

Supporting information for

**Magnetic beads-based AuNPs labelling combined with inductively coupled
plasma mass spectrometry for sensitively and specifically counting cancer cells**

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Table S1: Running Parameters of ICP-MS

Parameter	Value
RF power	1400 W
Cool gas flow	15 L/min
Auxiliary gas flow	0.90 L/min
Nebulizer gas flow	0.80 L/min
Makeup gas rate	0.20 L/min
Torch	Non-shield torch
Cones	Nickel
Dwell times	10 ms
Resolution	Standard
Analogue detector voltage	2900 V
PC detector voltage	1750 V
Monitored isotope(m/z)	¹⁹⁷ Au
Nebulizer type	MCN (optimum flow is 50 - 200 μL/min)

Table S2: Comparison on the analytical performance among several previous methods and this study.

Assay method	Detection limit	Analysis time	Ref.
Polymerase chain reaction (PCR)-based method	2 mL of blood (1×10^6 cells/mL)	Two days	[1]
Colorimetric method based on platinum nanoparticles	125 cells	Dozens of hours	[2]
Colorimetric aptasensor based on cell-triggered cyclic enzymatic signal amplification	40 cells	Dozens of hours	[3]
Colorimetric method based on gold nanoparticles	200 cells	Several hours	[4]
Aptamer-based electrochemical method	100 cells	Several hours	[5]
Fluorescent aptasensor based on graphene oxide	200 cells	Several hours	[6]
Gold nanoparticles-tag combined with ICP-MS	100 cells	3 hours	This study

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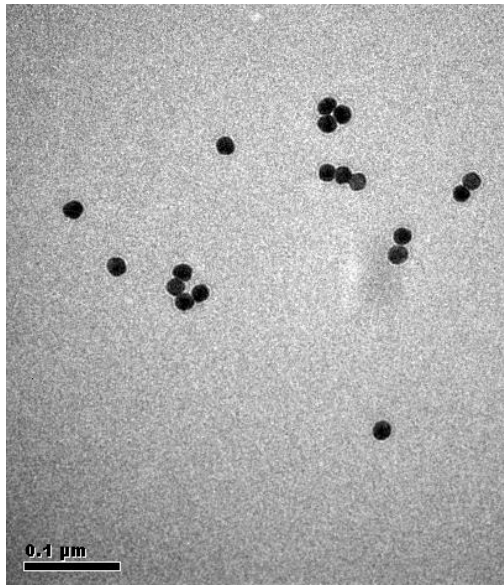


Figure S1: The TEM image of citrate-stabilized AuNPs used in the experiment.

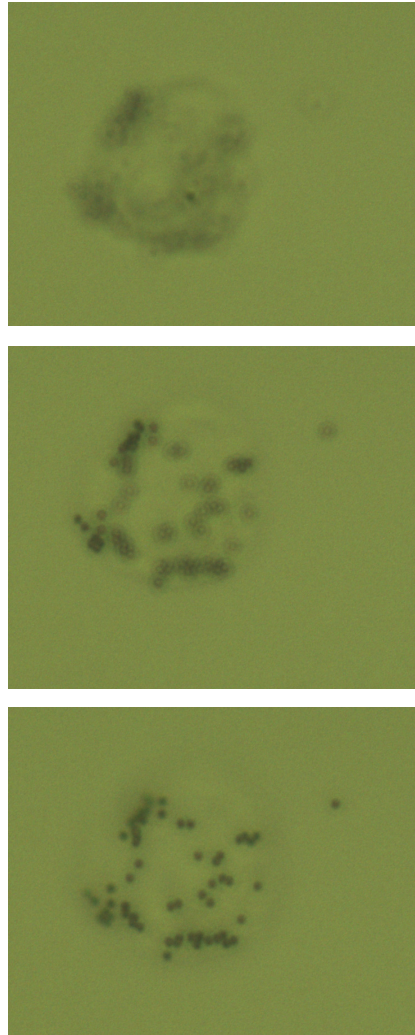


Figure S2: The optical microscope image of a single SMMC-7721 cell, which has interacted with MBs-aptamer-C_p-AuNPs-A_p-AuNPs conjugates, observed in different focal distance.

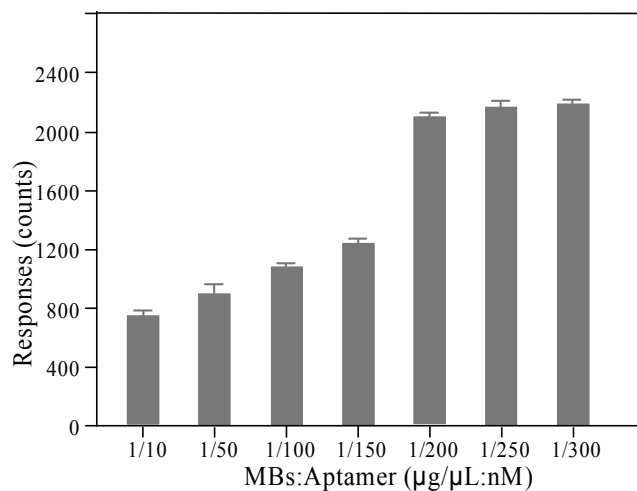


Figure S3: Effect of the ratio of MBs and aptamer DNA (MBs/Aptamer) on the ICP-MS signals. The ratios of MBs to aptamers were 1:10, 1:50, 1:100, 1:150, 1:200, 1:250, 1:300 (μg/μL:nM) respectively, the concentration of SMMC-7721 was 1000 cells/mL.

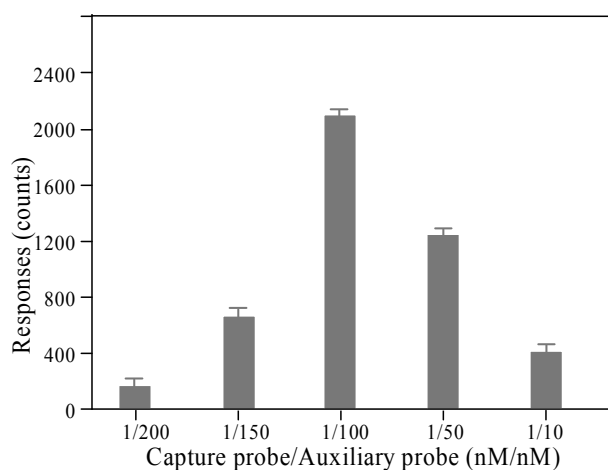


Figure S4: Effect of the ratio of capture probe and auxiliary probe (C_p/A_p) on the ICP-MS signals. The ratios of capture probe and auxiliary probe (C_p/A_p) were 1:10, 1:50, 1:100, 1:150, 1:200 (molar ratio) respectively, the concentration of SMMC-7721 was 1000 cells/mL.