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Supporting Information

Bacterial Adaptability of Enzyme and pH Dual-Responsive Surface for

Infection Resistance

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Figure S1. Wide-scan XPS spectra of the samples. (a) Cellulose; (b) Cellulose_{LbL}; (c) Cellulose_{LbL}-Van; (d) Cellulose_{LbL}-Van-HA.



Figure S2. ATR-FTIR spectra of NHS-PEG-NHS/PEI on cellulose substrates with various bilayer numbers. Inset: Plot of absorbance in the amide group at 1555 cm⁻¹ and 1645 cm⁻¹ against bilayer number.



Figure S3. Van release profile of Cellulose_{LbL}-Van samples versus the number of NHS-PEG-NHS/PEI bilayers in pH 5 buffer solution for 24 h. (Error bars: standard deviation, n = 3.)



Figure S4. Antibacterial property of samples against E. *coli*. E. *coli* suspension was incubated with samples for 2 h or 24 h, the adherent bacteria on samples were incubated on agar plates (A). (B) The number of adherent bacteria on samples after 2 h incubation. (a) Cellulose_{LbL10}-HA; (b) Cellulose_{LbL10}-Van; (c) Cellulose_{LbL10}-Van-HA; (d) Cellulose_{LbL10}-Van-AA. (Error bars: standard deviation, n = 3.)



Figure S5. The antibacterial property of the β -carboxylic linked Van samples and freely loaded Van samples that pretreated in PBS for 2 h. S. *aureus* suspension was incubated with pretreatment samples for 24 h. (a) Cellulose_{LbL10}-Van_{free} without PBS treatment; (b) Cellulose_{LbL10}-Van_{free} immersed in PBS for 2 h; (c) Cellulose_{LbL10}-Van immersed in PBS for 2 h; (d) Cellulose_{LbL10}-Van-HA immersed in PBS for 2 h.



Figure S6. Quantification of cell adhesion and cell proliferation on various sample surfaces by using a hemocytometer with the trypan blue dye exclusion test. (a) Si; (b) Si_{LbL10}; (c) Si_{LbL10}-Van; (d) Si_{LbL10}-Van-HA. (Scale bar is 50 μ m.) (Error bars: standard deviation, n = 3.)