

Supporting Information

Title

Enhanced Bone Regeneration via PHA Scaffolds Coated with Polydopamine-Captured BMP2

Authors:

Xu Zhang[#], Jian Li[#], Jin Chen, Zi-Xin Peng, Jiang-Nan Chen, Xinyi Liu, Fuqing Wu, Peng Zhang, and Guo-Qiang Chen**

Affiliations:

Dr. X. Zhang, Prof. G. Q. Chen ([Corresponding authors](#))
Key Laboratory of Industrial Biocatalysis, Ministry of Education
Department of Chemical Engineering
Tsinghua University
Tsinghua-Peking Center of Life Sciences
Beijing 100084, China
E-mail: chengq@mail.tsinghua.edu.cn

J. Li, Z. X. Peng, Prof. P. Zhang ([Corresponding authors](#))
Shenzhen Engineering Research Center for Medical Bioactive Materials
Center for Translational Medicine Research & Development
Shenzhen Institutes of Advanced Technology
Chinese Academy of Sciences
Shenzhen, Guangdong, 518055, China.
E-mail: peng.zhang@siat.ac.cn

J. Chen, J.-N. Chen, X. Liu, Dr. F. Wu, Prof. G. Q. Chen
School of Life Sciences
Tsinghua University
Tsinghua-Peking Center of Life Sciences
Beijing 100084, China

X. Z. and J. L. contributed equally to this paper

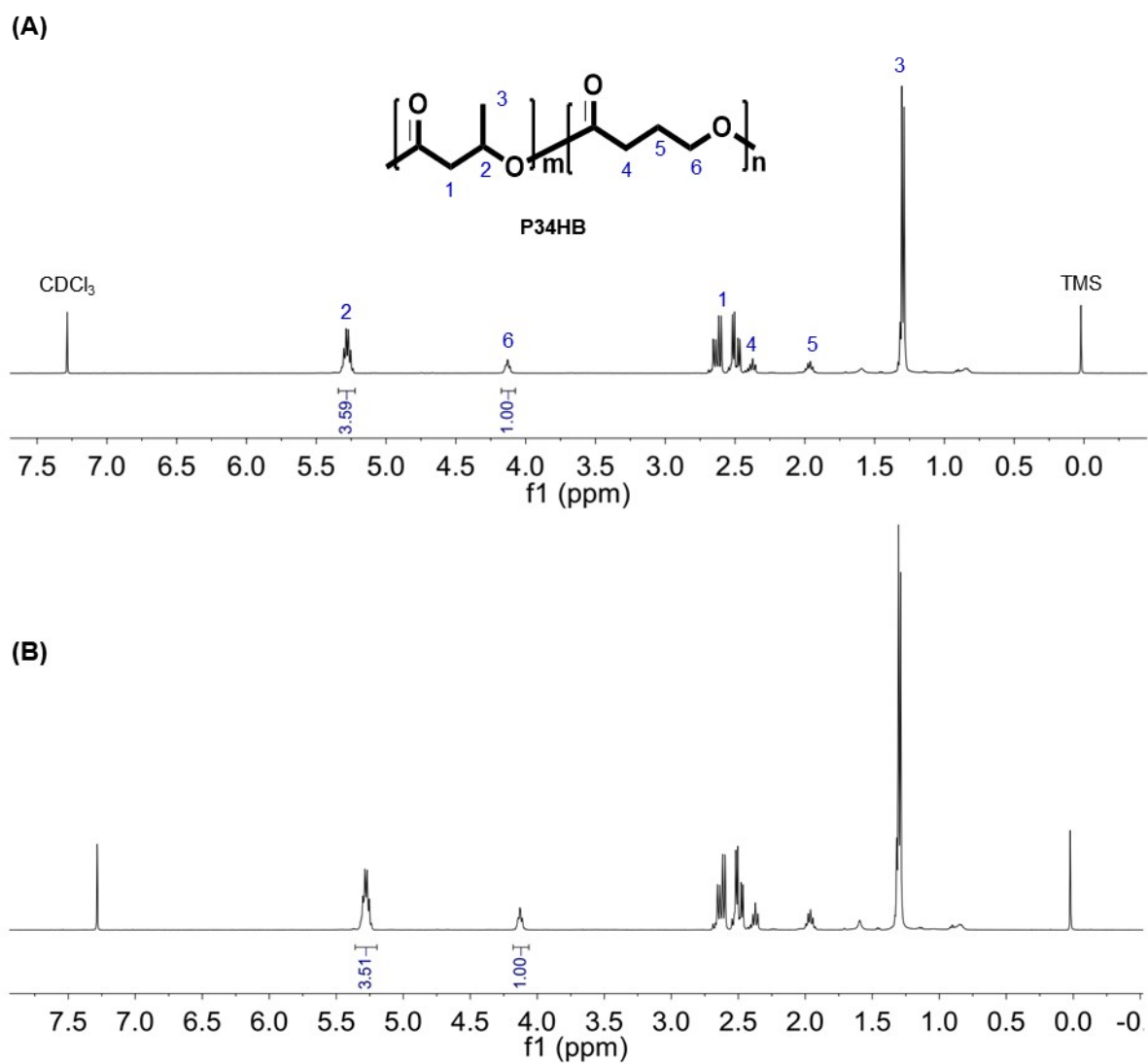


Figure S1. Structural analysis of PHA materials using ¹H Nuclear magnetic resonance (NMR).

(A) P34HB raw materials were biosynthesized using engineered *H. bluephagenesis* TD; (B)

P34HB materials were obtained after FDM.

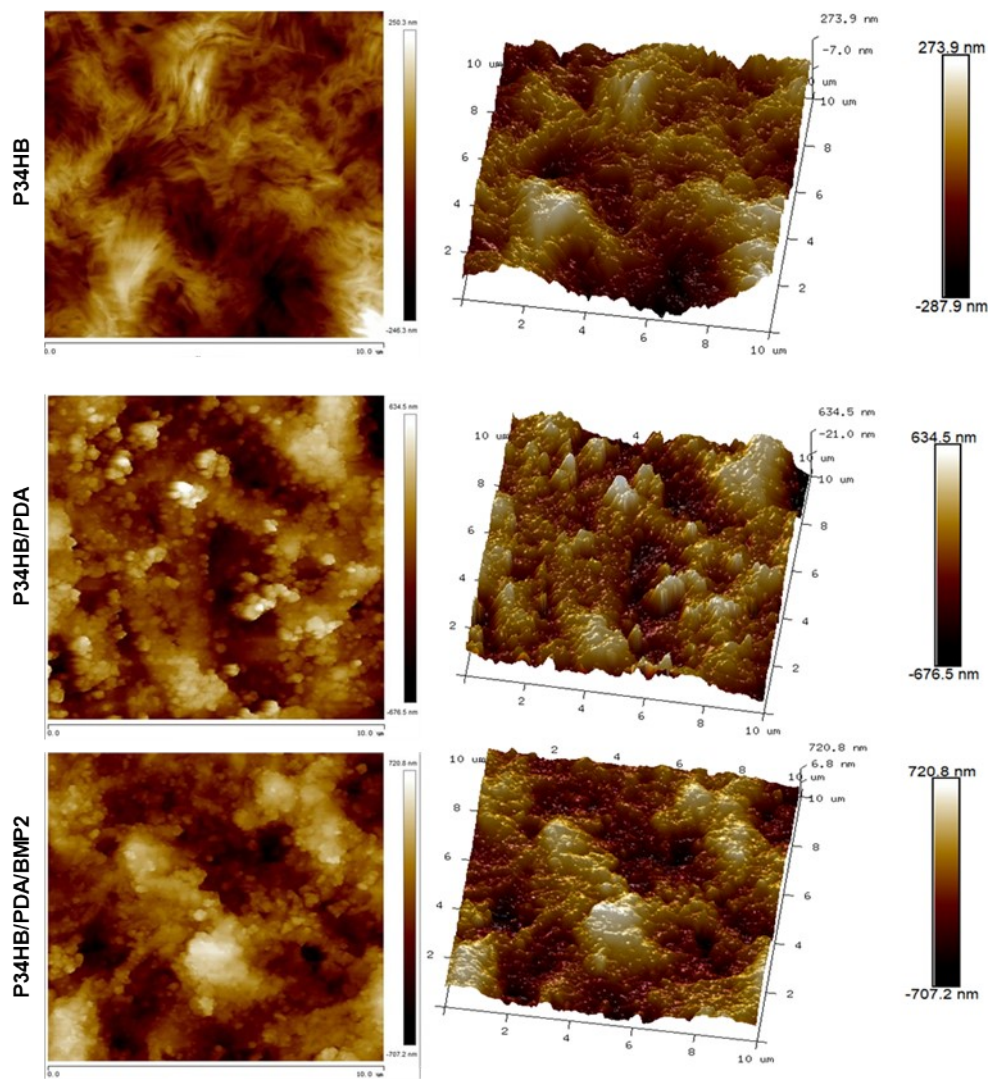


Figure S2. Surface morphology of different P34HB films determined by atom force microscope (AFM).

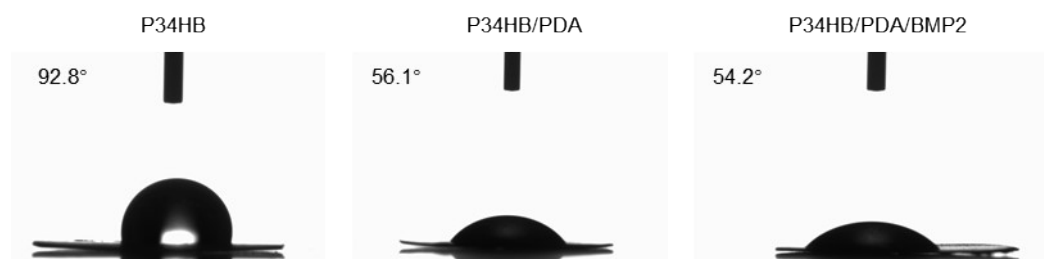


Figure S3. The hydrophilicity of P34HB films including P34HB, PDA-coated P34HB and BMP2-functionalized P34HB, as determined by a video optical contact angle measuring instrument.

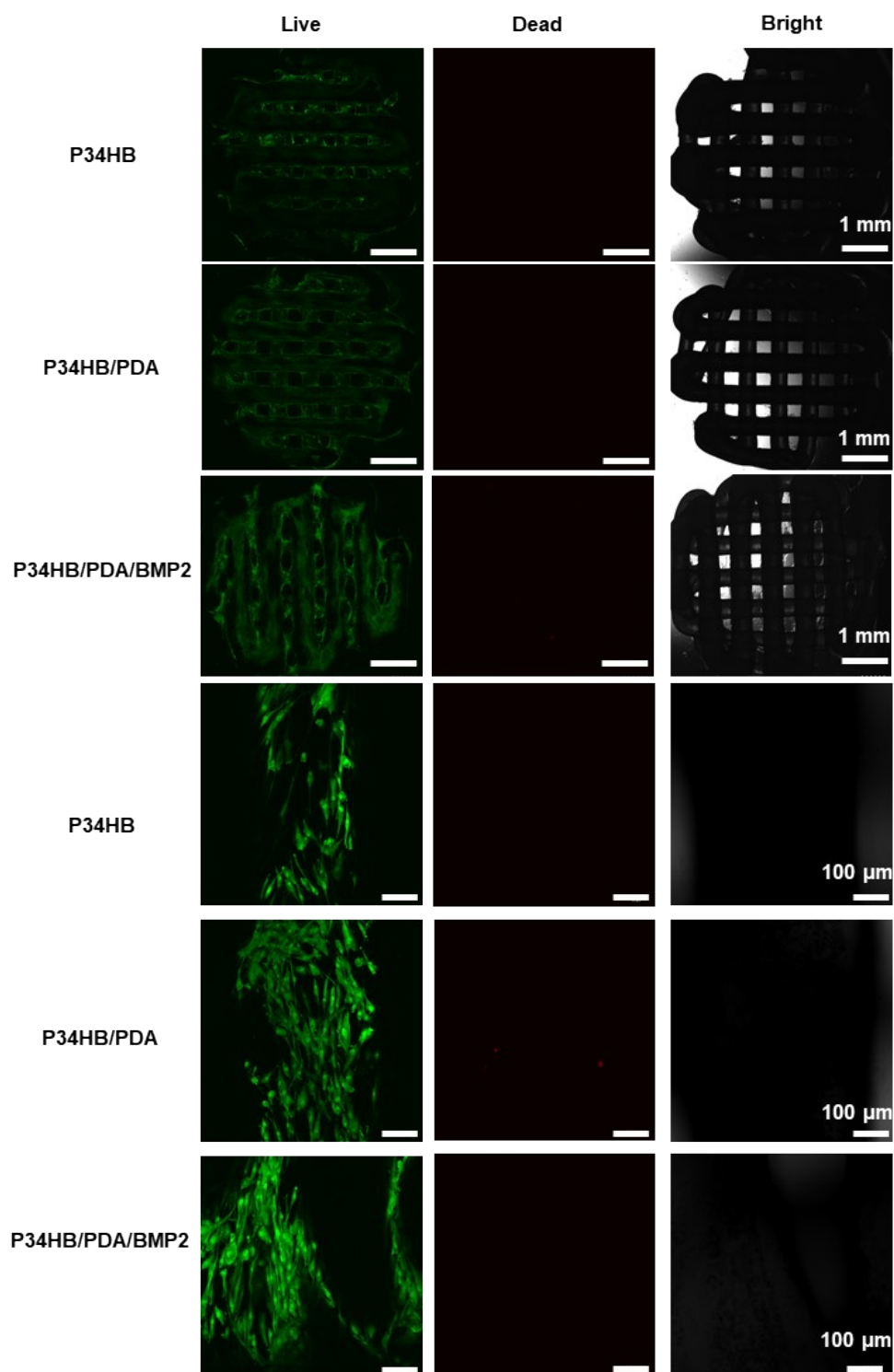


Figure S4. Representative confocal fluorescence images of ADSCs cocultured with scaffolds for day 7 and stained with LIVE/DEAD assay kit (live cells, green fluorescence; dead cells, red fluorescence).

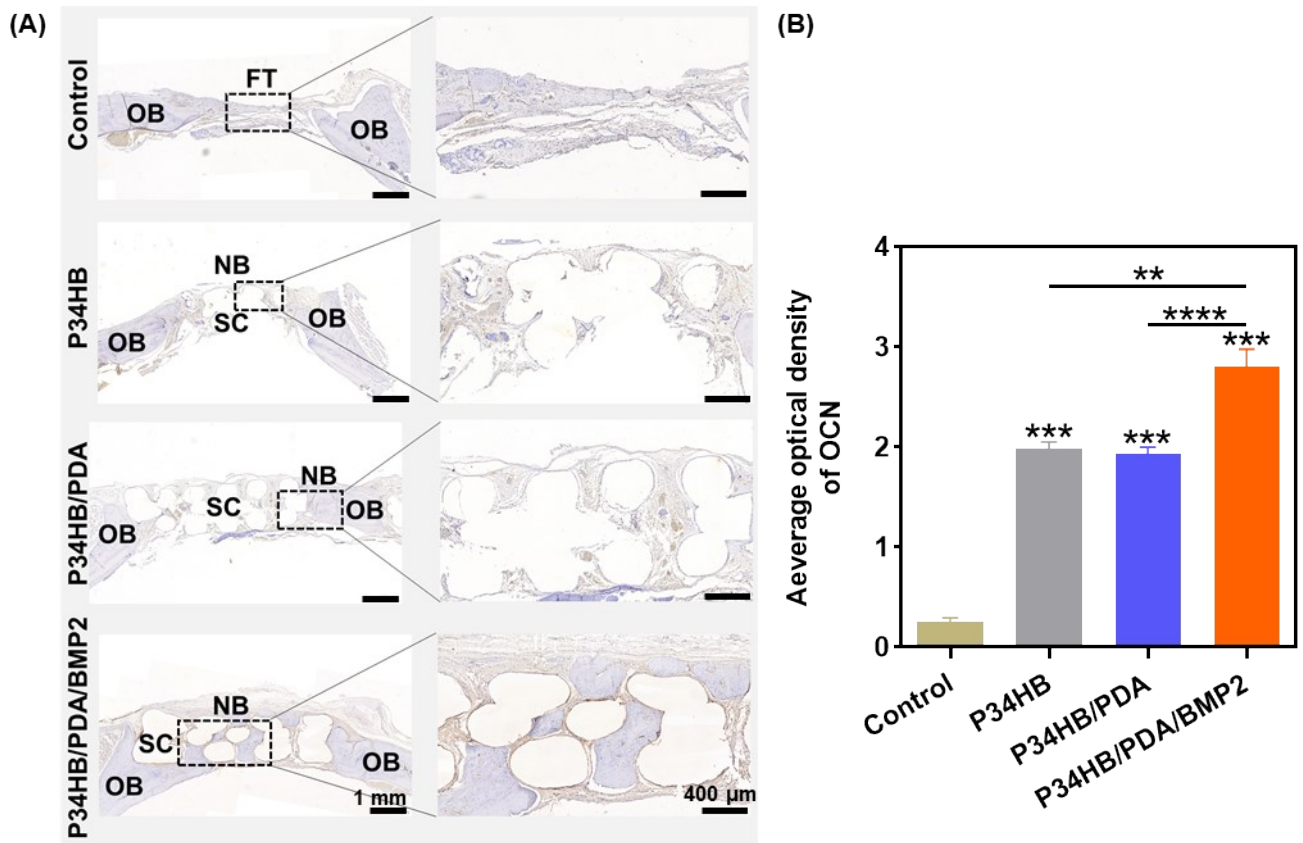


Figure S5. Histological staining and observation of bone tissue decalcified sections after 8 weeks of post-implantation. (A) Immunohistochemical staining of OCN; (B) Quantified average optical density at region of interest (ROI); OB, original bone; FT, fibrous tissue; NB, new bone; SC, scaffolds. The control group in the figure represented that there were no scaffolds. All data were showed as means \pm SD. ** $P < 0.01$, *** $P < 0.001$, **** $P < 0.0001$, one-way analysis of variance (ANOVA) with Tukey's post hoc test.

Table S1. Primer sequences of gene-related osteogenesis in RT-PCR.

Gene	forward	reverse
<i>RUNX2</i>	5'-CACTGGCGCTGCAACAAGA-3'	5'-CATTCCGGAGCTCAGCAGAAT-3'
<i>Colla1</i>	5'-GCTTGGTCCACTTGCTTGA-3'	5'-GAGCATTGCCTTTGATTGCTG-3'
<i>OCN</i>	5'-TGTGGAGGGTTGTGGGTGT-3'	5'-TCAACTGGGGTGGGGTTTT-3'
<i>OPN</i>	5'-GATGAATCTGATGAACTGGT-3'	5'-GTGATGTCCTCGTCTGTAGCA-3'
<i>GAPDH</i>	5'-GCACCGTCAAGGCTGAGAAC-3'	5'-TGGTGAAGACGCCAGTGGA-3'