Supporting Information

Mesoporous silica nanoparticles/gelatin porous composite scaffolds with localized and sustained release of vancomycin for treatment of infected bone defects

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Supplementary experimental section

Histological evaluation of animal model

Briefly, the collected radius samples were fixed in 4% paraformaldehyde overnight, decalcified in 10% EDTA, and embedded in paraffin. Then sagittal sections with 5 μm were obtained using a microtome (EXAKT310, Germany). Thereafter, the sections were subjected to Gram staining for bacterial colonization assessment and Masson's trichrome staining for bone tissue morphology observation. In addition to the infected samples, the normal samples were also included for comparison.

Supplementary figures

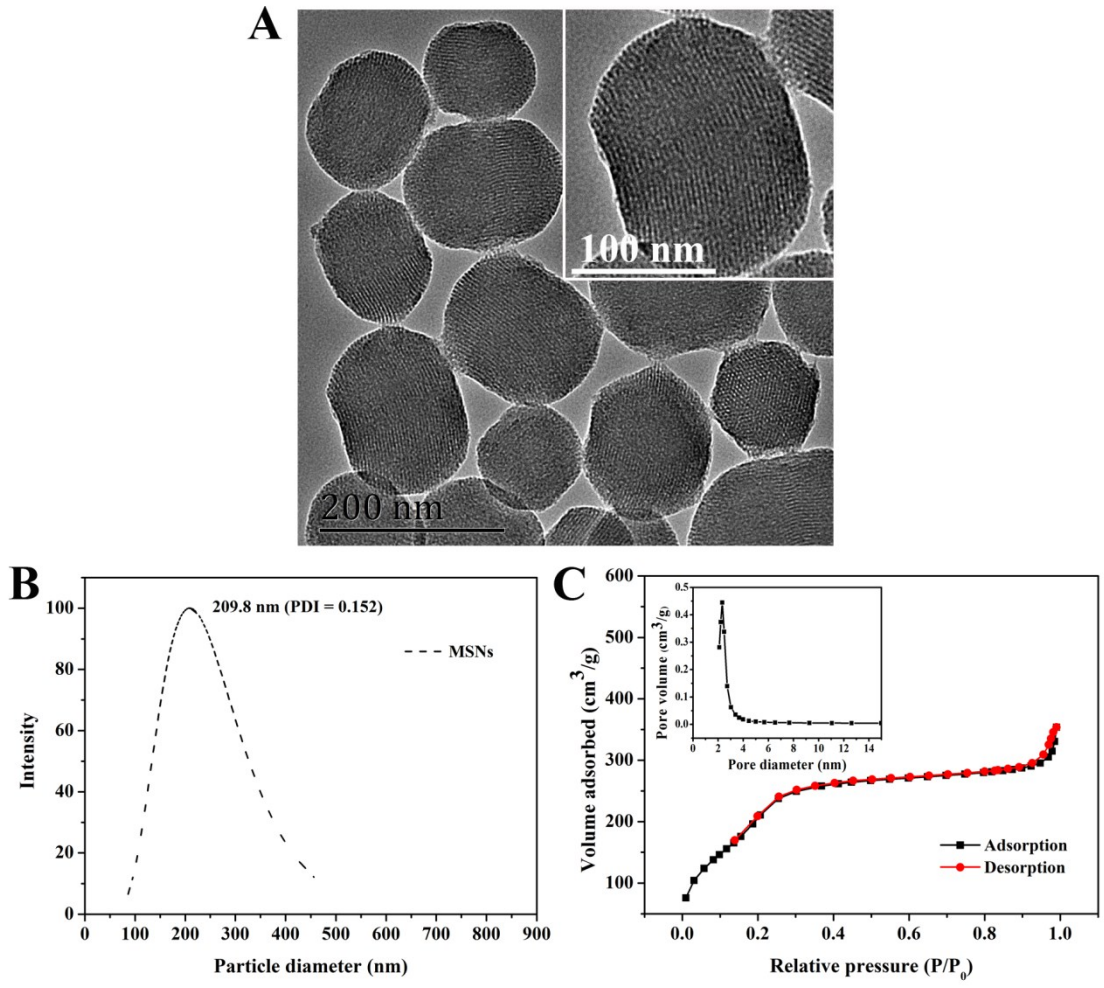

Fig. S1 Characterization of prepared MSNs. (A) TEM image (inset is the magnified image), (B) size distribution and (C) N_2 adsorption-desorption isotherms (inset is the pore size distribution).

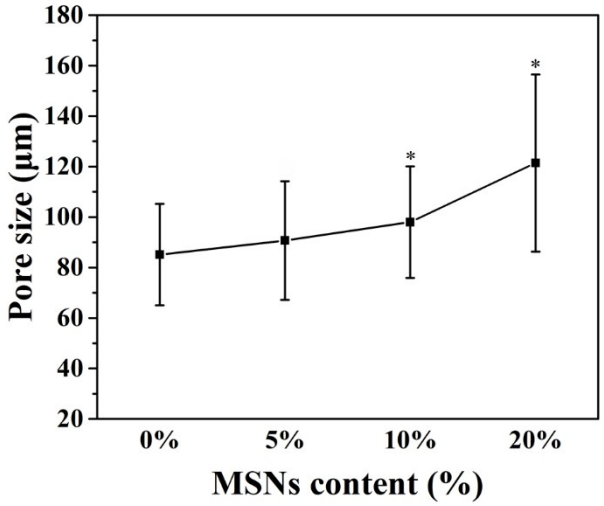

Fig. S2 Effects of MSNs content on pore size of prepared scaffolds. The average pore size in each scaffold was determined sing SEM images with Image J 1.34 software, where 100 measurements of the pores were randomly selected, $^{*}P < 0.05$ vs. pure Gelatin scaffold.

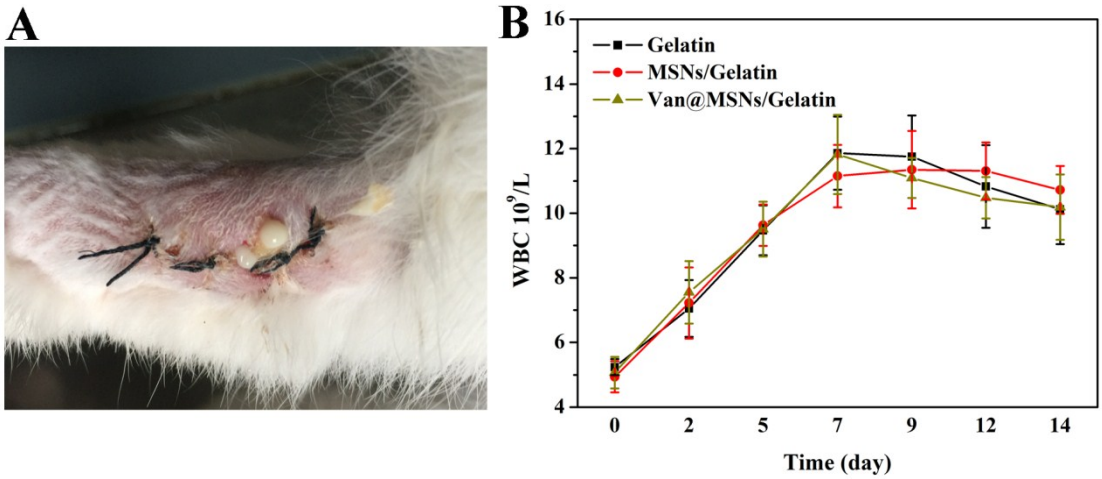

Fig. S3 (A) Digital photo of operation area in rabbit after modelling surgery for 2 weeks and (B) WBC determination at different time points.

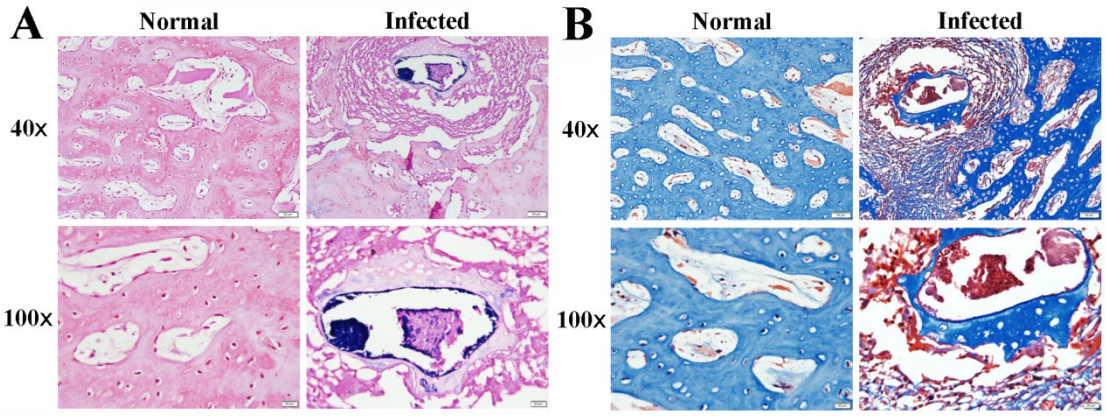

Fig. S4 Histological evaluation of animal model establishment after 2 weeks: (A) Gram staining and (B) Masson's trichrome staining.

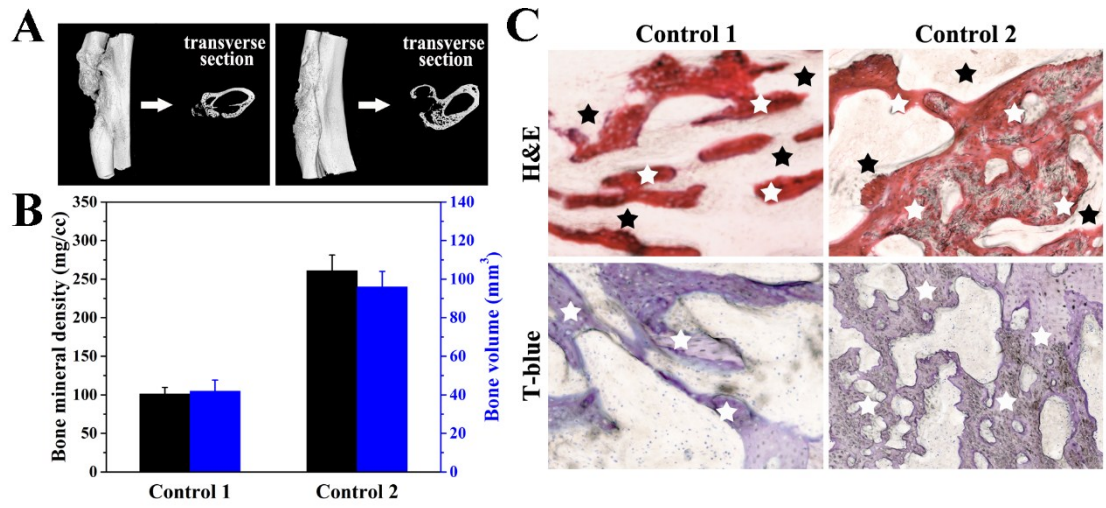

Fig. S5 *In vivo* evaluation of Van groups at 12 weeks post-operation. (A) 3D micro-CT reconstructed images of rabbit radius. (B) Quantitative analysis of regenerated bone mineral density and bone volume. (C) H&E and T-blue staining. Black stars indicate the inflammatory cells and white stars indicate the newly formed bone.

Table S1 Primer sequences used for PCR amplification.

Gene	Primer sequences	Product size
RUNX2	Forward 5' ACGTACCCAGGCGTATTTCA 3'	187 bp
	Reverse 5' GCTGGATAGTGCATTCGTGG 3'	
OPN	Forward 5' AGCCATGAGTCAAGTCAGCT 3'	183 bp
	Reverse 5' ACTCGCCTGACTGTCGATAG 3'	
OCN	Forward 5' AATAGACTCCGCGCTACCTC 3'	112 bp
	Reverse 5' GCTAGCTCGTCACAATTGGG 3'	
GADPH	Forward 5' CAAGTTCAACGGCACAGTCA 3'	102 bp
	Reverse 5' CCCCATTTGATGTTAGCGGG 3'	

Table S2 Diameters of bacterial inhibition zone for different samples after 24 h incubation.

Samples	Outer diameter (mm)	Diameter difference between outer and inner diameter (mm)
Gelatin	–	–
MSNs/Gelatin	–	–
Van@Gelatin	19.65 ± 0.53	9.60 ± 0.43
Van@MSNs/Gelatin	17.56 ± 0.26	7.22 ± 0.22

Table S3 Diameters of bacterial inhibition zone for different samples at different release time periods.

Release time	Samples	Outer diameter (mm)	Diameter difference between outer and inner diameter (mm)
3 d	Van@Gelatin	15.19 ± 0.43	5.17 ± 0.46
	Van@MSNs/Gelatin	16.57 ± 0.28	6.59 ± 0.29
7 d	Van@Gelatin	13.05 ± 0.20	3.22 ± 0.10
	Van@MSNs/Gelatin	14.62 ± 0.39	4.64 ± 0.39
13 d	Van@Gelatin	10.35 ± 0.14	0.56 ± 0.18
	Van@MSNs/Gelatin	12.92 ± 0.16	3.11 ± 0.13