

Supporting Information

Antimicrobial and Anti-Inflammatory Gallium-Defensin Surface Coatings for Implantable Devices

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Supplementary figures

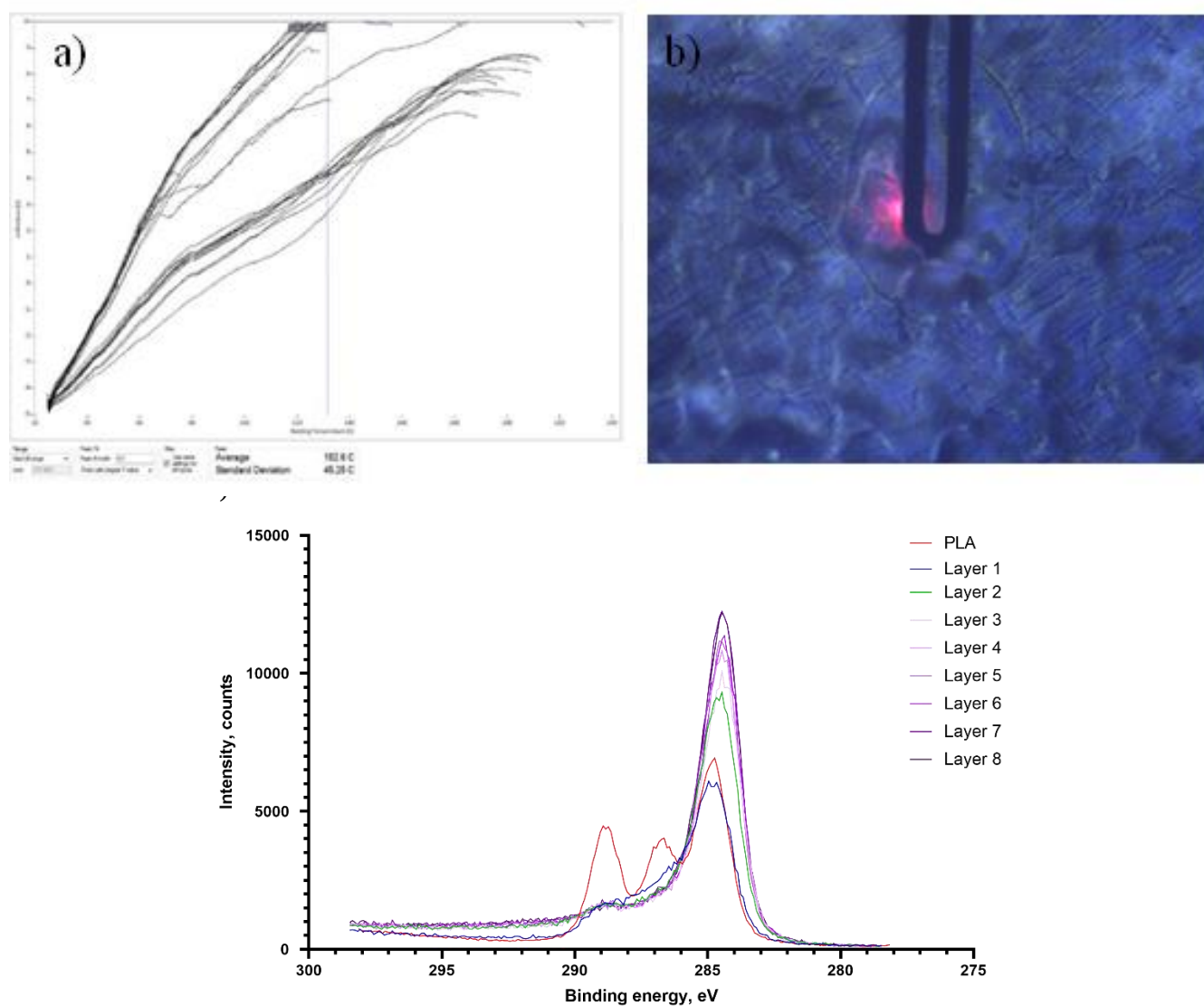


Figure S1: Nanothermal and elemental analysis of Ga-implanted samples: a) nanoTA spectra for Ga16, b) corresponding microscope image showing erratic temperature readings and melting underneath the surface, indicated by the circular area surrounding the tip, and c) changes to the chemical composition (based on C1s peak 285 eV) at different depth from the surface (as labelled and coloured) against PLA (red) showing carbonisation of the top layer of the Ga-implanted surface.

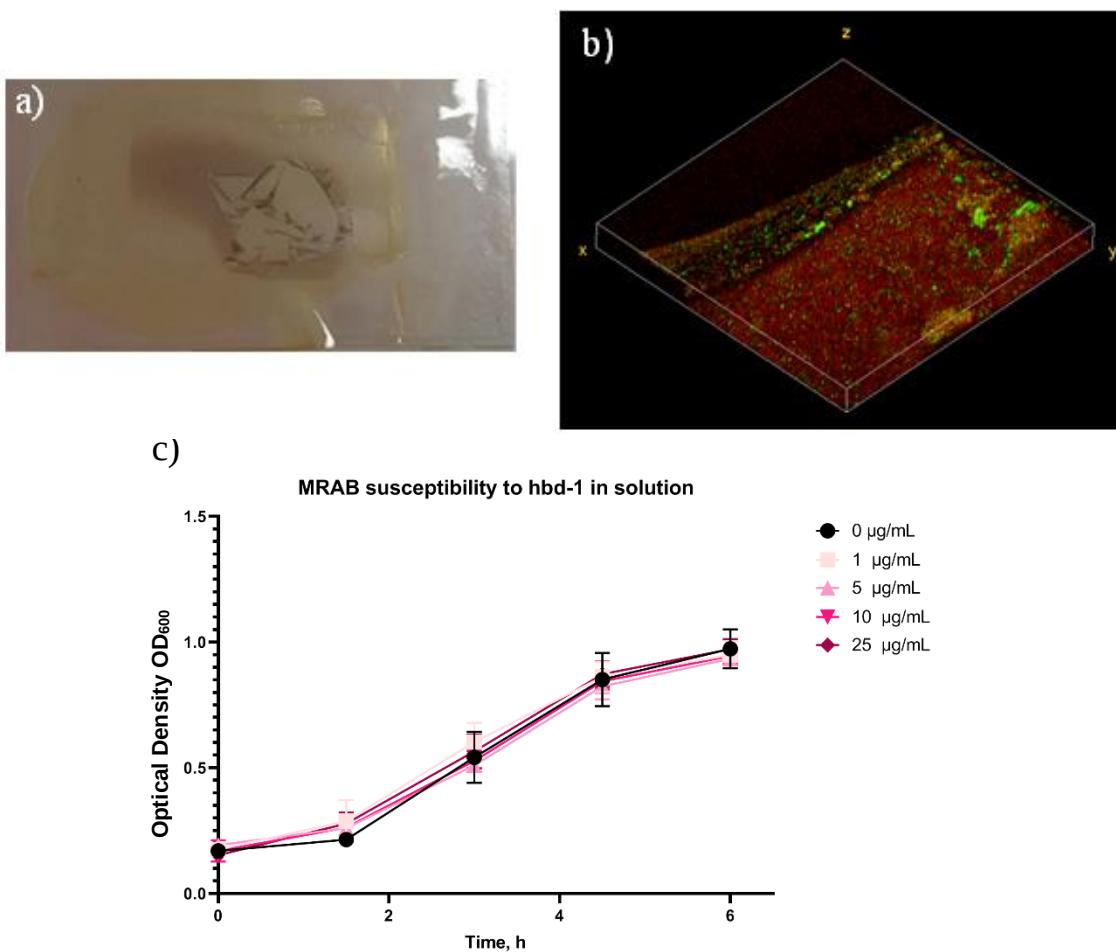


Figure S2: Analysis of the physical stability of the coating showing peeling of thick top layer in Ga16 a) following bacterial biofilm study (photograph) b) confocal image of live:dead stained bacteria on Ga16 sample. While there is still a large proportion of dead bacteria, the peeling effect is clear. c) Bacteria density measurements using defensin in solution at 0, 1, 5, 10 and 25 µg/mL showing no difference in bacteria growth over 6 h with increasing defensin concentration.

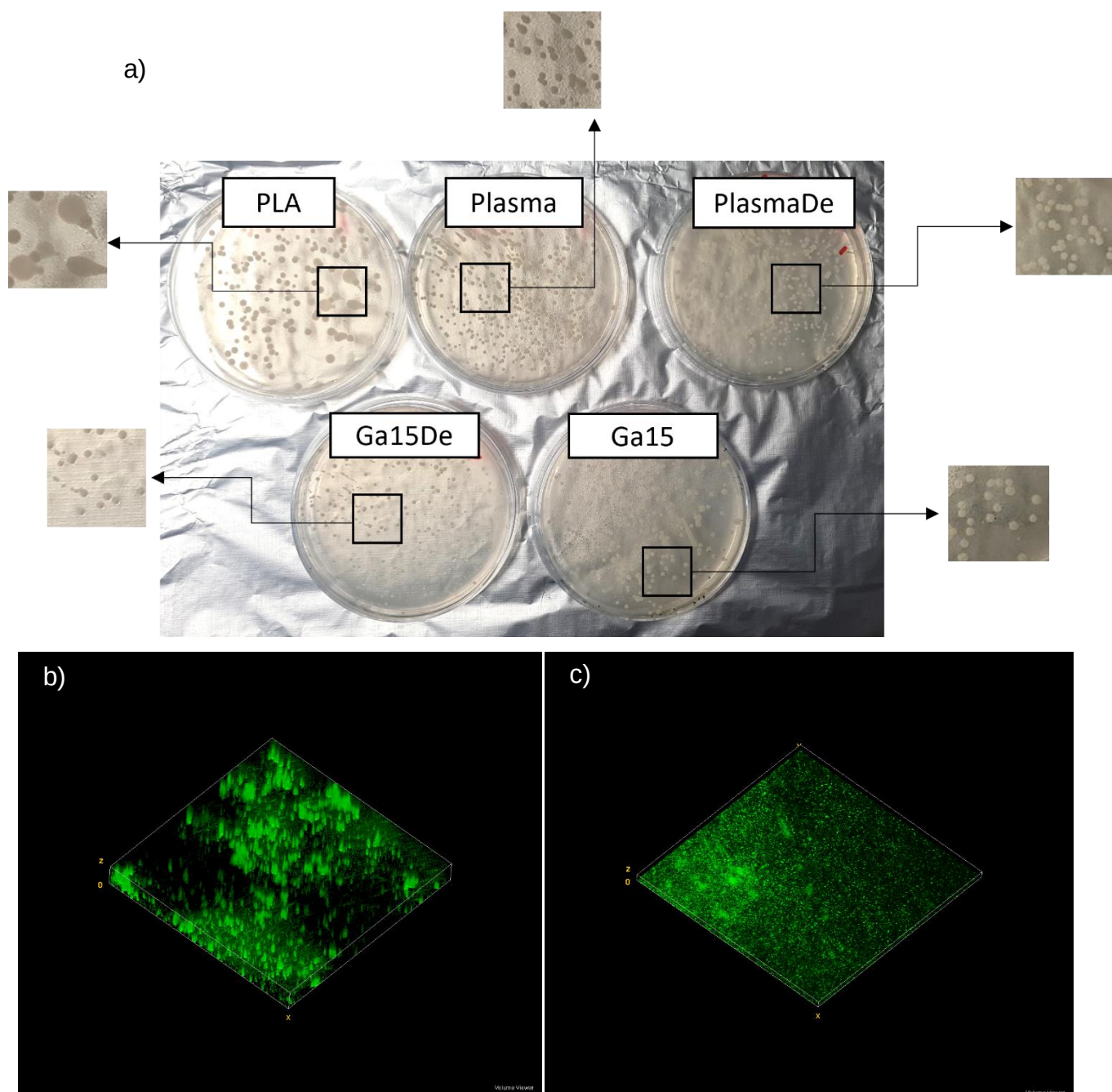


Figure S3: Bacterial persistence on the surface and biofilm formation on control surfaces: a) MRAB colonies grown on all surfaces; colonies grown on control surfaces were significantly larger, with varied morphology in comparison to the modified surfaces. b) and c) confocal images of biofilm formation and bacterial spread on the untreated PLA surface; 20x magnification.

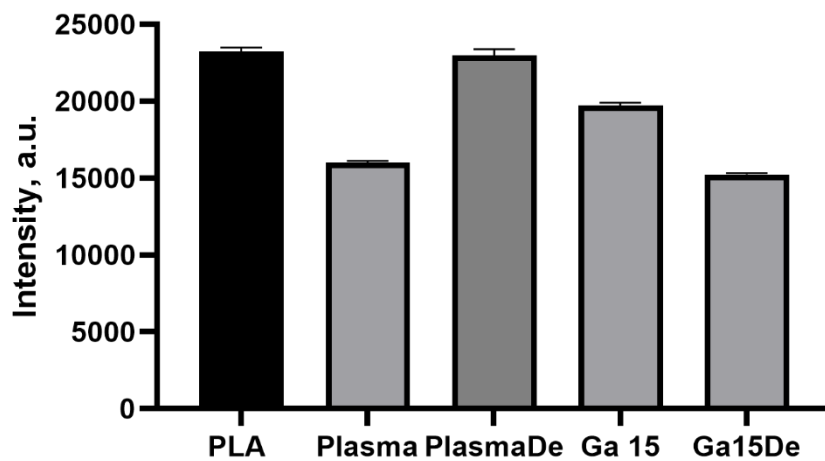


Figure S4: Cell viability of THP-1 derived macrophages (QBlue assay) grown on surfaces showing cell viability was maintained following surface modification with Ga and De both independently and synergistically.