

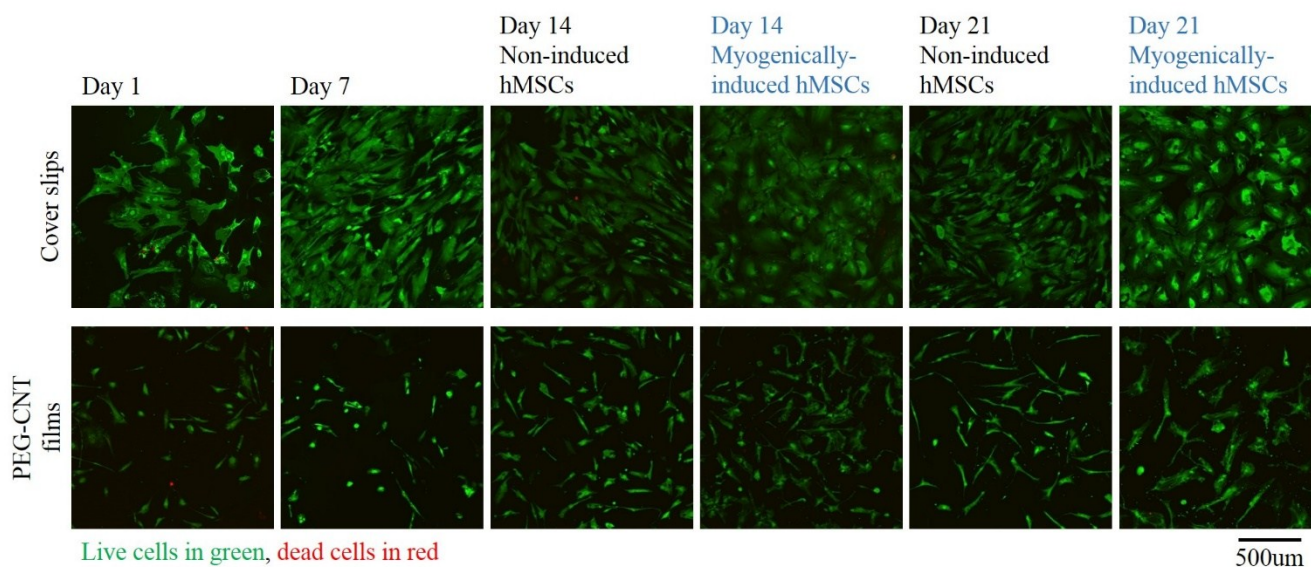
## Supplementary Data:

### 1. Live/dead staining

#### Method:

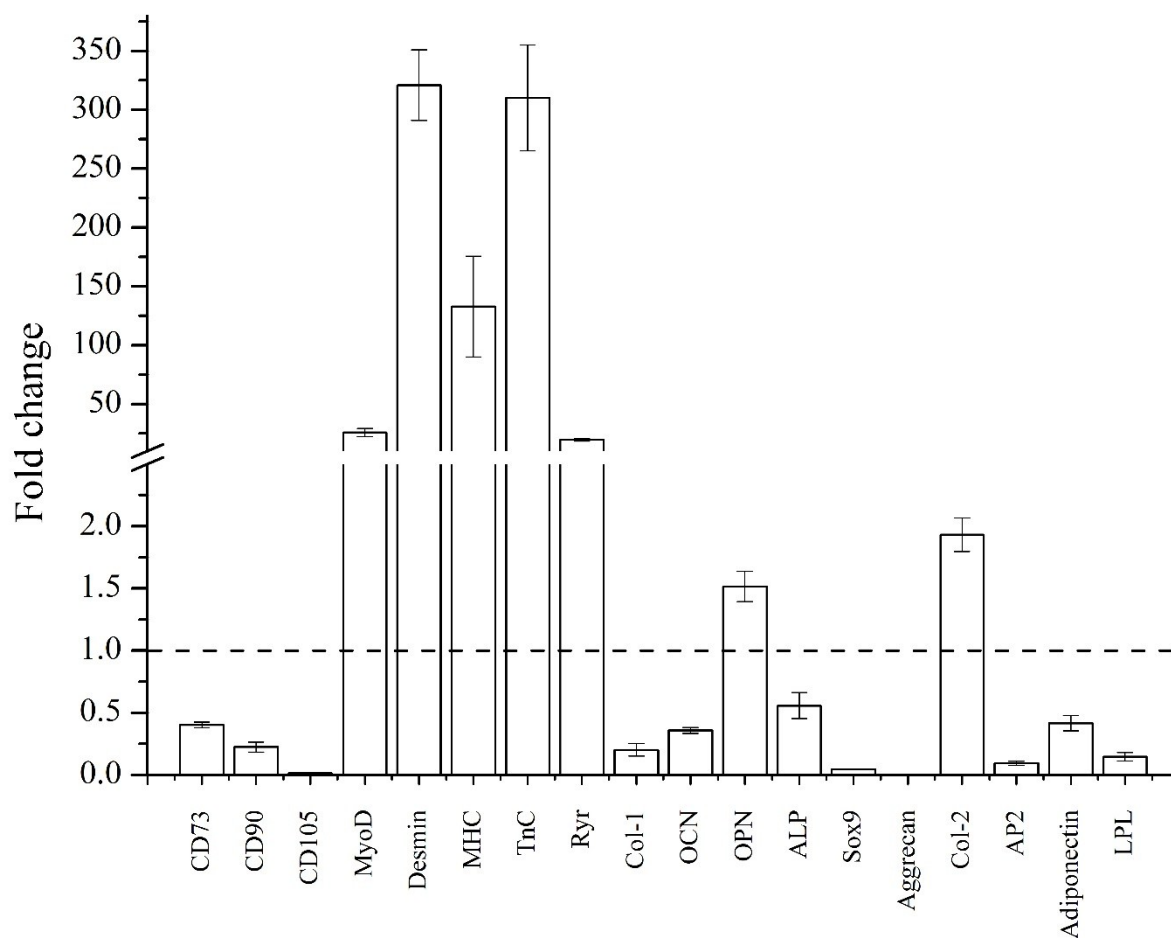
The cell viability at day 1, 7, 14 and 21 was determined by a fluorescent live/dead viability/cytotoxicity kit (Invitrogen, USA) according to the manufacturer's instruction. Briefly, 2  $\mu$ M calcein-AM and 4  $\mu$ M EthD-1 were added into the hMSC samples after washing with PBS at each time point. The samples were incubated in dark at 37 °C for 45 minutes and then examined by a confocal microscope (Olympus, Japan).

#### Result:

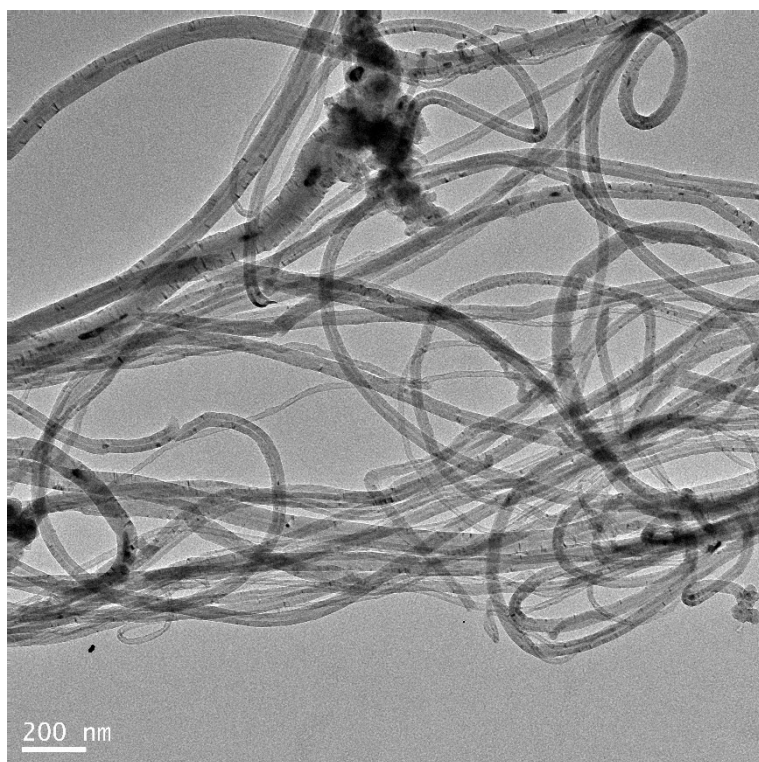


Supplementary Fig. S1. Live and dead staining of hMSCs (induced to myogenic differentiation or not) on cover slips and PEG-CNT films during 21 days incubation.

Human skeletal muscle cells (SKMCs, Lonza, Switzerland) were seeded at 3500 cells/cm<sup>2</sup> in SKGM Bullet Kit (Lonza, Switzerland). SKMCs were maintained at 37°C, 5% CO<sub>2</sub> air atmosphere and medium was replaced twice per week. Sub-culturing was conducted when cells reached 80-90% confluence with 0.25% trypsin-EDTA (Invitrogen, USA).



Supplementary Fig. S2. Fold change of hMSC-feature, myogenic, SKMC-specific, osteogenic, chondrogenic and adipogenic genes in SKMCs with  $2^{-\Delta\Delta CT}$ . Each gene was related to GAPDH and normalized to the negative control of non-induced hMSCs on cover slips, n=5.



Supplementary Fig. S3. A representative TEM image of pristine CNTs.

Supplementary Table S1

*P*-value from two-way ANOVA of fold change for two variables of substrate and induction

	variables		
Genes	Substrate	Induction	Substrate*Induction
CD73	0.312	$2.308 \times 10^{-8*}$	0.002*
CD90	0.043*	$2.120 \times 10^{-4*}$	0.937
CD105	0.314	$1.233 \times 10^{-6*}$	0.373
MyoD	$2.980 \times 10^{-8*}$	0.167	$4.530 \times 10^{-4*}$
Desmin	$3.615 \times 10^{-6*}$	0.503	0.949
MHC	$9.919 \times 10^{-7*}$	0.502	0.994
TnC	$3.279 \times 10^{-8*}$	0.259	0.024*
Ryr	$9.118 \times 10^{-5*}$	0.092	0.413
Col-I	0.006*	0.096	0.609
OCN	0.807	0.088	0.001*
OPN	$5.995 \times 10^{-8*}$	0.023*	0.276
ALP	0.004*	$2.069 \times 10^{-5*}$	0.056
Sox9	$1.086 \times 10^{-9*}$	$1.595 \times 10^{-14*}$	$1.086 \times 10^{-9*}$
Aggrecan	0.005*	0.113	0.002*
Col-II	0.302	0.911	0.361
AP2	0.002*	$5.549 \times 10^{-7*}$	0.734
Adiponectin	0.090	0.495	0.225
LPL	$4.712 \times 10^{-10*}$	$1.387 \times 10^{-12*}$	$5.022 \times 10^{-10*}$

\*indicated significant difference if  $P < 0.05$