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Supporting information

Selective capture of mesenchymal stem cells over fibroblasts and immune cells on the E7-modified collagen substrates under flow circumstances

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1. The changes in frequency of the E7-modified collagen substrates traced by QCM.

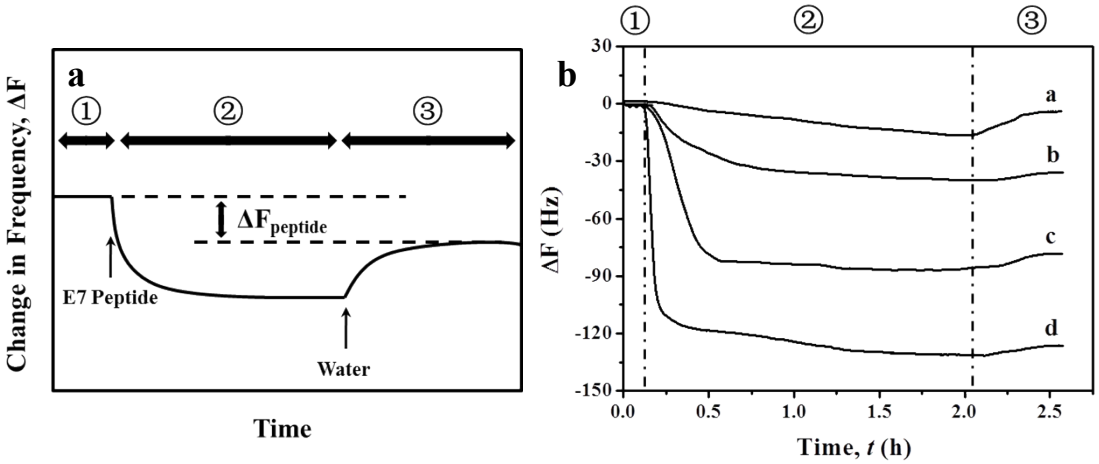

Figure S1. (a) Schematic representation (not to scale) and (b) actual experimental data showing the measured change in frequency in of a QCM experiment. The sensors were spin-coated with collagen and conjugated with sulfo-SMCC, then washed twice with conjugation buffer (pH 7.0). For QCM-D experiment, water was first injected into the chambers to get a baseline. Then the resonance frequency continuously went down and then reached a platform after injecting the E7 peptide solution for 1.5h. When the reaction was finished, the sensors were washed with water until a horizontal line was

observed. The difference between the original state and the final state ($\Delta F_{peptide}$) represents the immobilized mass on the surface. Details of the measurements are described in the "Characterization of the E7-modified collagen substrates" section of the text.

2. The collagen substrates modified with FITC labeled E7 peptide using different concentration of Sulfo-SMCC.

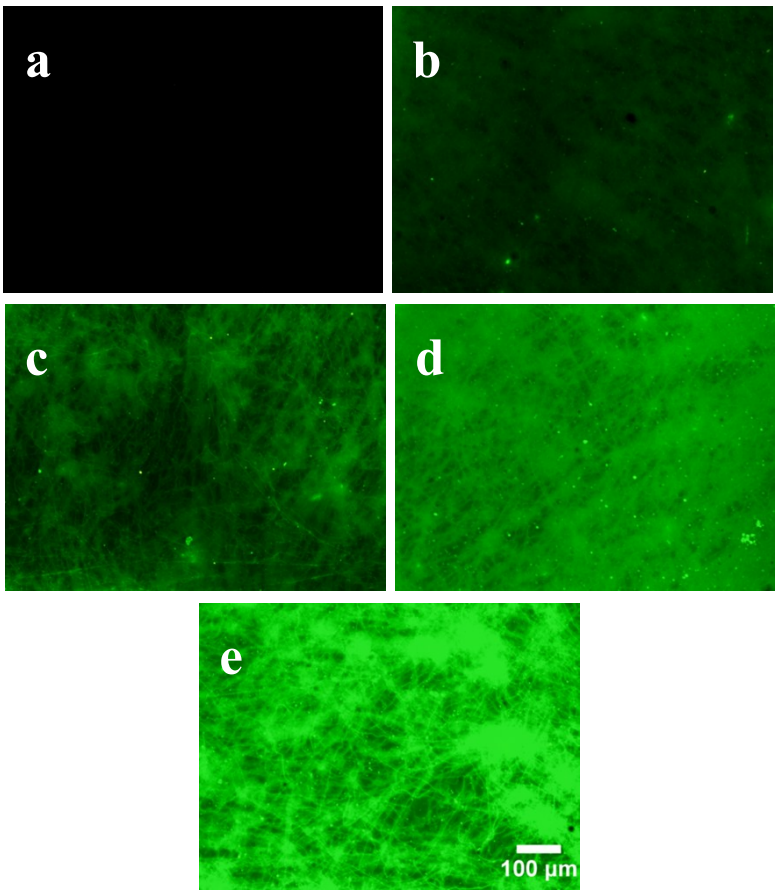

Figure S2. (a) Col, pure collagen substrates. (b) Col/E7, E7 peptide was physically adsorbed on collagen substrates. (c) CP1, 0.5mg/mL (d) CP2, 1mg/mL (e) CP3, 2mg/mL.

3. The compositions of collagen I

Table S1. The compositions of collagen I analyzed by an amino acid analyzer.

Compositions	Mass percent (%)	The amounts of the amino residues per 100 amino acid	
		experimental results	Literature reference
ASP	6.72	5.4	4.8
THR	2.05	1.9	1.5
SER	3.28	3.4	3.4
GLU	12.57	9.3	7.4
GLY	25.57	36.9	33.5
ALA	10.14	12.3	10.7
CYS	0.62	0.28	—
VAL	2.76	2.6	2.2
MET	0.92	0.67	—
ILE	1.61	1.3	1.2
LEU	3.54	2.9	2.7
TYR	0.56	0.33	0.4
PHE	2.37	1.6	1.3
LYS	3.89	2.9	2.5
HIS	0.68	0.47	0.5
ARG	8.15	5.1	5
PRO	13.56	12.8	12.4

4. Influence of FBS

The effect of fetal bovine serum (FBS) on E7 peptides function was investigated (Figure S3). As shown in the figure, the adhesion rates of BMSCs increased for both Col and CP3 when FBS was added. This phenomenon indicated BMSCs would be in a better culture condition in the presence of FBS. Second, it can be found that no matter the absence or presence of FBS, the E7-modified substrates always showed the enhancement on the adhesion of BMSCs. Therefore, the conjugated E7 peptides should be the key factor to endow MSCs selectivity to the collagen substrate, although the influence on protein absorption of E7 peptides might also exist.

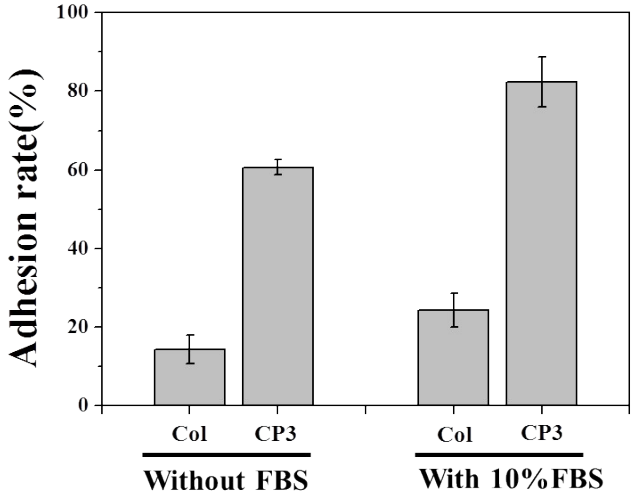

Figure S3. The adhesion rates of BMSCs cultured on Col and CP3 for 4h with/ without FBS. MSCs density was 1.5×10^4 cells per well.