Supporting Information

Antimicrobial Titanium Surface via Click-Immobilization of Peptide and Its in Vitro/Vivo Activity

Junjian Chen[1,2,3,4,‡], Yuchen Zhu[4,‡], Menghua Xiong[1], Guansong Hu[2], Jiezhao Zhan[4], Tianjie Li[1,3], Lin Wang[1,3,], Yingjun Wang[1,2,3,4,*]*

1. School of Biomedical Science and Engineering, South China University of Technology, Higher Education Mega Center, Panyu, Guangzhou 510006, China.

2. National Engineering Research Center for Tissue Restoration and Reconstruction, South China University of Technology, Higher Education Mega Center, Panyu, Guangzhou 510006, China.

3. Key Laboratory of Biomedical Materials and Engineering of the Ministry of Education, South China University of Technology, Wushan Road, Tianhe, Guangzhou 510641, China.

4. Guangdong Province Key Laboratory of Biomedical Engineering, South China University of Technology, Higher Education Mega Center, Panyu, Guangzhou 510006, China.

* wanglin3@scut.edu.cn

* imwangyj@scut.edu.cn

Figure S1. The high-resolution XPS Si 2p spectrum of *Ti* and *Ti–APTS*.

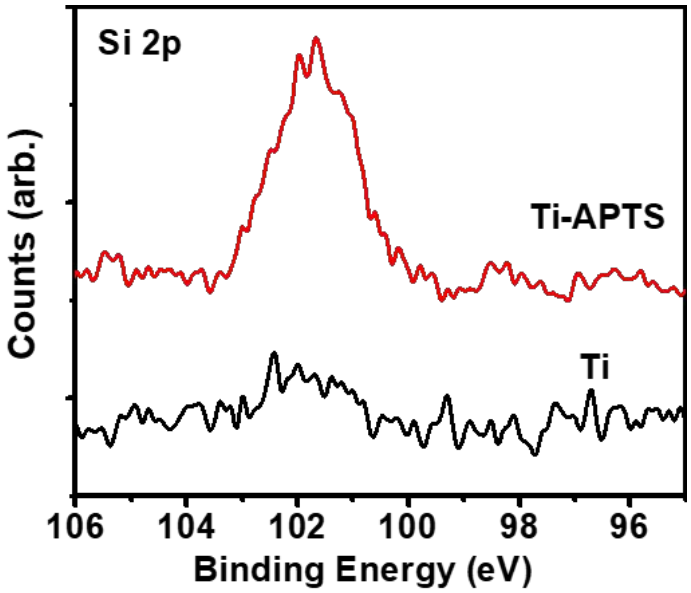

Figure S2. The high-resolution XPS Cu 2p spectrum of *Ti–AMP*.

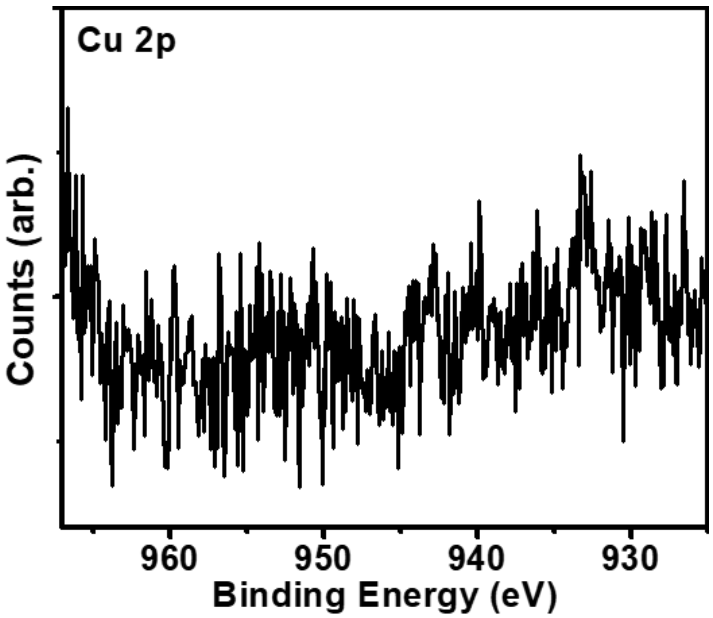

Figure S3. The AFM 3D-microtopography of (a) *Ti* and (b) *Ti-100AMP*.

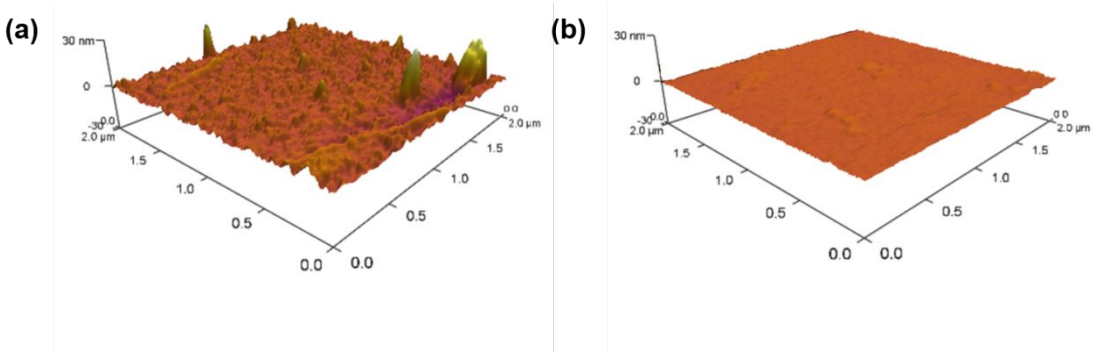

Figure S4. The contact angles of indicated substrates. # denotes significant differences ($p < 0.01$) and & denotes significant differences ($p < 0.001$) compared with *Ti*.

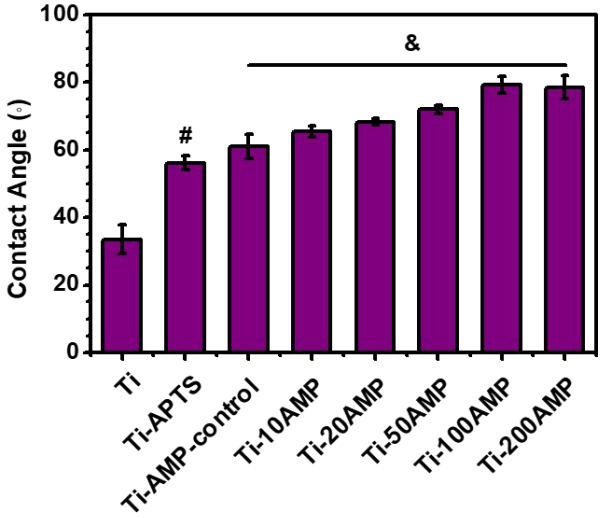

Figure S5. (a) The QCM-D assay for the click reaction on the QCM-D chip. (b) The high-resolution XPS N 1s spectrum of the QCM-D chip after click reaction.

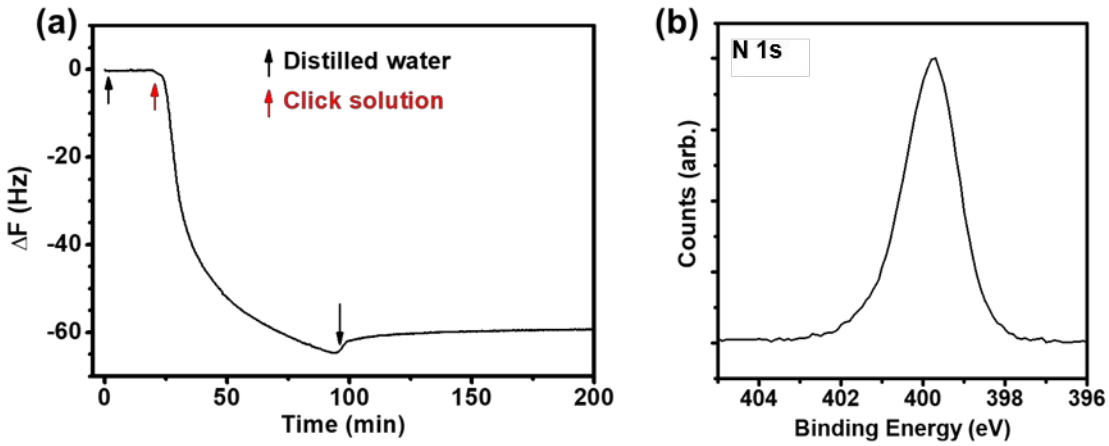

Figure S6. The live/dead assay of *E. coli* on the indicated substrates. (The images were got under FITC and TRITC channels, and merged with the NIS software. The green bacteria were live, while the red bacteria were dead)

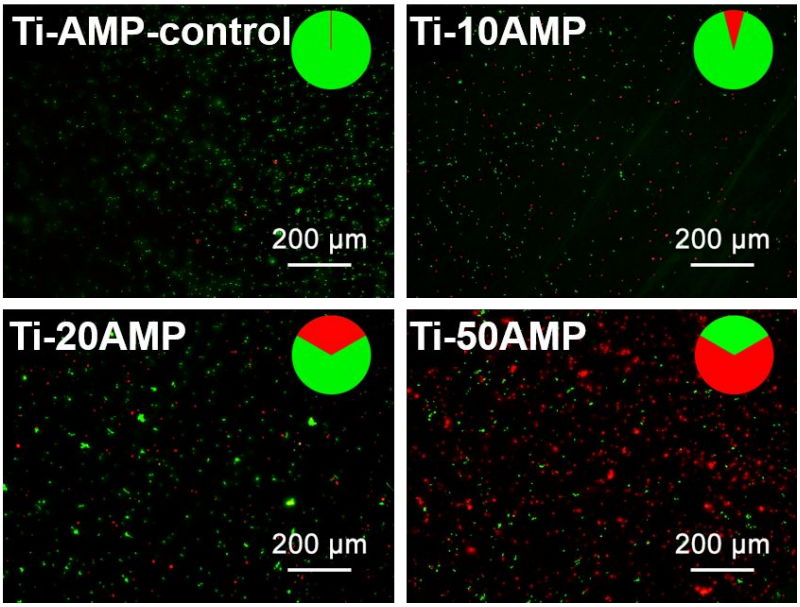

Figure S7. The stability of the antimicrobial activity of *Ti-100AMP* against *S. aureus*.

# denotes significant differences ($p < 0.01$) compared with *Ti-AMP-control* (Control).

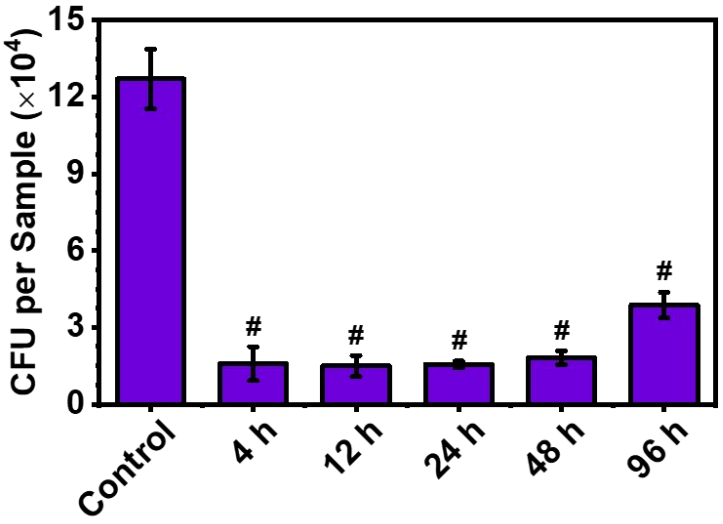

Figure S8. The morphology of *mBMSCs* on the indicated substrates after 24 h in culturing. The scale bar denotes 200 μm.

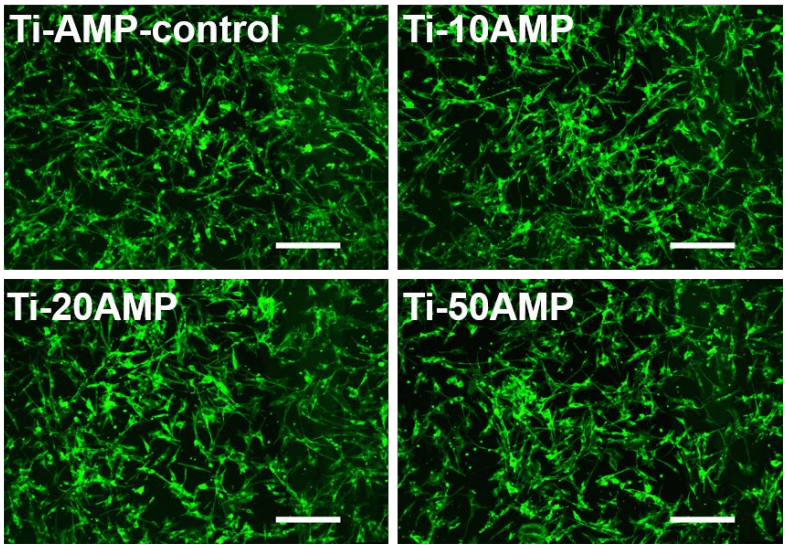

Figure S9. Photomicrographs of longitudinal sections of proximal tibia in (a) - (e) *Ti-AMP-control* and (f) - (j) *Ti-AMP* of rabbits in H&E staining. (k) the quantification of the inflammatory cells in *Ti-AMP-control* and *Ti-AMP* (n=6, and the other images were shown in Figure 7(c) and (d) in manuscript). The scale bar denotes 100 μm.

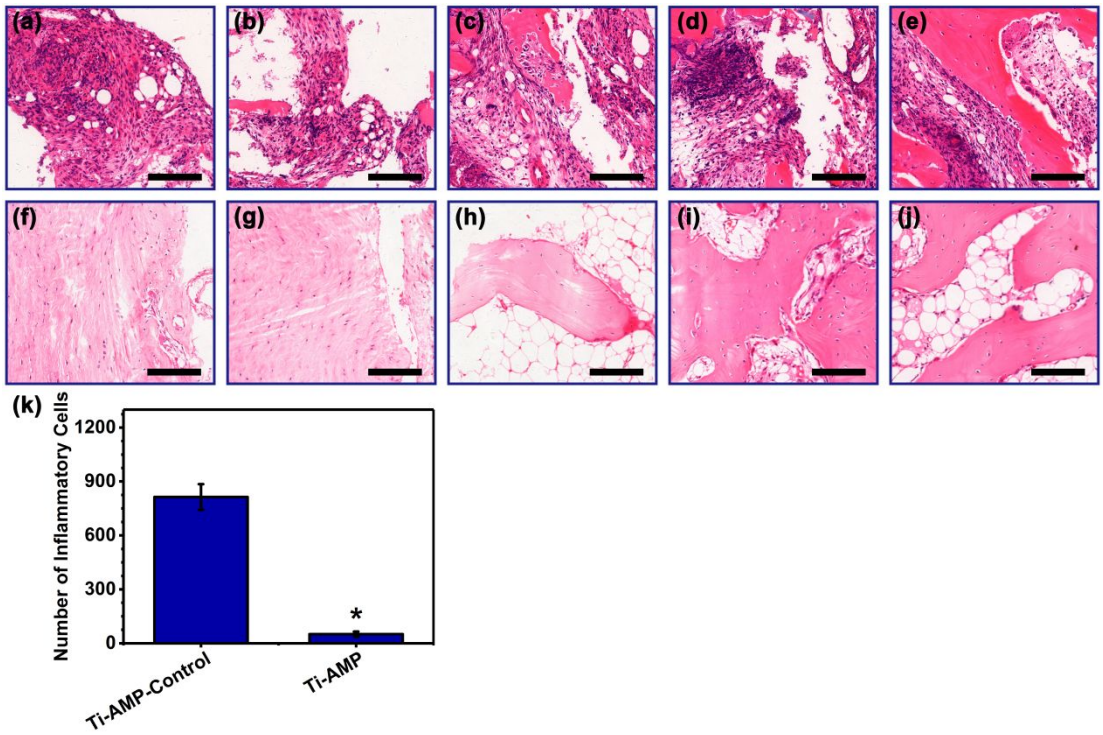

Table S1. The abbreviations of different substrates.

Substrates Abbreviation	**Treatment Method**
Ti	Pristine Ti substrate
Ti-APTS	*Ti* + silane coupling agent (APTS)
Ti-biotin-control	*Ti-APTS* + click solution with 100 μM of biotin-azide and 0 μM of $CuSO_4$
Ti-biotin	*Ti-APTS* + click solution with 100 μM of biotin-azide and 100 μM of $CuSO_4$
Ti-AMP-control	*Ti-APTS* + click solution (with 100 μM of PEG-HHC36) without $CuSO_4$
Ti-10AMP	*Ti-APTS* + click solution with 10 μM of PEG-HHC36 peptide
Ti-20AMP	*Ti-APTS* + click solution with 20 μM of PEG-HHC36 peptide
Ti-50AMP	*Ti-APTS* + click solution with 50 μM of PEG-HHC36 peptide
Ti-100AMP/ Ti-AMP	*Ti-APTS* + click solution with 100 μM of PEG-HHC36 peptide
Ti-200AMP	*Ti-APTS* + click solution with 200 μM of PEG-HHC36 peptide