

Index

a

- accelerated blood clearance (ABC)
 - phenomenon 90
- acetal based drug delivery system 106
- 2-acrylamidophenyl boronic acid (2-AAPBA) 399
- 3-(acrylamido)-phenylboronic acid (3-AAPBA) 390
- [2-(acryloyloxy)ethyl]-trimethylammonium chloride (AETA) 400
- acute myeloid leukemia (AML) 152, 237
- acyl homoserine lactone (AHL) 230
- (3-acrylamidopropyl)trimethylammonium chloride (ATMA) 400
- 1-adamantanecarboxylic acid (ACA) 333
- Adcetris[®] 153, 154, 164, 165, 167, 169
- ado-trastuzumab emtansine 154, 155, 164
- agarose hydrogels 406, 407
- AHL, *see* acyl homoserine lactone (AHL)
- albumin 6
 - protein corona 10
 - PS-loaded 182
- alkaline phosphatase (ALP) 428
- amine-modified graphene (G-NH₂) 271
- 3-aminopropyltriethoxysilane (APTES) 299
- AML, *see* acute myeloid leukemia (AML)
- ammonium bicarbonate (ABC) 194
- amphiphilic copolymers, polymeric micelles
 - examples of 88
 - kinetic stability 91
 - PEG 89
 - polybetaine 91
 - PVP 90
 - redox-responsive micelles 92
 - thermodynamic stability 91
- androgen receptor (AR) 210
- angioprep-2 peptide modified dendrimer 71
- anodic oxidation method 445
- anodic stripping voltammetric (ASV) detection 227
- antibody dependent cell-mediated cytotoxicity (ADCC) 158
- antibody–drug conjugates (ADCs)
 - Adcetris[®] 153
 - ado-trastuzumab emtansine 154
 - antibodies 158
 - antigens, R&D process 166, 167
 - auristatins 156
 - BR96-DOX 151
 - calicheamicins 157
 - camptothecin 158
 - chemotherapy drugs 155
 - concept of 151
 - duocarmycins 158
 - enzyme responsive linkers 163
 - fleximer 169
 - maytansine 156
 - mechanism of action 165, 166
 - Mylotarg[®] 152
 - noncleavable linkers 165
 - pH responsive linkers 161
 - pharmacokinetics 169
 - pyrrolobenzodiazopine 158
 - random and site-specific conjugation 168
 - redox responsive linkers 162
 - timeline 150
- apoferritins 182
- aptamers 71, 452
- arginine–glycine–aspartate/aspartic acid (RGD) 70, 260
- artificial pancreas, nanostructured hydrogels
 - β -cell spheroids 403
 - bioartificial pancreases 403
 - immunosuppressive drugs 403
 - islets, microencapsulation of 404

- artificial pancreas, nanostructured hydrogels
 (*contd.*)
 – LBL hydrogel films 407
 – type I diabetes 403
 ASV, *see* anodic stripping voltammetric (ASV)
 atom transfer radical polymerization (ATRP)
 132, 289
 auristatins 156
- b**
- bare metal stent (BMS) implantation 437,
 449
 Barrett esophagus 178
 bevacizumab 158
 bioactive nano coating
 – biological induction nano coating 452
 – cell capture nano coating 451
 – DESs 449
 – ECM coating 449
 – EPCs 449
 – vascular healing process 450
 bioartificial pancreas 403, 404
 bioluminescence resonance energy transfer
 (BRET) 216
 biomimetic sensing and diagnostics, *see*
 molecular imprinted polymers (MIPs)
 biomineralization method 427
 biomineralization-mimicking process 423
 biotin
 – dendrimers 65, 66
 – polymeric micelle 108
 blood–brain barrier (BBB) 71
 bombesin (BN) receptors 212
 bone tissue engineering
 – CaP blocks and scaffolds 427
 – MBG 430
 – nano CaP particle/polymer composite
 424
 – nano CaP particles 422
 boranetriethylamine (BTE) 332
 bovine serum albumin (BSA) 236
 Bragg's law 398, 399
 brain capillary endothelial cells (BCECs)
 69
 brain tumors 71, 215
 breast adenocarcinoma tumor 185
 breast cancer (BC)
 – estrogen receptor-mediated endocytosis
 68
 – Kadcyla[®] 154
 – quantum dots 209
 – VEGF modified PAMAM dendrimers 69
 brentuximab vedotin, *see* Adcetris[®]
 BSA, *see* bovine serum albumin (BSA)
- c**
- c-Jun N-terminal kinase (JNK) 271
Caenorhabditis elegans 241
 caffeine 301
 calcium phosphates (CaP) 421
 calicheamicins 156
 camptothecin (CPT) 158, 241, 252
 cancer
 – deaths 61, 149, 207
 – drug delivery, microfluidics applications
 – – Genexol-PM 117
 – – implications 141
 – – “magic bullet” 117
 – – NK105 117
 – – NK911 117
 – – physiological barriers 133
 – global burden of 207
 – MRI detection
 – – longitudinal and transverse relaxation
 time 344
 – – proton MR spectroscopy 344
 – – radio-frequency 344
 – – T1-weighted MRI contrast agents 350
 – – T2-weighted MRI contrast agents 344
 – photo therapies
 – – vs. chemotherapy 259
 – – combined therapy, nano-graphene 262
 – – photodynamic therapy 260
 – – photothermal therapy 259
 – – vs. radiotherapy 259
 – treatment, challenges in 61
 CaP blocks and scaffolds, surface nano
 structures
 – interaction, bone cells 428
 – in vivo study 429
 – preparation 427
 carbohydrates
 – dendrimers 65–66
 – diabetes management 387
 carbon nanotubes (CNTs)
 – photothermal therapy 186
 – π - π stacking interaction 104
 cathepsin B 162
 CD44 antigen 109
 cefotaxime (CEF) 291
 cell imaging
 – polymers coated Au NCs 240
 – proteins stabilized Au NCs 236
 – small molecules stabilized Au NCs 234
 – thiols 231
 cell therapy 149
 cell-penetrating peptides (CPPs) 8
 central nervous system (CNS) 328
 chemotherapy 61, 149, 257

- chemical drugs 149
 - cytotoxins 149
 - limitations 99
 - Mylotarg 152
 - photodynamic therapy, combination of 194
 - photothermal therapy, combination of 192
 - chlorin e6 (Ce6) 252
 - circular dichroism (CD) 229
 - circulating tumor cells (CTCs)
 - dendrimers 77
 - detection, quantum dots 217
 - CNS, *see* central nervous system (CNS)
 - collagen–alginate composite (CAC) 406
 - colon cancer 158
 - combination therapy
 - PDT/PTT 195
 - photo/chemotherapy 192
 - compartment models 15
 - complement dependent cytotoxicity (CDC) 158
 - computational fluid dynamic (CFD) models 128
 - computed tomography (CT) 73, 239, 244, 364
 - Concanavalin A (Con A) 388
 - contact-lithographic process 404
 - copper sulfide (CuS) nanoparticles 191, 257
 - coronary artery bypass surgery (CABG) 437
 - coronary artery diseases (CADs) 437
 - coronary artery stent coating
 - biodegradable polymer coating 438
 - CABG surgery 437
 - CADs 437
 - delayed endothelialization 437
 - nanocomposite stent coating 440
 - PCI treatment 437
 - critical micelle concentration (CMC) 91, 132, 378
 - cryptophycin 150
 - crystalline colloidal array (CCA) 398
- d**
- D-penicillamine (DPA) 235
 - dendrimers 5
 - antibody, conjugation of 68
 - aptamers 71
 - biotin 66
 - brain targeting peptides 71
 - carbohydrates 65
 - computed tomography 73
 - dual-targeted dendrimer 72
 - EGF and EGFR 69
 - estrogen 67
 - FGF receptor 70
 - folic acid 63
 - hyaluronic acid 72
 - in vitro cancer diagnosis 77
 - lactoferrin receptors 69
 - LHRH receptors 70
 - MRI 74
 - multi-modal imaging 76
 - NIR fluorescence optical imaging 75
 - properties 61
 - RGD peptide 70
 - riboflavin 66
 - SPECT 74
 - transferrin receptors 69
 - deoxyribonucleic acid (DNA) 117
 - dextran (DEX) 274
 - Diabetes Control and Complications trial 387
 - diabetes mellitus 387
 - 4',6-diamidino-2-phenylindole (DAPI) 232, 234, 239
 - diamond-like carbon (DLC) nanocomposites 440, 441
 - 3,3'-dichlorobenzidine (DCB) detection 301
 - diethylene triamine pentacetate acid (DTPA) 74
 - diffusive mixing 124
 - 2,3-dimethylmaleic anhydride (DA) 263
 - direct stamp imprinting method 305, 307
 - disulfide linkage 106–107
 - dolastatin 150, 156
 - DOX/ICG co-loaded lipid-polymer hybrid nanoparticles (DINPs) 192
 - doxorubicin (DOX) 234, 252, 364, 365
 - droplet-based mixing 124
 - drug to antibody ratios (DARs) 165, 166, 168, 169
 - drug-eluting stents (DESs) 437, 438, 443, 444, 449, 453, 454
 - dual-modality imaging technique 364
 - duocarmycins 156, 158
 - dynamic light scattering (DLS) 132
- e**
- ECM, *see* extracellular matrix (ECM)
 - EGFR, *see* epidermal growth factor receptor (EGFR)
 - electro tomography 334, 335
 - electrochemical sensors 287
 - amperometric morphine sensor 287, 290
 - ATRP initiators 292
 - AuNPs 290
 - calcitonin 292
 - catechol and dopamine 291

- electrochemical sensors (*contd.*)
- cefotaxime 291
 - D- and L-aspartic acid 292
 - electrodeposition of MIP films 289
 - electrosynthesised polymeric matrixes 287
 - ephedrine 288
 - free radical polymerization approach 291
 - IL 291
 - immobilization protocols 287
 - measurements, modes of 287
 - molecular wires 291
 - nano-structured materials 289
 - potentiometric sensors 287
 - propranolol 287
 - PVC membrane 288
 - quercetin-imprinted polymer layers 292
 - surface-imprinted carbon nanotubes 288
 - voltammetric sensor 287
- electropolymerization 305, 306
- EndoremTM 367
- endothelial cells (ECs) 445
- endothelial progenitor cells (EPCs) 449
- enhanced permeation and retention (EPR)
- effect 1, 134, 243, 259, 373
- enzyme responsive linkers 163
- epicardial adipocytes 239
- epidermal growth factor receptor (EGFR) 68, 209, 263
- epithelial cell adhesion molecule (aEpCAM) 77
- EPR, *see* enhanced permeability and retention (EPR)
- Escherichia coli* 230, 241
- esophageal cancer 177
- estrogen-modified dendrimers 65, 67–68
- estrogen receptor (ER) 209
- ethylene glycol dimethacrylate (EGDMA) 285, 391
- extracellular drug conjugate (EDC) system 170
- extracellular matrix (ECM) 134, 218, 243, 424
- f**
- ferritin (FRT)
- Au NCs 243
 - PS-loaded 181–182
- ferucarbotran (Resovist) 362
- ferumoxides (Feridex) 362
- fibroblast growth factors (FGF) 70
- Fischer–Tropsch process 341, 342
- FITC, *see* fluorescein isothiocyanate (FITC)
- fleximer 169
- FLIM, *see* fluorescence lifetime imaging (FLIM)
- fluorescein isothiocyanate (FITC) 297, 397
- fluorescence lifetime imaging (FLIM) 234
- fluorescence resonance/Förster energy transfer (FRET) 7, 75, 229, 396
- fluorescent sensors 292
- organic fluorophores 293
 - quantum dots 297
 - small organic analytes and biomacromolecules 293
 - transduction mechanisms 292
- folic acid (FA) 236, 252
- dendrimers 63–65
 - polymeric micelle 108
- Food and Drug Administration (FDA) 90, 150, 162, 177, 252, 375
- fourier transform infrared spectroscopy (FT-IR) 229
- free radical polymerization 298
- g**
- gadolinium 244
- gadolinium diethylene triamine pentacetate acid (Gd-DTPA) 351
- β -galactosidase 164
- “galvanic replacement” method 232
- gastric cancer 219
- gemtuzumab ozogamicin, *see* Mylotarg[®]
- gene therapy 69
- gene transfection efficiency delivery 255
- gene-eluting stents (GESs) 453
- Genexol-PM 93
- glioblastoma 215
- glucose oxidase (GOD) 388
- glucose sensors
- contraction-type glucose-sensitive hydrogels 399
 - diffraction grating sensors 401
 - electrocatalytically active enzyme/mediator nanostructures 396
 - Fabry–Perot sensor 401
 - fluorescent sensors 397
 - gold nanorods 396
 - holographic sensors 399
 - label-free optical sensing methods 397
 - microgel particles 399
 - noninvasive/minimally invasive monitoring 399
 - optical transduction method 396
 - PCCA sensors 398
 - polyacrylamide hydrogel 398
- glucuronic acid 164
- β -glucuronidase 164
- glutathione (GSH) 106, 228
- glycolysis 107

- gold nanocages (AuNCs) 190
 gold nanoclusters
 – biosensing, *see* luminescent Au NCs, biosensing
 – cell imaging, *see* cell imaging
 – gold nanostructures, biomedical diagnosis 227
 – *in vivo* imaging 241
 – permeation of 246
 – photostability 246
 gold nanoflowers (AuNFs) 190
 gold nanoparticles (AuNPs)
 – FA-modified dendrimer 73
 – photothermal therapy 189, 190
 gold nanorods (AuNRs) 189
 gold nanoshells (AuNSs) 190
 gold nanostructures
 – biomedical diagnosis 227
 – photothermal therapy 188–190
 GQDs, *see* graphene quantum dots (GQDs)
 graphene
 – photothermal therapy 187
 – π - π stacking interaction 104
 graphene oxide (GO)
 – biomedical research 195
 – photothermal therapy 187
 graphene quantum dots (GQDs) 266
- h**
 Hammer's method 271
 hematoxylin and eosin (H&E) staining 274
 hemolysis assay 376
 hepatocarcinoma 73
 heptamenthine 184
 herceptin 68
 herringbone mixing 124
 hexadecylammonium chloride (HAD.HCl) 331
 high hormone receptors (HHR) 210
 histidine (His) 234
 Hodgkin's lymphoma (HL) 153, 215
 hollow gold nanospheres (HAuNS) 190
 horseradish peroxidase (HRP) 299
 HSA, *see* human serum albumin (HSA)
 human epidermal growth factor receptor 2 (HER2) 154, 209
 human serum albumin (HSA) 182, 234, 364
 hyaluronic acid (HA) 72
 hybridoma technique 151
 hydrogen bond 103
 hydrophobic drugs 6
 hydrothermal process 422
 hydroxyapatite (HAP) materials 422
 2-hydroxyethyl methacrylate (HEMA) 295, 401
 hydroxyl-camptothecin (SN38) 252
 hydrozone 105
 hyperthermia 368
 hypocrellin (HA) 263
- i**
 ICC, *see* inverted colloidal crystal (ICC)
 imatinib mesylate 446
 immunotherapy 149
 "in situ self-assembly" method 305, 309
in vivo biodistribution of NMs
 – anatomic basis of 10
 – hydrophilicity and hydrophobicity 13
 – shape and deformability 12
 – size 11
 – zeta potential 12
 indium-111 (111In) 69
 inorganic nanomaterials 5–6
 – bone tissue engineering
 – – bioceramics and bioglasses 421
 – – calcium phosphates 421
 – – CaP blocks and scaffolds, surface nano structures, *see* CaP blocks and scaffolds
 – – mesoporous bioactive glasses 430
 – – nano CaP particles, *see* nano CaP particles
 – vs. organic photosensitizer 184–186
 instant blood-mediated inflammatory reactions (IBMIRs) 411
 insulin
 – closed-loop/self-regulated insulin delivery system 388
 – glucose-sensitive hydrogels 389
 – glucose-sensitive layer-by-layer assembled hydrogel films 392
 – glucose-sensitive microgels 390
 – type I diabetes 388
 interleukin 12 (IL12) 69
 International Diabetes Federation 387, 403
 inverse opal hydrogel silica colloidal crystal 400
 inverted colloidal crystal (ICC) 404
 IONP, *see* iron oxide nanoparticles (IONP)
 irinotecan 252
 iron overload mechanism 371
 iron oxide nanoparticles (IONP) 255, 268
- k**
 Kadcyla[®] 154
 Kirkendall process 339

I

- L-penicillamine (LPA) 235
- “lab-on-a-chip” systems 121
- lactate dehydrogenase (LDH) 372
- lactobionic acid (LA) modified dendrimer 73
- lactoferrin (Lf) receptors 69
- layer-by-layer (LBL) films 392
- leukemia 184
- limit of detection (LOD) 303
- lipid droplet (LD) 239
- lipids 2
- liposomes 2
- lithography fabrication process 120
- liver cancer
 - EGF modification 69
 - quantum dots 213, 216
- localized surface plasma resonance (LSPR) 189
- low hormone receptors (LHR) 210
- low temperature isotropic pyrolytic carbon (LTIC) 440
- luminescent Au NCs, biosensing 234, 235
 - heavy metal ions detection 228
 - ROS and antioxidants detection 228
 - virus, bacteria and cells 230
- lung cancer
 - Lf–dendrimer conjugate 69
 - quantum dots 213
- luteinizing hormone-releasing hormone (LHRH) 70

m

- macrophages 270
- Magic Bullets 151
- magnetic fluid hyperthermia (MFH) 369
- magnetic iron oxide nanoparticles
 - cell labeling and tracking 367
 - drug delivery 364
 - gene delivery 366
 - hyperthermia 368
 - *in vitro* cytotoxicity test 375
 - *in vivo* toxicity test 376
 - metabolism 369
 - MRI contrast agent 362
 - nanotoxicity mechanism 370
 - parameters, nanoparticles toxicity 371
 - surface engineering 377
- magnetic nanoparticles (MNPs) 361
- magnetic nanostructures (MNSs)
 - alloys 333
 - biomedical applications 327
 - bottom-up method 327
 - colloidal chemical synthetic methods 327
 - diagnostic nanotechnology 328

- metal carbides 340
- metal nanoparticles, *see* metal nanoparticles
- metal oxides 335
- MRI contrast agents 328
- MRI-based cancer detection 344
- top-down strategy 327
- magnetic resonance imaging (MRI) 74, 244, 268, 327–329, 361, 368
- magnetron sputtering method 442
- major vault protein (MVP) 72
- maleimide 411
- mammalian target of rapamycin (m-TOR) 209
- MAPK, *see* mitogen-activated protein kinase (MAPK)
- matrix metalloproteinases (MMPs) 107
- matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) 232
- maximum tolerated dose (MTD) 149
- maytansine 150, 156
- membrane-bound matrix metalloproteinase-2 (MMP-2) 71
- 2-mercaptosuccinic acid (MSA) 233
- mesenchymal stem cells (MSCs) 349, 367
- mesoporous bioactive glass (MBG) 421
- metal nanoparticles
 - cobalt nanoparticles 332
 - iron nanoparticles 328
 - nickel nanoparticles 332
- methacrylic acid (MAA) 106, 285
- methotrexate 151
- MFH, *see* magnetic fluid hyperthermia (MFH)
- micellar drug carriers 118
- micelle formation, on-chip characterization of
 - HTS, copolymer self-assembly 131
 - micelle kinetic stability 132
 - self-assembly kinetics, high temporal resolution 128
- micellization mechanisms 117
- microfluidic fabrication, polymer micelles
 - active mixing 122
 - diffusive microfluidic mixer 122
 - droplet-based chaotic mixing 127
 - exothermicity 122
 - heterogeneous micellization 122
 - microarchitecture-induced mixing 126
 - passive-mixing techniques 122
 - solvent mixing process 121
- micromilling process 120
- micromolding process 404
- microRNAs (miRNAs) 71
- microscopic imaging 239
- microtip fabrication process 296

- microvortex mixing 124
- minimum effective dose (MED) 149
- mitogen-activated protein kinase (MAPK) 271
- mixed monolayer protected cluster (MMPC1) 373
- molecular imaging techniques 364
- molecular imprinted polymers (MIPs)
 - aqueous samples 310
 - biological receptors 283
 - “bulk” polymerization 285
 - controlled/“living” radical polymerization technique 310
 - covalent approach 284
 - crosslinking monomers 285
 - electrochemical sensors, *see* electrochemical sensors
 - fluorescent sensors, *see* fluorescent sensors
 - functional monomers 285
 - generation of 284
 - MIP films 285
 - non-covalent approach 284
 - QCM sensors 286, 305
 - semi-covalent approach 284
 - SPR sensors 300
 - transduction mechanism 309
 - ultratrace analyses 310
- monoclonal antibody (mAb) 151
 - IR700 conjugation 179
 - PIT 178
- monomethylauristatin E (MMAE) 153
- mononuclear phagocytic system (MPS) 12
- mouse mesenchymal stem cells (MSCs) 407
- MRI, *see* magnetic resonance imaging (MRI)
- MSCs, *see* mesenchymal stem cells (MSCs)
- multidrug resistance (MDR) 263, 365
- multimodal imaging 241, 244
- multipulse excitation scheme 237
- Mylotarg[®] 152
- myristoyl choline 103
- myristoylated polyarginine peptide (MPAP) 366

- n**
- N-isopropylacrylamide (NIPAM) 106, 390
- N-succinimidyl-3-(2-pyridyldithio) propionate (SPDP) 366
- nano CaP particles
 - bone cells, interaction of 423
 - control synthesis of 422
 - interaction, polymer composites 426
 - in vivo study, nano Ca-P/polymer composites 426
 - preparation, nano CaP/polymer composites 424
- nano-graphene oxide (NGO) 252
- nano-graphene, biomedical applications
 - biomedical imaging 263, 266
 - drug delivery 251, 255
 - functionalized graphene 251
 - gene delivery 253
 - imaging-guided therapy 266
 - inorganic nanoparticles 251
 - photo therapies, cancer, *see* cancer, photo therapies
 - potential toxicity 251
 - toxicity, *see* toxicity, nano-graphene
- nano-photosensitizer (nano-PS)
 - albumin nanoparticles 182
 - applications 197
 - combined PDT/PTT 195
 - combined photo/chemotherapy 192
 - ferritin nanoparticles 181
 - mAb-IR700 conjugation 179
 - passive delivery 178
 - PEG–DSPE block copolymers 180
 - PEG–PAsp micelles 180
 - photodynamic therapy 182
 - photothermal therapy, *see* photothermal therapy (PTT)
 - polypeptide micelles 181
- nanocomposite stent coating
 - carbon-based nanocomposites 440
 - nanoparticles 446
 - nanoporous and nanotube 443
 - POSS-based nanocomposite 443
 - specific bioinert nanocomposites 440
 - titanium oxide nanocomposites 442
- nanomaterials (NMs)
 - common metabolism 13
 - degradable vs. non-degradable 13
 - EPR effect 1
 - folate modified pH-sensitive PAMAM 9
 - formulation development 1
 - free drug vs. drug encapsulated 13
 - in vivo biodistribution 10
 - inorganic 5
 - lipids 3
 - optimal physicochemical parameters 14
 - organ distribution vs. cell-specific targeting 6
 - overexpressed membrane receptors 7
 - passive targeting 7
 - physical targeting delivery 9
 - polysaccharides 3
 - proteins 3
 - surface modification 14

- nanomaterials (NMs) (*contd.*)
 - synthetic nanomaterials, *see* synthetic nanomaterials
 - tumor microenvironment 8
 - tumor overexpressed enzymes 7
 - nanoparticle-based drug delivery, stent system 448
 - nanostructured hydrogels, diabetic managements
 - artificial pancreas, *see* artificial pancreas, nanostructured hydrogels
 - glucose sensing 396
 - insulin release, *see* insulin release
 - natural nanomaterials
 - lipids 3
 - polysaccharides 3
 - protein 3
 - near infrared spectrum (NIR) 364
 - near-infrared (NIR) fluorescence imaging 75
 - negative hormone receptors (NHR) 210
 - nephrogenic systemic fibrosis (NSF) 351
 - NGO, *see* nano-graphene oxide (NGO)
 - nitrogen mustards 149
 - noncleavable linkers 165
 - NSF, *see* nephrogenic systemic fibrosis (NSF)
- O**
- octadecene (ODE) 331
 - octadecyl acrylate (ODA) 106
 - octadecyl-*p*-vinylbenzyltrimethylammonium chloride (OVDAC) 299
 - oleic acid (OA) 331
 - oleylamine (OAm) 331
 - oligodeoxynucleotides (ODNs) 237
 - oligonucleotides 65
 - organic fluorophores 293
 - organic nanoparticles
 - advantages 179
 - albumin 182
 - ferritin nanoparticles 181
 - PEG–DSPE block copolymers 180
 - PEG–PAsp micelles 180
 - photothermal therapy 186
 - polypeptide micelles 181
 - ovalbumin (OVA) 237
 - ovarian cancer and quantum dots 212
 - oxidative phosphorylation 107
 - oxidative stress 370
- P**
- paclitaxel 3, 63, 66, 90, 446
 - palladium (Pd) nanosheets 190
 - PALM, *see* photoactivated localization microscopy (PALM)
 - pancreatic cancer and quantum dots 212–213
 - PAT, *see* photoacoustic tomography (PAT)
 - PDT, *see* photodynamic therapy (PDT)
 - PEG, *see* polyethylene glycol (PEG)
 - PEG-*b*-poly(aspartate) (PEG–PAsp) block copolymers 180
 - peptides
 - brain-targeting dendrimers 71
 - LHRH-modified PPI dendrimer 70
 - RGD-dendrimer conjugate 70
 - percutaneous coronary intervention (PCI) 437, 438, 441, 449
 - PET, *see* positron emission tomography (PET)
 - pharmacokinetics and pharmacodynamics (PK/PD), nanomaterials
 - administration routes 40, 48
 - blood and tissue PK 40, 41
 - compartment models 15
 - components 33
 - CPP modification 33
 - development 50
 - drug loaded natural NMs, PK data 26
 - drug loaded synthetic NMs, PK data 29
 - encapsulated drugs, variations of 39, 46, 47
 - experiment to simulation 15
 - ligand modification 33
 - PBPK models 20, 25
 - PK data 35
 - shape 33
 - size 25
 - surface coating 33
 - phase inverse approach 300
 - phenylboronate ester bonds 393, 402
 - phenylboronic acid (PBA) 388
 - phospholipids 2
 - photoactivated localization microscopy (PALM) 246
 - photodynamic therapy (PDT) 104, 259, 260
 - chemotherapy, combination of 194
 - esophageal cancer 177
 - ICG-loaded Ca₃P₂ nanoparticles 183
 - limitations and side effects 178
 - PEG–PAsp micelles 180
 - photothermal therapy, combination of 195
 - porfimer sodium 177
 - PS, light and oxygen 177
 - PS-conjugated antibody 183
 - Photofrin[®] 177
 - photoimmunotherapy (PIT)
 - mAb conjugated with PS 178
 - vs. PDT 178
 - photosensitizer (PS), *see* nano-photosensitizer (nano-PS)

- phototherapy
 - laser and phototherapeutic agents 177
 - noninvasive approach 177
 - photodynamic therapy, *see* photodynamic therapy (PDT)
 - photoimmunotherapy 178
 - photothermal therapy, *see* photothermal therapy (PTT)
- photothermal therapy (PTT) 257, 259
 - carbon photosensitizer 186
 - chemotherapy, combination of 192
 - CuS nanoparticles 191
 - gold nanoshells 178
 - gold nanostructures 188
 - organic photosensitizer 184
 - PB nanoparticles 191
 - Pd nanosheets 191
 - PEGPLL-PLLeu nanomicelles 181
 - photoabsorbing agents 178
 - photodynamic therapy, combination of 195
- photothermally enhanced gene transfection 257
- physical entrapment approach 305
- physiologically based PK (PBPK) models 20
- plasmonic nanobubbles (PNBs) 194
- point-of-care testing (POCT) 227
- polyacrylic acid (PAA) 268, 276
- poly(allylamine hydrochloride) (PAH) 263, 408
- polyamidoamine (PAMAM) dendrimers
 - biotin-conjugated 66
 - chemical structures of 62
 - EGF modification 69
 - FA, MTX and FITC modified dendrimer 63, 64
 - FGF receptors 70
 - HA modification 72
 - lactose-modified PAMAM dendrimers 65
 - *N*-acetylgalactosamine-targeted dendrimer 66
 - recombinant anti-HER2 antibody trastuzumab 68
- polybetaine 89, 91
- poly(ϵ -caprolactone) (PCL) 90, 119, 424
- poly(carboxybetaine) 91
- poly(dimethyldiallylammonium chloride) (PDDA) 393
- polydimethylsiloxane (PDMS) 121, 405
- polyetherimide (PEI) 4
- poly(2-ethyl-2-oxazoline)-poly(L-lactide) diblock copolymers 106
- poly(ethylene glycol) (PEG) 89, 101, 119, 252, 370, 407
- poly(ethylene glycol)-*b*-poly(L-lysine)-*b*-poly(L-leucine) (PEGPLL-PLLeu) nanomicelles 181
- poly(ethylene glycol)-distearoylphosphatidylethanolamine (PEG-DSPE) block copolymers 180
- poly(ethylene glycol)-poly(aspartic acid) copolymers 102
- poly(ethylene glycol)-poly(L-lysine) block copolymer 103
- poly(ethylenimine) (PEI) 241, 253, 366, 393
- polyglycolic acid (PGA) 119
- polyhedral oligomeric silsesquioxane (POSS) 443
- poly(lactic acid) (PLA) 90, 104, 119, 439
- poly(lactic-*co*-glycolic acid) (PLGA) 4, 90, 123
- polylactide (PLA) 424
- poly(*N*-vinylpyrrolidone) (PVP) 89, 90
- poly(*o*-aminothiophenol) (PoAT) 307
- poly(phosphobetaine) 91
- poly(styrene sulfonate) (PSS) 407
- poly(vinyl acetate) (PVAc) 285
- polymeric micelles
 - amphiphilic copolymers, *see* amphiphilic copolymers, polymeric micelle
 - bioactive substance and enzyme sensitive nanocarriers 107
 - characteristics 100
 - crystallization 104
 - disassociation of 88
 - drug incorporation 92
 - drug loading 101
 - drug release profiles 102
 - electrostatic interaction 103, 119
 - formation 88, 119
 - functionalization 93
 - host-guest interaction 103
 - hydrogen bond 103
 - hydrophobic interaction 102, 119
 - microfluidics 120
 - PEG-DSPE block copolymers 180
 - PEG-PAsp micelles 180
 - pH-sensitive micelles 105
 - π - π stacking interaction 103
 - polypeptides 181
 - redox-sensitive polymeric micelles 106
 - self-assembly 102
 - size and size distribution 100
 - stereocomplexation 104
 - surface properties 101
 - targeted drug delivery 108

- polymeric micelles (*contd.*)
 - viral vectors 120
 - polymerized crystalline colloidal array (PCCA) 398
 - polypeptide micelles 181
 - polypropyleneimine (PPI) dendrimers
 - chemical structures of 62
 - mannose- and lactose-conjugated 65
 - polypyrrole (PPy) 185
 - polysaccharides 2, 3
 - polystyrene (PS) 303
 - polyvinyl chloride (PVC) 287
 - porfimer sodium 177, 178
 - porphyrins 186
 - positron emission tomography (PET) 266, 364
 - postimprinting modification methods 297
 - prostate cancer (PC)
 - PSMA 71
 - quantum dots 212, 216
 - riboflavin receptors 66
 - prostate-specific membrane antigen (PSMA) 68, 71, 212
 - protein nanoparticles 3, 6
 - advantages 181
 - PS-loaded 181–182
 - “proton sponge” effect 5
 - prussian blue (PB) 191
 - PTT, *see* photothermal therapy (PTT)
 - pulmonary toxicity 276
 - PVC, *see* polyvinyl chloride (PVC)
 - pyrrolbenzodiazepine (PBD) 157, 158
- q**
- quantum dots (QD)-mediated fluorescence resonance energy transfer (QD-FRET) 128, 129, 216
 - quantum dots (QDs) 126, 297
 - biosafety 220
 - brain tumors 215
 - breast cancer 209
 - CTCs detection 217
 - glioblastoma 215
 - Hodgkin’s lymphoma 215
 - in situ molecular imaging 207, 209
 - liver cancer 213
 - lung cancer 213
 - ovarian cancer 212
 - pancreatic cancer 212
 - prostate cancer 212
 - reproducibility and comparability 221
 - SLN mapping 215
 - standardization 221
 - tumor biomarkers detection 216
 - tumor microenvironment 217
 - quartz crystal microbalance (QCM) 286, 305
- r**
- ractopamine (RAC) detection 307
 - radionuclide (RNA) conjugates 170
 - radiotherapy 149, 259
 - Raman spectroscopy 130, 234
 - reactive oxygen species (ROS) 177, 228, 260, 270, 370
 - red blood cells (RBCs) 6, 15
 - redox responsive linker 161–162
 - reticuloendothelial system (RES) 89, 99, 169, 346, 362, 376
 - reversible addition-fragmentation chain transfer (RAFT) 91, 288, 295
 - RGD peptides 109
 - RGD4C-modified ferritin (RFRT) 182
 - riboflavin–dendrimer conjugates 66–67
 - Rituxan 252, 265
- s**
- Sauerbrey equation 305
 - Scanning electron micrographs 308
 - selenocysteine 168
 - self-biomarking strategy 242
 - sentinel lymph node (SLN) mapping 215–216
 - SERS, *see* surface enhanced Raman spectroscopic (SERS)
 - simulated body fluid (SBF) 425
 - single photon emission computed tomography (SPECT) 74, 77
 - small interfering ribonucleic acid (siRNA) 117
 - smooth muscle cells (SMCs) 445, 450, 451, 454
 - soft lithography process 404
 - sol–gel method 423
 - solid lipid nanoparticles (SLN) 2
 - solvothermal process 336
 - sortase 168
 - SPIO, *see* superparamagnetic iron oxide (SPIO)
 - SPR, *see* surface plasmonic resonant (SPR)
 - Stöber sol–gel reaction 298, 299
 - stereocomplex polymeric micelle 104–105
 - stomach cancer 158
 - streptozotocin (STZ) 392, 394, 406, 407
 - succinimidyltrans-4-(maleimidylmethyl)cyclohexane-1-carboxylate (SMCC) 154
 - superparamagnetic iron oxide (SPIO) 344, 361

- surface enhanced Raman spectroscopic (SERS) detection 227
 surface free radical polymerization method 301, 305, 306
 surface plasmonic resonant (SPR) absorption 227
 surface-initiated controlled/"living" radical polymerization 286, 301, 302, 310
 synergistic therapy 192, 195, 257
 synthetic nanomaterials
 – enzyme-sensitive NMs 5
 – pH-sensitive linkage 5
 – polyetherimide 4
 – redox sensitive NMs 5
 – thermo/radio wave sensitive NMs 5
- t**
- targeted dendrimers
 – antibody, conjugation of 68
 – aptamers 71
 – biotin 66
 – brain targeting peptides 71
 – carbohydrates 65
 – computed tomography 73
 – dual-targeted dendrimer 72
 – EGF and EGFR 69
 – estrogen 67
 – FGF receptor 70
 – folic acid 63
 – hyaluronic acid 72
 – in vitro cancer diagnosis 77
 – lactoferrin receptors 69
 – LHRH receptors 70
 – multi-modal imaging 76
 – NIR fluorescence optical imaging 75
 – RGD peptide 70
 – riboflavin 66
 – SPECT 74
 – transferrin 69
 TEM, *see* transmission electron microscopic (TEM) imaging
 Tesla mixing 124, 126
 tetrabromobisphenol A (TBBPA) 298, 299
 tetramethylrhodamine isothiocyanate (TRITC) 397
 TGF- β , *see* transforming growth factor beta (TGF- β)
 theophylline detection 301, 302, 307
 thiol-capped Au NCs 231–234
 thiomab–drug conjugates (TDCs) 168
 3D hydrodynamic flow focusing (3D HFF) 125
 "time gated" approach 237
 titanium oxide (Ti–O) film 442
 TNF related apoptosis-inducing ligand (TRAIL) 69, 71
 toxicity, nano-graphene
 – functionalized GO, cytotoxicity 273
 – in vivo toxicity, GO and functionalized GO 273
 – pristine graphene and GO, cytotoxicity 270
 – pulmonary toxicity 276
 TPE, *see* two-photon excitation (TPE)
 transendothelial electrical resistance (TEER) 138
 transferrin (Tf) receptors 69, 237
 transforming growth factor beta (TGF- β) 271
 transglutaminase 168
 transition-metal dichalcogenides (TMDCs) 191
 transmission electron microscopic (TEM) imaging
 – alkyl-PEI/SPIO nanocomposites 368
 – Au NCs 230, 236
 – cRGD-DOXO-SPIO-loaded polymeric micelles 365
 – RGO–IONP nanocomposite 269
 – Fe/Fe₃O₄ nanoparticles 331, 337
 – FeO NPs 338
 – FePt nanowires and nanorods 334
 – iron carbide NCs 342
 trastuzumab 154, 158
 trinitrotoluene (TNT) detection 303, 304
 trioctylphosphine oxide (TOPO) 332, 340
 triphenylphosphonium (TPP) 240
 tripolyphosphate (TPP) 391
 tumor, microfluidic replications
 – drug testing, microfluidic models 133
 – microfluidic micelle/nanoparticle transvascular transportation 137
 – transport barriers, nanomedicine 134
 – tumor interstitial transportation 139
 tumor necrosis factor α (TNF α) 69, 138
 two-photon excitation (TPE) 232, 246
- v**
- valine-citrulline (Val-Cit) 153, 162
 vascular endothelial growth factor (VEGF) 69, 158
 vascular healing process 449, 450, 454
 vascular stent system 439
 vindesine 151
 volume phase transition temperature (VPTT) 390, 392

w

- wheat germ agglutinin (WGA) 72
- World Health Organization (WHO)
 - cancer morbidity and mortality 99
 - gadolinium contrast agents 351
- wrap–bake–peel process 339, 341

x

- xanthate 91

z

- zinc hexadecafluorophthalocyanine (ZnF16Pc)
 - delivery system 182
- zinc phthalocyanine (ZnPc) 194, 260