Supplementary Materials

Folic acid-functionalized magnetic nanoprobes via PAMAM dendrimers/SA-biotin mediated cascade amplifying system for efficient enrichment of circulating tumor cells

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Hengyi Xu, e-mail address: HengyiXu@ncu.edu.cn
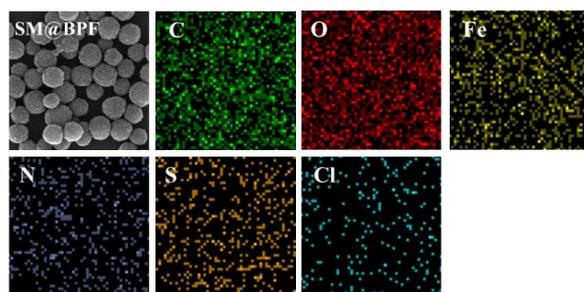
Zhifei Wang, e-mail address: zfwang@seu.edu.cn

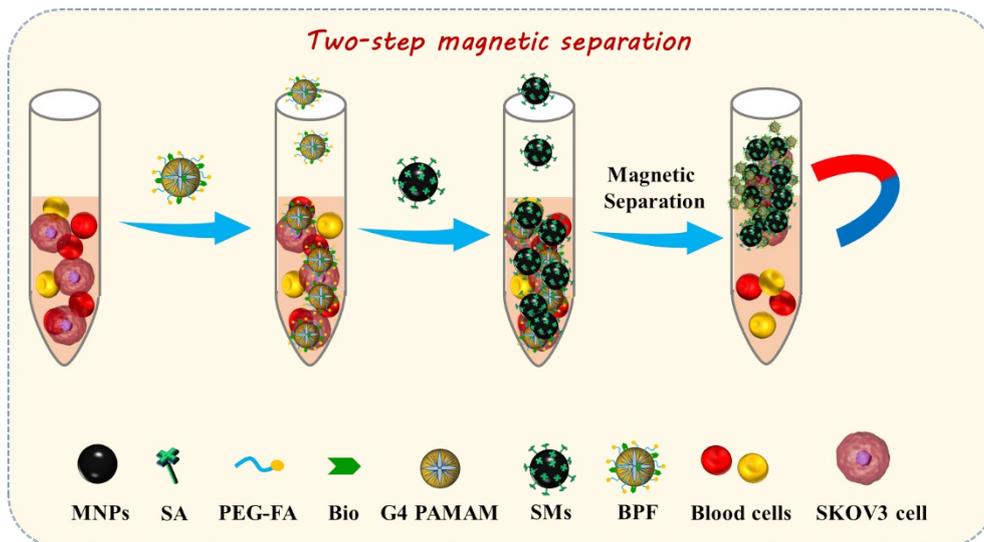**Fig. S1.** The relative element mapping of SM@BPF by SEM analysis.

Fig. S2. The preparation process of SMs and BPF, and the schematic diagram for CTCs separating in blood via two-step binding strategy.
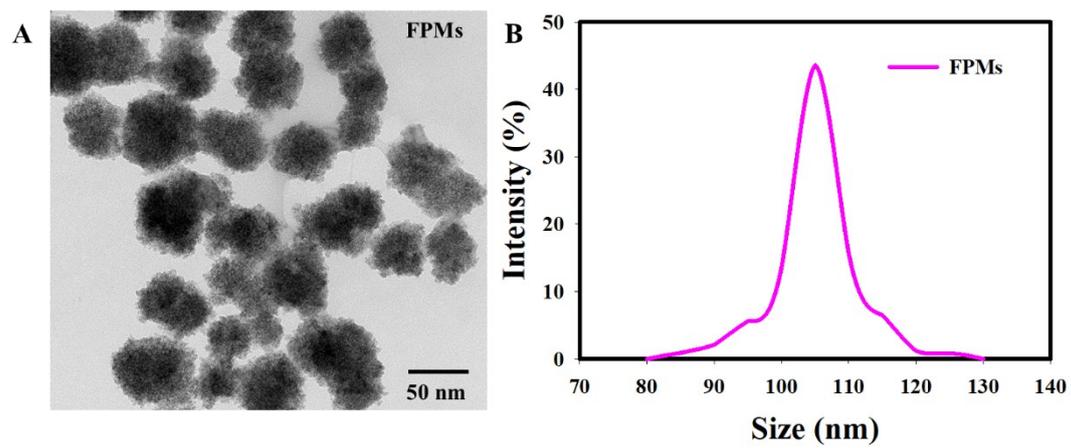
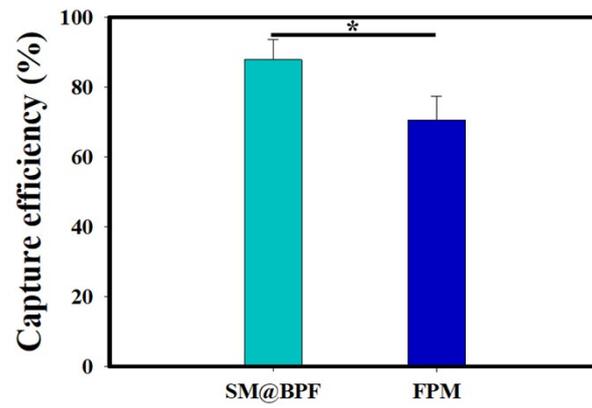**Fig. S3.** TEM image (A) and hydrodynamic size (B) of FPMs.

Fig. S4. Capture efficiency of SKOV3 by SM@BPF and FA-PAMAM-MNPs (FPM).
*** $p < 0.001$, ** $p < 0.01$, or * $p < 0.05$. Error bars indicate standard deviation (n = 3).

Table S1 Comparison of the current magnetic separation technique for CTC enrichment and detection.

Nanoplatform	Probe	Sample	Capture efficiency	Cell viability	Cancer cells	Detection method	Ref.
Ab-silane-coated MNPs	anti-HER2 antibody	Whole blood	84%	/	SK-BR-3 cells	/	[1]
MNPs-Ab	anti-MCSP antibody	PBS	70.2%	/	LM-MEL-33 cells	colorimetric detection	[2]
Ab@Lipo-MNP-GO	anti-EpCAM antibody	Whole blood	~68%	viable	HCT-116 cells	Immunafluores-cence staining	[3]
Tf-PEG-b-AGE coated IONPs	Transferrin (Tf)	Whole blood	$58.7 \pm 6.4\%$	89%	D556 Medullobla-stoma cells	/	[4]
UCNP–Apt–Biotin and IONPs–Av	Aptamer	PBS	80%-90%	/	CCRF-CEM cells	CCK4-based ICC	[5]
Apt-MBs	aptamer	Whole blood	55 %	/	DLD-1 cells	SERS imaging	[6]
Fe$_3$O$_4$@HA capsules	FA and anti-EpCAM antibody	Whole blood	88%	viable	MCF-7 cells	three-color ICC	[7]
MNPs-FA	FA	Whole blood	61.3%	viable	SKOV3 cells	HE4-based ICC	[8]
FA-BSA-MNP	FA	Whole blood	61.3%	92.7%	SKOV3 cells	HE4-based ICC	[9]
MNPs-SA and biotin-BSA-FA	FA	Whole blood	80%	viable	SKOV3 cells	HE4-based ICC	[10]
SM@BPF	FA	Whole blood	79.6%	93.2%	SKOV3 cells	HE4-based ICC	This study

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Table S2 Numbers of identified CTCs from ovarian patients and normal female blood samples.

Sample (No.)	Sample volume (mL)	Numbers of identifed CTC
1	1.0	7
2	1.0	3
3	1.0	11
4	1.1	5
5	1.0	2
6	1.0	6
7	1.1	4
8	1.0	2
9	1.0	3
10-20	1.0	0

No: number.