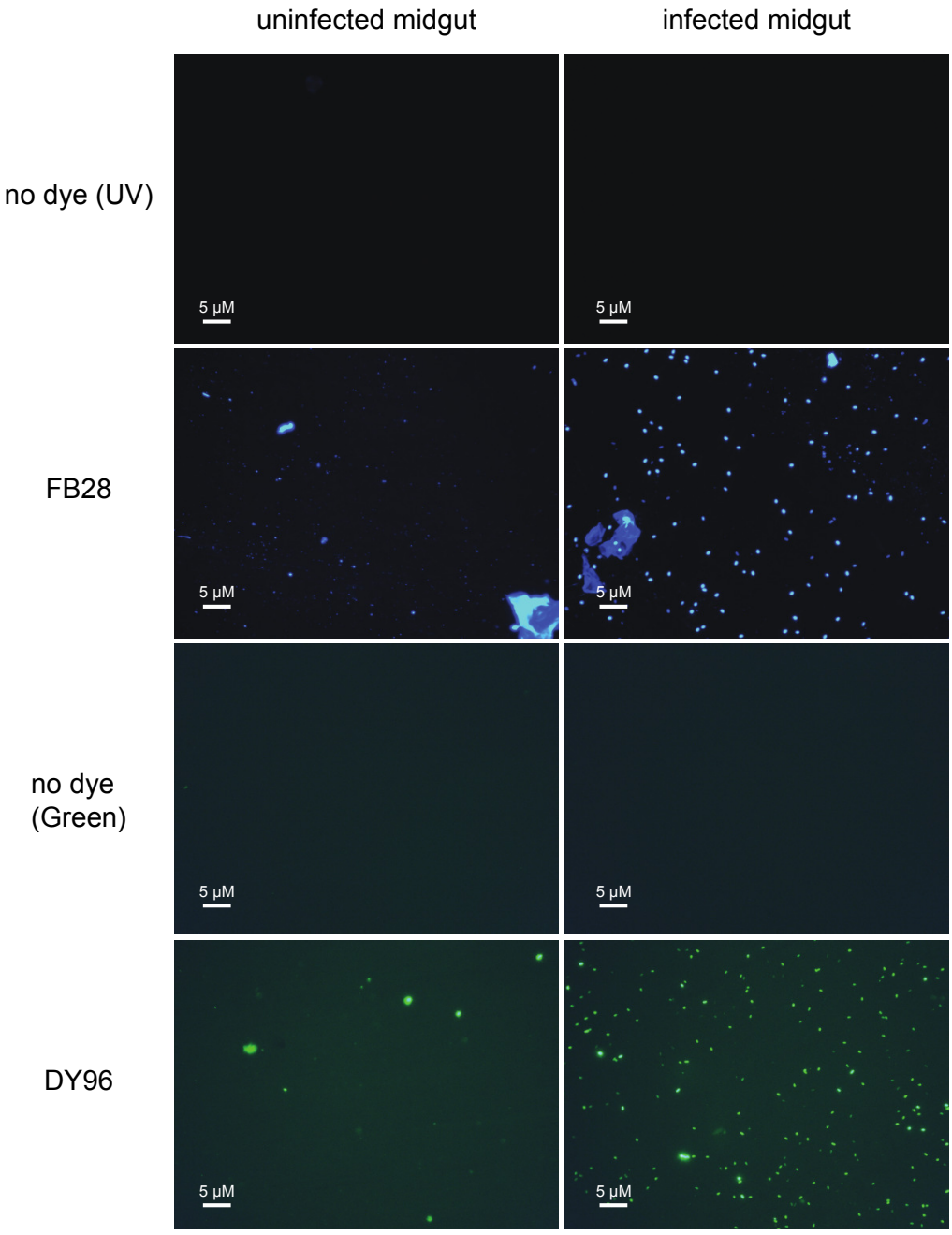


**Fig. S1. Chitin-binding dye Solophenyl Flavine 7GFE 500 (Direct Yellow 96) allows visualization of *N. ceranae* spores.** Midgut preparations from an uninfected and an infected bee from an infected colony were stained with FB28 or Solophenyl Flavine 7GFE 500, or left unstained and were visualized with UV using a 20x objective lens.

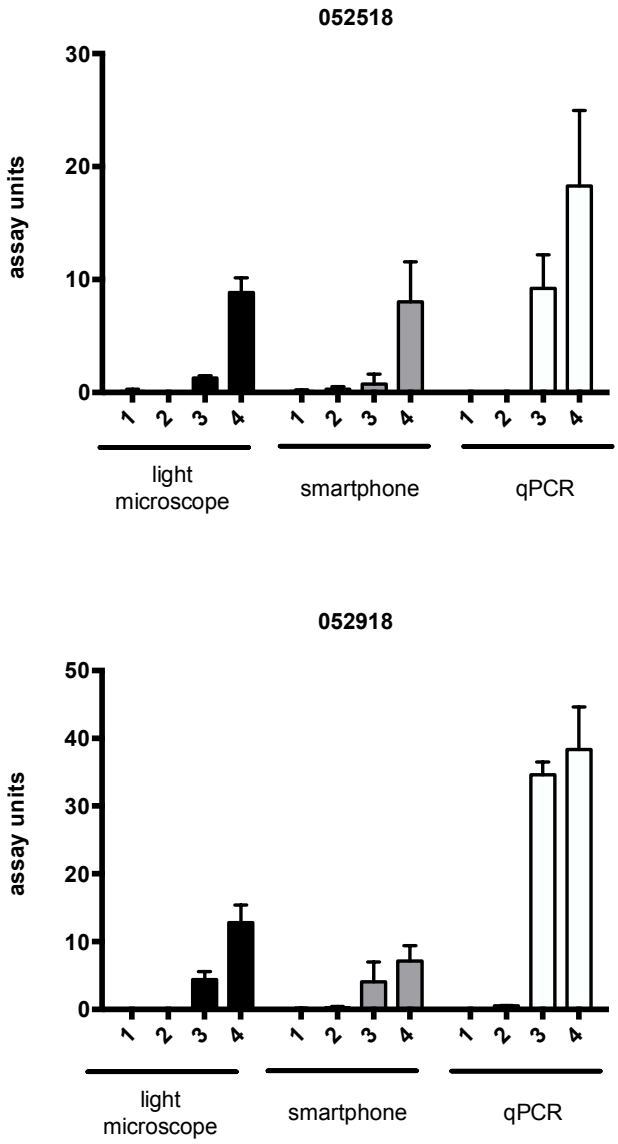


**Fig. S2.** *N. ceranae* levels as determined by spore count using traditional light microscopy (assay units = $1x10^6$ spores per bee), smartphone-based microscope (assay units = $1x10^6$ spores per bee), and qPCR (assay units = relative genome equivalents) in pooled samples from 10 honey bee midguts bees from four individual colonies over two experiments. For qPCR, the difference between the Ct number for honey bee *β-actin* and that of *N. ceranae 16S* was used to calculate the level of infection relative to *β-actin* using the $\Delta\Delta C_T$ method.