Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Tumor-targeted folate-decorated albumin stabilised silver nanoparticle induce apoptosis at low concentration in human breast cancer cells

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Nanomaterials	Therapeutic and imaging agents	Model system under study	Applications	References
BSA-CAD	Dox, ICG-Der-02	MDA-MB-231, MCF-7, Bel-7402, HELF, Normal (Kunming) mice, Athymic nude mice	Chemotherapy	[30]
BSA-AuNC	Dox, MPA	A549, HepG-2, MDA-MB-231, HTC116, Athymic nude mice and Normal (Kunming) mice	Chemotherapy and NIR fluorescence tumor imaging	[26]
BSA-$MnFe_2O_4$ MNPs	Dox, AgInS2–ZnS QDs	HeLa	Chemotherapy, MRI	[27]
BSA-dextran	Dox, Fe_3O_4	KB, H22 tumor-bearing mice, KB tumor-bearing mice	Chemotherapy, MRI	[28]
BSA	AuNSs	HeLa	PTT	[31]
BSA	Dox, Fe_3O_4	KB, BALB/C nude mice	Chemotherapy combined with hyperthermia	[32]
BSA	BEX	MCF-7, A549	Chemotherapy	[34]
BSA-CM-β-CD	5-FU	SMMC-7721, HeLa	Chemotherapy	[35]
BSA-Alginate-Cysteine	TMX	MCF-7, Athymic nude mice	Chemotherapy	[36]
BSA	Au NC, Au NPs	MGC803	Dual modality imaging	[33]
BSA	CdTe/ ZnS	KB, 293T	Cancer diagnosis	[29]
BSA	Ag NPs	MCF-7, A549	Cancer therapy	Current study

Doxorubicin (Dox), cis-aconitic anhydride (CAD), Gold nanocluster (AuNC), Magnetic nanoparticles (MNPs), Quantum dots (QDs), Gold nanostars (AuNSs), Bexarotene (BEX), Carboxymethyl-β-cyclodextrin (CM-β-CD), Tamoxifen (TMX)

Table S1. Folate conjugated BSA based NPs and its applications

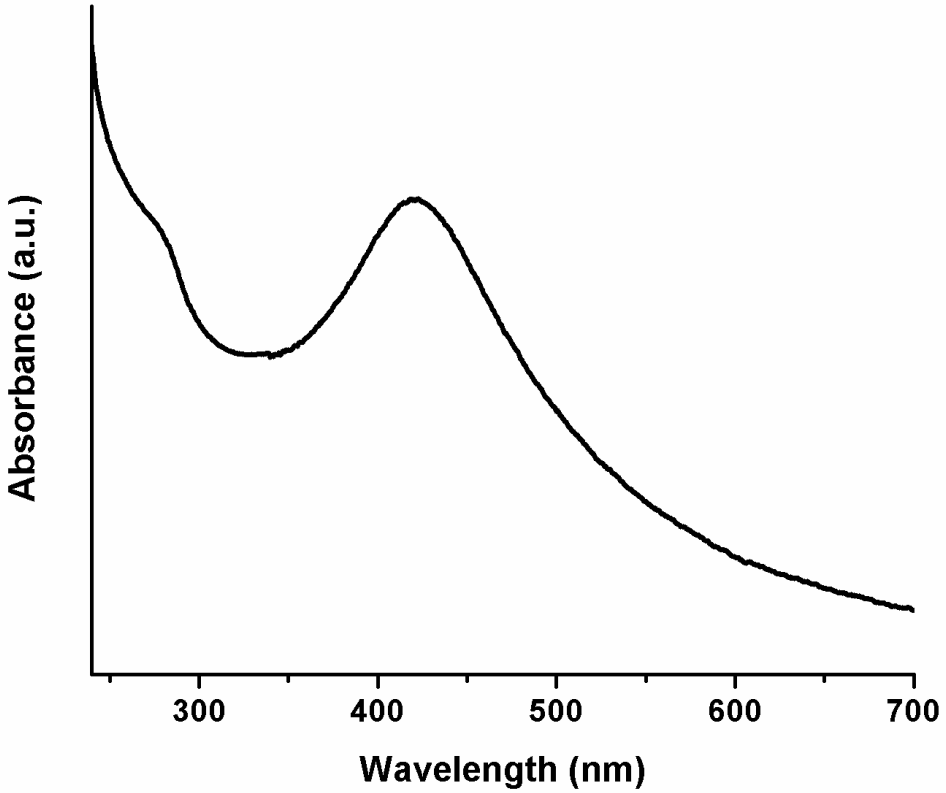

Fig. S1. UV-visible absorption spectra of BSA-Ag NPs.

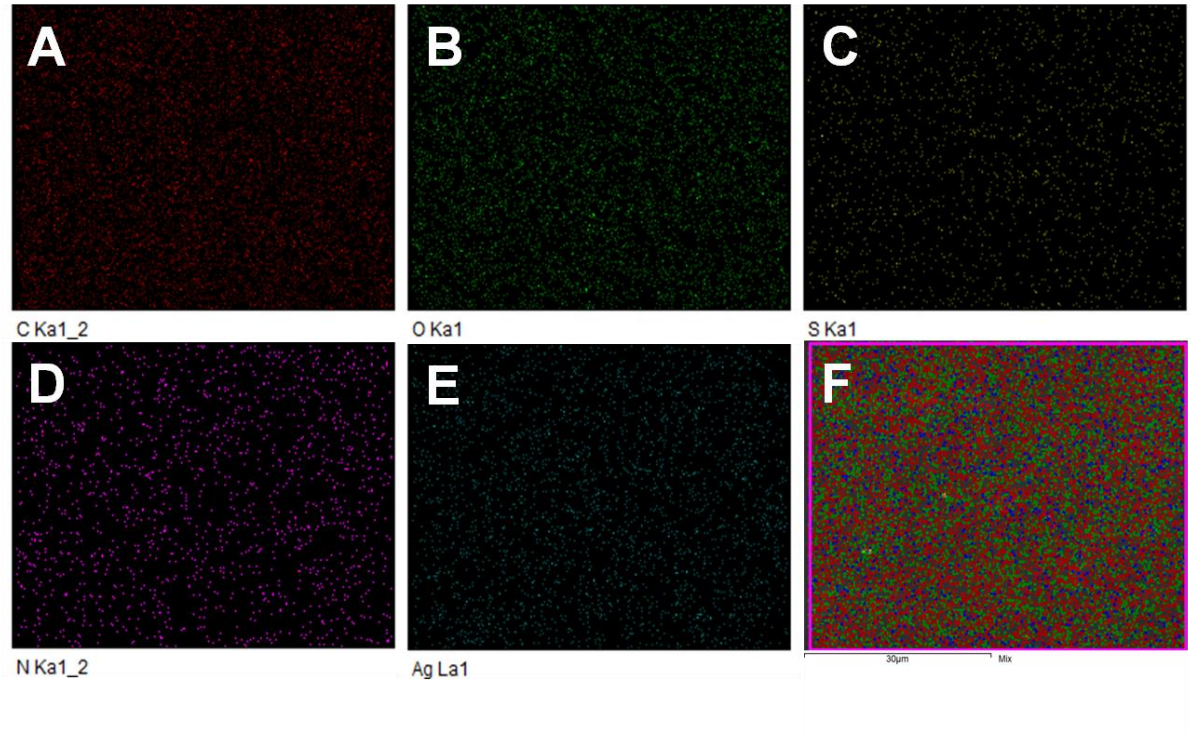

Fig. S2. Color coded SEM/EDX dot maps depicting the individual elemental distribution in FA-BSA-Ag NPs from (A-E) red for carbon, green for oxygen, yellow for sulphur, purple for nitrogen, blue for silver and (F) overlay image.

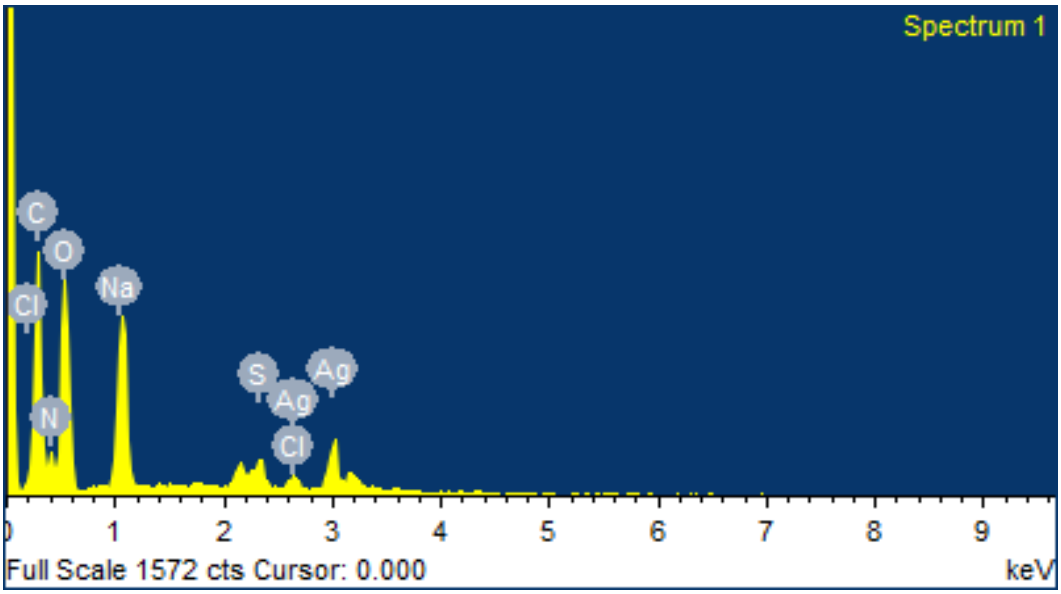

Fig. S3. Energy dispersive spectra of FA-BSA- Ag NPs.

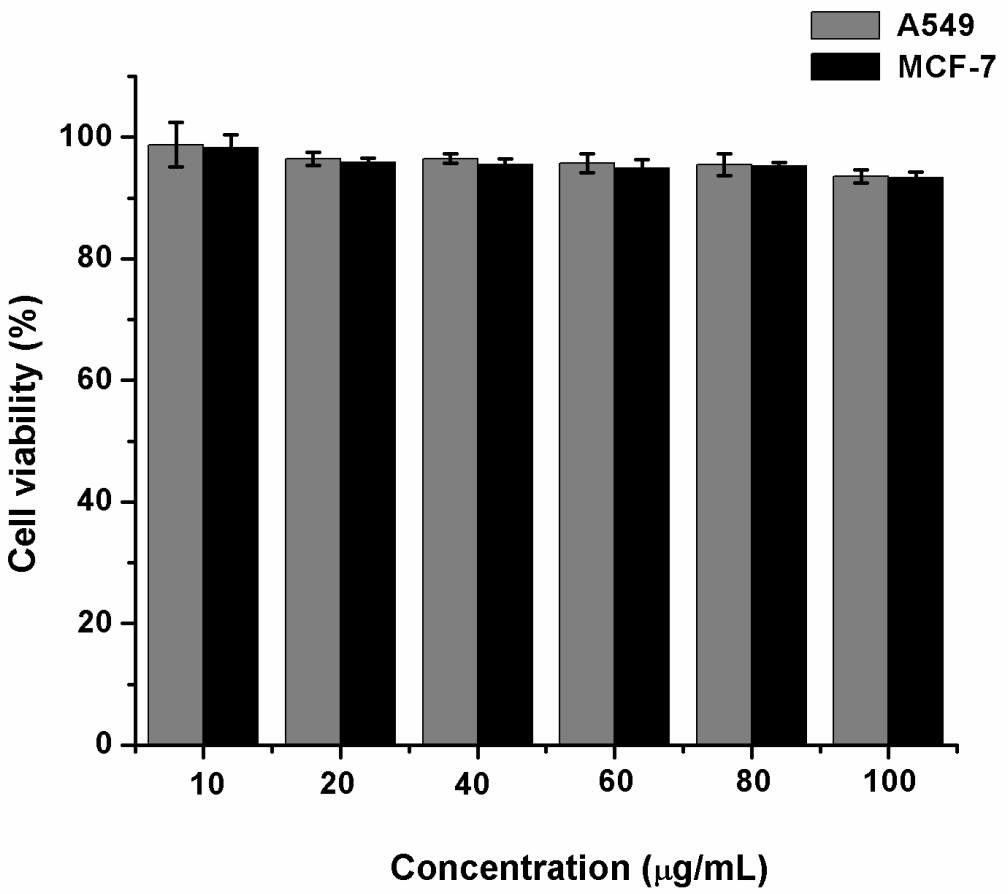

Fig. S4 Cell viability assay (MTT assay) of BSA

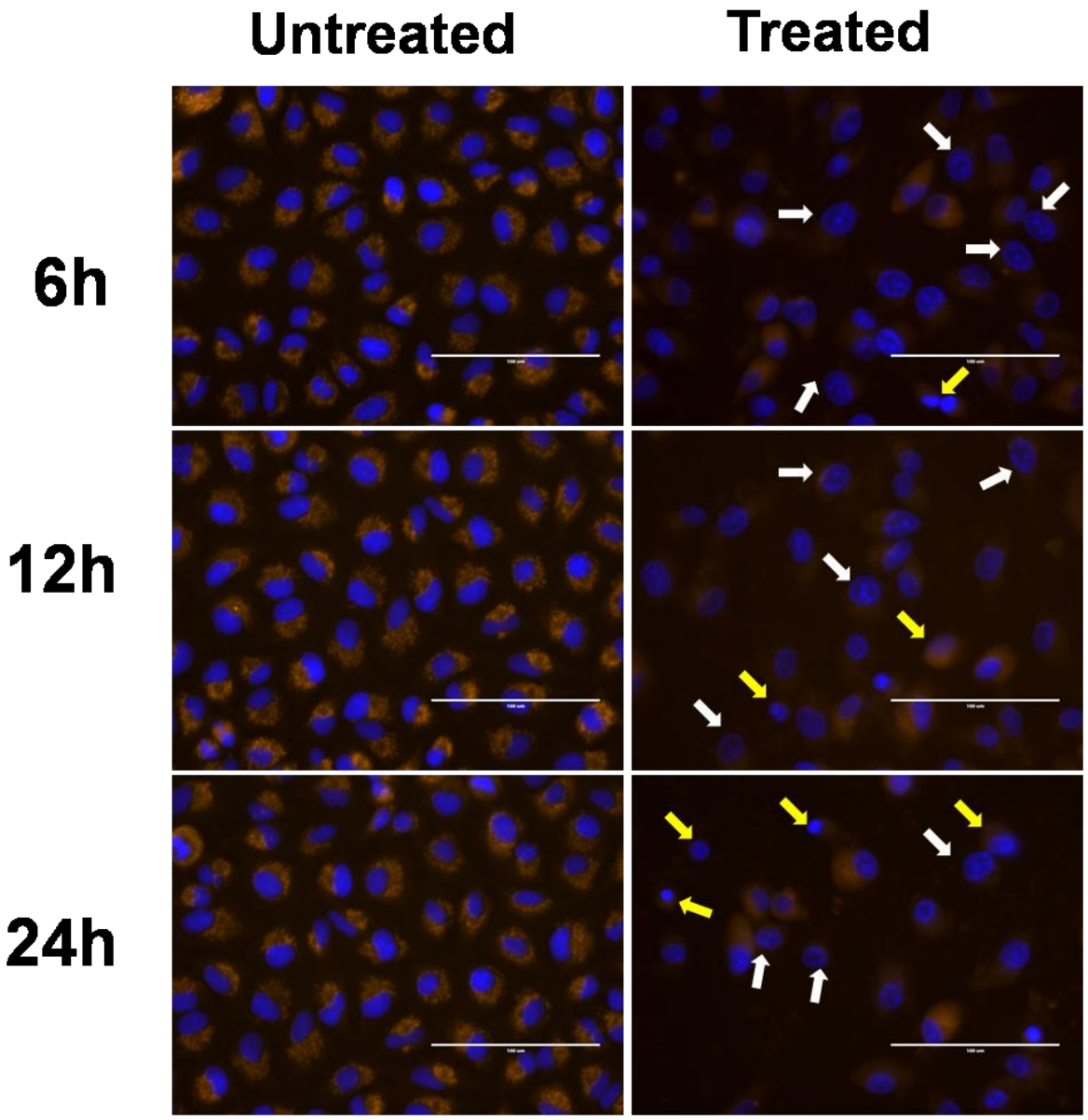

Fig. S5 Time-dependent overlay images of untreated and FA-BSA-Ag NPs (IC_{50}) treated A549 cells stained with Hoechst 33342 (blue) and co-stained with rhodamine B (red). White arrows indicate chromatin condensation (dark spots) and yellow arrows point towards cytoskeleton compaction. Scale bar: 100 μm.

Functional groups	-OH	N-H (amide A)	C=O (amide I)	N-H (amide II)	C-O	N-H (amide III)	C-H	C-H (aromatic)
Wave No. (cm^{-1})	3306.5	2959.57	1655.84	1537.43	1391.66	1242.24	1166.42	613.28
Vibration	-OH stretch	N-H stretch	C=O stretch	N-H bend	C-O stretch	N-H bend	C-H bend	C-H bend

Table S2. Characteristic major absorption bands in the IR spectra of the BSA-Ag NPs.

Functional groups	-OH	-N-H	$-CH_2$	C=O	$-CH_2$	COO-	C-C	C-N	C-O	C-H	C-O
Wave No. (cm^{-1})	3414.54	3325.76	3107.41	1694.33	1484.49	1335.35	1292.2	1236.98	1006.75	757.87	589.89
Vibration	-OH stretch	-N-H	$-CH_2$	C=O stretch	$-CH_2$	COO-	C-C	C-N	C-O stretch	C-H bend	C-O bend

Table S3. Characteristic major absorption bands in the IR spectra of the raw folic acid powder.

Gene	Primers
Beta-actin	Forward: 5’ CTGTCTGGCGGCACCACCAT 3’ Reverse : 5’ GCAACTAAGTCATAGTCCGC 3’
p53	Forward: 5’ TGGCCCCTCCTCAGCATCTTAT 3’ Reverse : 5’ GTTGGGCAGTGCTCGCTTAGTG 3’
Caspase-3	Forward : 5’ TTCAGAGGGGATCGTTGTAGAAGTC 3’ Reverse : 5’ CAAGCTTGTCGGCATACTGTTTCAG 3’
C-myc	Forward : 5’ CCAGGACTGTATGTGGAGCG 3’ Reverse : 5’ CTTGAGGACCAGTGGGCTGT 3’
Bax	Forward : 5’ AAGCTGAGCGAGTGTCTCAAGCGC 3’ Reverse : 5’ TCCCGCCACAAAGATGGTCACG 3’
Bad	Forward : 5’ CCTTTAAGAAGGGACTTCCTCGCC 3’ Reverse : 5’ACTTCCGATGGGACCAAGCCTTCC 3’
Bcl-xl	Forward : 5’ATGGCAGCAGTAAAGCAAGC 3’ Reverse : 5’ CGGAAGAGTTCATTCACTACCTGT 3’

Table S4. List of apoptotic signalling genes primers used in semi-quantitative RT-PCR analysis.