

Supplementary Information

Releasable antimicrobial polymer-silk coatings for combating multidrug-resistant bacteria

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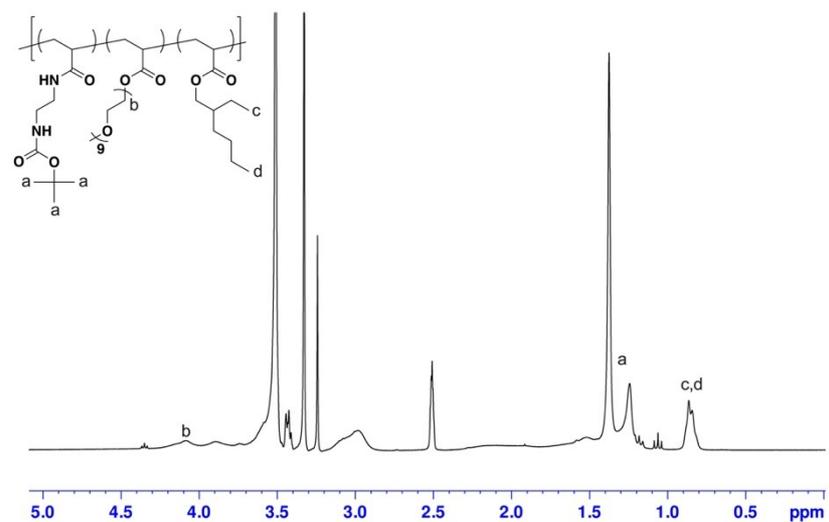


Figure S1. ^1H NMR spectra of Boc-protected P1 in *d*-DMSO.

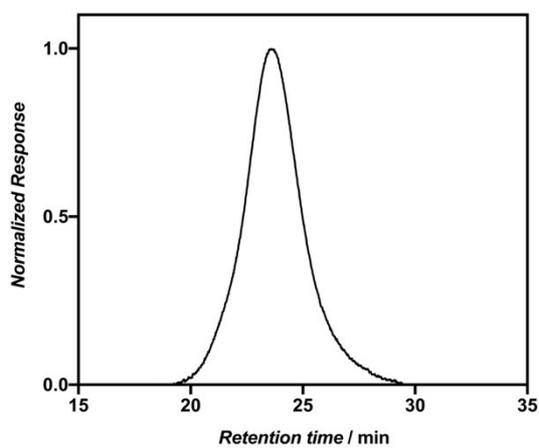


Figure S2. DMAC GPC-differential refractive index (DRI) chromatogram of the Boc-protected P1.

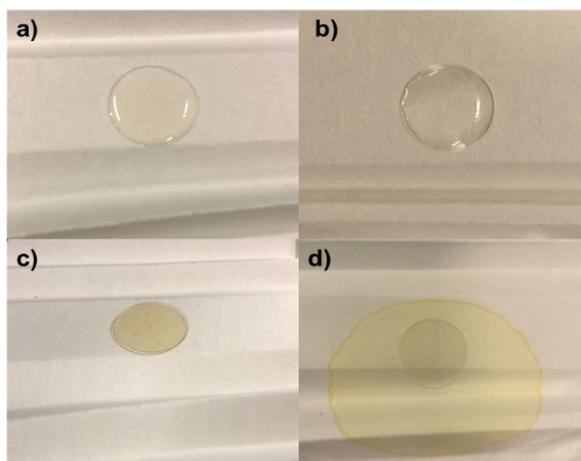


Figure S3. Evaluation of the formation of P1 films on glass coverslips with and without the presence of silk. (a) Silk-P1 and (b) silkless water-P1 mixtures immediately after casting on coverslips; (c) silk-P1 film ($S_1P_{1.6}$) formed on glass coverslip after annealing; and (d) silkless water-P1 sample after annealing showing no stable film formation on glass coverslip.

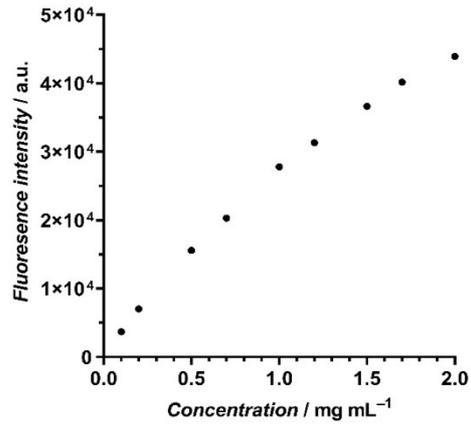


Figure S4. Calibration curve of fluorescein labeled P1 for quantification of P1 release from S₁P_{11,6}.

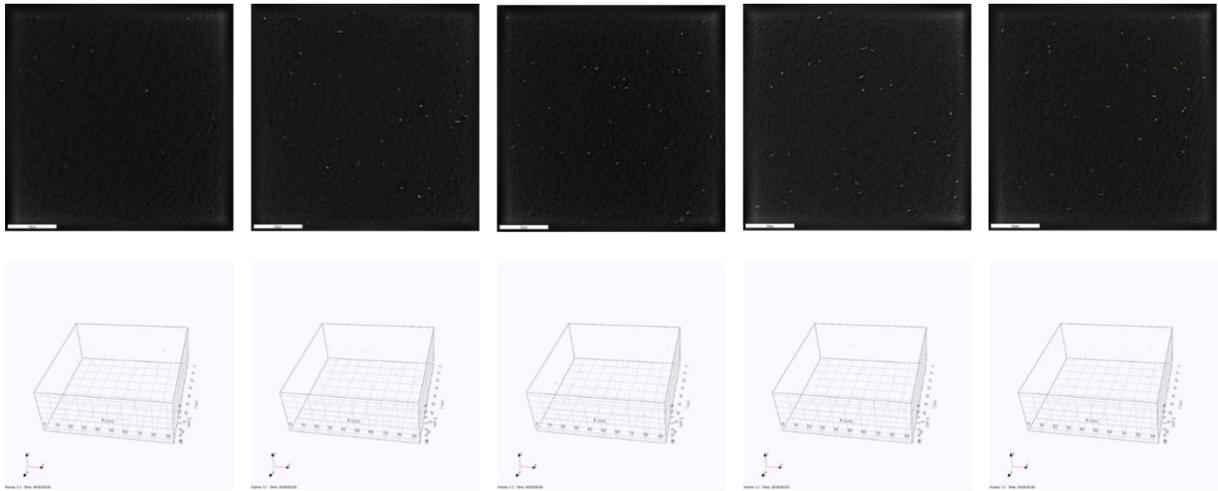


Figure S5. Nanolive images of *P. aeruginosa* PAO1 biofilm mass formed on S₁P_{11,6}-coated glass coverslips.

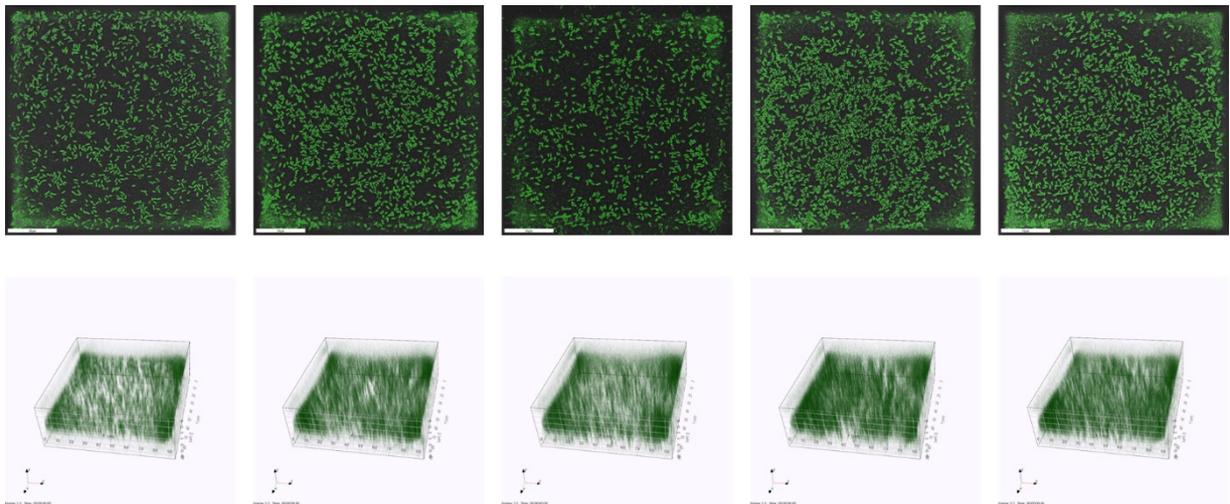


Figure S6. Nanolive images of *P. aeruginosa* PAO1 biofilm mass formed on uncoated glass coverslips.

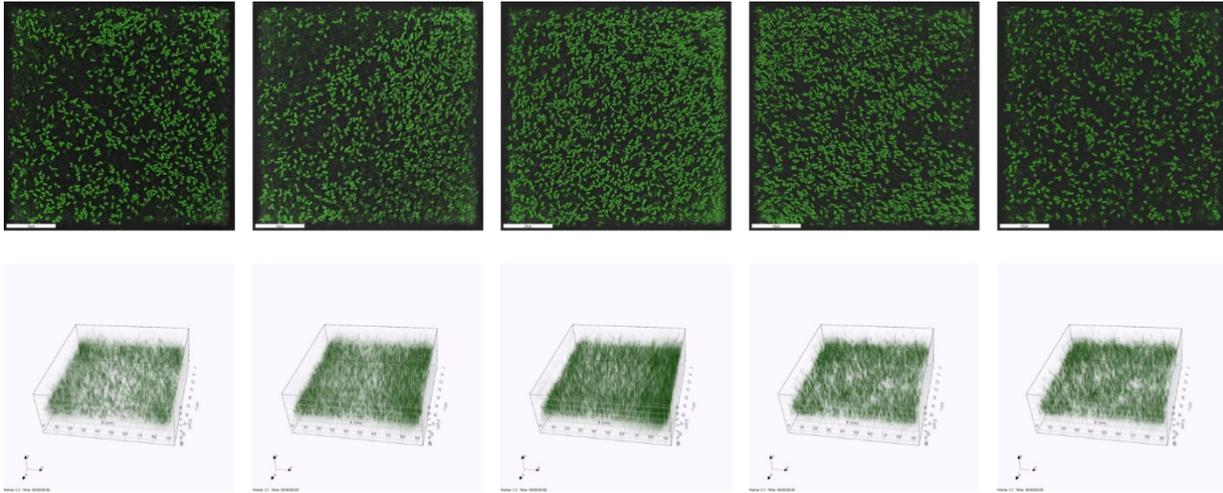


Figure S7. Nanolive images of *P. aeruginosa* PAO1 biofilm mass formed on silk-coated glass coverslip.

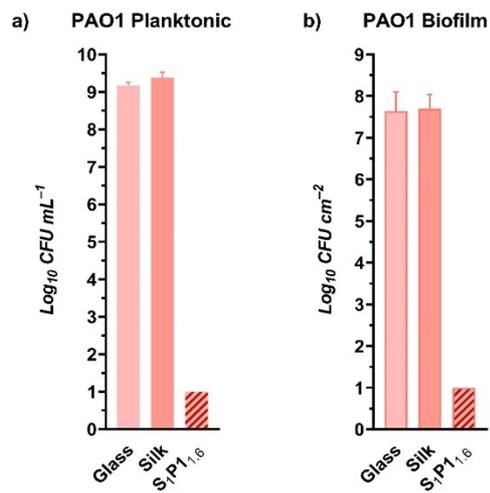


Figure S8. Antibacterial activity of S₁P_{1.6} film against *P. aeruginosa* PAO1 (a) planktonic and (b) biofilm cells as determined by colony forming unit (CFU) analysis after 24 h of incubation. Data are representative of at least three independent experiments \pm SD.

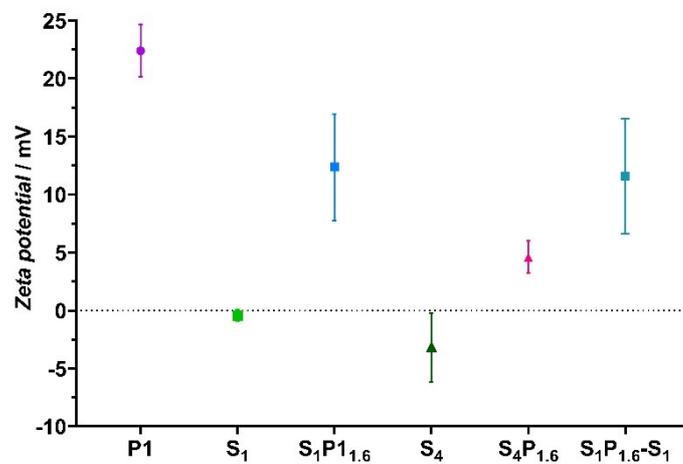


Figure S9. Zeta potential values of antimicrobial polymer P1 in water and the supernatants of 1 wt% silk (S₁), S₁P_{1.6}, 4 wt% silk (S₄), S₄P_{1.6}, and S₁P_{1.6} with blank silk topcoat (S₁P_{1.6}-S₁) film after 6.5 hours of incubation in water. Data are representative of at least three independent experiments \pm SD.

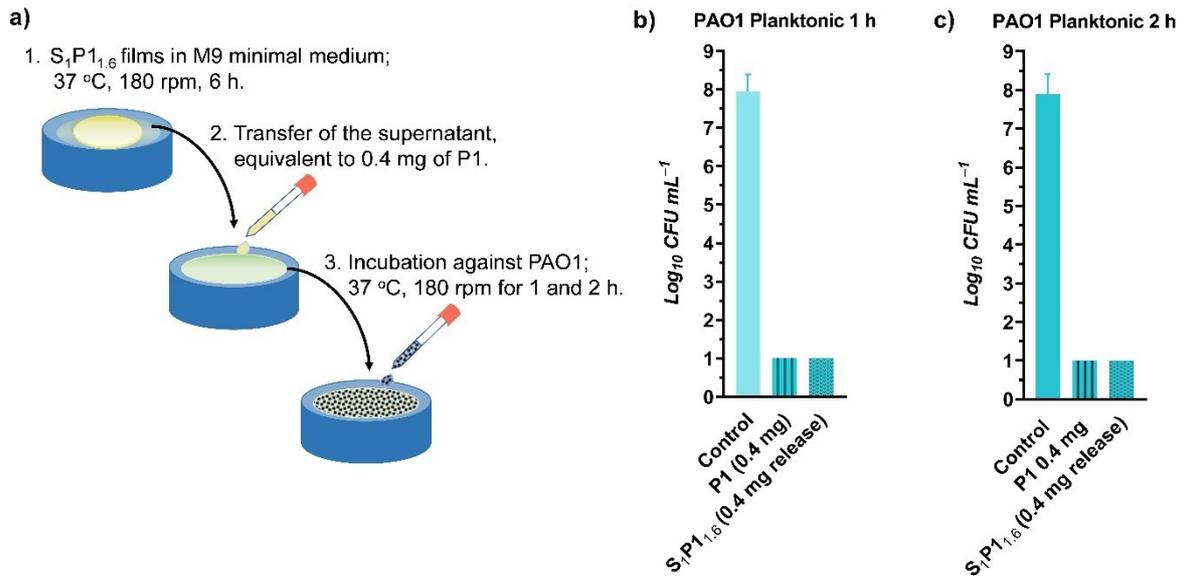


Figure S10. (a) Schematic illustration of antibacterial activity experiment using 0.4 mg of P1 released from of $S_1P_{1,6}$ film. Antibacterial activity of pure P1 in solution (denoted as P1 (0.4 mg)) and 0.4 mg of P1 released from of $S_1P_{1,6}$ film (denoted as $S_1P_{1,6}$ (0.4 mg release)) against PAO1 as determined by CFU analysis after (b) 1 h and (c) 2 h of incubation. Data are representative of at least three independent experiments \pm SD.

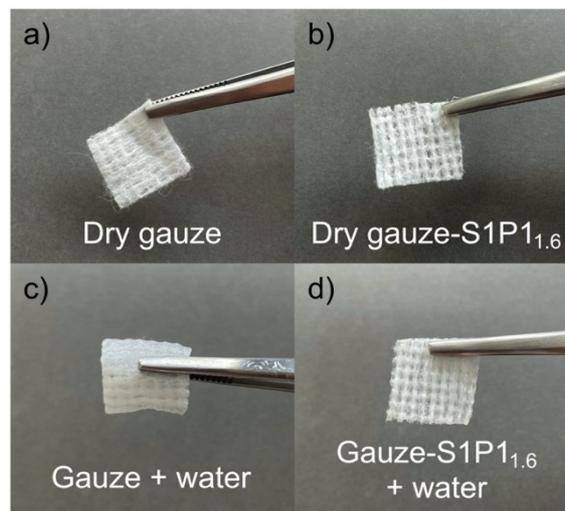


Figure S11. Comparison of uncoated and $S_1P_{1,6}$ film-coated cotton gauze. (a) Uncoated and (b) $S_1P_{1,6}$ film-coated cotton gauze with less frayed fibers in dry state; (c) uncoated cotton gauze after soaking in water for 1 minute; and (d) $S_1P_{1,6}$ film-coated cotton gauze after soaking in water for 1 minute showing the invisible film coating can maintain the gauze structure.

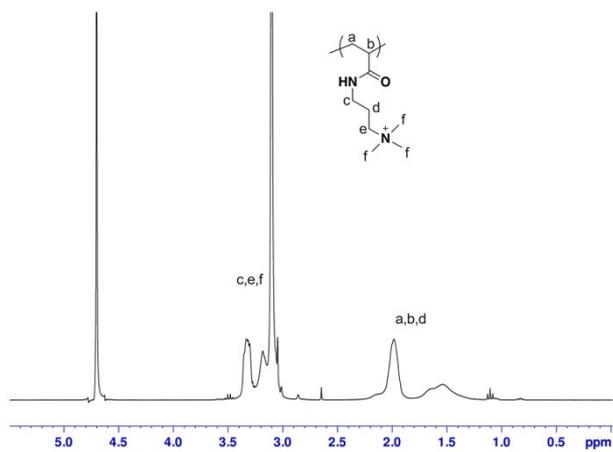


Figure S12. ^1H NMR spectra of P2 in D_2O .

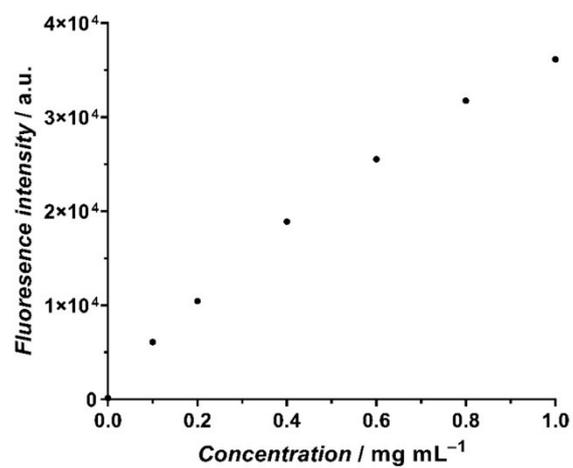


Figure S13. Calibration curve of fluorescein labeled P2 for quantification of P2 release from $\text{S}_1\text{P}_{21.6}$.