**Summary of biomimetic nanomaterials for biosensors in non-invasive disease diagnosis**

**(Appendix 1)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Diseases  [Reference] | Nanomaterials | Morphology | Type of biosensors | Identification of molecular | Targeted analyte | diagnosis |
| Cancer [58] | Au | Nanoparticles | Electrochemical biosensor | PLIN-2 antibody | PLIN-2 | RCC |
| Cancer [59] | Au | Nanoparticles | Electrochemical biosensor | Organic ligands | VOCs | Gastric cancer |
| Cancer [60] | Au | Composite nanoparticles | Optical  biosensor | MUC1 Apt1 | MUC1 | Cancer cells |
| Cancer [62] | Au | Nanoparticles | Optical  biosensor | Oligonucleotide acid | Telomerase | Bladder cancer |
| Cancer [64] | Ag | Nanoparticles | Electrochemical biosensor | polymer | MDA | Lung cancer |
| Cancer [65] | Ag | Composite nanomaterial | Electrochemical biosensor | Organic matric | MDA | cancer |
| Cancer [66] | La (OH)3 | Nanoparticles | Electrochemical biosensor | Cyfra21-1  antibody | Cyfra-21-1 | Oral cancer |
| Cancer [67] | GO | Nanoparticles | Optical  biosensor | CD133-6 binding peptide | CD133 | Cancer cells |
| Cancer [68] | MSNs | Nanoparticles | Electrochemical biosensor | miRNA-21 probe | miRNA-21 | Cancer |
| Cancer [69] | MSNs | Nanoparticles | Electrochemical biosensor | Proline dehydrogenase | L-proline | Cancer |
| Inflammatory diseases [70] | Au | Nanoparticles | Electrochemical biosensor | Pepsin antibody | Pepsin | LPR |
| Inflammatory diseases [73] | Au | Nanoparticles | Electrochemical biosensor | Biological  Polymer | Nitrite ions | Inflammatory diseases |
| Inflammatory diseases [74] | Ag | Nanoparticles | Optical  biosensor | PMB | Lipopolysaccharide | Bacterial infections |
| Inflammatory diseases [75] | GO | Composite nanomaterials | Optical  biosensor | Hepatitis B surface  antibody | Hepatitis B surface antigen | Hepatitis B |
| Neurological disease [77] | Au | Nanoparticles | Optical biosensor | Cortisol antibody | Cortisol | Stress disease |
| Neurological disease [78] | Au | Nanoparticles | Optical  biosensor | DNA | MiR-137 | AD |
| Neurological disease [80] | Graphene | Nanoparticles | Electrochemical biosensor | anti-Aβ | Aβ42 | AD |
| Neurological disease [81] | Ag | Nanoparticles | Optical biosensor | Organic chelate | DA | Parkinson  disease |
| Metabolic diseases [82] | Au | Composite nanomaterial | Press  biosensor | BSA  antibody | BSA | Nephropathy |
| Cardiovascular diseases [83] | Pt | Nanocluster | Electrochemical biosensor | Cholesterol oxidase | Cholesterol | Cardiovascular diseases |

AD, Alzheimer’s Disease; Aβ42, Amyloid-beta peptide 1-42 BSA, bovine serum albumin; CNTs, carbon nanotubes; LPR, laryngopharyngeal reflux; MDA, Malondialdehyde; MSNs, silica nanomaterials; MUC1 Apt1, MUC1, mucin-1; MWCNTs, multi-walled carbon nanotubes; PLIN-2, perilipin-2; PMB, polymyxin B; RCC, renal cell carcinoma; VOCs, volatile organic compounds.

**Summary of biomimetic nanomaterials for bioimaging in non-invasive disease diagnosis**

**(Appendix 2)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Diseases  Reference | Materials | Morphology | Type of bioimaging | Identification  of molecular | Targeted  analyte | diagnosis |
| Cancer [85] | Au | Nanostar | OI | Cyclic-RGDyK peptide | Integrins | Glioblastoma |
| Cancer [86] | Au | Nanoshell | USI | Anti-VEGF receptor type 2 and anti-p53 | VEGF receptor type 2 and p53 | Breast cancer |
| Cancer [87] | SPIO | Nanoparticles | MRI | Glycine | Lung immune cell | Lung cancer |
| Cancer [88] | SPIO | Nanoparticles | MRI | Biological  polymer | ROS | Cancer |
| Cancer [90] | Pd | Nanoparticles | PAI | RGD peptide | Integrin αvβ3 | Breast cancer |
| Cancer [91] | GO | Composite  Nanoparticles | OI | FA | FA receptors | Cancer |
| Cancer [92] | Silica | Nanotube | MRI | Monoclonal antibody | PSMA | prostate cancer |
| Inflammatory diseases [93] | Carton | Nanotube | OI | M13 bacteriophage | F’-pili | Bacterial infections |
| Cardiovascular diseases [94] | SPIO | Nanoparticles | MRI | Monoclonal antibody | Tenascin-C | Atherosclerotic |
| Cardiovascular diseases [95] | Fe | Composite Nanoparticles | MRI | (HSP)-70 antibody | HSPs | Atherosclerotic |
| Cardiovascular diseases [97] | Fe | Nanoparticles | MRI | CREKA peptide | Thrombosis | Atherosclerotic |

DA, Dopamine; FA, Folic acid; FRs, folate receptors; Hsp, heat shock protein; MRI, Magnetic resonance imaging**;** OI, Optical imaging;PAMs, peptide amphiphile micelles; PMB, Polymyxin B; PSMA, prostate-specific membrane antigen; RGD, arginine-glycine-aspartic acid; ROS, locally reactive oxygen species; USI, Ultrasound imaging; VEGF, vascular endothelial growth factor.