ELECTRONIC SUPPLEMENTARY INFORMATION

Nanowire sensors monitor bacterial growth kinetics and response to antibiotics

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Bacterial culture preparation:

First, colonies from LB agar Petri dish were transferred to LB medium and incubated overnight at 37 ˚C to obtain a liquid stock of active bacteria. Then, an inoculation was than from the LB preculture into fresh M9 and LB medium in a manner that an initial population of 10^8 cells mL^{-1} were obtained. The bacteria were incubated again at 37 ˚C for the measurement experiments.

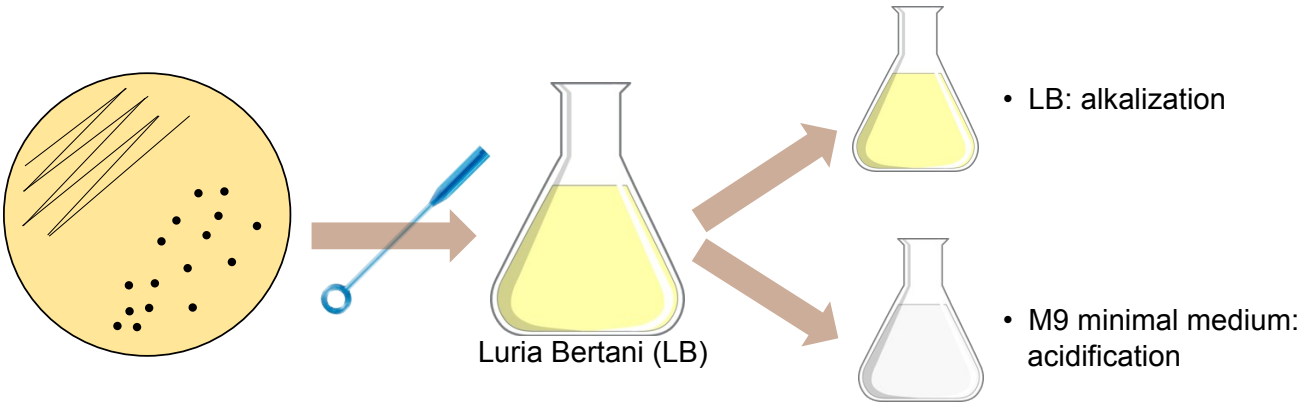

Figure S1. Bacterial culture preparation. Cells from colonies in an LB agar Petri dish were inoculated in Luria Bertani (LB) medium and incubated at 37 ˚C. Then, they were inoculated again in the culture media used for the measurements (LB and M9).

Effect of culture medium deterioration

The drift of the signal in pH and current in honeycomb nanowire field effect transistor (HC-FET) through 24h by using M9 without bacteria was analyzed in order to discard signal changes coming from the deterioration of the culture medium (**Figure S2**). After the whole incubation time, the signal did not change, confirming that the observed results during the monitoring of the bacteria were only due to their activity.

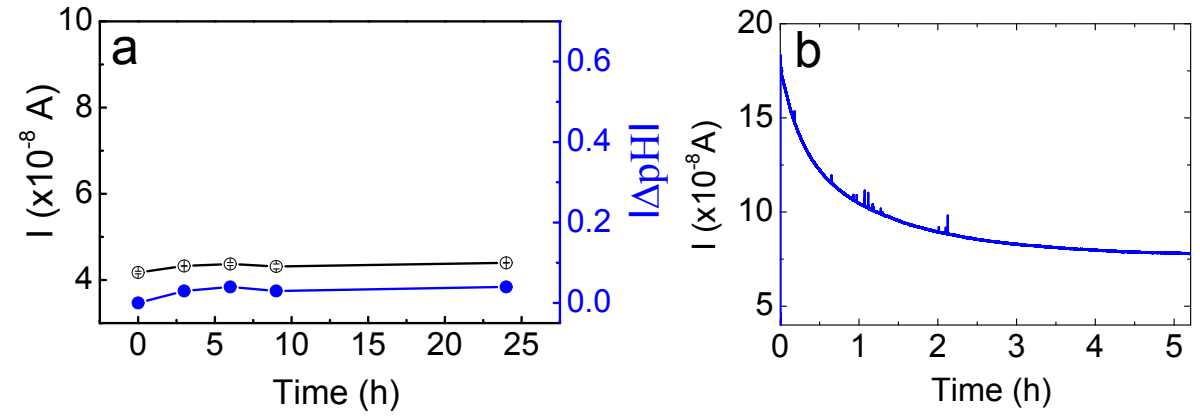

Figure S2. (a) Time-course analysis of pH and conductivity in HC-FET in presence of M9 without bacteria, showing no degradation in 24 hours. (b) Real-time analysis of HC-FET conductivity drift immersed in M9. The signal stabilizes after the third hour.

Antibiotic test in Luria Bertani (LB) medium:

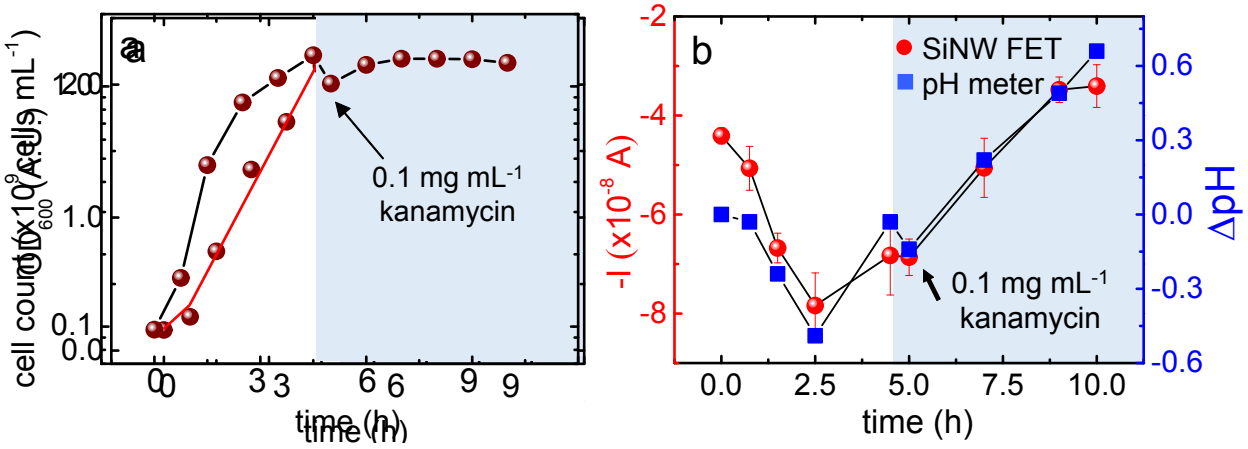

Figure S3. Time-course measurement of (a) growth curve using optical density measurements at 600 nm (OD_{600}) for the bacteria cultures treated with bacteriostatic and (b) pH change and FET signal during bacteria incubation in LB, including addition of 30% fresh medium with kanamycin (blue region, final concentration 0.1 mg mL^{-1}). Despite the stop of the growth upon kanamycin injection, the cells continue changing the pH with their metabolic activity.

Effect of antibiotics on pH and current:

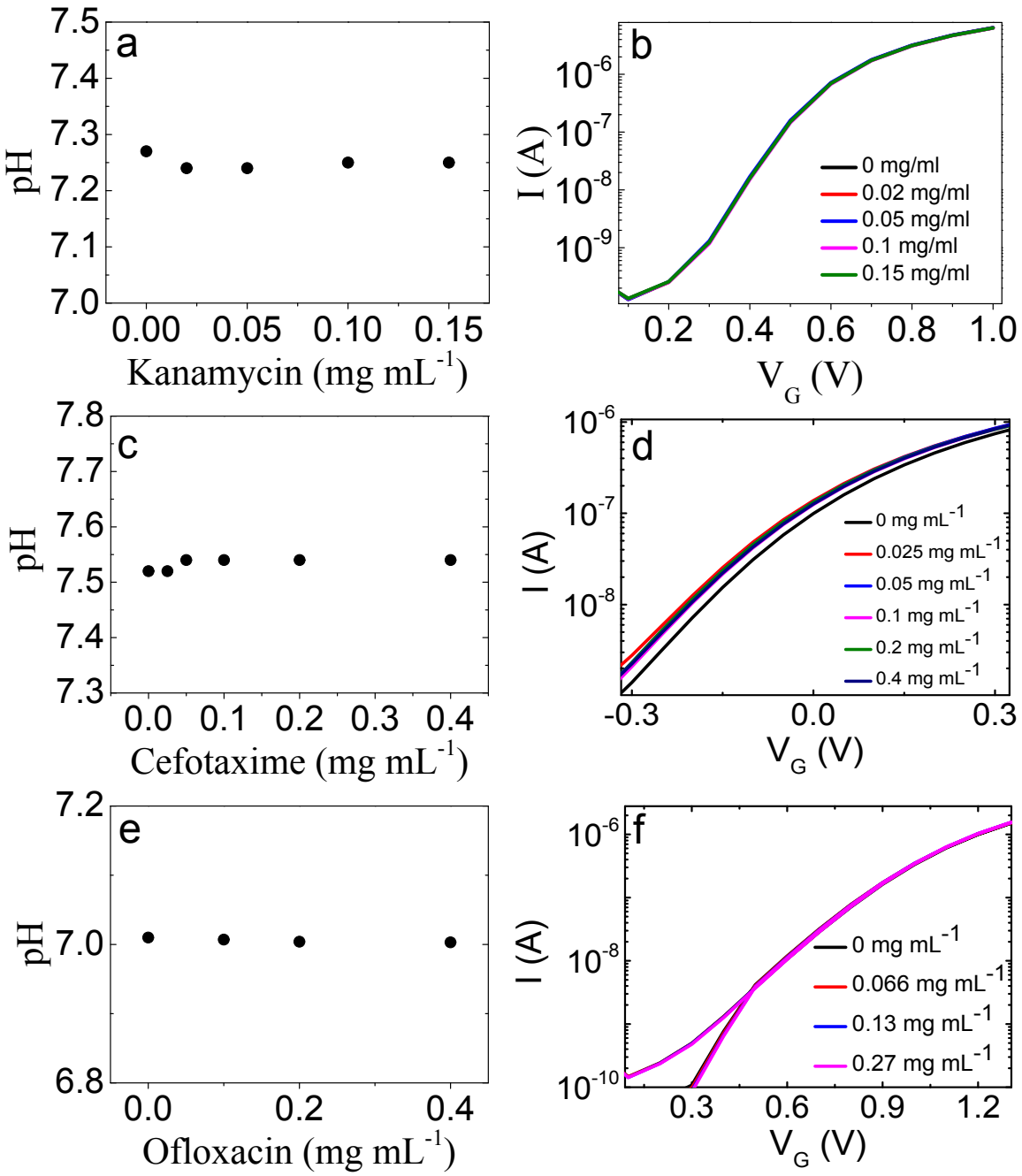

Figure S4. (a, c, e) pH and (b, d, f) transfer curves of a HC-FET for M9 with different kanamycin, cefotaxime and ofloxacin concentrations below and above the one used through this work. The antibiotics do not significantly affect the signal with the increase of their concentration.

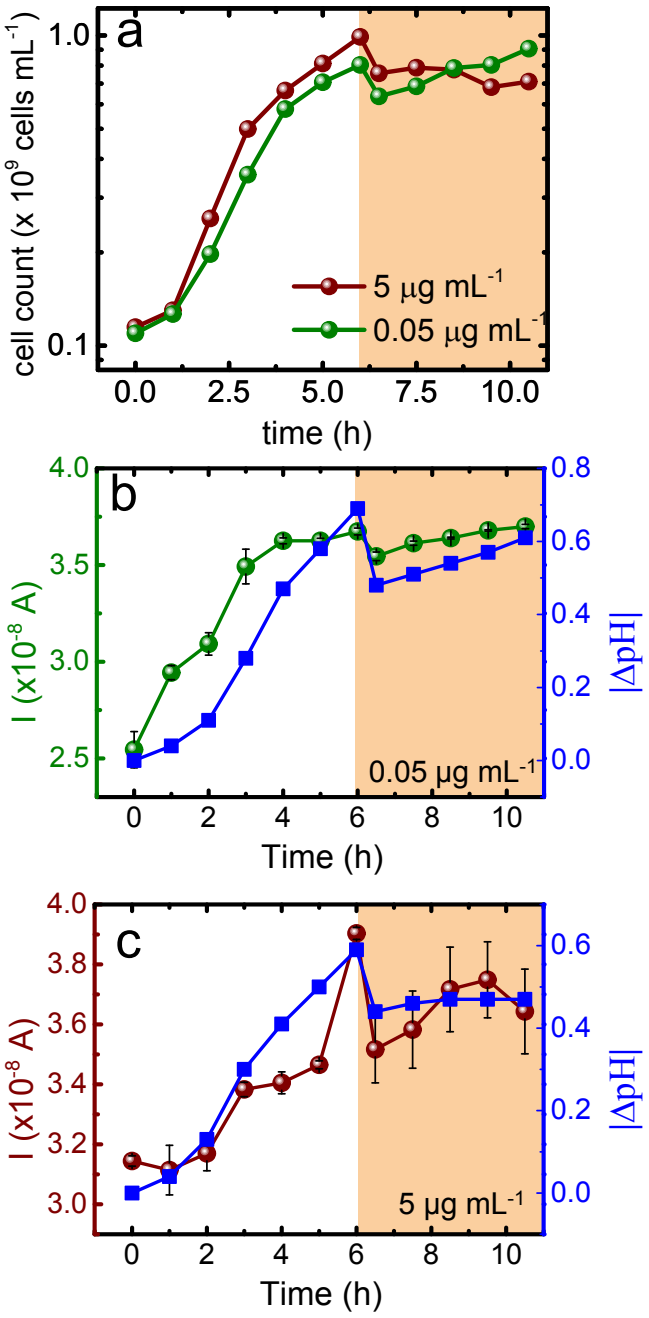

Figure S5. Comparison of ofloxacin effect at lower concentrations. (a) Cell count by optical density with ofloxacin addition of two different concentrations after the sixth hour (0.05 μg mL^{-1}, below the MIC; 5 μg mL^{-1}, around the MIC). (b) Current and pH change with antibiotic addition (below the MIC) after the sixth hour. (c) Current and pH measurements with antibiotic addition (around the MIC) after the sixth hour.

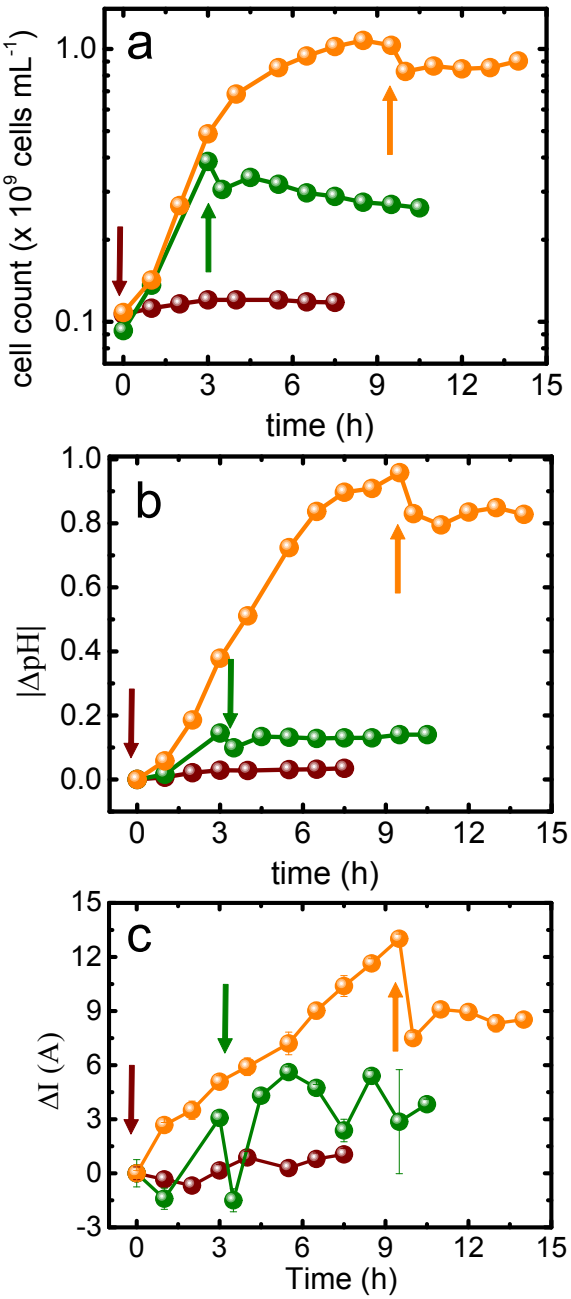

Figure S6. Comparison of different ofloxacin addition moments above the MIC (0.1 mg mL^{-1}). (a) Cell count by optical density with ofloxacin addition at three different moments: in the beginning (wine-colored curve), during exponential phase (green curve) and at stationary phase (orange curve). (b) pH change of the same three incubations. (c) Current change on the three incubations.