Supporting Information

Screening and investigation of a short antimicrobial peptide-AVGAV

Yang Cao[a†], Linlin Kang[a†], Yumei Wang[a], Zekai Ren[a], Han Wu[a], Xin Liu[a], Hailin Cong[a,b,c], Bing Yu[a,b*], Youqing Shen[a,d]*

a. College of Chemistry and Chemical Engineering, College of Materials Science and Engineering, Institute of Biomedical Materials and Engineering, Qingdao University, Qingdao, 266071, China

b. State Key Laboratory of Bio-Fibers and Eco-Textiles, Qingdao University, Qingdao 266071, China

c. School of Materials Science and Engineering, Shandong University of Technology, Zibo 255000, China

d. Key Laboratory of Biomass Chemical Engineering of Ministry of Education, Center for Bionanoengineering, and Department of Chemical and Biological Engineering, Zhejiang University, Hangzhou 310027, China

*Corresponding authors at: Institute of Biomedical Materials and Engineering, College of Materials Sciences and Engineering, Qingdao University, Qingdao 266071, China

E-mail addresses: hailincong@yahoo.com (H. Cong); yubingqdu@yahoo.com (Bing Yu)

†Equal Contribution

Contents:

Table S1. The heating program of the muffle furnace.

Stage	Temperature (°C)	Time (min)
1	20	20
2	120	60
3	250	120
4	250	20
5	350	120
6	350	20
7	450	120
8	450	20
9	550	240
10	550	60

Table S2. Table of the minimum inhibitory concentration of antimicrobial peptides against different bacteria

Types of bacteria	Minimum inhibitory concentration (μg/mL)
Escherichia coli	150
Staphylococcus aureus	250
Staphylococcus epidermidis	800
Pseudomonas aeruginosa	700
Salmonella paratyphi B	500
Candida albicans	200

Table S3. Allergy experiment skin reaction ratings

Cutaneous reactions	Score
Erythema and eschar formation	
No erythema	0
Slight erythema (barely visible)	1
Marked erythema (scattered or small patches of erythema)	2
Moderate to severe erythema	3
Severe erythema (purplish red) to slight eschar formation	4
Edema formation	
No edema	0
Slight edema (barely visible)	1
Moderate edema (raised skin with clear contour)	2
Severe edema (skin bulge of 1 mm or more	3
Maximum score	7

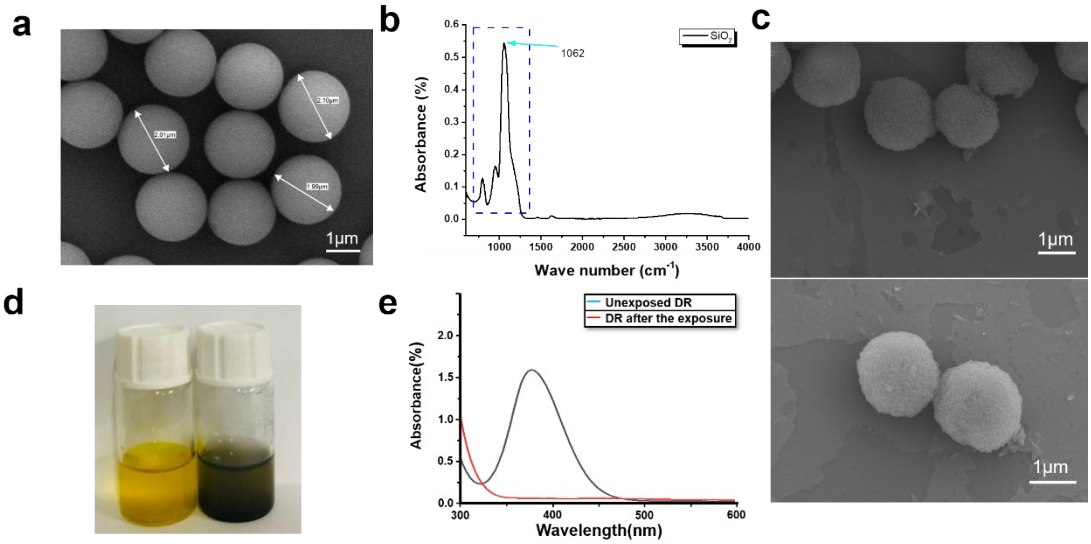

Figure S1. Characterization of membrane chromatography: (a) SEM images of silica microspheres; (b) FTIR spectra of silica microspheres; (c) SEM images of silica microspheres coated with Staphylococcus aureus membrane; (d) Color change of diazo resin before and after exposure (yellow before exposure); (e) UV absorption spectra of diazo resin before and after exposure.

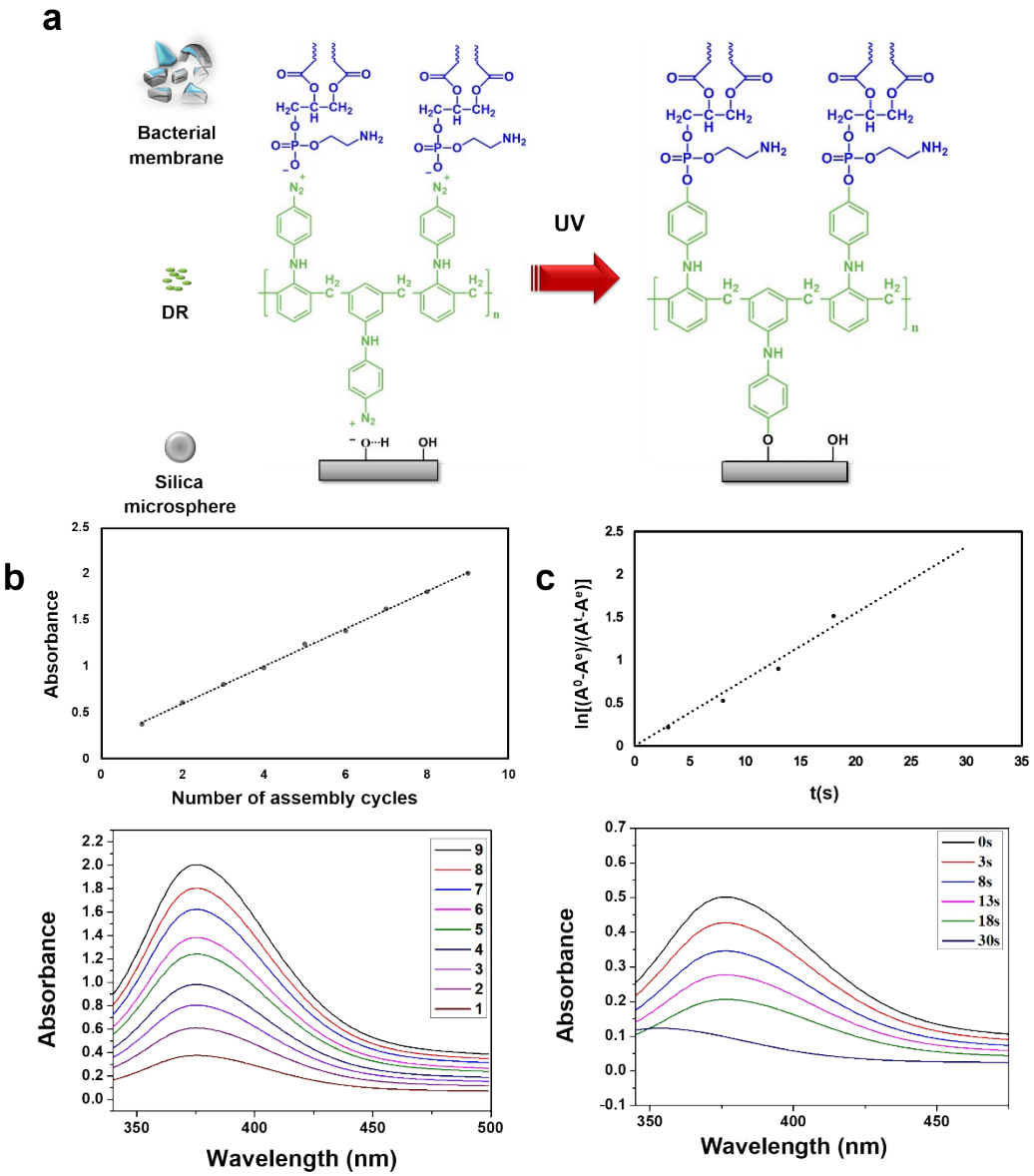

Figure S2. (a) Schematic diagram of the reaction of DR exposed to ultraviolet light; (b) UV visible spectra of components from DR and Escherichia coli bacterial cell membranes. Number of assembly cycles (from bottom to top): 1, 2, 3, 4, 5, 6, 7, 8 and 9. The illustration shows that the absorbance of the film at 380 nm varies linearly with the number of assembly cycles; (c) UV-vis spectra of DR and *Escherichia coli* bacterial cell membranes multilayer coatings at different irradiation times. Irradiation time (s) (top to bottom): 0, 3, 8, 13,18, 28, and 30; Irradiation intensity (at 365 nm): 350 μW/cm^2.

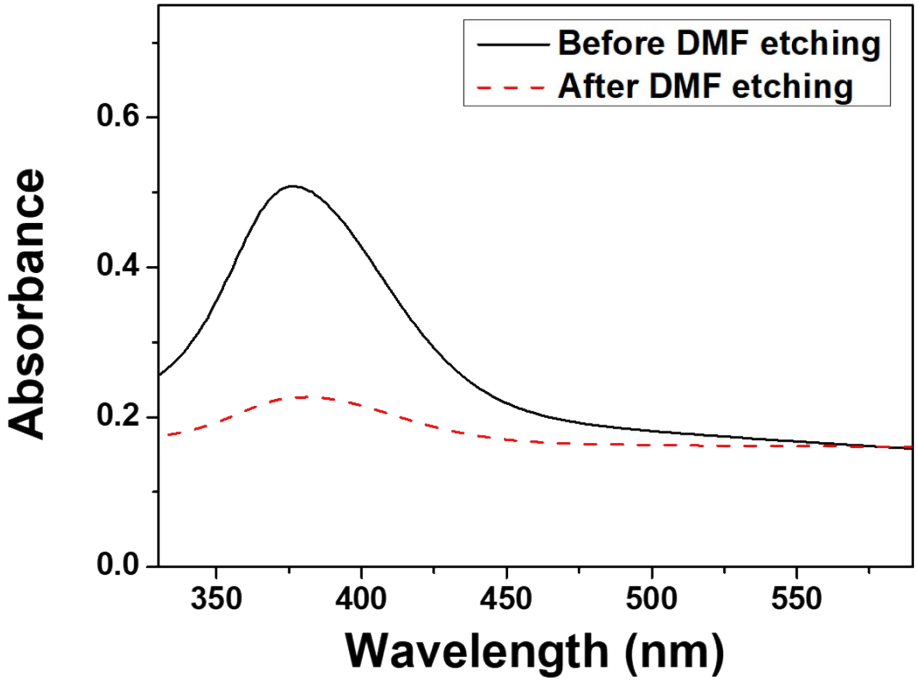

Figure S3. UV-vis spectra of irradiated DR/bacterial membrane chromatography (Staphylococcus aureus) multilayer coating before (solid line) and after (dotted line) 30 minutes of DMF etching at 25 °C.

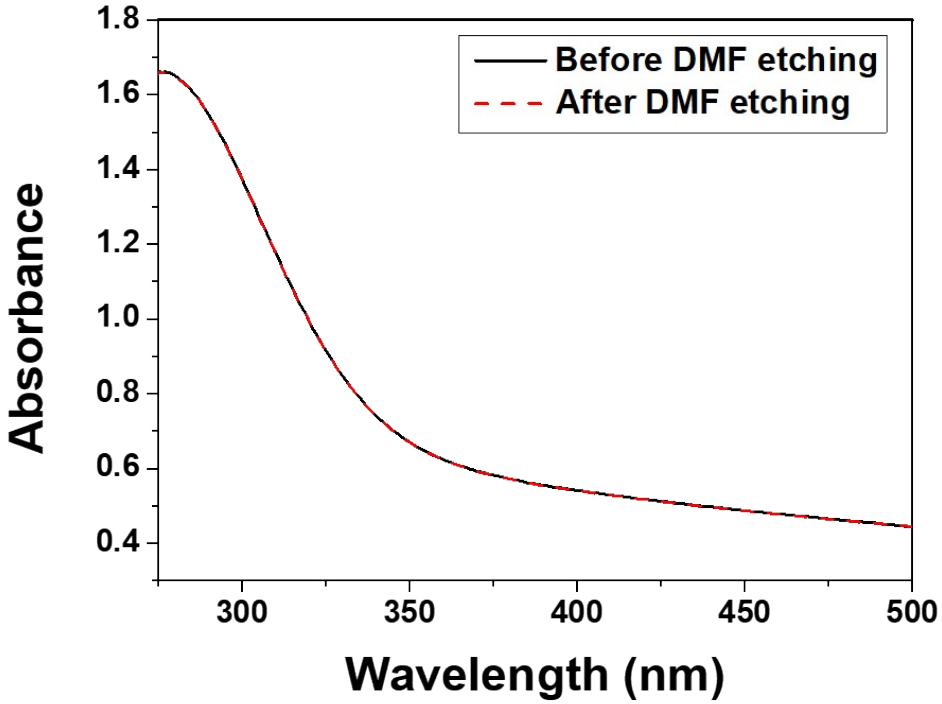

Figure S4. UV-vis spectra of unirradiated DR/bacterial membrane chromatography (Staphylococcus aureus) multilayer coating before (solid line) and after (dotted line) 30 minutes of DMF etching at 25 °C.

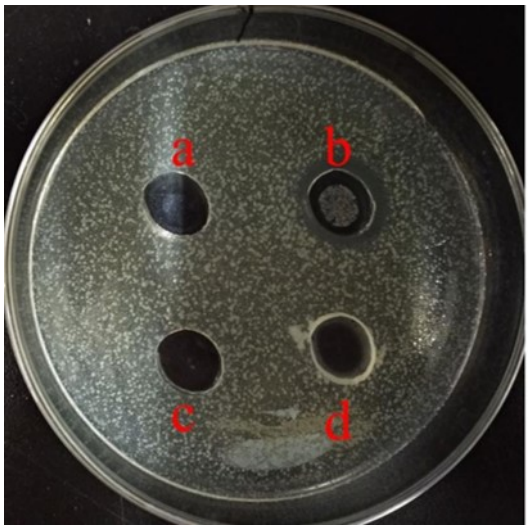

Figure S5. Peptide library (2 mg/mL) inhibition zone experiment diagram: (a), (c), (d) is Antibacterial peptides without bacteriostatic effect; (b) is Antimicrobial Peptide Library Containing AVGAV.

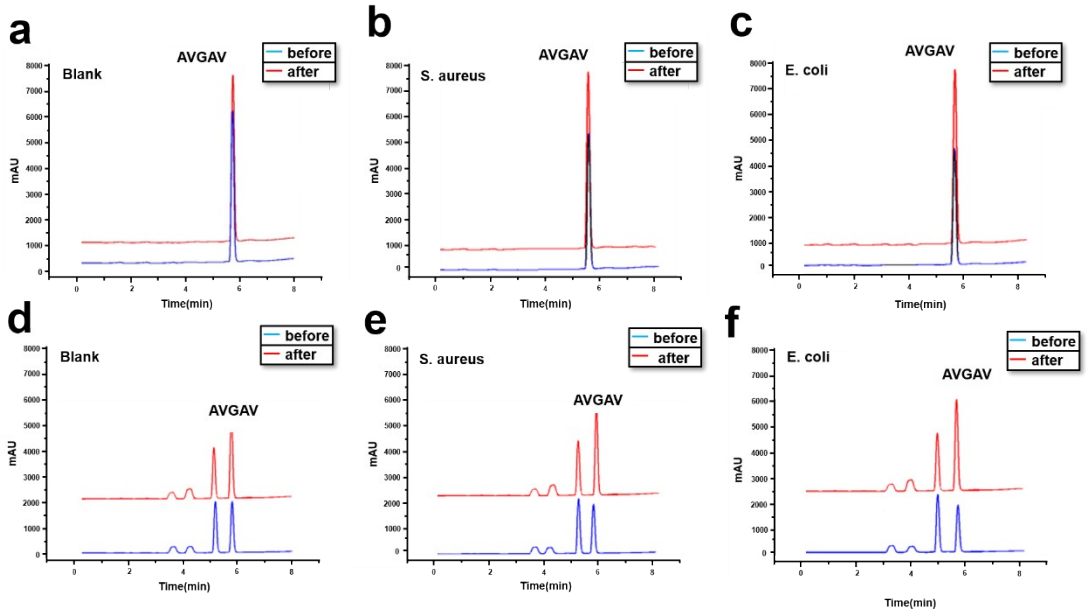

Figure S6. Liquid chromatograms of adsorbed peptide pools by membrane chromatography: (a) (b) (c) detection of peptide pools by corresponding membrane chromatography of blank control, S. aureus, E. coli; (d) (e) (f) detection of antimicrobial peptide AVGAV by membrane chromatography corresponding to blank control, S. aureus, E. coli.

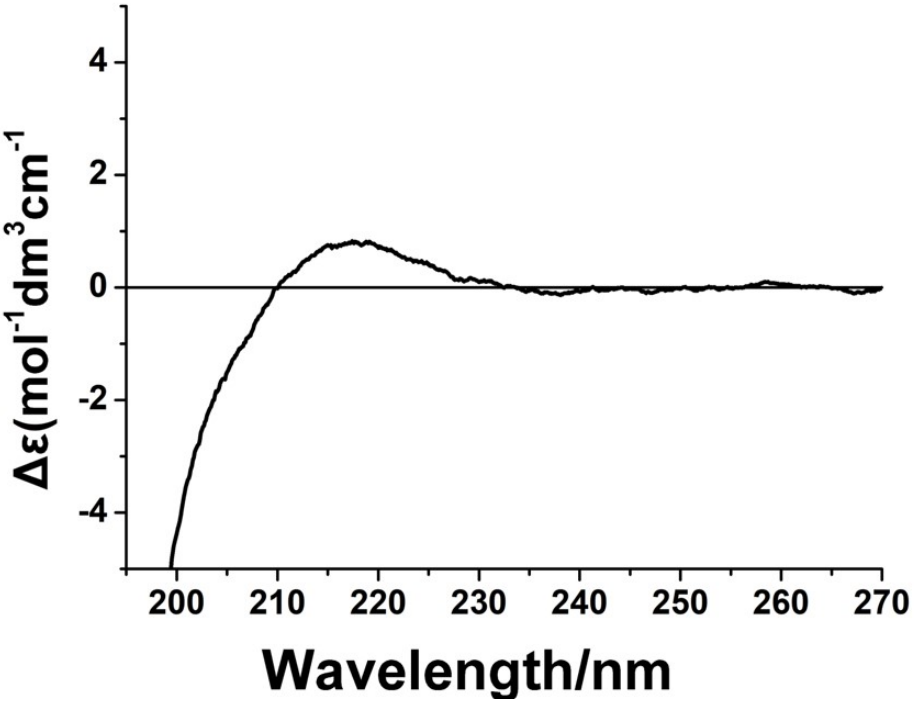

Figure S7. Circular dichroism image of antimicrobial peptide (AVGAV) in phosphate buffered saline