

Electronic Supporting Information (ESI)

Super-Assembled Core/shell Fibrous Frameworks with Dual Growth Factors for *In Situ* Cementum- ligament-bone Complex Regeneration

Tian Ding,^a Jianhua Li,^a Xingshuang Zhang,^b Lingqian Du,^a Yang Li,^c Dengwang Li,^c Biao Kong,^{*b} and Shaohua Ge,^{*a}

a Department of Periodontology, School and Hospital of Stomatology, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Laboratory for Dental Materials and Oral Tissue Regeneration, Jinan, Shandong 250012, China

b Department of Chemistry, Shanghai Key Lab of Molecular Catalysis and Innovative Materials, iChEM, Fudan University, Shanghai 200433, China

c Shandong Key Laboratory of Medical Physics and Image Processing & Shandong Provincial Engineering and Technical Center of Light Manipulations, School of Physics and Electronics, Shandong Normal University, Jinan 250358, China

** Corresponding author*

shaohuage@sdu.edu.cn (Shaohua Ge)

bkong@fudan.edu.cn (Biao Kong)

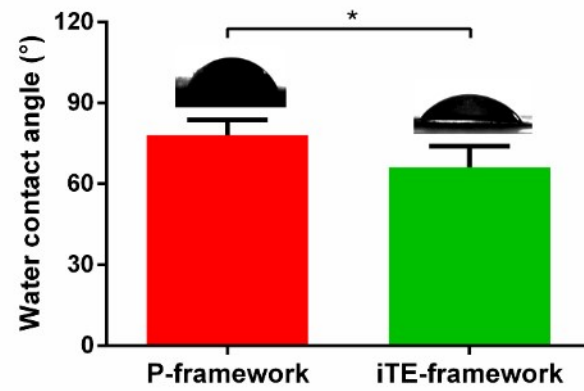


Figure S1. Water contact angle of the frameworks. Data were presented as mean \pm SD ($n = 6$). $*P < 0.05$.

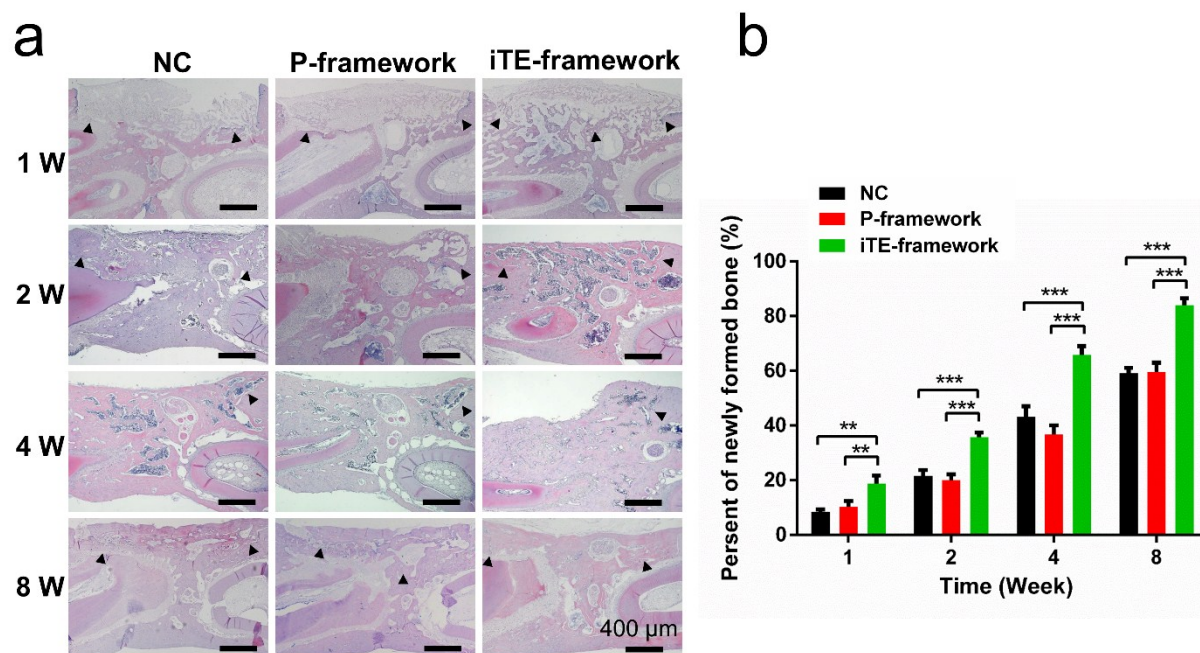


Figure S2. Histological assessment of bone formation in three groups. (a) H&E staining of the periodontal defects at 1, 2, 4 and 8 weeks post-surgery. Black arrows indicated border of the defects. (b) quantitative analysis of newly formed bone areas in the three groups at 1, 2, 4 and 8 weeks post-surgery. $**P < 0.01$ and $***P < 0.001$.

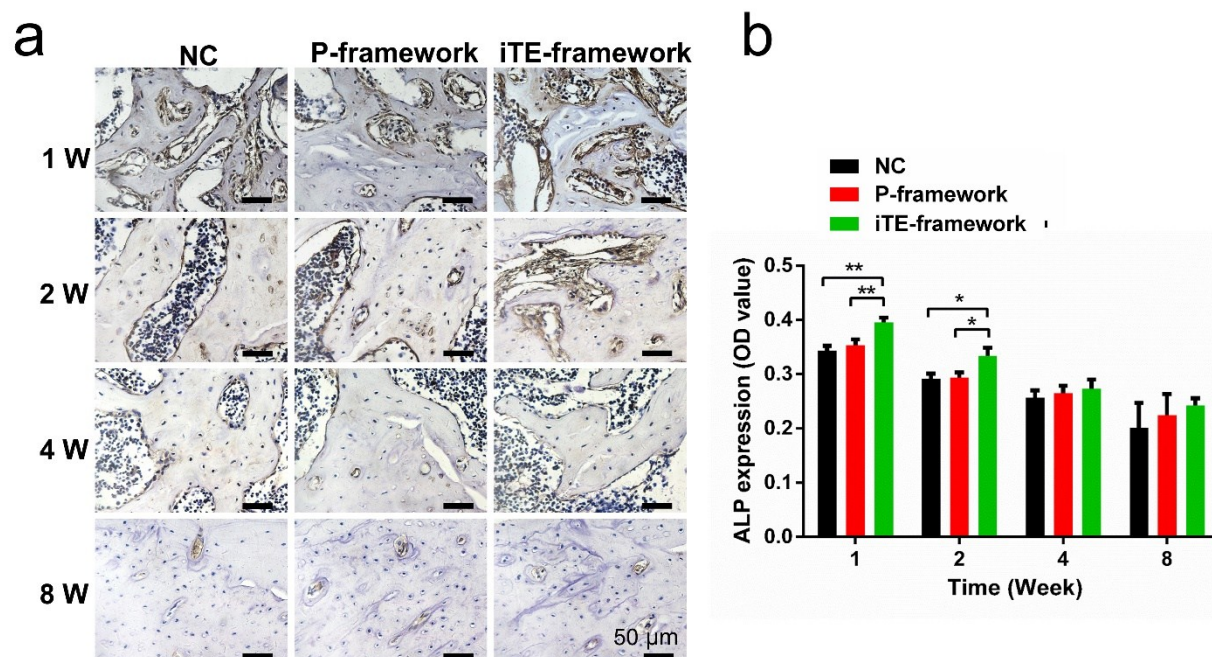


Figure S3. ALP expression in NC, P-framework and iTE-framework groups. (a) Immunohistochemical staining of ALP (brown) at 1, 2, 4 and 8 weeks post-surgery. (b) Quantitative analyses of ALP expression in the three groups at 1, 2, 4 and 8 weeks post-surgery. * $P < 0.05$ and ** $P < 0.01$.

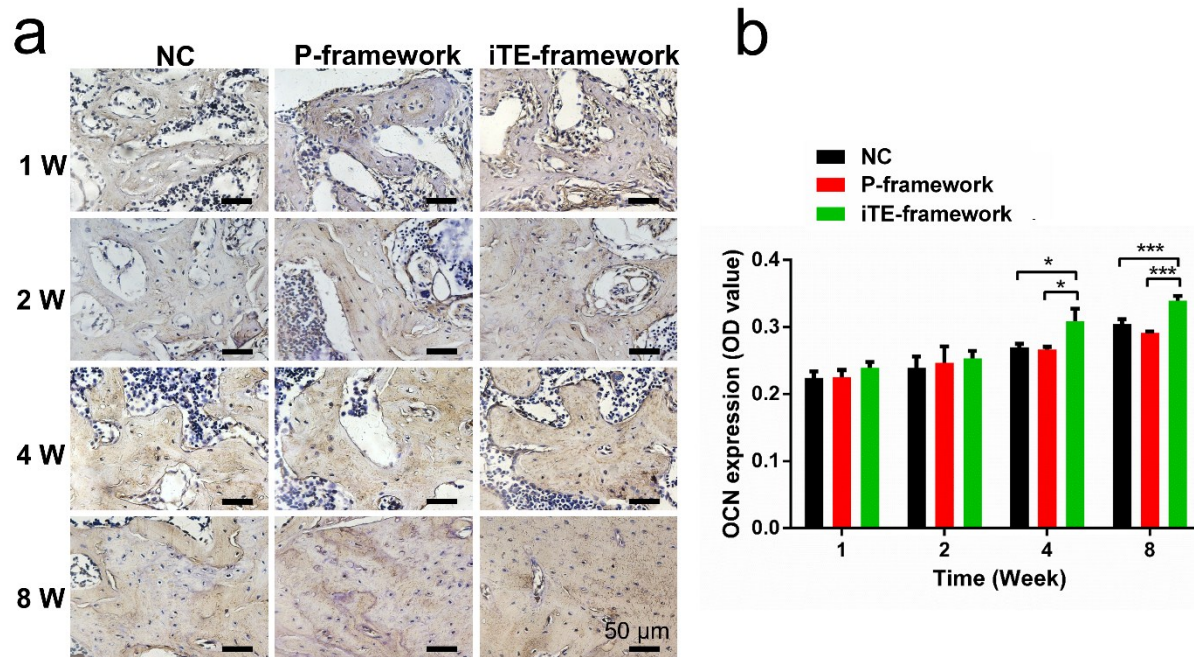


Figure S4. OCN expression in NC, P-framework and iTE-framework groups. (a) Immunohistochemical staining of OCN (brown) at 1, 2, 4 and 8 weeks post-surgery. (b) Quantitative analyses of OCN expression in three groups at 1, 2, 4 and 8 weeks post-surgery. * $P < 0.05$ and *** $P < 0.001$.

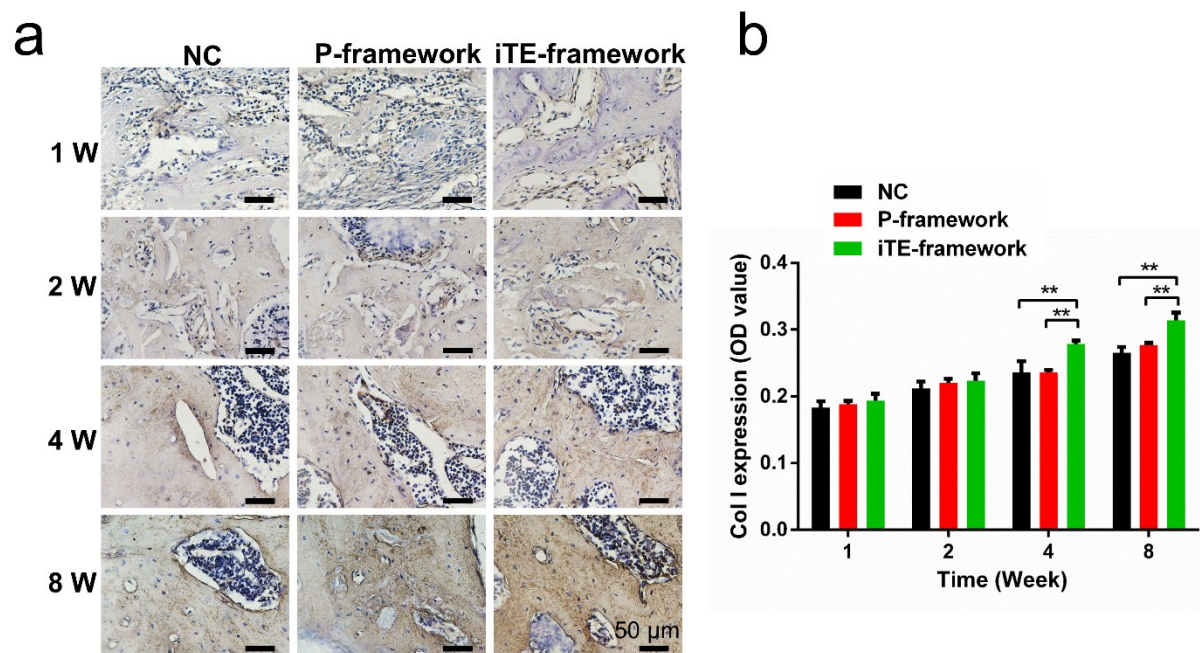


Figure S5. Col I expression in NC, P-framework and iTE-framework groups. (a) Immunohistochemical staining of Col I (brown) at 1, 2, 4 and 8 weeks post-surgery. (b) Quantitative analyses of Col I expression in three groups at 1, 2, 4 and 8 weeks post-surgery. ** $P < 0.01$.

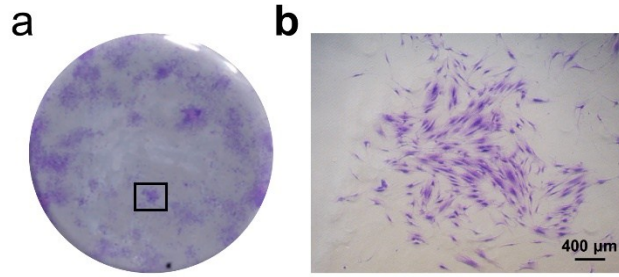


Figure S6. Characteristic of PDLSCs. (a) Single colonies were formed after PDLSCs being seeded at low density and cultured for 9 days. (b) Cell clusters derived from a single PDLSCs colony.

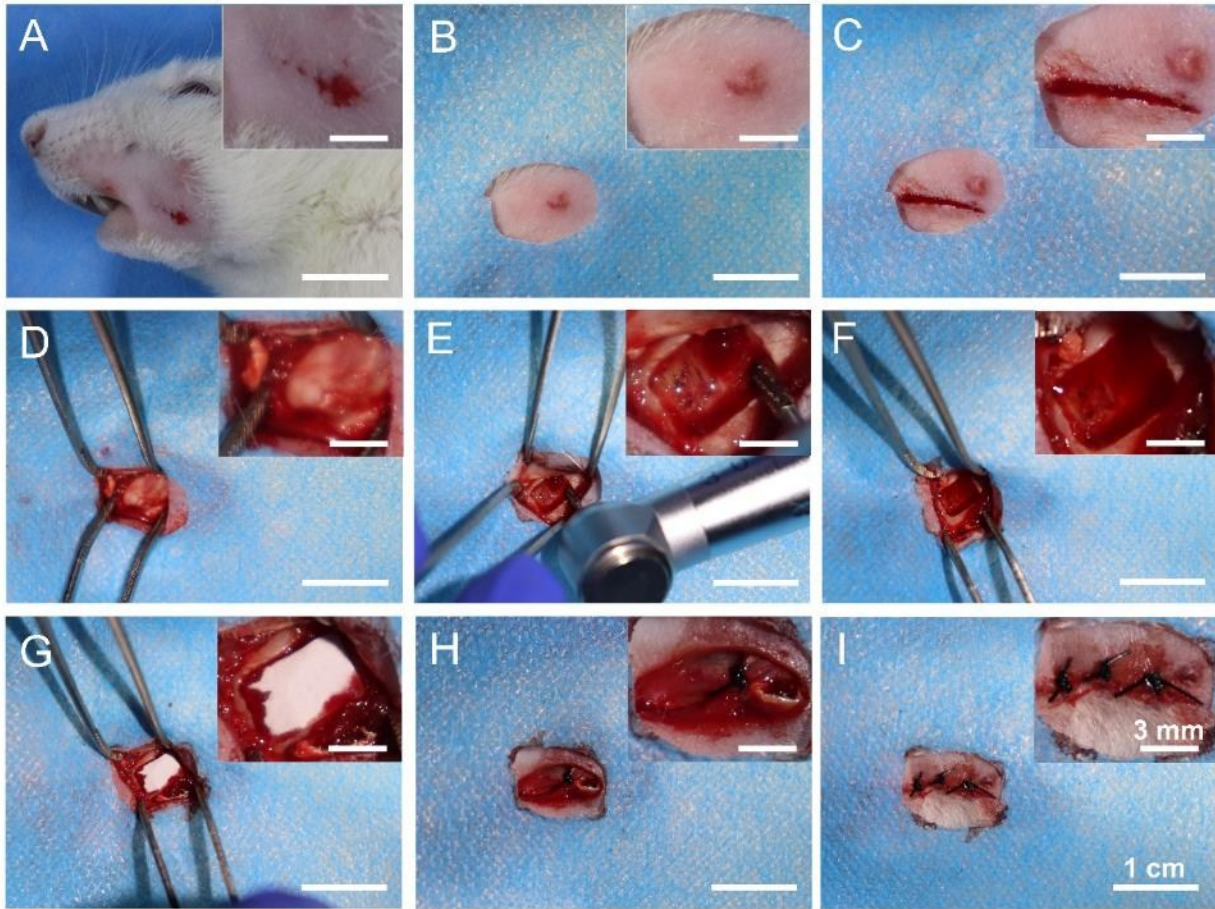


Figure S7. An overview of surgical procedure for rat mandibular defect. (a) Preoperative skin preparation. (b) The surgical area was disinfected and covered with sterile drape. (c) A 1 cm long extra-oral incision was made parallel to the lower edge of the mandible. (d) The subcutaneous tissues and masseter muscle were dissected from bone surface. (e) Preparation of the mandibular bone defect. (f) The created mandibular bone defect. (g) Implantation of framework. (h) Suturing subcutaneous tissues. (i) Suturing skin.

Table S1. Mechanical properties of P-framework and iTE-framework.

Sample	Ultimate tensile strength	Facture strain	Elastic modulus
	(MPa)	(%)	(MPa)
P-framework	2.32 ± 0.20	69.35 ± 13.02	143.67 ± 29.76
iTE-framework	2.17 ± 0.18	60.91 ± 2.26	153.76 ± 5.25

Table S2. Primer sequences for qRT-PCR.

Gene	Forward primer (5'-3')	Reverse primer (5'-3')
<i>GAPDH</i>	GCACCGTCAAGGCTGAGAAC	TGGTGAAGACGCCAGTGGA
<i>ALP</i>	ATGGGATGGGTGTCTCCACA	CCACGAAGGGGAAGTTGTC
<i>Runx2</i>	TCCACACCATTAGGGACCATC	TGCTAATGCTTCGTGTTTCCA
<i>BSP</i>	CCCCACCTTTTGGGAAAACCA	CCCCACCTTTTGGGAAAACCA
<i>OPN</i>	TCCTAGCCCCACAGACCCTT	CACACTATCACCTCGGCCAT
<i>OCN</i>	TCACACTCCTCGCCCTATT	GATGTGGTCAGCCAACTCG