Electronic Supplementary Material (ESI) for Nanoscale.

How can nanotechnology help the fight against breast cancer?

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ELECTRONIC SUPPLEMENTARY INFORMATION

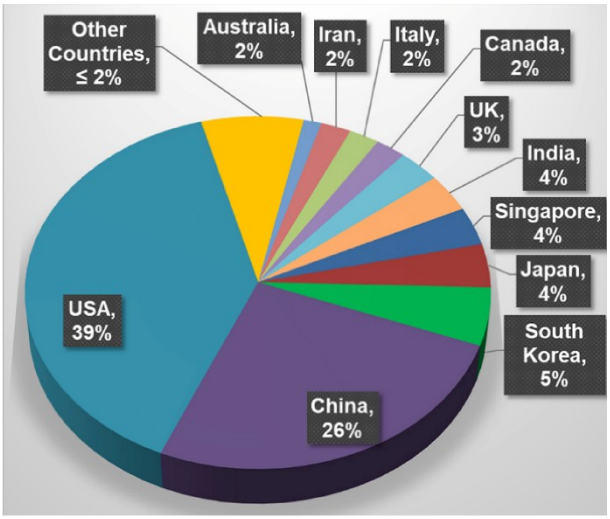
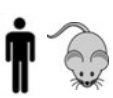


Fig. S1. Percentage of publications carried out on nanomaterials fight against BC per Countries. The piece of the cake in yellow, reported the studies in a percentage of <2 % conducted in other countries such as: New Zealand, Greece, Brazil, Taiwan, Malaysia, Riyadh-Saudi Arabia, The Netherlands, Israel, Germany, France, Georgia, Poland.

Table S1: Drug delivery

Material	Drug	Imaging	Model	Cell type	Ref.*
Poly(lactic-co-lycolic) Acid Nanoparticles	Dextran (T-40)	Fluorescence imaging	In vivo / In vitro (MCF-7 cells)		[42]
Poly(lactic-co-glycolic) Acid Nanoparticles	Doxorubicin	CLSM	In vivo / In vitro (C127I cells)		[22]
Paclitaxel Nanoparticles	Paclitaxel	Fluorescence imaging	In vivo (MCF-7 cells)		[36]
Paclitaxel Nanoparticles	Paclitaxel	CLSM, NIR	In vivo / Intro (MCF-7 cells)		[35]
FeCo/Graphitic Carbon Shell Nanocrystals	Doxorubicin	MRI, NIR	In vitro (MCF-7 cells)		[23]
Superparamagnetic Iron Oxide Nanoparticles	Doxorubicin	CLSM	In vitro (MCF7 cells)		[24]
Liposomes	Doxorubicin	CLSM, Fluorescence imaging	In vivo / In vitro / Ex vivo (MDA-MB-231 cells)		[71]
Mesoporous Silica Nanoparticles	Paclitaxel	CLSM	In vitro (MDA-MB-231, MDA-MB-468)		[38]
Poly(lactic-co-glycolic) Acid Nanoparticles	Curcumin	CLSM	In vitro (MDA-MB-231 cells)		[39]
Mesoporous Silica Nanoparticles	Antibody (Her2-neu Herceptin)	MRI, CLSM	In vitro (SKBR-3 cells)		[28]
DNA Origami	Doxorubicin	Fluorescence imaging	In vivo / Ex vivo (MDA-MB-231 cells)		[21]
Gold Nanorods and Gold Nanoparticles	Docetaxel	CLSM	In vitro (MCF7 and B16F10 cells)		[44]
PLGA-TPGS Nnanoparticles	Docetaxel	CLSM	In vivo / In vitro (MCF-7/TXT cells)		[45]
Iron-Oxide Nanoparticles	Peptides	CLSM	In vivo (MCF10CA1a model)		[8]
Solid Polymer-Lipid Nanoparticles	Ibuprofen, Naproxen	Fluorescence imaging	In vitro / In vivo / Ex vivo (EMT6, MDA-MB-231, DU145 cells)		[9]

* The reference numbers in the table refer to those in the main text.

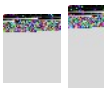
Table S2: Imaging applications

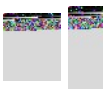
Material	Conjugated molecules	Imaging	Model	Cell type	Ref.*
Poly(lactic-co-glycolic) Acid Nanoparticles	Rhodamine-6G	Fluorescence imaging	In vitro (MDA-MB-231 cells)		[80]
Quantum Dots	Poly(lactide)-Vitamin E TPGS	CLSM	In vitro (MCF-7 cells)		[120]
Superparamagnetic Iron Oxide Nanoparticles	NIR Dye (Cy5.5), Peptides	MRI, NIR	In vivo / In vitro / Ex vivo (BT-20 cells)		[79]
Liposomes	Iodine	CT	In vivo / In vitro (R3230AC cells)		[144]
Gold Nanoparticles	Sodium Dodecyl Sulphate, Polyethylene Glycol	CLSM	In vitro (Hs578T cells)		[121]
Hollow Gold Nanospheres	Dihydrolipoic Acid, Raman Reporter, Anti-rabbit IgG	SERS, Fluorescence imaging	In vitro (MCF-7 cells)		[81]
Superparamagnetic Iron Oxide Nanoparticles	Luteinizing Hormone Releasing Hormone	iMQC	In vivo / In vitrio (MDA-MB-435, PC-3 cells)		[164]
Magnetic Nanoparticles and Golden Carbon Nanotubes	Amino-Terminal Fragment of the Urokinase Plasminogen Activator, Polyethylene Glycol, Folic Acid	Fluorescence imaging	In vivo / In vitro (MDA-MB-231 cells)		[82]
Magnetic Nanoparticles	Urokinase Plasminogen Activator, NIR Dye (Cy5.5)	MRI, NIR, Fluorescence imaging	In vivo / In vitro (4T1, T47D cells)		[83]
Quantum Dots	Antibody (AVE-1642), Small molecule, Fluorophore (Alexa 680)	CLSM, Fuorescence imaging	In vivo / In vitro (MCF-7 cells)		[122]
Gold Nanorods	14-Amino Acid Peptide Bombesin	Fluorescence imaging	In vitro (PC-3, T-47D cells)		[84]

Quantum Dots	Antibodes (anti-CD44v6, anti-CD24)	Fluorescence imaging	In vitro (Tumor Tissue)		[85]
Gold Nanoparticles	Bovine Serum Albumin	Fluorescence imaging	In vitro (MCF-7 cells)		[5]
Mesoporous Silica Nanoparticles	Antibody (anti-EGFR)	Fluorescence imaging	In vitro (MCF-7 cells)		[86]
Gold Nanoparticles	Antibody (anti-EGFR)	Fluorescence imaging	In vitro (A431, 270-GBM, H2224, MDAMB-453 cells)		[87]
Silica-Gold Nanoshells	Polyethylene Glycol, P-mercaptoaniline	SERS	In vitro (MCF-7 cells)		[154]
Silica-Gold Nanoshells	Polyethylene Glycol, Antibody (anti-HER2)	NIR, MRI, Fluorescence imaging	In vivo / In vitro (BT474AZ, MDAMB231 cells)		[56]
Quantum Dots	Prtein A, Antibody (anti-CXCR4, anti-HER2), Polyethylene Glycol	Fluorescence imaging	In vitro (KPL-4 cells)		[88]
Silica-Gold Nanoshells	–	OCT	Ex vivo (Tumor Tissue)		[165]
Gold-Gold Sulfide Nanoparticles	Antibodies (anti-HER2, anti-IgG)	CLSM	In vitro (SK-BR-3 cells)		[123]
Superparamagnetic Iron Oxide Nanoparticles	Poly2-hydroxyethyl Aspartamide, Antibody (HER2/neu)	MRI	In vitro (H520, SKBR-3 cells)		[57]
Magnetic Nanoparticles	Oleic Acid, Polyethylene glycol, Antibodies (IgG, anti-HER-2)	MRI, CLSM	In vitro (MCF-7 cells)		[58]
Quantum Dots	Polystyrene Polymer	Fluorescence imaging	In vitro (MCF-7 cells)		[89]
Quantum Dots	Antibody (anti-PAR1)	Fluorescence imaging	In vivo / In vitro (KPL-4 cells)		[90]

Superparamagnetic Iron Oxide Nanoparticles	Polylactic acid, D-α-Tocopherol Polyethylene glycol 1000 Succinate	MRI	In vivo / In vitro (MCF-7 cells)		[59]
Polylactic-co-glycolic Acid Nanoparticles	Nanoparticles, Gadolinium-Diethylenetriamine Penta-Acetic Acid	MRI	In vivo / In vitro (MCF-7 cells)		[60]
Quantum Dots	Polyethylene Glycol Phosphatidylethanolamine, Antibody (anti-nucleosome 2C5)	NIR	In vivo / Ex vivo (4T1, B16F10 cells)		[135]
Superparamagnetic Iron Oxide Nanoparticles	–	MRI	In vivo (Tumor Tissue)		[54]
Superparamagnetic Iron Oxide Nanoparticles	–	MRI, CT	In vivo (Tumor Tissue)		[145]
Perfluorocarbon Nanoparticles	NIR Peptides (Cypate-cRGDfK Cypate-C18)	NIR	In vivo / Ex vivo (4T1 cells)		[136]
Poly(n-butyl cyanoacrylate) Nanocapsules	Cyanine (IR-768)	CLSM	In vitro (MCF-7 cells)		[124]
Superparamagnetic Iron Oxide Nanoparticles	Free Folic Acid	MRI	In vivo / In vitro (MDA-MB-231 cells)		[61]
Silica-Gold Nanoshells	Polyethylene Glycol, Antibodies (anti-HER2/neu, anti-IgG)	NIR	In vitro (SK-BR-3, HCC1419, JIMT-1 cells)		[137]
Nanoglobules	Peptide (CLT1)	MRI	In vivo / In vitro (MDA-MB-231 cells)		[62]
Superparamagnetic Iron Oxide Nanoparticles	D-a-Tocopheryl-co-polyethylene glycol-1000 succinate, Copolymer (Pluronic®F127)	MRI	In vivo / In vitro (MCF-7 cells)		[63]
Gold Nanoparticles	Polyethylene Glycol, Antibody (HER81)	SEM	In vitro (SK-BR-3 cells)		[173]

Liposomes	Iodine	CT	In vivo / In vitro (4T1 cells)		[146]
Magnetic Nanoparticles	Fluorophores (Feridex, Dextranase)	MRI, CLSM	In vivo / In vitro (MCF-7 cells)		[125]
Magnetic Nanoparticles	Polyethylenimine, Polyethylene Glycol, siRNA	CLSM	In vitro (MCF-7, TC2 cells)		[126]
Upconversion Nanoparticles	Polyethyleneglycol, Chlorin e6	NIR, CLSM	In vivo / In vitro (4T1 cells)		[127]
Mesoporous Silica Nanoparticles	NIR Dye	NIR	In vivo (4T1, luc-D3H2LN MDA-MB-23 cells)		[138]
Magnetic Nanoparticles	5-Aminolevulinic Acid, Indocyanine Green Dye	CT, NIR	In vivo (Tumor Tissue)		[139]
Quantum Dots	Antibodies (anti-HER2, anti-collagen IV)	Fluorescence imaging	In vitro (Tumor Tissue)		[91]
Gold Nanoparticles	Polyethylene Glycol, Antibodies (anti-Her2)	CT	In vivo / In vitro (BT-474, MCF7 cells)		[147]
Superparamagnetic Iron Oxide Nanoparticles	—	MRI	In vivo (Breast tissue)		[13]
Quantum Dots	Tetraethyl Orthosilicate, Antibody (anti-EGFR)	Fluorescence imaging	In vitro (MDA-MB-435S, SMMC-7721 cells)		[92]
Liposomes	Thioated Oligonucleotide Aptamer, E-selectin, Polyethylene Glycol	Fluorescence imaging	In vivo / In vitro (MDA-MB-435S, SMMC-7721 cells)		[93]
Polyβ-L-malic Acid Platform	Antibody (anti-HER2/neu), NIR Dye (Alexa Fluor 680), Polyethylene Glycol	CLSM	In vivo / In vitro (BT-474, SKBR-3, MDA-MB-231, MDA-MB-435, MDAMB-468 cells)		[128]

Quantum Dots, Superparamagnetic Iron Oxide Nanoparticles	Polylactic Acid-d-a-Tocopheryl Polyethylene Glycol 1000 Succinate Nanoparticles	MRI, CLSM, Fluorescence imaging	In vivo / In vitro (MCF-7 cells)		[64]
Superparamagnetic Iron Oxide Nanoparticles	Quantum Dots, Superparamagnetic Iron Oxide Nanoparticles, Antibody (anti Her2)	SQUID, Fluorescence imaging	In vivo / In vitro (MCF-7, MDA-MB-231, BT-474 cells)		[94]
Superparamagnetic Iron Oxide Nanoparticles	–	MRI, CT	In vivo (Breast tissue)		[148]
Photoswitchable Nanoparticles	Antibody (anti-Her2)	NIR, Fluorescence imaging	In vitro (SK-BR-3 cells)		[96]
Quantum Dots	Polyethyleneglycol, Fatty Ester Matrix	Fluorescence imaging	In vivo (MDA435 cells)		[95]
Magnetic Nanocluster	Pyrenyl Hyalurone	MRI	In vivo / In vitro (MDA-MB-231 cells)		[65]
Nanoglobule	–	MRI	In vivo (MDA-MB-231 cells)		[66]
Mesoporous Silica Nanoparticles	NIR Dye (MDT)	NIR	In vivo (4T1 cells)		[140]
Superparamagnetic Iron Oxide Nanoparticles	Chitosan, Polyethylene Glycol, Antibody (Neu)	MRI, CLSM	In vivo / In vitro / Ex vivo (MMC cells)		[67]
Superparamagnetic Iron Oxide Nanoparticles	Dimercaptosuccinic Acid, 2-Deoxy-d-Glucose	MRI	In vitro (MDA-MB-231 cells)		[68]
Magnetic Nanoparticles	Gold, Lanthanidedoped Rare-Earth Nanocrystals, Polyethylene Glycol	MRI	In vivo (4T1 cells)		[69]

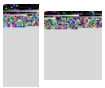
Multiwalled Carbon Nanotubes	Magnetite Nanoparticles, Polyethylene Glycol	CLSM	In vivo / In vitro (MCF7, MDA MB231 cells)		[129]
Magnetic Nanoparticles	Integrin (αvβ3), Amines (DTSSP)	MRI, FMT, CT	In vivo / Ex vivo (4T1 cells)		[70]
Poly(lactic-co-glycolic) Acid Nanoparticles	Indocyanine Green, Folic Acid	NIR, Fluorescence Imaging	In vivo / In vitro (MCF7 cells)		[97]
Poly(lactic-co-glycolic) Acid Nanoparticles	Magnetic Nanoparticles	MRI, US	In vivo / In vitro (VX2 cells)		[71]
Gold Nanoparticles	Peptides (p12, CRGDH)	CLSM	In vitro (MDA-MB-231, MCF-7 cells)		[130]
Quantum Dots	Antibody (Anti-GRP78 scFv)	Fluorescence imaging	In vitro (MDA-MB-231 cells)		[98]
Quantum Dots	Antibody (Anti-HER2)	NIR, MRI, Fluorescence imaging	In vivo / In vitro (KPL-4 cells)		[99]
Gold Nanoparticles	Antibody (CD24, CD44)	SERS	In vitro (MDA-MB-231 cells)		[155]
Gold Nanoparticles	Wheat-Germ Agglutinin, Polyethylene Glycol	NIR	In vivo / In vitro (BT549 cells)		[141]
Magnetic Nanoparticles	Antibody (Anti-HER2)	MRI, SQUID	In vivo / In vitro (MCF7 cells)		[153]
Magnetic Nanoparticles	Fluorophores (TRITC)	CLSM	In vivo / In vitro (MTGB cells)		[131]
Magnetic Nanoparticles	3-Aminopropyl triethoxysilane, Antibody (Anti-HER2)	MRI	In vivo / In vitro (MDA-MB-231, SKBR-3, MDA-MB-453, MCF7, 4T1 cells)		[72]

Superparamagnetic Iron Oxide Nnanoparticles, Liposomes	Polyethylene Glycol, Rhodamine-DHPE	MRI, Fluorescence imaging	In vivo / In vitro (MDA-MB-453, MCF-7 cells)		[100]
Quantum Dots	Magnetic Beads, Nucleolin Aptamer AS1411	Fluorescence imaging	In vitro (MCF-7 cells)		[101]
Magnetic Nanoparticles	Dopamine-Polyethylene Glycol	Fluorescence imaging	In vitro (MCF-7 cells)		[102]
Graphene Oxide	Antibody (Anti-HER2), ^{111}In-benzyl-diethylenetriamine-pentaacetic acid	SPECT	In vivo / In vitro (MDA-MB-231 cells)		[163]
Superparamagnetic Iron Oxide Nanoparticles	—	MRI	In vivo (4T1 cells)		[167]
Gold Nanoparticles	Dendrimers	MRI, CT	In vivo / In vitro (MCF7 cells)		[149]
Superparamagnetic Iron Oxide Nanoparticles	—	MRI	In vivo / In vitro (4T1 cells)		[168]
Magnetic Nanoparticles	MiRNA (Anti miR-10b)	MRI	In vivo / In vitro (MDAMB-231 cells)		[171]
Gold Nanoparticles	Thioglycolic acid, 6-Thioguanine, 2-Mercaptoethanol, 1-Propanthiol	X-Ray	In vitro (MDAMB-231 cells)		[160]
Mesoporous Silica Nanoparticle	^{64}Cu, Antibody (TRC105)	PET, NIR	In vivo / In vitro (4T1 cells)		[142]
Magnetic Nanoparticles	Polyethylene Glycol, Antibody (anti-EGFR)	MRI, CLSM, FMT	In vivo / In vitro (MDA-MB-231, MDA-MB-453 cells)		[73]

Gold Nanoparticles	Thiol-PEG, 3-Aminopropyl triethoxysilane	Fluorescence imaging	In vivo / In vitro (MDA-MB-231LM2 cells)		[103]
Superparamagnetic Iron Oxide Nanocomposites	Polyethylenimine, siRNA	MRI, CLSM	In vivo / In vitro / Ex vivo (MCF-7/ADR cells)		[74]
Quantum Dots	–	NIR, CLSM	In vitro (MCF-7/WT cells)		[132]
Superparamagnetic Iron Oxide Nanoparticles	Amino Terminal Fragment, Antibody (SvFcEGFR)	NIR, MRI, UTE	In vivo / In vitro (MiaPaCa-2, 4T1CFhR cells)		[166]
Superparamagnetic Iron Oxide Nanoparticles	Antibody (anti-ICAM1), Casein	MRI, Fluorescence imaging	In vivo / In vitro (MDA-MB-231, MCF7, MCF10A cells)		[104]
Mesoporous Silica Nanoparticles	Polyethyleneimine, Folic Acid, RNA interference (Notch-1 shRNA)	MRI, CLSM	In vitro (MDA-MB-231 cells)		[75]
Gold Nanoparticles	Bisphosphonate	CT, X-ray	In vitro / Ex vivo (Tumor Tissue)		[150]
Hyaluronic Acid Derived Nanoparticles	Aminopropyl-1-pyrenebutanamide, Aminopropyl-5β-cholanamide, Octadecylamine	Fluorescence imaging	In vivo / In vitro (MDA-MB-231 cells)		[105]
Zinc Oxide Nanoparticles	Antibody (^{64}Cu, TRC105)	Fluorescence imaging, PET	In vivo / Ex vivo (4T1 cells)		[106]
Superparamagnetic Iron Oxide Nanoparticles	Dextran, Bombesin	MRI	In vivo / In vitro (T47D)		[169]
Quantum Dots	Recombinant Protein (GST-EGFP-GB1), Antibody	Fluorescence imaging, NIR	In vivo / In vitro (T47D)		[107]

Quantum Dots	Antibodies (QD-655, QD-655)	Fluorescence imaging	In vitro / Ex vivo (Tumor Tissue)		[108]
Quantum Dots	Antibodies (QD-655, QD-655, anti-Ki67 rabbit)	Fluorescence imaging	In vitro / Ex vivo (Tumor Tissue)		[109]
Conjugated Polymers	1,2-Distearoyl-sn-glycero-3-phosphoethanol-amine-N-[methoxy(polyethylen eglycol)-2000], Folate	CT	In vivo / In vitro (MCF-7 cells)		[151]
Gold Nanoparticles	–	CT, X-ray	In vivo (WT and PyMT mice)		[152]
Quantum Dots	Antibody (anti-PAR1-QDs)	Fluorescence imaging	In vitro / Ex Vivo (KPL-4)		[110]
Polymer Nanoparticles	–	MRI	In vivo (Breast Tissue)		[55]
Superparamagnetic Iron Oxide Nanoparticles	Liposomes	MRI	In vivo / In vitro (4T1, MDA-MB-231 cells)		[76]
Poloxamer Blend Nanoparticles	Poloxamer 180, IR820	Fluorescence images	In vitro (MCF-7 cells)		[111]
Enzymatically Activated Fluorescent Nanoprobes	Fluorescent molecule (AF750)	Fluorescence images, NIR	In vitro (MDA-MB-231 cells)		[112]
Gold Nanoparticles	Integrin ($\alpha_v\beta_3$)	Fluorescence images, CT	In vitro / Ex vivo (4T1-GFP-luc)		[113]
Superparamagnetic Iron Oxide Nanoparticles	Dimercaptosuccinic Acid, 2-Deoxy-D-glucose	MRI	In vivo / In vitro (MCF-7 and MDA-MB-231 cells)		[77]

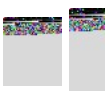
Layered Double Hydroxide	Isotopes	PET	In vivo (4T1 cells)		[162]
Nanodiamonds	Polyethylene glycol, Antibody (anti-HER2)	PAI	In vivo / In vitro (4T1 cells)		[179]
Quantum Dots	Amphiphilic poly(maleic anhydride-alt-1-octadecene) Polymer	Fluorescence images	In vitro (SKBR3 cells)		[114]
Nanoparticles	Receptor-targeted surface-enhanced Raman scattering	SERS	In vitro (SKBR3 cells)		[156]
Graphene Oxide	Antibody (^{64}Cu-NOTA-GO-FSHR-mAb)	PET, Fluorescence images	In vitro / In vivo (MDA-MB-231 cells)		[236]
Quantum Dots	Antibody (^{64}Cu-NOTA-GO-FSHR-mAb)	MRI, Fluorescence images	In vitro / In vivo (MDA-MB-231 cells)		[116]
Gold Nanorods, Superparamagnetic Iron Oxide Nanoparticles	Polyethylene Glycol, Cystamine (anti-EGFR)	MRI, Fluorescence images	In vitro (MCF7-231 cells)		[78]
SERS Nanoparticles	Antibodies (mAb anti-EGFR, anti-HER2, anti-CD44 / CD24)	SERS	In vivo / Ex vivo (A431 cells)		[157]
Silicon Nanoparticles	–	SERS	In vitro (MCF-7 cells)		[158]
Luminomagnetic Nanorods	–	Fluorescence images	In vitro (T47D, MDA-MB-231 cells)		[117]
Superparamagnetic Iron Oxide Nanoparticles	D/L-Lactide/Glycolide Copolymer	Fluorescence images	In vitro / In vivo (CT26, 4T1, LLC, B16F10 cells)		[118]

Quantum Dots	Metal-free/cadmium-free (bio CFQD®)	CLSM	In vitro / Ex vivo (MCF-7 cells)		[133]
Polyamidoamine-based Silica Nanoparticles	Antibody (anti-HER2)	NIR	In vitro / In vivo (SK-BR3, MDA-MB-231 cells)		[143]
Magnetic Nanoparticles	–	CLSM	In vitro (MDA-MB-231 cells)		[134]
Magnetic Nanowires	Antibody	FI	In vitro / Ex vivo (MCF-7, MDA-MB-231 cells)		[119]
Gold Nanostars	Antibody	SERS	In vitro / In vivo (MDA-MB-231, MDA231-LM2 cells)		[175]
Zinc Oxide Nanoparticles	Carbon Nanoparticles	CLSM	In vitro (MCF-7 cells)		[174]
Liposomes	Ammonium bicarbonate	PAI	In vitro / In vivo (MDA-MB-231 cells)		[177]
Poly(lactic-co-glycolic) Acid Nanoparticles	MMP2	MRI, NIR	In vitro / In vivo (MDA-MB-231 cells)		[176]
SERS Nanoparticles	–	SERS	In vitro (SKBR3, MDA-MB-231 cells)		[159]
Quantum Dots	–	FI	Ex vivo (Tumor tisue)		[172]
Gold Nanoparticles	HEPES, Bombesin, PEG	X-ray	In vitro / In vivo (T47D cells)		[161]
Superparamagnetic Iron Oxide Nanoparticles	Fluorescein-5-maleimide-labeled DARPin G3	MRI	In vitro / In vivo (SKBR-3, MDA-MB-231, HL-7702 cells)		[170]

* The reference numbers in the table refer to those in the main text.

Table S3: Theranostic applications

Material	Conjugated molecules	Theranostic applications	Model	Cell type	Ref.*
Magnetic Nanoparticles	Oleic Acid, Copolymers (Pluronic®F68, F108, L64, Tetronic®T904, T908)	Tumor Detection	In vivo / In vitro (MCF-7 cells)		[182]
Superparamagnetic Iron Oxide Nanoparticles	Dextran (T-40), Antibody (Herceptin)	Tumor Detection, Drug Delivery	In vivo / In vitro (MCF-7, BT-474, SKBR-3, MDA-MB-231 cells)		[33]
Gold Nanorods	Iron Nanoaprticles, Poly ethylene Glycol, Antibody (Herceptin)	Tumor Detection, Drug Delivery	In vitro (MCF-7, SK-BR-3 cells		[32]
Gold Nanorods	Antibody (Herceptin), Polyethylene Glycol	Tumor Detection, Delivery	In vivo / In vitro / Ex vivo (MCF-7, BT-474 and SKBR-3 cells)		[31]
Calcium Phosphosilicate Composite Nanoparticles	Antibody (anti-CD71), Avidin	Tumor Detection, Drug Delivery	In vivo / In vitro (BxPC-3, MDA-MB-231 cells)		[214]
Single-Walled Carbon Nanotubes	Copolymers (Pluronic® F127)	Thermal Therapy	In vitro (Tumor Tissue)		[210]
Magnetic Nanoparticles	Oleic Acid, NIR dye (5700, 5177, 2826, 6825, 5491), Copolymers (Pluronic ®F127)	Tumor Detection	In vivo / Ex vivo (MCF-7 cells)		[183]
Magnetic Nanoparticles	Dextran (T-40), NIR Dye (Cy5.5), Peptides (EPPT), siRNA	Drug Delivery, Cancer Therapy	In vivo / In vitro / Ex vivo (BT-20, CAPAN-2, LS-174T cells)		[43]
Silica-Gold Nanoshells	Polyethylene Glycol, Antibody (anti-HER2)	Photothermal Therapy, Gene Therapy	In vivo / In vitro (SKBR3, MDAMB231, BT474AZ cells)		[180]
Silica-Gold Nanoshells	Polyethylene glycol, 3,3′-diethylthia-tricarbocyanine iodide	Photodynamic Therapy	In vitro (BT549 cells)		[190]

Magnetic Nanoparticles	Human Serum Albumin, Doxorubicin	Tumor Detection, Drug Delivery	In vivo / In vitro / Ex vivo (4T1 cells)		[184]
Thiol-functionalized Hyaluronic Acid	Allyloxy 12Cucurbit[6]uril, Fluorescein Isothiocyanate	Drug Delivery, Tissue Engineering	In vitro (B16F1, FPRL1/MCF-7 cells)		[223]
Magnetic Nanoparticles	β-Cyclodextrin, Copolymer (Pluronic®F127), Curcumin	Drug Delivery, Cancer Therapy	In vitro (MDA-MB-231, MCF-7, A2780CP, PC3 cells)		[41]
Magnetic Nanoparticles	Antibody (anti-HER2)	Cancer Therapy	In vivo / Ex vivo (MCF-7 cells)		[186]
Gold Nanoparticles	Molecule (DOTA-^{64}Cu), Amine Polyethylene Glycol Thiol	Tumor Detection	In vivo (EMT-6 cells)		[195]
Liposomes	Docetaxel, D-α-Tocopheryl Acid Succinate, Quantum Dots	Tumor Detection, Drug Delivery	In vitro (MCF-7 cells)		[44]
Magnetic Nanoparticles	Copolymers (Pluronic®F68), Curcumin	Drug Delivery	In vitro (MDA-MB-231 cells)		[40]
Gold Nanoparticles	Polyethylene glycol	Phototermal Therapy, Tumor Detection	In vivo / In vitro (MDA-MB-435 cells)		[196]
Calcium Phosphosilicate Nanoparticles	Polyethylene glycol, Indocyanine green	Photodynamic Therapy	In vivo (410.4, MDA-MB-231, Panc-02, BxPC-3-GFP, SAOS-2-LM7 cells)		[215]
Reduced Graphene Oxide	Antibody (Anti-CD105), ^{64}Cu-NOTA-TRC105	Phototermal Therapy	In vivo / in vitro / Ex vivo (4T1, MCF-7 cells)		[236]
Heparine/Folic acid Nanoparticles	IR-780 iodide	Phototermal Therapy	In vivo / In vitro (MCF-7)		[224]

PMAA-PS 80-g-St-DTPA polymer	Gadolinium, Doxorubicin	Drug Delivery	In vivo / In vitro (EMT6/WT cells)		[226]
Multiwalled Carbon Nanotubes	Alexa-fluor (AF488/647), Radionucleide (Technitium-99m), Folic Acid, Methotrexate	Tumor Detection, Drug Delivery	In vivo / In vitro (MCF-7, A549 cells)		[48]
Silica-Gold Nanoshells	Protoporphyrin IX, Peptide (TAT), 3,3'-diethylthia-dicarbocyanine iodide	Photodynamic Therapy	In vitro (BT-549 cells)		[191]
Magnetic Nanoparticles	Polyethylene glycol, Folic Acid, Tamoxifen	Tumor Detection, Drug Delivery	In vitro (MCF-7 cells)		[47]
Magnetic Nanoparticles	Acid (PHBA)-b-P(OEGA), Doxorubicin	Drug delivery	In vitro (MCF-7, H1299 cells)		[188]
Gold Nanorods	Polyethylene Glycol, Chlorin e6	Photothermal Therapy	In vivo / In vitro (MDA-MB-453 cells)		[206]
Mesoporous Silica Nanoparticles	Polyethylene glycol, Antibody (TRC105), Doxorubicin	Drug delivery, Tumor Detection	In vivo / In vitro / Ex vivo (4T1, MCF7 cells)		[201]
Hydrotropic Oligomer-Conjugated Nanoparticles	Glycol, Chitosan, Paclitaxel (PTX)	Cancer Therapy, Drug Delivery	In vivo / In vitro / Ex vivo (MDAMB-231 cells)		[227]
Silica-Gold Nanoshells	–	Photothermal Therapy, Ultrasonography	In vivo / In vitro (BT474 cells)		[192]
Magnetic Nanoparticles	NIR Dye (830-ATF), Doxorubicin	Tumor Detection, Drug Delivery	In vivo / In vitro (MDA-MB-231, MIA PaCa-2 cells)		[185]
Gold Nanorods	Fluorescein Isothiocyanate, Fluorophore (TAMRA), siRNA	Gene Therapy	In vitro (MCF-7, SK-OV-3 cells)		[205]

N-(2-Hydroxypropyl) methacrylamide Copolymer	Paclitaxel, NIR Dye (SQ-Cy5)	Tumor Detection, Drug Delivery	In vivo / In vitro (4T1 cells)		[37]
Gold Nanoparticles	SERS Molecules (MGITC, Rh6G, Cy5)	Tumor Detection	in vivo / In vitro (MDA-MB-231 cells)		[197]
Mesoporous Silica Nanoparticles	Fluorescein Isothiocyanate, Antibody (Herceptin+D8)	Drug Delivery, Tumor Detection	In vitro (MDA-MB-231, SK-BR-3 cells)		[30]
Liposomes	Magnetic Nanoparticles, Mitoxantrone	Tumor Detection, Drug Delivery	In vivo / In vitro (MCF-7, SK-OV-3 cells)		[46]
Poly(methacrylic acid)-polysorbate 80-grafted-starch	Gadolinium, HiLyte Fluor 750, FA dye, Doxorubicin	Tumor Detection, Drug Delivery	In vivo / In vitro / Ex vivo (MDA-MB-231 cells)		[225]
Copper(II) Sulfide Nanoparticles	Polyethylene Glycol	Photoacoustic Tomography, Tumor Detection	In vivo / In vitro (4T1 cells)		[218]
Mesoporous Magnetic Gold Nanoclusters	Doxorubicin, Pentoxifylline	Photothermal Therapy, Drug delivery	In vivo / In vitro (4T1, MCF-7 cells)		[49]
Tungsten Oxide Nanoparticles	Polyethylene Glycol	Photothermal Therapy	In vivo / In vitro (4T1 cells)		[219]
Quantum Dots	Mercaptoundecanoic Acid, Antibody (Anti-HER2)	Tumor Detection	In vitro (SK-BR-3, MCF-7 cells)		[217]
Carbon Nano-Onions	Boron Dipyromethene	–	In vitro (MCF7 cells)		[238]
Singlewalled Carbon Nanotubes	Endoglin/CD105, Doxorubicin	Drug Delivery, Tumor Detection	In vitro / In vivo (4T1 cells)		[211]

Theranostic Nanoparticles	Chlorin e6, Monomethoxy polyethylene glycol	Chemotherapy Tumor Detection	In vitro (MDA-MB-231 TNBC cells)		[230]
Gold Nanoparticles	5-Fluorouracil	Tumor Detection, Cancer Therapy	In vitro / In vivo (MDA-MB-231 cells)		[198]
Star polymers	Doxorubicin, Gadolinium	Drug Delivery	In vitro (MCF7 cells)		[231]
Gold Nanorods	Tetraethylortho silicate, G70Cetyltrimethylam monium bromide	Photothermal Therapy	In vitro (MDA-MB-231 cells)		[207]
Magnetic Nanoparticles	Tetraethylortho-silicate, N-(2-aminoethyl)-3-aminopropyltrimetho-xysilane, Polyethylenimine, Small hairpin RNA	Gene Delivery	In vitro (MCF7 cells)		[189]
Polymeric Theranostic Nanoparticles	Docetaxel	Chemotherapy Drug Delivery	In vivo / In vitro (MDA-MB-231 cells)		[226]
Singlewalled Carbon Nanotubes	Doxorubicin, Hyaluronic acid, Gadolinium	Photothermal Therapy, Tumor targeting	In vitro / In vivo (MCF-7)		[212]
Quantum Dots	Chitosan, Folic acid	Tumor imaging, Drug Delivery	In vitro (MDA-MB-231, MCF-7 cells)		[241]
Liposomes	Doxorubicin	Tumor imaging, Drug Delivery	In vivo / In vitro / Ex vivo (MDA-MB-468, SKBR3 cells)		[208]
Gold Nanoparticles	Doxorubicin	Drug Delivery, Cancer Therapy	In vitro (MCF7 cells)		[199]
Gold Nanoparticles	Antibody(anti-HER2), Gadolinium	Tumor Detection, Cancer Therapy	In vitro (A549, SKBR-3 cells)		[29]

Nanocarriers	Paclitaxel	Drug Delivery, Cancer Therapy	In vitro (MCF-7/ADR cells)		[34]
Nanoreporters	Doxorubicin	Drug Delivery, Cancer Therapy	In vivo / Ex vivo		[233]
Gold Nanoroads	Cisplatin, Folic acid	Tumor Detection, Cancer Therapy	In vitro / In vivo / Ex vivo (4T1 cells)		[203]
Gold Nanoparticles	Doxorubicin, Gadolinium	Drug Delivery, Photothermal Therapy	In Vivo (Tumor models)		[18]
Porous Silicon Nanoparticles	–	Tumor Detection, Cancer Therapy	In vitro (MCF7 cells)		[202]
Gold Nanoparticles	Doxorubicin	Cancer Detection, Photothermal Therapy	In vitro / In vivo (MCF7 cells)		[200]
Singlewalled Carbon Nanotubes	Polyethylene Glycol, NIR Dye (Cy5.5)	Cancer Detection, Photothermal Therapy	In vitro / In vivo (MCF7 cells)		[213]
Gold Nanoparticles	Doxorubicin, Folic acid, BSA	Chemo-photothermal Synergistic Therapy	In vitro / In vivo (MCF7 cells)		[27]
Superparamagnetic Iron Oxide Nanoparticles	Hyaluronan	Cancer Detection, Photothermal Therapy	In vitro / In vivo (MDA-MB-231 cells)		[181]
Superparamagnetic Iron Oxide Nanoparticles	Folic Acid, Doxorubicin	Tumor Detection, Cancer Therapy	In vitro / In vivo (MCF7 cells)		[26]
Theranostic polymeric Nanoparticles	Docetaxel	Tumor Detection, Cancer Therapy	In vitro (MCF7, SKOV-3 cells)		[51]
Liposomes	Doxorubicin, Cisplatin, Gemcitabine	Tumor Detection, Cancer Therapy	In vitro / In vivo (MDA-MB-231, 4T1 cells)		[52]
Mesoporous Silica Nanoparticles	Doxorubicin	Tumor Detection, Cancer Therapy	In vitro / In vivo (4T1 cells)		[204]

Gd_2O_3@albumin Conjugating Photosensitizer	Chlorin e6	Cancer Detection, Photodynami Theraphy	In vivo / Ex vivo (4T1 cells)		[222]
Tumor-targeting Ultrasound-triggered Phase-transition Nanodroplets	Nucleic Acids	Tumor Detection, Cancer Therapy	In vitro / In vivo (SK-BR-3, HGC-27 cells)		[234]
Polylactic and Glycolic Acid Nanoparticles	L-Ferritin, Paclitaxel	Cancer Detection, Drug Delivery	In vitro (MCF7, MDA-MB-231 cells)		[228]
Gold Nanorods, Gold Nanospheres	Thiolated-hyaluronic acid	Cancer Detection, Photothermal Therapy	In vitro (MCF7 cells)		[193]
Carbon Nanoparticles Nanodroplets	Poly(lactic-co-glycolic acid)	Cancer Detection, Photothermal Therapy	In vitro / In vivo (MDA-MB-231 cells)	 (rabbit)	[220]
Prussian blue (PB)/manganese dioxide Hybrid Nanoparticles	–	Cancer Detection, Photothermal Therapy	In vitro / In vivo (MCF7 cells)		[221]
Magnetic Nanoparticles	Doxorubicin	Tumor Detection, Cancer Therapy	In vitro / In vivo (MDA-MB-231 cells)		[187]
Gold Nanospheres	Polyethylene Glycol	Cancer Detection, Photothermal Therapy	In vitro / In vivo (4T1 cells)		[194]
Peptide Aptamer Targeted Polymers	Doxorubicin	Cancer Detection, Drug Delivery	In vitro / In vivo (MDA-MA-231, MDA-MB-468		[229]
Liposomes	Doxorubicin	Tumor Detection, Cancer Therapy	In vitro / In vivo (4T1 cells)		[209]

* The reference numbers in the table refer to those in the main text.