Electronic Supplementary Information

The idiosyncratic self-cleaning cycle of bacteria on regularly arrayed mechano-bactericidal nanostructures

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Table S1. Characterisation of control Si and nanostructured Si surfaces

	Control Si surfaces†	Nanopillar-featured Si surfaces
Height (nm)	N/A	380.3 ± 24.6
Spacing (nm)	N/A	89.3 ± 0.8
Surface roughness, S_a (nm)	0.82 ± 0.25	7.40 ± 0.32
Water contact angle (°)	58.9 ± 1.5	137.5 ± 2.3

Table S2. Surface Chemical Characterisation (Atomic %)

Si2p	38.39	39.55	39.19	58.65
N1s	0.48	0.2	0.25	0.39
C1s	10.81	10.29	10.2	9.98
O1s	44.98	44.38	44.98	30.98

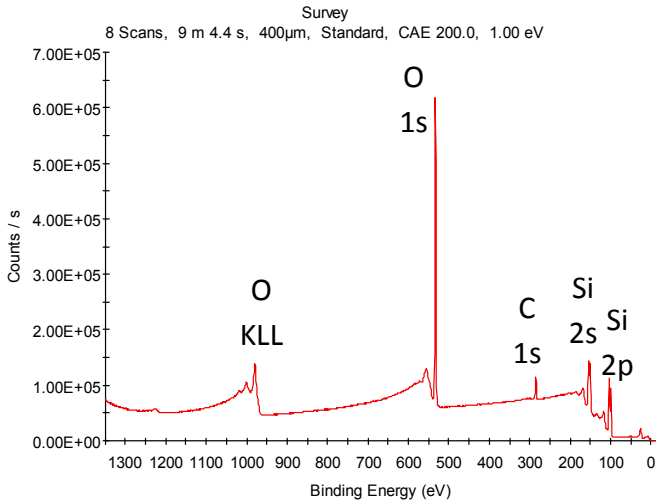

Figure S1. XPS survey spectra of nanopillared Si surfaces.

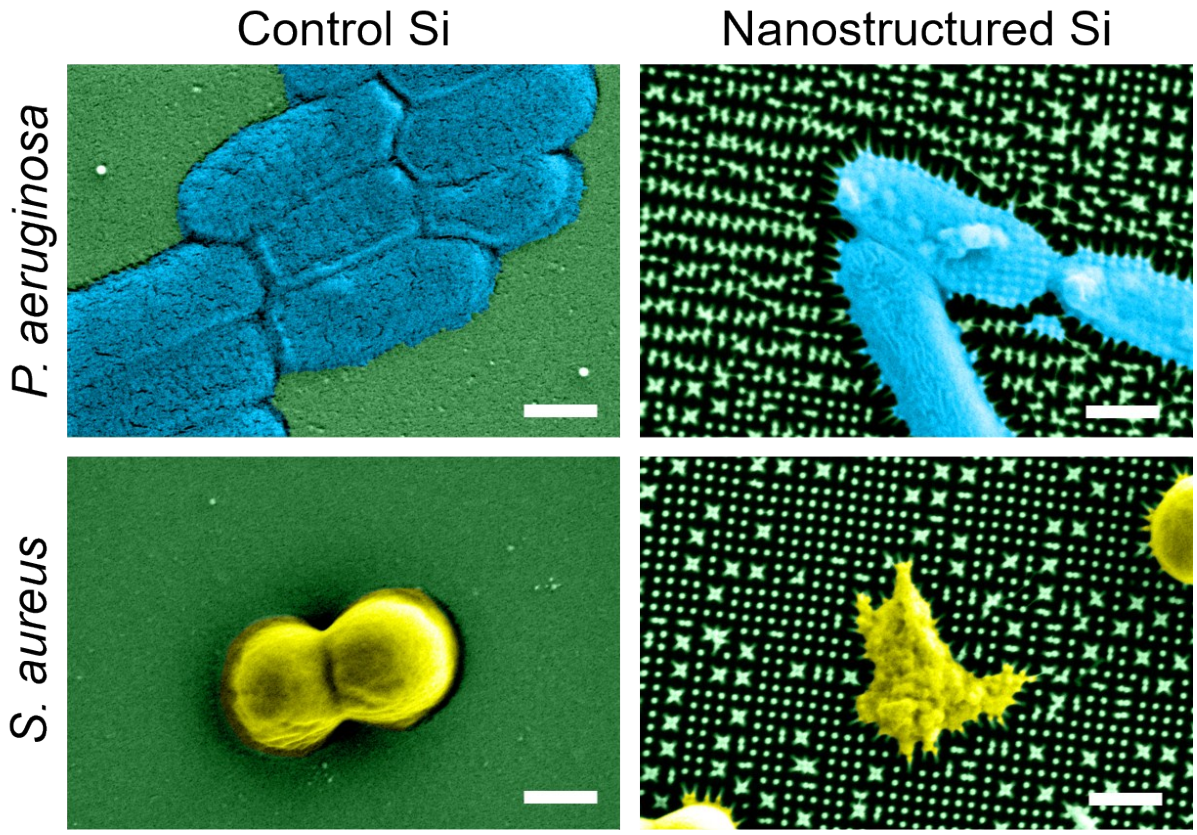

Figure S2. SEM micrographs of *P. aeruginosa* and *S. aureus* bacterial cells attached to control Si and nanostructured Si surfaces after an 18 h incubation period. Scale bars in SEM micrographs 500 nm.

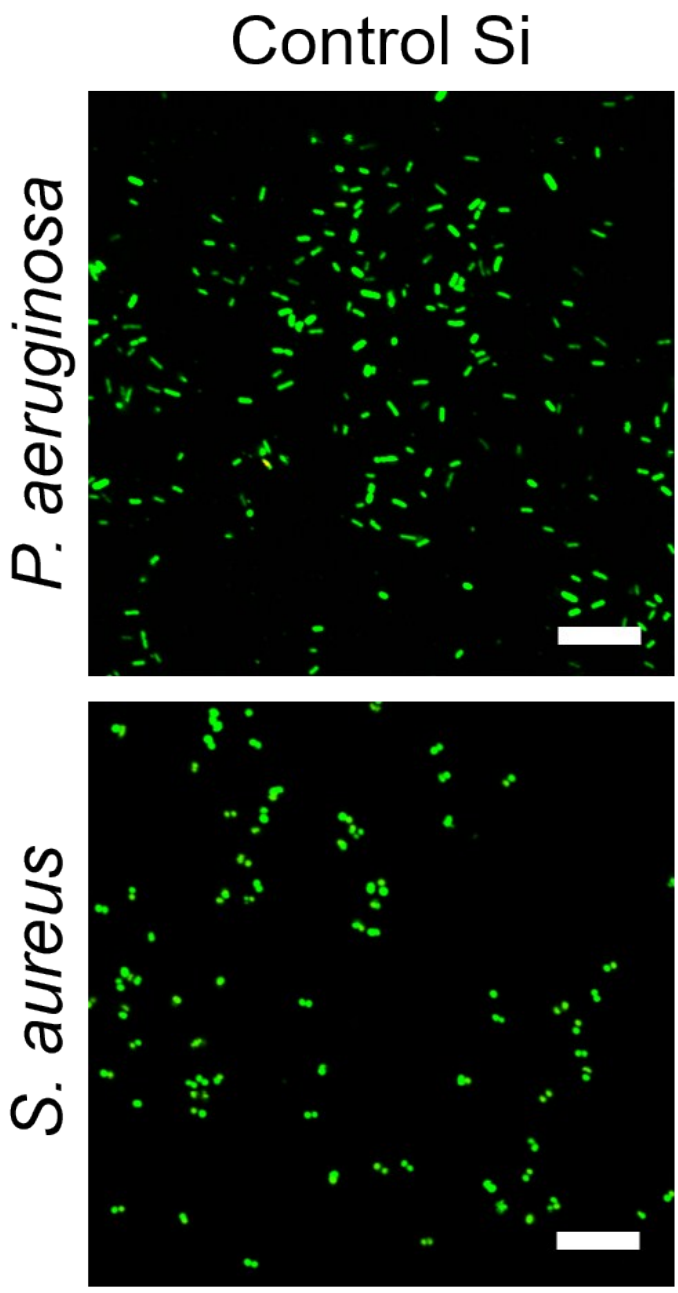

Figure S3. CLSM micrographs of *P. aeruginosa* and *S. aureus* bacterial cells attached to control flat Si after an 18 h incubation period. Live cells are stained green; damaged cells are stained red. Scale bars in CLSM micrographs 10 μm.

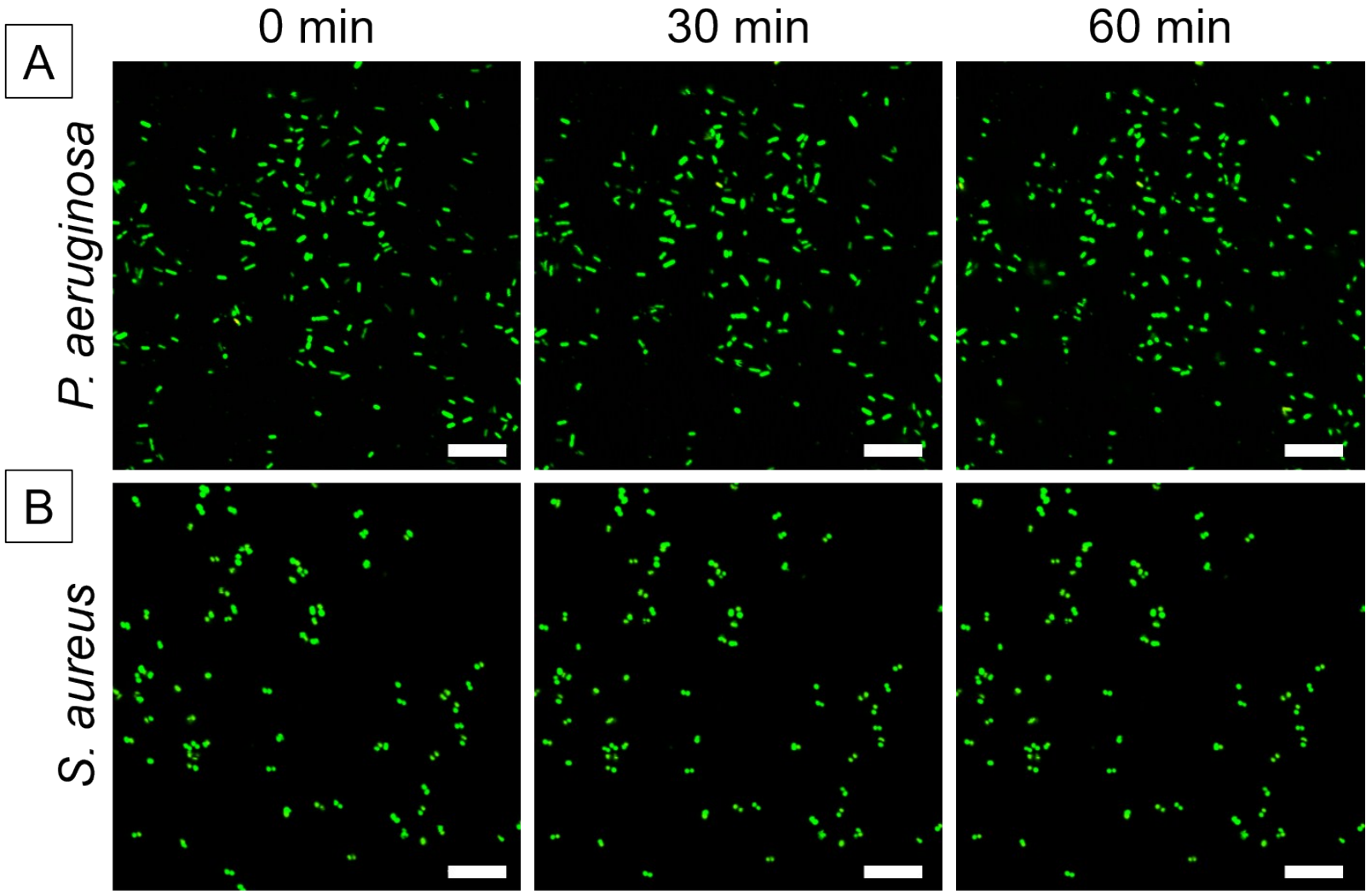

Figure S4. Time-lapse CLSM micrographs of *P. aeruginosa* and *S. aureus* bacterial cells attached to flat control Si surfaces after an 18h incubation. The time of acquisition has been indicated for each image. The number and viability of attached cell were stable for 1 hours. Scale bars are 10 μm.

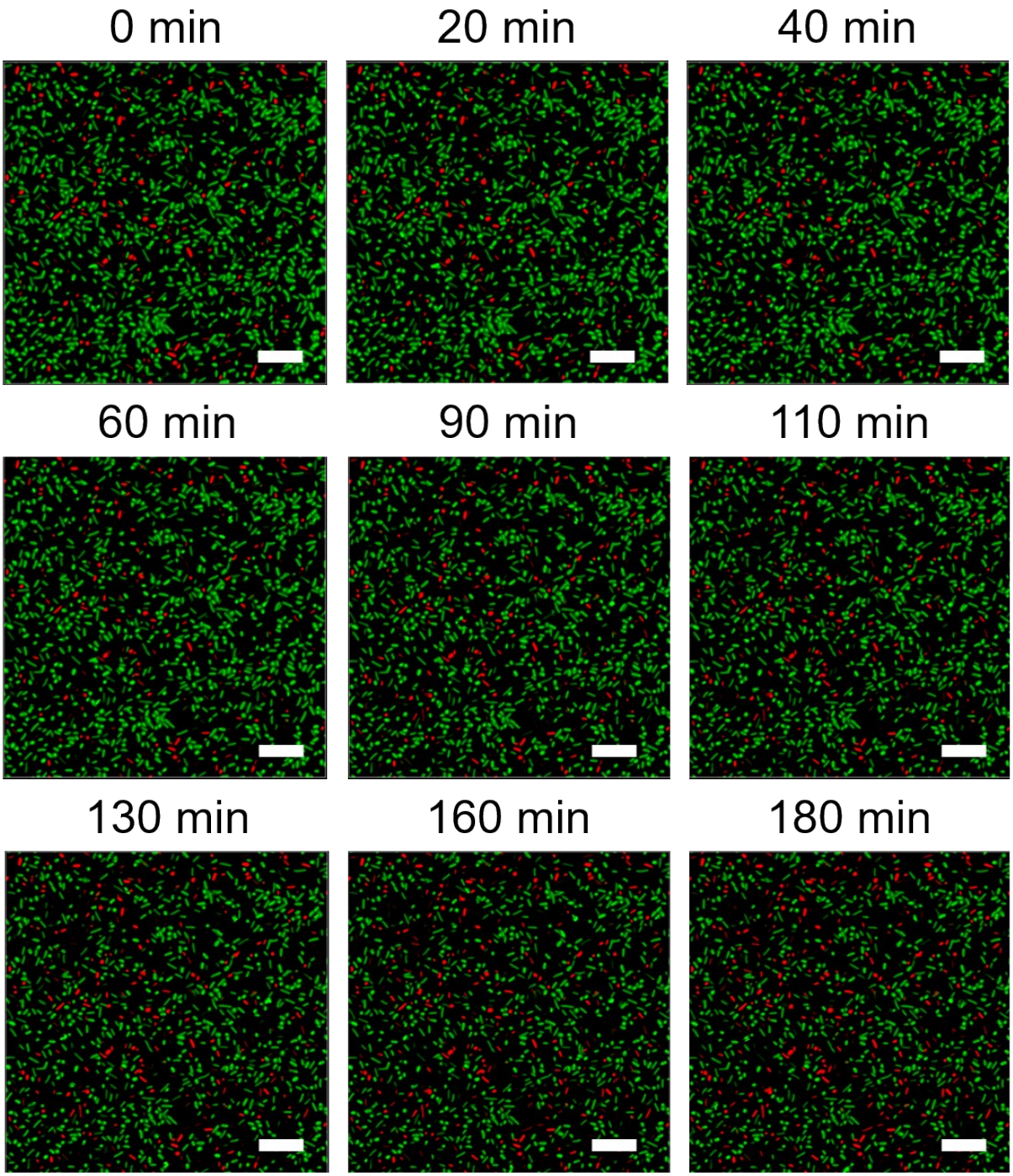

Figure S5. Time-lapse CLSM micrographs of *P. aeruginosa* bacterial cells attached to the 380 nm nanopillar-featured Si surfaces. The time of acquisition has been indicated for each image. Live cells are stained green; damaged cells are stained red. Scale bars are 10 μm

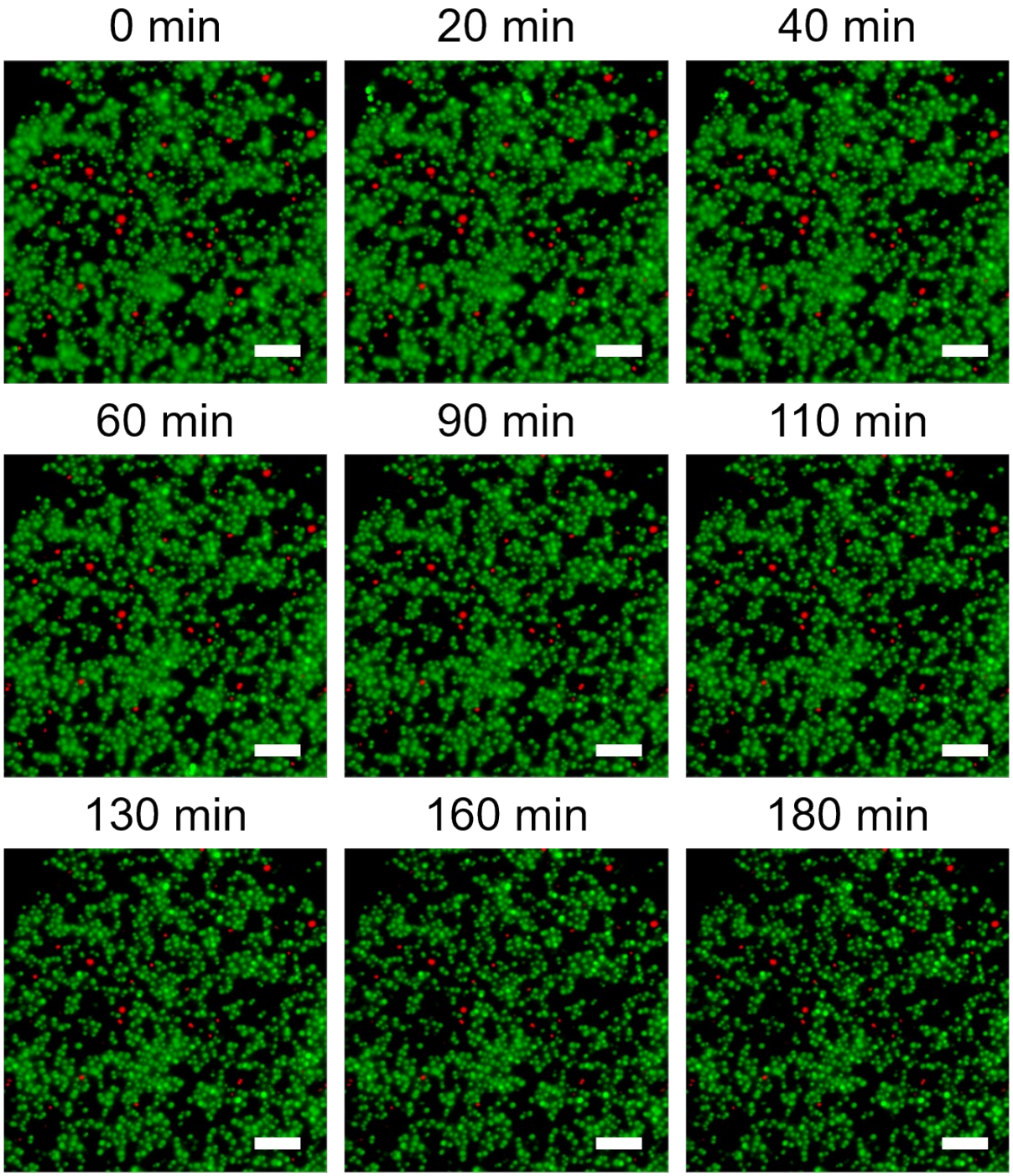

Figure S6. Time-lapse CLSM micrographs of *S. aureus* bacterial cells attached to the 380 nm nanopillar-featured Si surfaces. The time of acquisition has been indicated for each image. Live cells are stained green; damaged cells are stained red. Scale bars are 10 μm

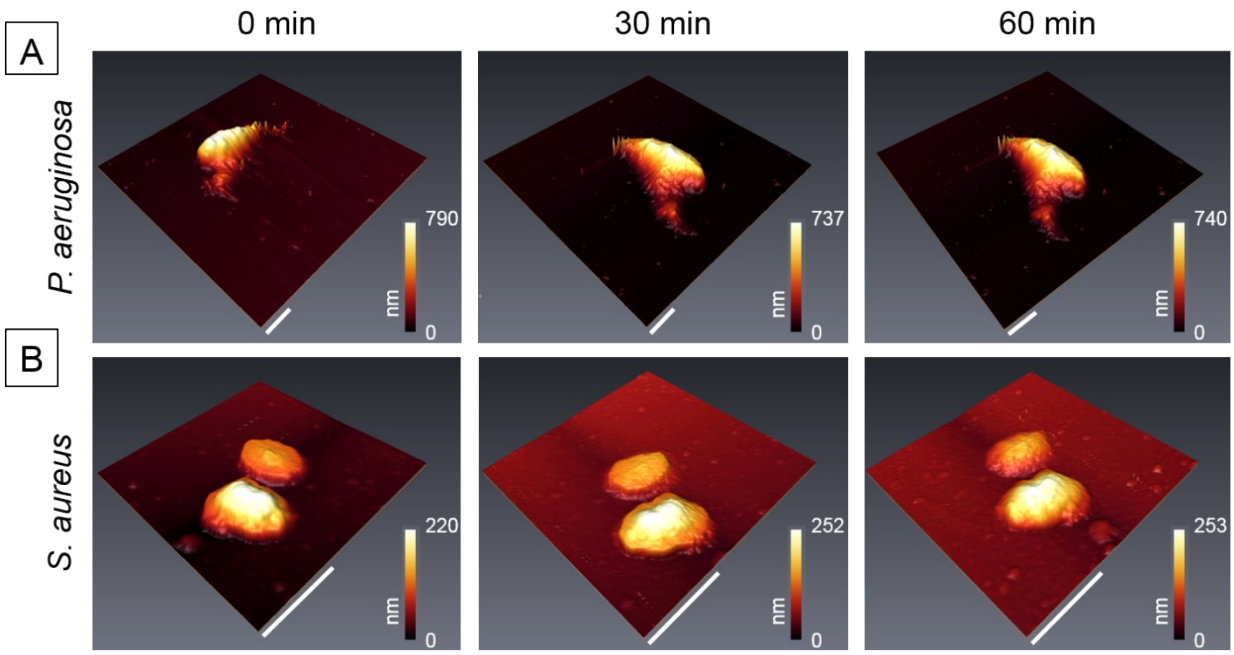

Figure S7. Time-lapse AFM height images of (A) *P. aeruginosa* and (B) *S. aureus* bacterial cells attached to flat control Si surfaces after an 18 h incubation period. The time of acquisition has been indicated for each image. The morphology and extracellular polymeric substances of attached bacterial cells remained intact after 60 minutes being submerged and scanned in MilliQ water. Scale bars are 1 µm.

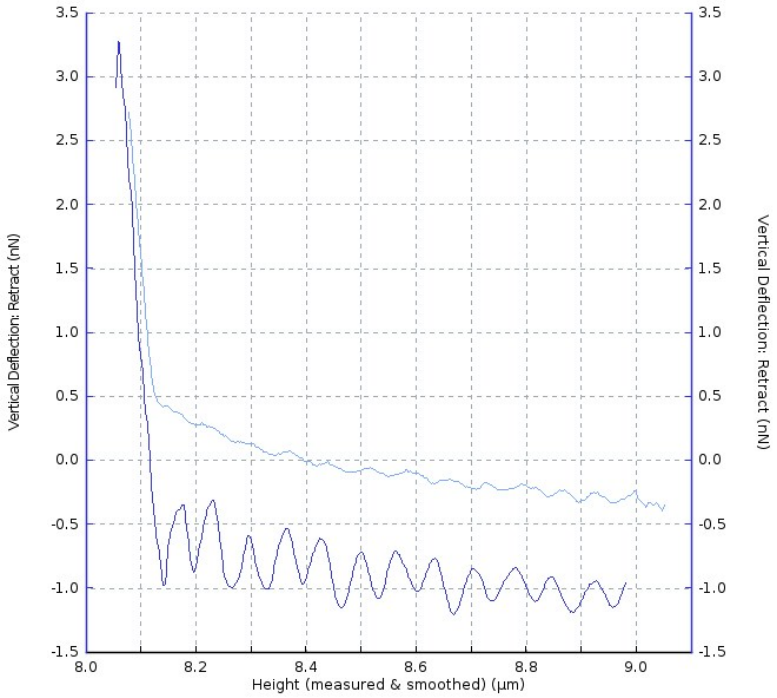

Figure S8. Force distance curve recorded during QI™ mode scanning of *P. aeruginosa* attached onto control Si sample, representing 1 pixel. Vertical forces are in the range of 2-4 nN.

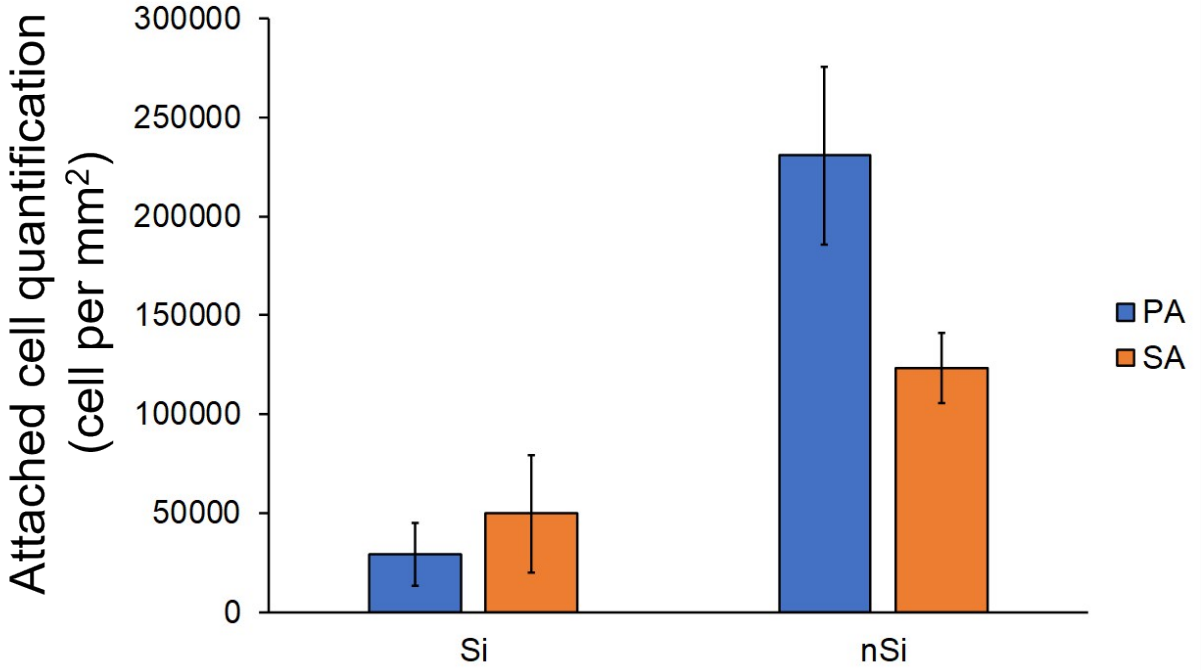

Figure S9. Quantification of *P. aeruginosa* and *S. aureus* bacterial cells attached to the flat control Si and the 380 nm nanopillar-featured Si surfaces after an 18 h incubation period represented as the number of attached cells per mm^2 projected area. Error bars are standard deviation.