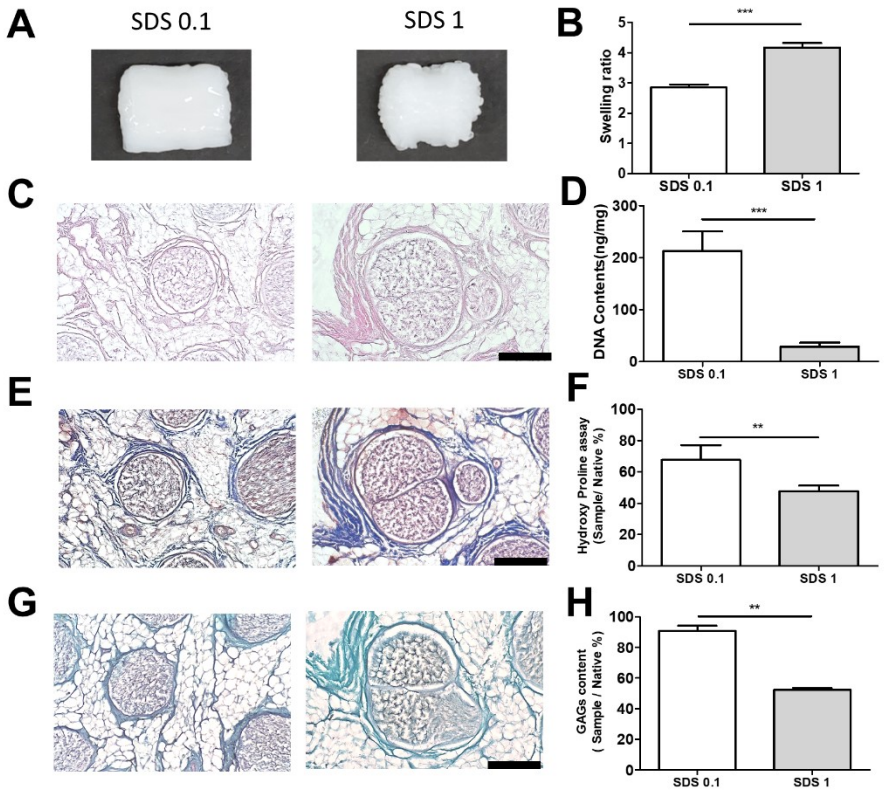
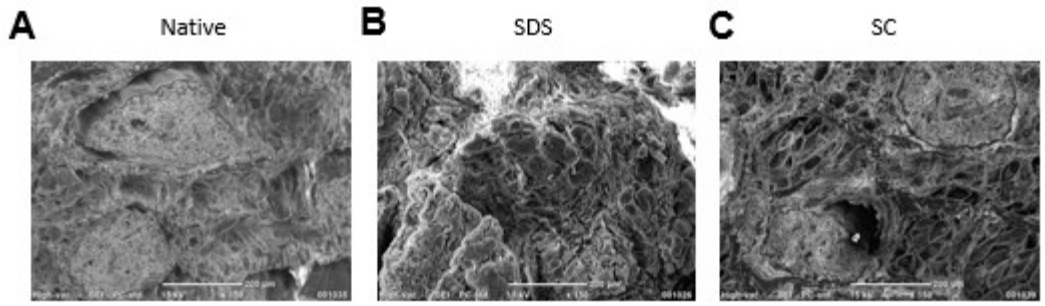
	Native	SDS 0.5	SC	unit
DNA	637±43.36	13±1.33	22±3.30	ng/mg
sGAG	100	68.33±6.03	82.09±8.11	%
Hydroxy proline	100	52.21±3.32	67.39 ±4.23	%
Functional protein number	1098±125.12	103±22.38	345±48.23	ea
Young's modulus (extens)	59.1±7.3	42±3.5	57±5.3	Mpa
Critical strength	4.3±1.15	3.64±0.89	4.13±0.46	N
PC12 differentiation ratio (21 days)	84±11.28	43± 3.36	74±18.35	㎛
Immune cell reaction (early phase : 1week)	103.36 ±5.28	48.29± 3.36	31.65±8.12	%
	No graft (control)	**SDS 0.5**	**SC**	**unit**
Muscle rehabilitation(weight)	16.36± 4.88	25.33±1.32	31.11±4.33	%
Nerve regeneration (in vivo)	11.01±2.11	16.26±4.44	24.92±4.13	%
Myelin sheath formation	2.86±1.16	1.47±0.03	7.49±1.03	㎛

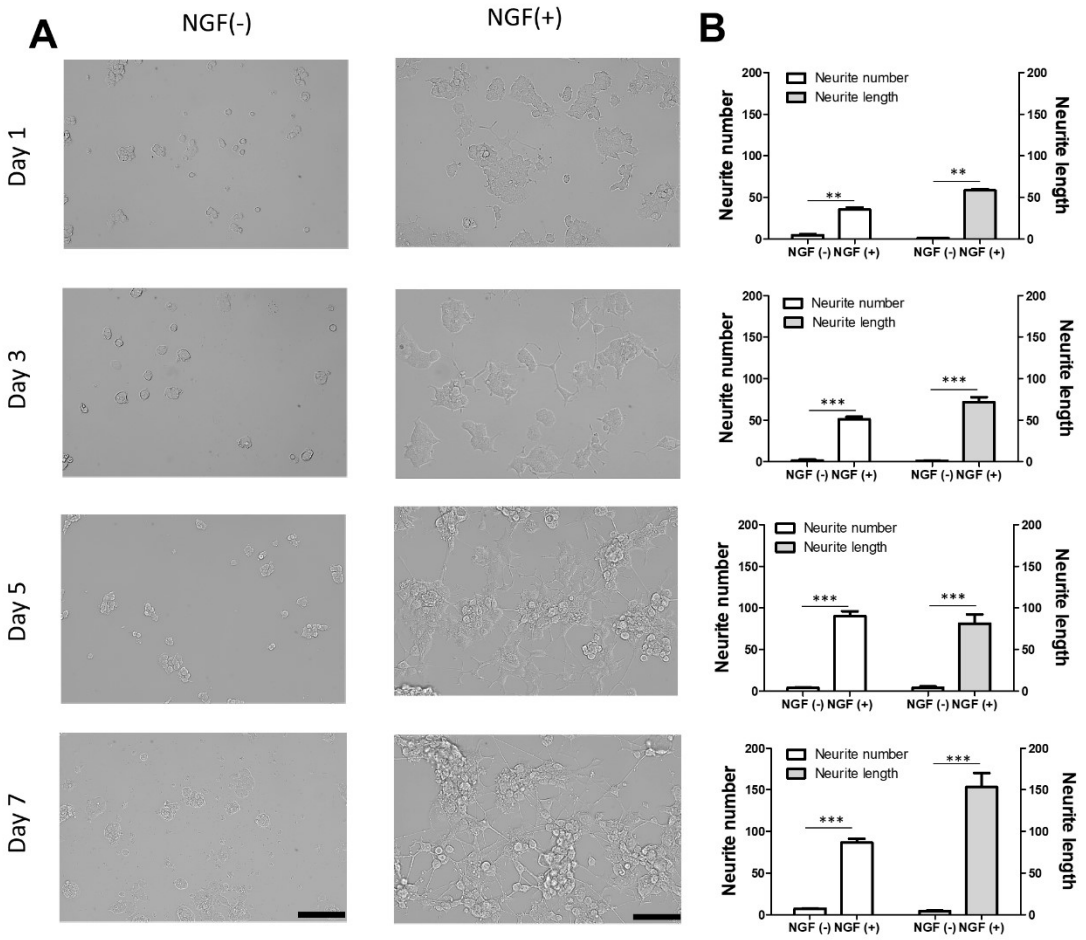
Supplementary table 1. Comparation of quantitative difference among scaffold characterization data and in vitro, in vivo compatibility



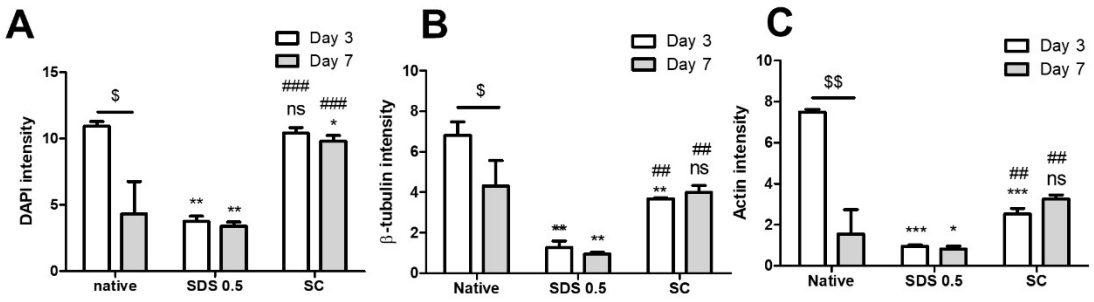
Supplementary Figure 1. Polymeric composition analysis and contents measurements of decellularized tissues processed with various decellularization methods. (A) Representative images decellularized nerve tissues (SDS 0.1 %, 1 % w/v). (B) Swelling ratios of decellularized nerve tissues (SDS 0.1 %, 1 % w/v). (C) Hematoxylin and eosin staining of decellularized nerve tissues (SDS 0.1 %, 1 % w/v). (D) DNA contents of native and decellularized tissues (E) MTC staining decellularized nerve tissues (SDS 0.1 %, 1 % w/v). (F) Hydroxyproline contents of decellularized nerve tissues (SDS 0.1 %, 1% w/v). (G)Safranin-O staining of decellularized nerve tissues (SDS 0.1 %, 1 % w/v) (H) Sulfated gag contents decellularized nerve tissues (SDS 0.1 %, 1 % w/v). (scale bar = 50 ㎛)



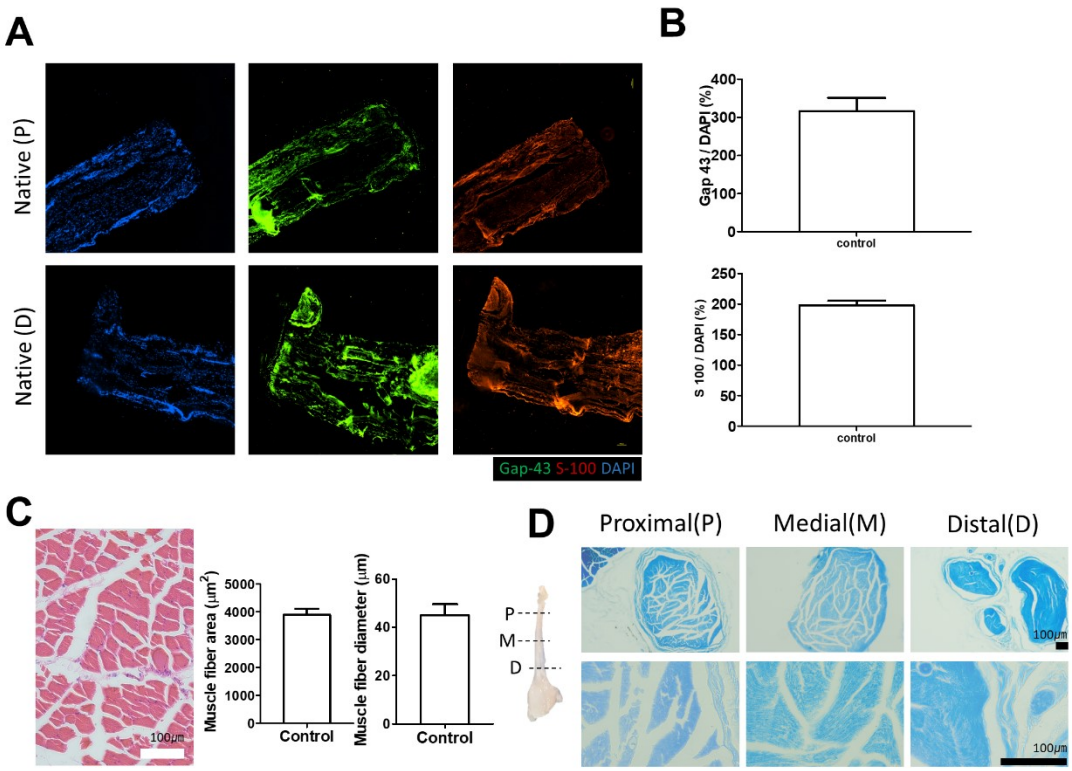
Supplementary Figure 2. SEM image of native tissues and decellularized tissues (A) SEM image of native tissues (B) SEM image of decellularized tissue with SDS chemical. (C) SEM image of decellularized tissue with supercritical fluids.



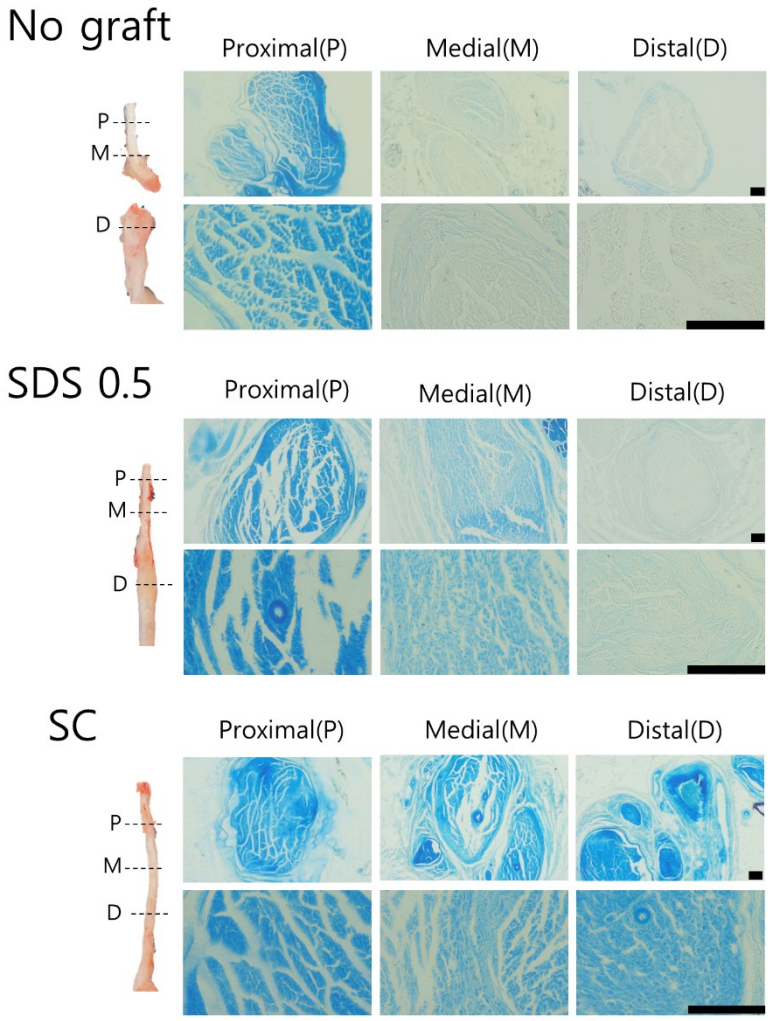
Supplementary Figure 3. PC12 differentiation data cultured on well plates with NGF. (A) Representative images of differentiated and non-differentiated PC12 cells. (B)Neurite number and length of PC12 cells. (scale bar = 100㎛)



Supplementary Figure 4. Fluorescence data of PC12 cells cultured for 3,7 days on nerve tissue slices (A) DAPI fluorescence intensity of each experimental group. (B) Class III β-tubulin fluorescence intensity of each experimental group. (C) Actin fluorescence intensity of each experimental group.



Supplementary Figure 5. Quantitative data of native tissues. (A) Gap-43, S-100 staining of native tissues (P: proximal , D: distal) (B) Characterization of Gap-43, S-100 signals of native tissues. (C) Muscle fiber diameter and area of native muscle tissue. (D) Luxol fast blue staining of native sciatic nerve tissues.



Supplementary figure 6. Luxol fast blue staining of cross sectioned regenerated nerves after 8 weeks. (A) Luxol blue staining of regenerated nerves (no material implant / proximal, medial, distal areas) (B) Luxol blue staining of regenerated nerves (SDS 0.5 % decellularized ECM implant / proximal, medial, distal areas) (C) Luxol blue staining of regenerated nerves (SC decellularized ECM implant/ proximal, medial, distal areas). (scale bar = 50 ㎛).