

Nanohybrids via polycation-based nanoemulsion method for dual-mode detection of human mesenchymal stem cells

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ESI 1. Chemical constitution of PMNs

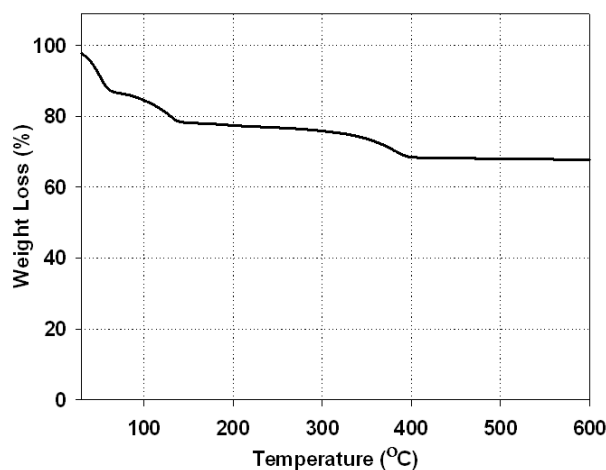


Figure S1. Thermogravimetric curve of PMNs.

Mass ratio of PEI to MNCs in PMNs was determined to be 2.57 using a thermogravimetric analyzer (Figure S1). Using the average density and volume of a PMN particle confirmed by laser scattering,¹⁻³ the amount PEI associated with MNCs was 1.09×10^{-6} ng.

ESI 2. Chemical quantification of FITC in FPMNs

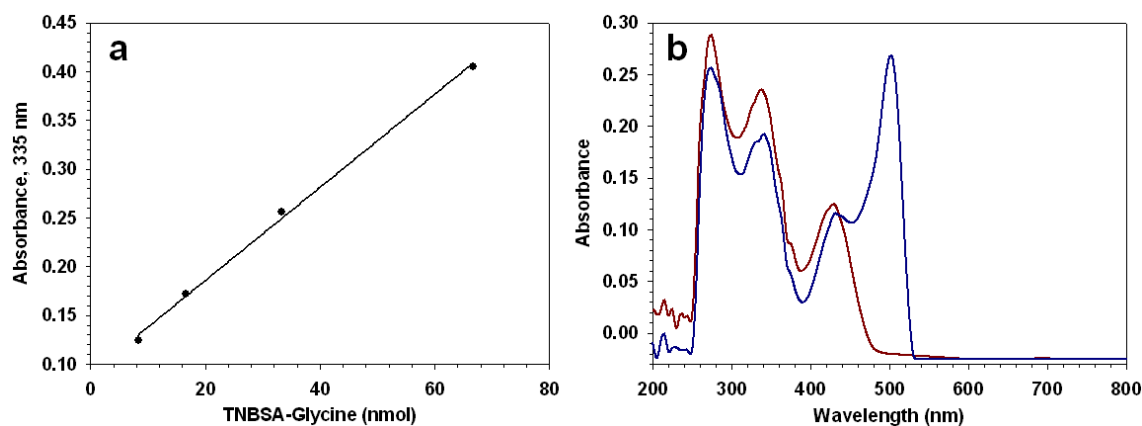


Figure S2. (a) Standard curve of TNBSA reacted with glycine. (b) UV-Vis absorption spectrum of PMNs (brown line) and FPMNs (blue line) reacted with TNBSA.

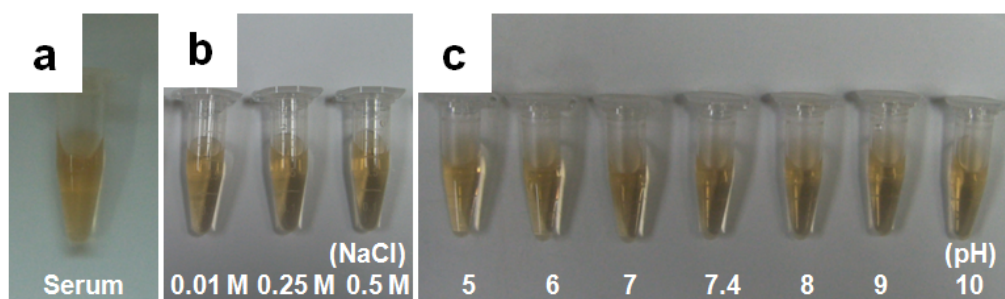
Table S1. Chemical quantification of amines in PMNs and FPMNs (13 mg/mL).

	Absorbance at 335 nm	Numbers of amines (molecules)
PMNs	0.234	1.80×10^{16}
FPMNs	0.186	1.20×10^{16}

The number of FITC molecules associated in FPMNs were accounted by measuring the number of primary amines on the surface of PMNs and FPMNs using a Hermanson's method.⁴ Because 2,4,6-trinitrobenzene sulfonic acid (TNBSA) is a rapid and sensitive assay reagent for the determination of free amino groups, primary amines form a highly chromogenic derivative, which can be measured at 335 nm.⁵

For quantification of primary amine of PMNs and FPMNs, above all, calibration curve ($y = 0.0048x + 0.0901$; x: mole of TNBSA reacted with glycine, y: absorbance at 335 nm) was obtained by using glycine as standard reagent (Figure S2a). Then, we calculated the numbers of FITC molecules in FPMN by comparison of number of primary amines between PMNs and FPMNs. Therefore, the number of FITC on the surface of FPMN was 6.0×10^{15} molecules (Figure S2b and Table S1).

ESI 3. Colloidal stability studies of FPMNs



S3. Colloidal stability of FPMNs in (a) serum, (b) NaCl solution and (c) against various pH ranges.

FPMNs maintained stable conditions in serum (Fetal Bovine Serum, Gibco) for their potential *in vivo* stability. FPMNs also exhibited stable conditions over the saline concentration of NaCl (0.15 M) and against various pH conditions (Figure S3).

References

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