Supporting information

Impedimetric Bacterial Detection Using Random Antimicrobial Peptide Mixtures

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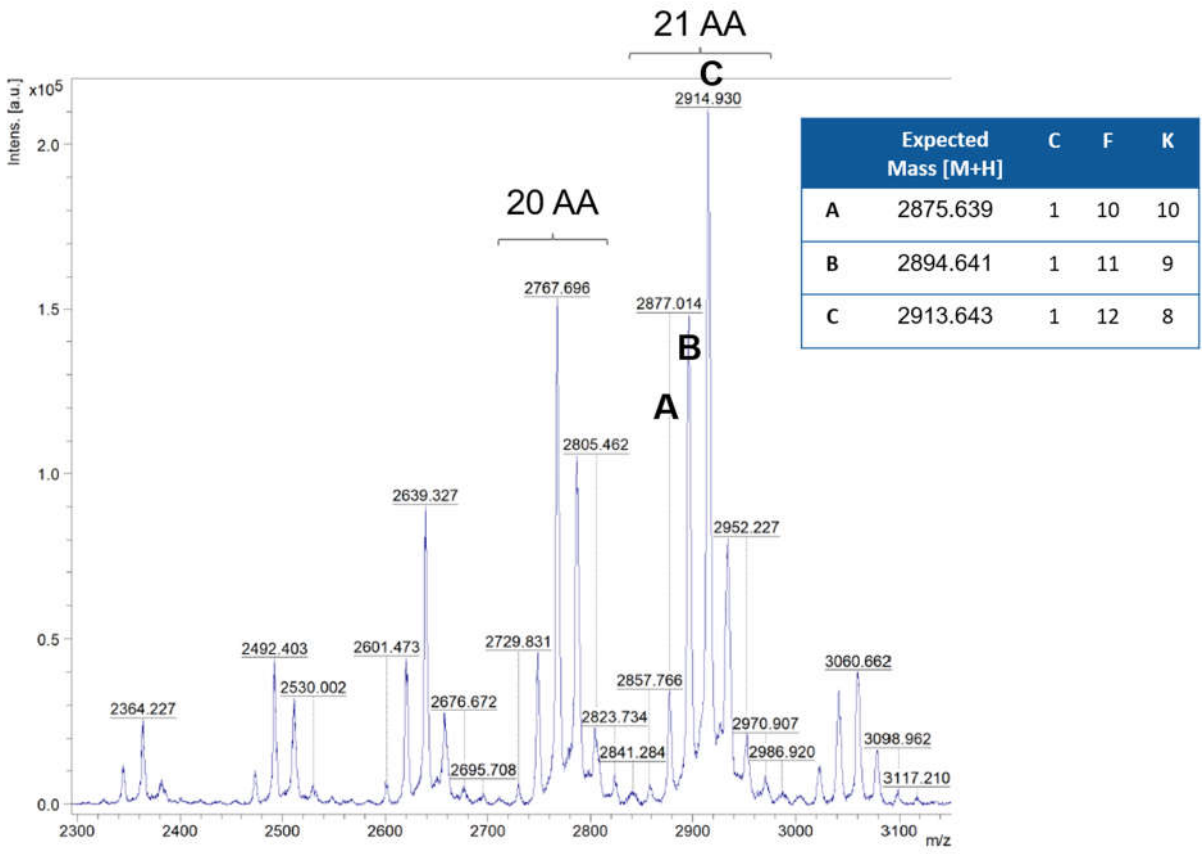

	Expected Mass [M+H]	C	F	K
A	2875.639	1	10	10
B	2894.641	1	11	9
C	2913.643	1	12	8

Figure S1. MALDI TOF/TOF analysis of CFK. Averaged expected molecular mass is 2875.639 Da. The main peak corresponds to 21-mer with distribution of F:K ratio.

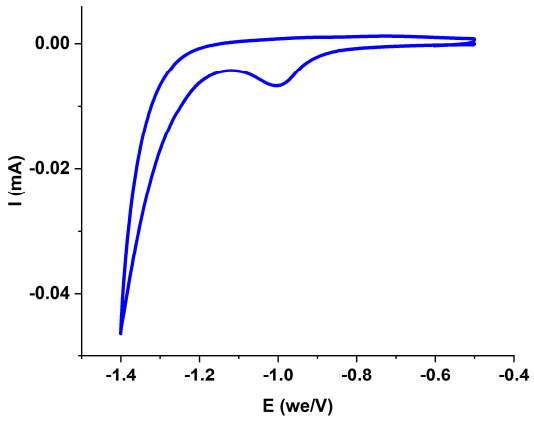

Figure S2. Reductive desorption of FKC modified Au electrode. The CV recorded in 0.1 M KOH solution from -0.5 to 1.4 V at the scan rate of 150 mV.

$$Au\text{-}SR + e^- \rightarrow Au + SR^-$$

From the CV data, we were able to calculate the density of FK molecules according to equation:

$$\mathrm{FK} = \frac{\mathrm{Q} * \mathrm{C}}{\mathrm{A}}$$

Here, FK is the amount of FK molecules, Q is the charge transfer (calculated by the integral of the CV peak), C is the coulomb constant and A is the area of the electrode. We obtain FKC surface concertation of 2.5 molecules/nm^2 = 1.4*10^{-10} moles/cm^2.

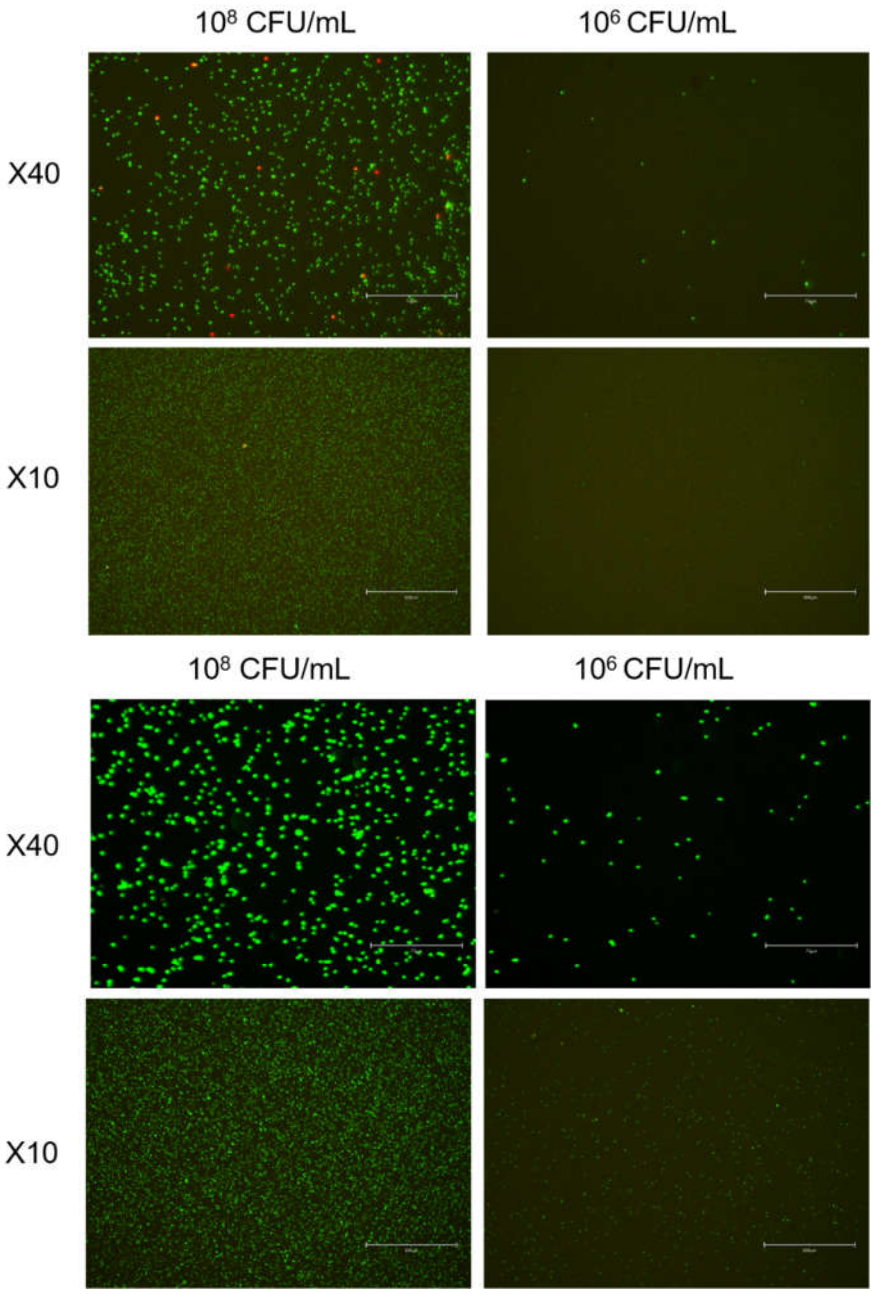

Figure S3. Coverage of Au-FKC surfaces with 10^8 and 10^6 CFU/mL MRSA and *E.coli* in 2 magnifications as observed by EVOS fluorescence microscopy. Scale bar: magnification X40 – 75μM, magnification X10 – 300 μM.

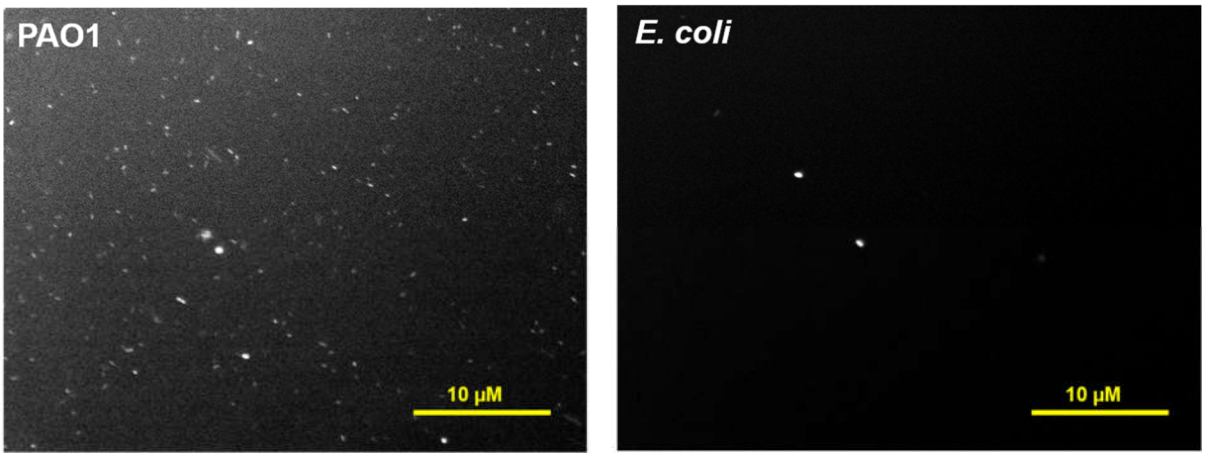

Figure S4. Binding of bacteria to bare Au as observed by fluorescence microscopy, magnification X20.

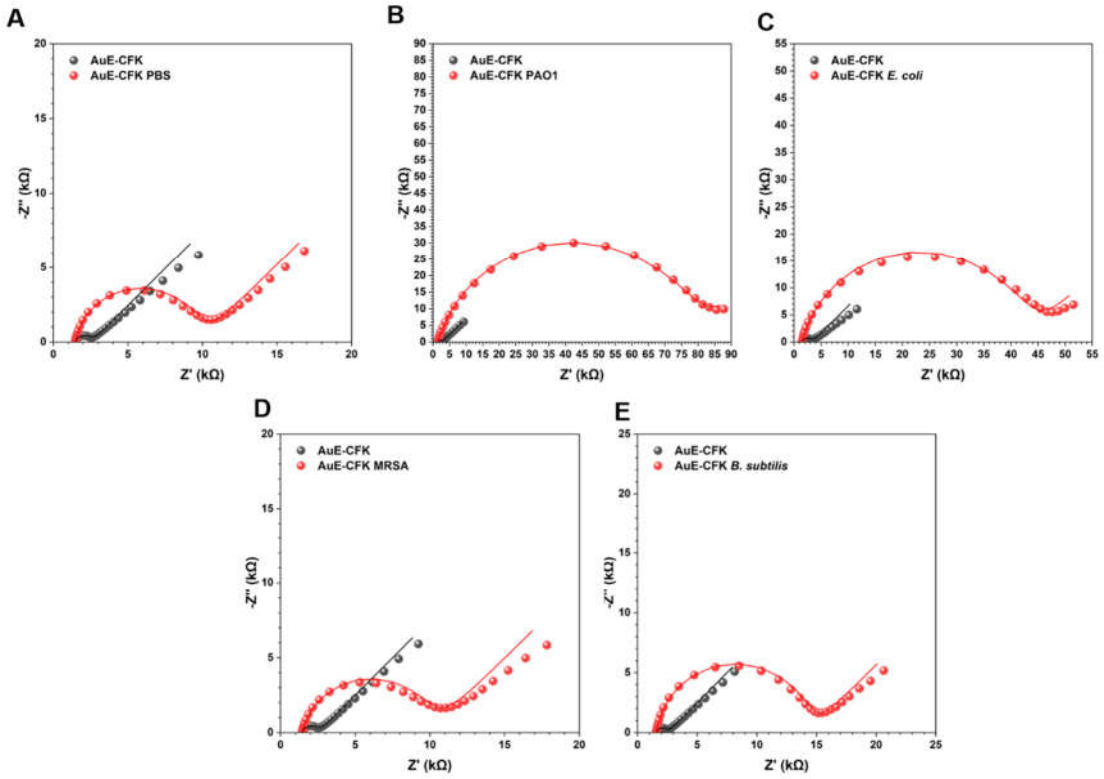

Figure S5. Nyquist plot of AuE-CFK before (Black) and after 40 min (Red) exposure to bacteria. Raw data are presented as circles, and as lines when fit to a Randles circuit. (**A**). PBS (**B**). PAO1 (**C**). *E. coli* (**D**). MRSA (**E**). *B. subtilis*. Results are Avg+SD of 3 experiments with 3 biological experiments.

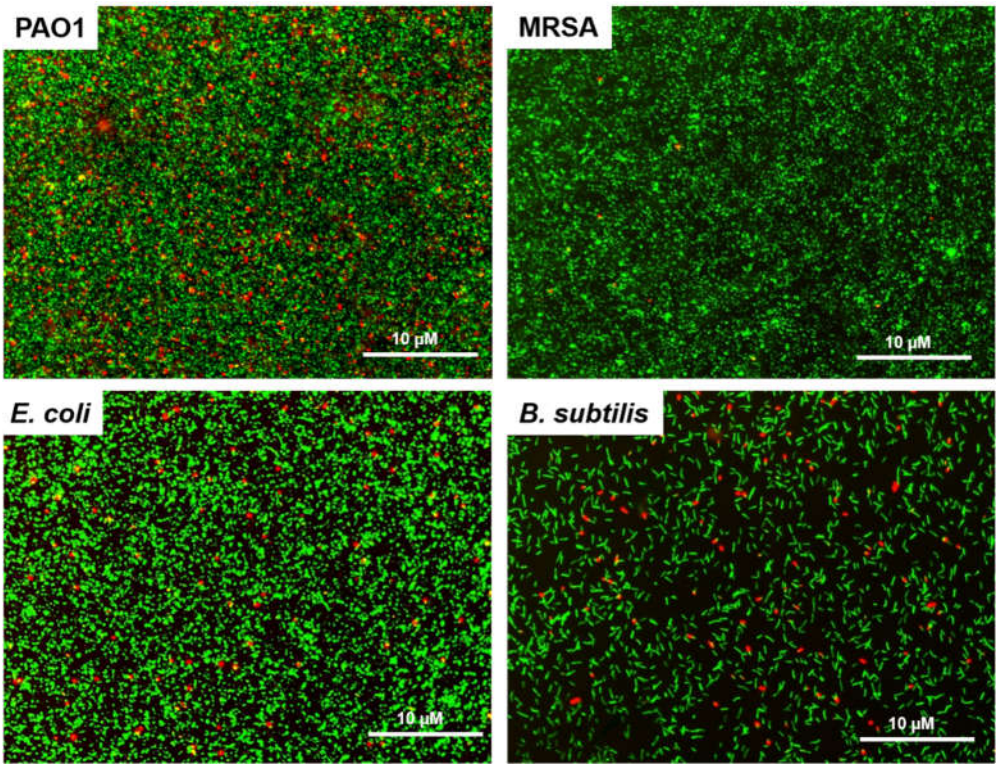

Figure S6. Live dead staining of various bacteria on Au-FKC surface.

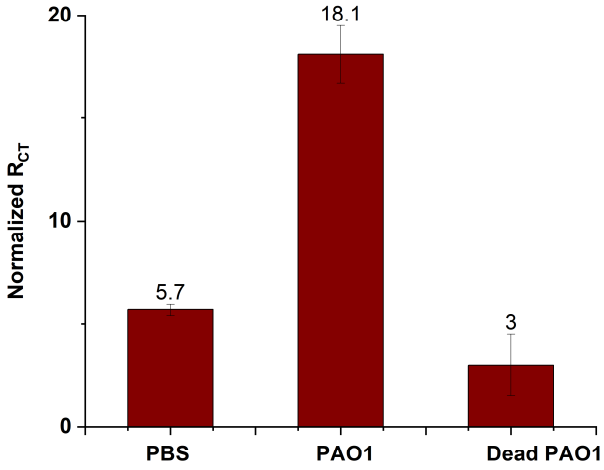

Figure S7. EIS measurements of AuE-FKC exposed to dead and live PAO1. PAO1 was killed using addition of 100 μg/mL FKC to bacteria suspension.

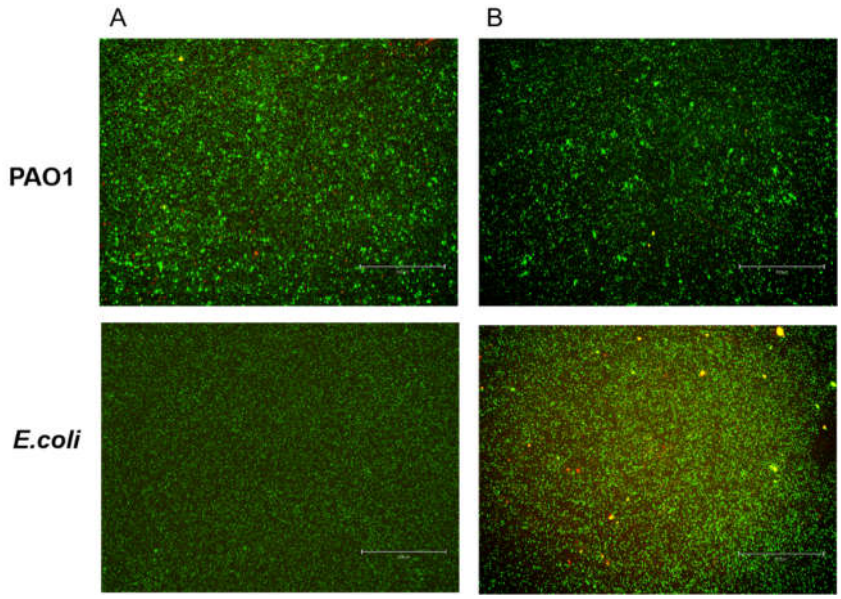

Figure S8. Effect in $[Fe(CN)_6]^{3-/4-}$ on the binding of bacteria to FKC surfaces. A. after 10 min incubation with bacteria. B. After additional incubation with $[Fe(CN)_6]^{3-/4-}$. Magnification x10, scale bar – 300 μM.