

Biofunctionalized Decellularized Tissue-Engineered Heart Valve with Mesoporous Silica Nanoparticles for Controlled Release of VEGF and RunX2-siRNA against Calcification

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Supplementary informations

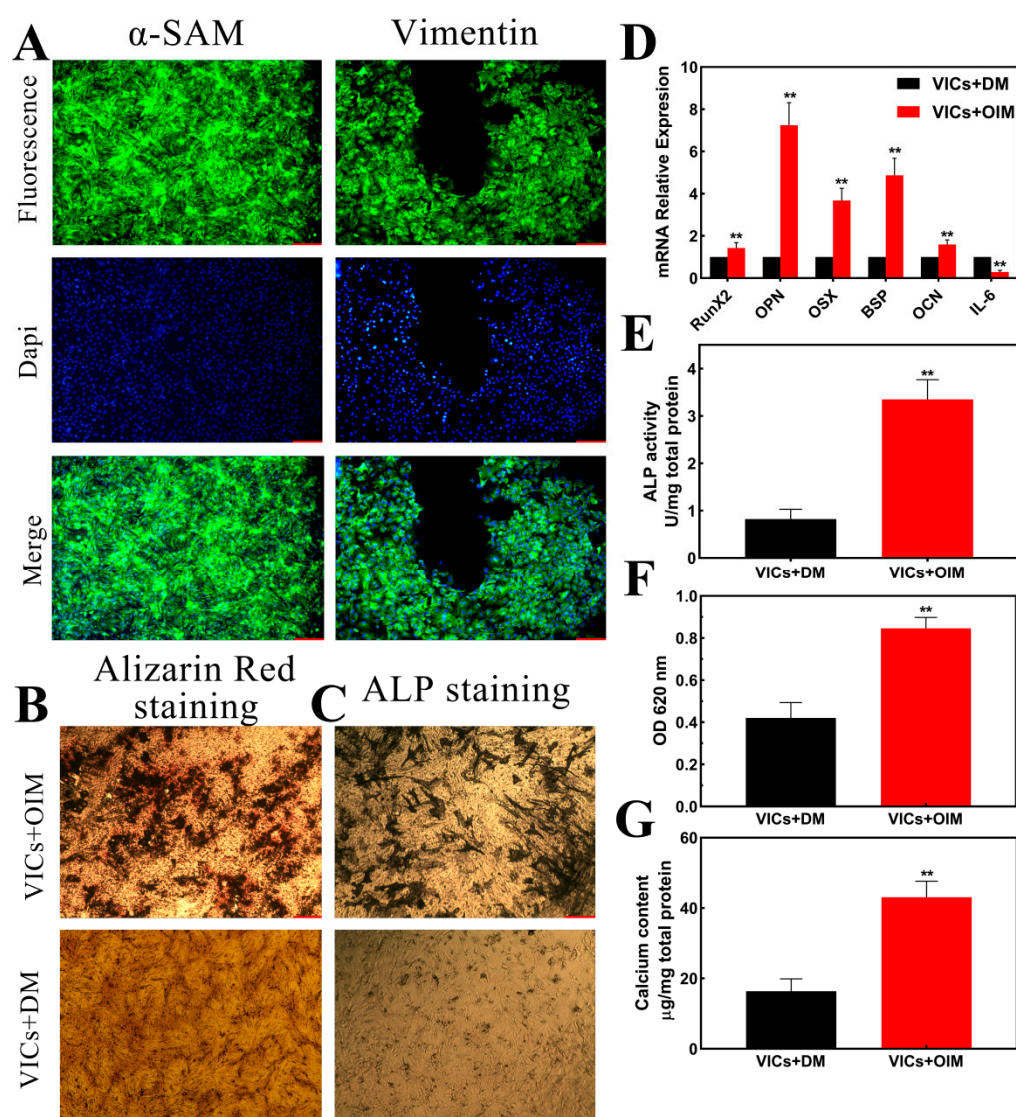


Figure S1. Evaluation of rat valvular interstitial cell calcification model. A. α -SAM and Vimentin immunofluorescence staining. B. Representative image of Alizarin red staining. C. Representative image of ALP staining. D. mRNA expression of related calcification genes. E. Quantitative analysis of ALP staining. F. Quantitative analysis of alizarin red staining. G. Determination of calcium content. Significant differences (* $p < 0.05$, ** $p < 0.01$), $n = 3$, scale bar = $20\mu\text{m}$.

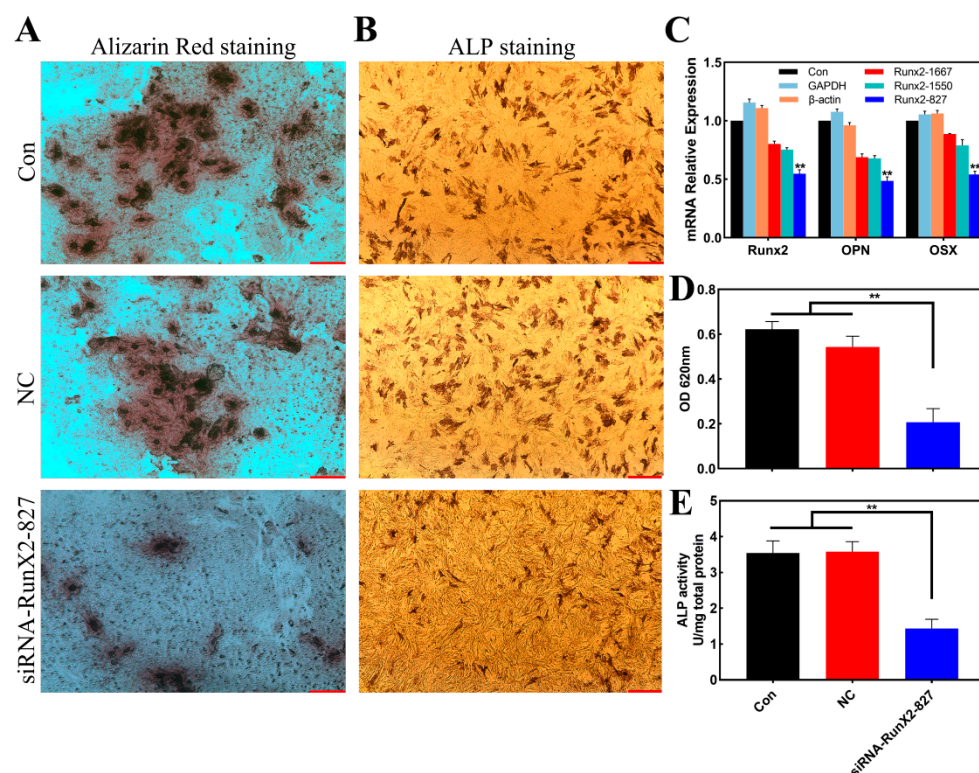


Figure S2. Anti-calcification of RunX2-siRNA. A. Representative image of Alizarin red staining. B. Representative image of ALP staining. C. mRNA expression of calcification genes associated with valve interstitial cells was detected after transfection with RunX2-siRNA. D. Quantitative analysis of alizarin red staining. E. Quantitative analysis of ALP staining. Significant differences (* $p < 0.05$, ** $p < 0.01$), $n = 3$, scale bar = $20\mu\text{m}$.

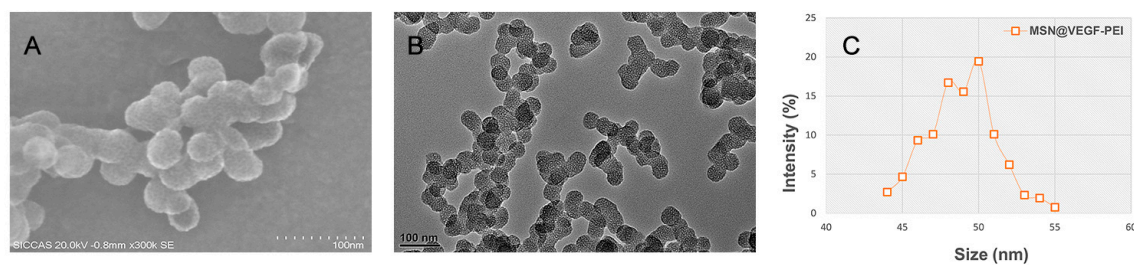


Figure S3. Characteristics of MSN@VEGF-PEI. A. SEM images of MSN@VEGF-PEI. B. TEM images of MSN@VEGF-PEI. C. Particle size analysis.

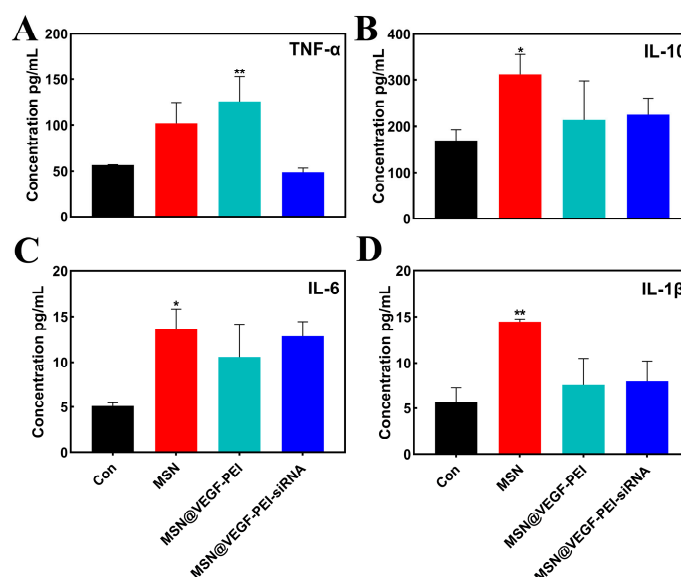


Figure S4. Release of inflammatory factors. A. TNF-α. B. IL-10. C. IL-6. D. IL-1β. Significant differences (* $p < 0.05$, ** $p < 0.01$), $n = 3$.

Table S1. Primer used in this study.

Gene and primer direction		Sequence(5' to 3')
Rat GAPDH	Forward	GGAATCCACTGGCGTCTTCA
	Reverse	GGTTCACGCCCATCACAAAC
Rat RunX2	Forward	TCTTCCCAAAGCCAGAGCG
	Reverse	TGCCATTTCGAGGTGGTCG
Rat OPN	Forward	CCAAGCGTGGAAACACACAGCC
	Reverse	GGCTTTGGAAGCTCGCCTGACTG
Rat OSX	Forward	GCCTACTTACCCGTCTGACTTT
	Reverse	GCCCACTATTGCCAACTGC
Rat BSP	Forward	CACTG GAGCCAATGCAGAAGA
	Reverse	TGGTGGGGTTG TAGGTTCAAA
Rat OCN	Forward	GCCCTGACTGCATTCTGCCTCT
	Reverse	TCACCACCTTACTGCCCTCCTG
Rat IL-6	Forward	CCTTCTTGGGACTGATGT
	Reverse	ACTGGTCTGTTGTGGGTG

Abbreviations: GAPDH, glyceraldehyde-3-phosphate dehydrogenase; RunX2, core binding factor α1; OPN, osteopontin; OSX, osterix; BSP, bone sialoprotein; OCN, osteocalcin; IL-6, interleukin-6.