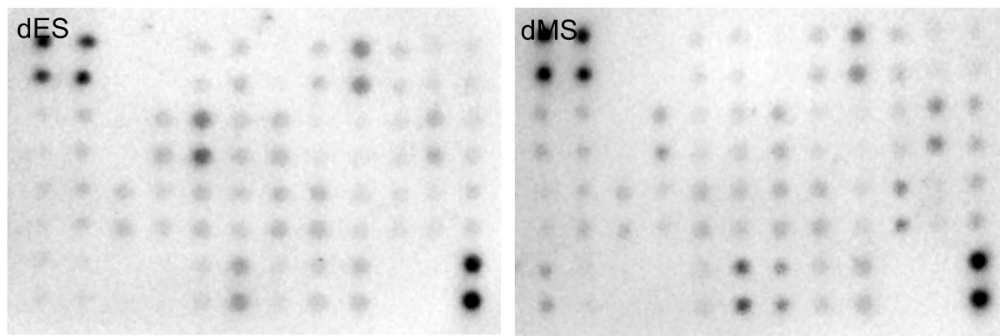


### Supplementary data

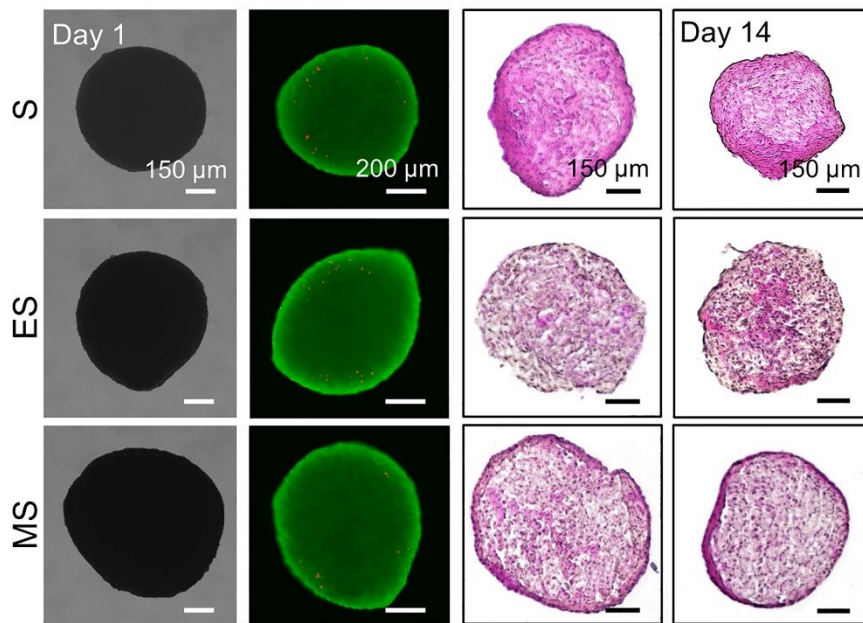
Gene	Species	Sequence (5'-3')
<i>GAPDH</i>	Human	Fw: GTC AGT GGT GGA CCT GAC CT Rv: TGC TGT AGC CAA ATT CGT TG
<i>ADAMTS</i>	Human	Fw: CCT CTG TCT GTG TGC AAG GA Rv: GTG GCT CCA GTT GGA ATT GT
<i>G-CSF</i>	Human	Fw: GCT TGA GCC AAC TCC ATA GC Rv: TTC CCA GTT CTT CCA TCT GC
<i>SLIT3</i>	Human	Fw: CTT GTC TCC CTG TCC ACC AT Rv: CTG GAT GGG AAT CTC CTT GA
<i>MMP9</i>	Human	Fw: TTG ACA GCG ACA AGA AGT GG Rv: GCC ATT CAC GTC GTC CTT AT
<i>PDGF</i>	Human	Fw: CTT TAA GAA GGC CAC GGT GA Rv: CTA GGC TCC AAG GGT CTC CT
<i>RUNX2</i>	Human	Fw: GCA GTT CCC AAG CAT TTC AT Rv: CAC TCT GGC TTT GGG AAG AG
<i>OSX</i>	Human	Fw: TAA TGG GCT CCT TTC ACC TG Rv: CAC TGG GCA GAC AGT CAG AA
<i>OCN</i>	Human	Fw: GTG CAG AGT CCA GCA AAG GT Rv: TCA GCC AAC TCG TCA CAG TC
<i>OPN</i>	Human	Fw: TGA AAC GAG TCA GCT GGA TG Rv: TGA AAT TCA TGG CTG TGG AA
<i>Col1a</i>	Human	Fw: GTG CTA AAG GTG CCA ATG GT Rv: CTC CTC GCT TTC CTT CCT CT

**Table S1.** List of primers for RT-qPCR.

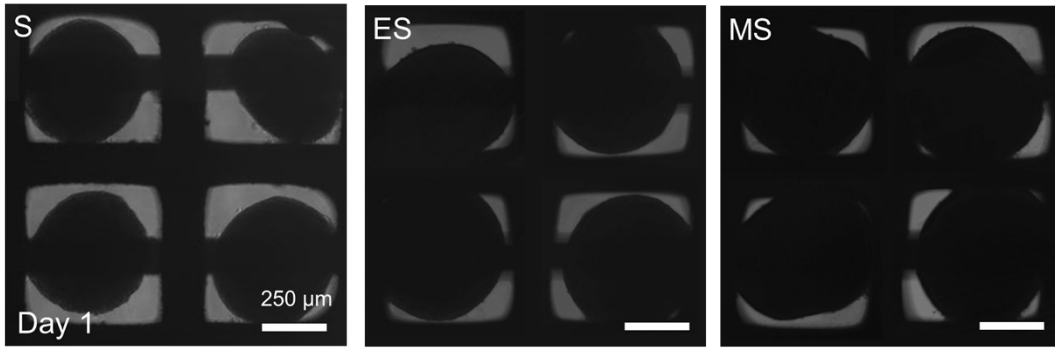


	A	B	C	D	E	F	G	H	I	J	K	L
1	POS	POS	NEG	NEG	AR	bFGF	beta-NGF	EGF	EGFR	FGF-4	FGF-6	FGF-7 (KGF)
2												
3	GCSF	GDNF	GM-CSF	HB-EGF	HGF	IGFBP-1	IGFBP-2	IGFBP-3	IGFBP-4	IGFBP-6	IGF-1	IGF-1R
4												
5	IGF-2	M-CSF	M-CSFR	NT-3	NT-4	PDGFR alpha	PDGFR beta	PDGF-AA	PDGF-AB	PDGF-BB	PLGF	SCF
6												
7	SCFR (CD117)	TGF alpha	TGF beta 1	TGF beta 2	TGF beta 3	VEGF-A	VEGFR2	VEGFR3	VEGF-D	BLANK	BLANK	POS
8												

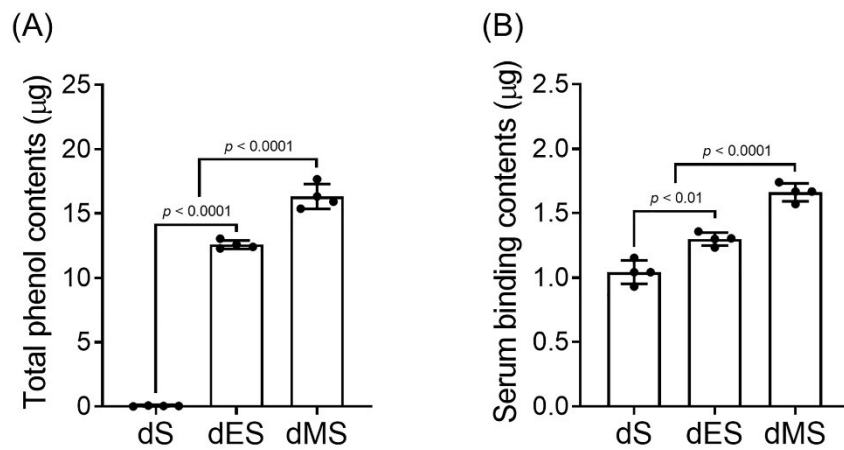
**Supplementary Figure S1.** The whole images of the growth factor array of the decellularized scaffolds (upper), and the position information of each type of growth factor on the growth factor array sheet (lower).



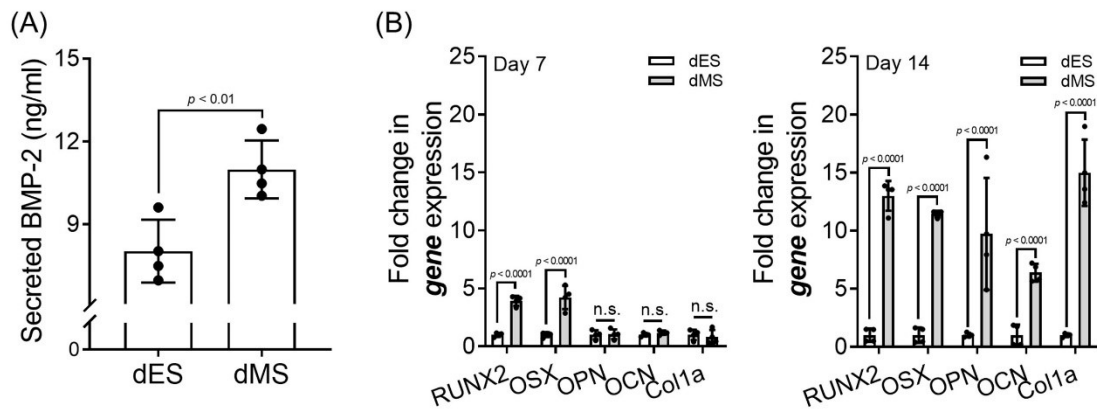
**Supplementary Figure S2.** Phase contrast images and live/dead staining of sectioned engineered spheroids on day 1, and H&E staining images on day 1 and 14.



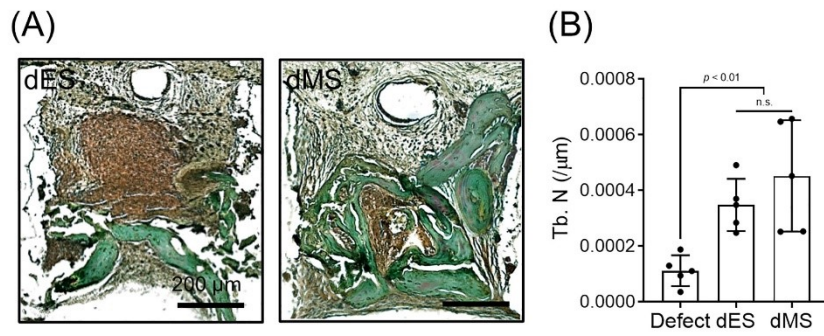
**Supplementary Figure S3.** Phase contrast images of the engineered spheroids-laden scaffold on day 1.



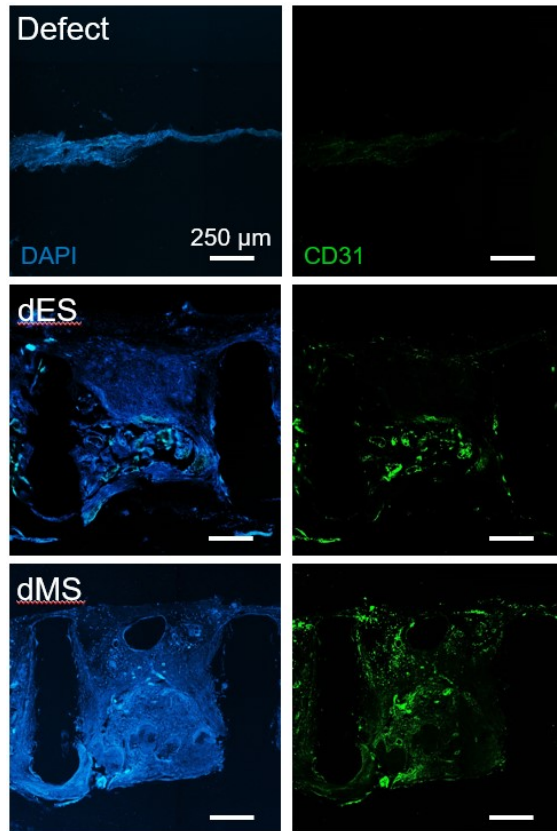
**Supplementary Figure S4.** Additional functions of the decellularized spheroids-laden scaffolds. (A) Total phenol quantification of the decellularized scaffolds by Folin-Ciocalteu assay. (B) The amount of serum binding to the decellularized scaffolds by immersing them to the FBS-contained solution in 37°C, 24 hr, and analyzed indirectly by measuring the remained serum in the solution through micro-BCA assay.



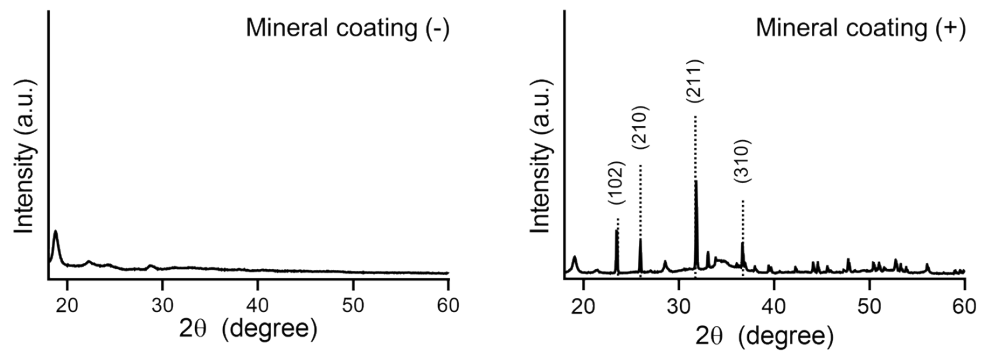
**Supplementary Figure S5.** Additional *in vitro* osteogenic effect analysis of the decellularized scaffold. (A) Released amount of BMP-2 from the hADSCs seeded on the decellularized scaffolds. (B) RT-qPCR of the osteogenic gene markers through day 7 (left) and 14 (right).



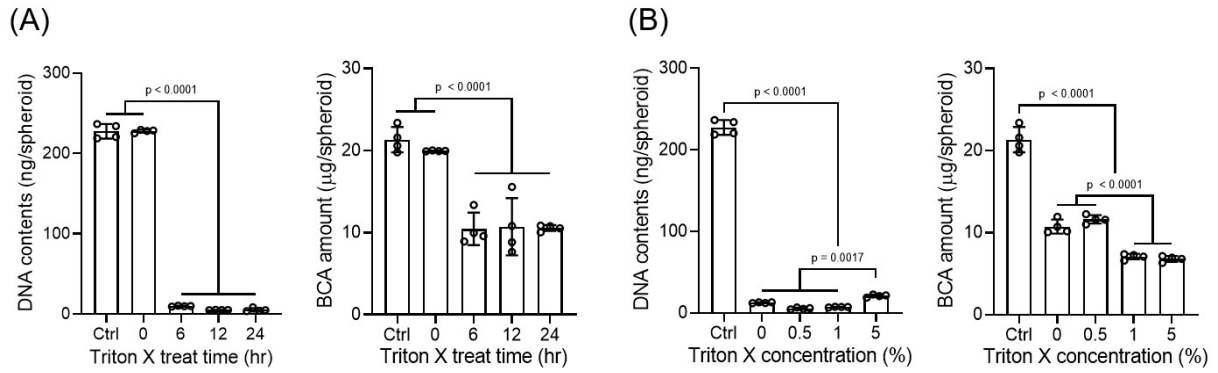
**Supplementary Figure S6.** (A) Magnified images of the Goldner's trichrome staining of the groups. (B) Analysis of newly regenerated trabecular number of the groups from Micro-CT analysis.



**Supplementary Figure S7.** IF staining images for CD31 of the groups with vertically sectioned samples.

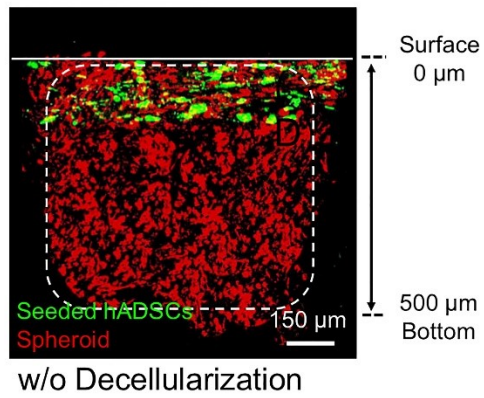


**Supplementary Figure S8.** XRD analysis of the non-mineral coated fibers and mineral coated fibers.



**Supplementary Figure S9.** Optimization of decellularization condition for the engineered spheroids. (A) DNA assay and BCA assay of the decellularized spheroids with different Triton X-100 treat times. (B) DNA assay and BCA assay of the decellularized spheroids with different Triton X-100 concentrations.

Cell seeding on the surface



**Supplementary Figure S10.** The vertically sectioned images of cell seeded on the non-decellularized scaffolds; spheroid or decellularized spheroid (Red), newly seeded cells (Green).