~~What is claimed is:~~ CLAIMS:

~~1. A particle having at least one surface and an agent immobilized on the surface, wherein:~~

~~the agent selectively binds to a target that is a first member of a specific binding pair; and~~

~~binding of the target to the particle inhibits the interaction of the target with a second member of the specific binding pair.~~

~~2. A particle, comprising a surface and an agent immobilized on the surface, wherein:~~

~~the agent can selectively bind to a target; and~~

~~binding of an agent to the target inhibits interactions between the target and a cell.~~

~~3. The particle of claim 1 or 2, wherein the particle is shaped and sized to circulate in the vasculature of a subject.~~

~~4. The particle of any one of the preceding claims, wherein the particle is larger than 1 μπι.~~

~~5. The particle of any one of the preceding claims, wherein the longest dimension of the particle is no greater than about 5 μπι.~~

~~6. The particle of any one of the preceding claims, wherein the smallest dimension of the particle is at least about 300 nm.~~

~~7. The particle of any one of the preceding claims, further comprising a plurality of coating molecules.~~

~~8. The particle of claim 7, wherein:~~

~~the particle comprises an interior surface and an exterior surface;~~

~~the agent is immobilized on the interior surface and the exterior surface;~~

~~the plurality of coating molecules are bound to the exterior surface; and~~

~~the coating molecules inhibit interactions between the agent and molecules on a cell surface.~~

~~9. The particle of claim 7 or 8, wherein the plurality of coating molecules increases the clearance of the particle in vivo.~~

~~10. The particle of claim 9, wherein the plurality of coating molecules increase the clearance of the particle by phagocytosis, renal clearance, or hepatobiliary clearance.~~

~~11. The particle of claim 7 or 8, wherein the plurality of coating molecules decreases the clearance of the particle in vivo.~~

12. The particle of claim 7 or 8, wherein the plurality of coating molecules inhibits interactions between the agent and either cells or extracellular proteins.

13. The particle of any one of claims 7 to 12, wherein the plurality of coating molecules comprises a polymer.

14. The particle of any one of claims 7 to 13, wherein the plurality of coating molecules is biodegradable.

15. The particle of any one of the preceding claims, wherein the particle is dendritic.

16. The particle of any one of the preceding claims, wherein:

the particle is porous;

the surface comprises outer surfaces and inner surfaces; and

the inner surfaces consist of the inner walls of the pores of the particle.

17. The particle of claim 16, wherein the agent is immobilized on the inner surfaces.

18. The particle of claim 16 or 17, wherein a plurality of pores have a cross-sectional dimension of at least 50 nm.

19. The particle of any one of claims 16 to 18, wherein the particle has a porosity of about 40% to about 95%.

20. The particle of any one of claims 16 to 19, wherein the particle comprises metal, gold, alumina, glass, silica, silicon, starch, agarose, latex, plastic, polyacrylamide, methacrylate, a polymer, or a nucleic acid.

21. The particle of claim 20, wherein the particle comprises porous silicon.

22. The particle of any one of the preceding claims, wherein the particle is substantially cubic, pyramidal, conic, spherical, tetrahedral, hexahedral, octahedral, dodecahedral, or icosahedral.

23. The particle of any one of the preceding claims, wherein the particle comprises one or more outward-facing protrusions.

24. The particle of claim 23, wherein the particle comprises more than one outward-facing protrusion.

25. The particle of any one of the preceding claims, wherein the particle comprises:

one or more vertices; and

one or more outward-facing protrusions pointing outward from at least one of its vertices.

26. The particle of any one of claims 23 to 25, wherein one or more protrusions are sized and oriented to inhibit: (i) the agent immobilized on the surface of the particle from binding or activating a cell surface receptor protein and/or (ii) when the target is bound to

~~the agent, the interaction of the target and a second member of a specific binding pair of which the target is the first member.~~

~~27. The particle of any one of the preceding claims, wherein the particle comprises two intersecting ridges extending from the surface of the particle, and the ridges are sized and oriented to inhibit: (i) the agent immobilized on the surface of the particle from binding or activating a cell surface receptor protein and/or (ii) when the target is bound to the agent, the interaction of the target and a second member of a specific binding pair of which the target is the first member.~~

~~28. The particle of any one of the preceding claims, wherein the particle comprise a tube.~~

~~29. The particle of claim 28, wherein the agent is immobilized on the inner surface of the tube.~~

~~30. The particle of claim 28 or 29, wherein the tube comprises at least one open end.~~

~~31. The particle of any one of claims 28 to 30, wherein the tube is a cylindrical tube, triangular tube, square tube, pentagonal tube, hexagonal tube, heptagonal tube, octahedral tube, or an irregularly-shaped tube.~~

~~32. The particle of any one of claims 28 to 31, wherein the particle comprises more than one tube.~~

~~33. The particle of claim 32, wherein the particle comprises a lattice defined by a plurality of tubes.~~

~~34. The particle of any one of claims 28 to 33, wherein the tube comprises a protein, nucleic acid, or polymer.~~

~~35. The particle of any one of claims 1 to 22, wherein:~~

~~the particle comprises a core subparticle and a plurality of protecting subparticles; and~~

~~the agent is immobilized on the core subparticle.~~

~~36. The particle of claim 35, wherein the core subparticle is about 100 nm to about 2 μπι in size.~~

~~37. The particle of claim 35 or claim 36, wherein the protecting subparticles are about 10 nm to about 1 μπι in size.~~

~~38. The particle of any one of claims 35 to 37, wherein the particle comprises 4 to 10^6 protecting subparticles.~~

~~39. The particle of any one of claims 35 to 38, wherein the particle comprises more than one core subparticle.~~

40. The particle of any one of claims 1 to 14, wherein the particle is a 2-dimensional shape.

41. The particle of claim 40, wherein the shape is a circle, ring, cross, fishbone, ellipse, triangle, square, pentagon, hexagon, heptagon, octagon, or star.

42. The particle of any one of the preceding claims, wherein the agent is oriented on the particle such that it has a reduced ability to bind to a molecule on the surface of a cell.

43. The particle of claim 42, wherein the agent is oriented on the particle such that it has a reduced ability to bind to a target on the surface of a cell.

44. The particle of any one of the preceding claims, wherein the agent is oriented on the particle such that it is sterically inhibited from binding to a molecule on the surface of a cell.

45. The particle of claim 44, wherein the agent is oriented on the particle such that it is sterically inhibited from binding to a target on the surface of a cell.

46. The particle of any one of the preceding claims, wherein the surface is oriented such that the agent has a reduced ability to bind to a molecule on the surface of a cell.

47. The particle of any one of the preceding claims, wherein the agent has a reduced ability to activate a cell surface receptor protein, relative to the ability of a natural ligand of the cell surface receptor protein.

48. The particle of claim 47, wherein the agent does not activate the cell surface receptor protein.

49. The particle of any one of claims 1 to 48, wherein the particle comprises void space.

50. The particle of any one of claims 1 to 49, wherein the isoelectric point of the particle is about 5 to about 9.

51. The particle of any one of claims 1 to 50, wherein the target is a viral protein.

52. The particle of claim 51, wherein the viral protein is from arbovirus, adenovirus, alphavirus, arenaviruses, astrovirus, BK virus, bunyaviruses, calicivirus, cercopithecine herpes virus 1, Colorado tick fever virus, coronavirus, Coxsackie virus, Crimean-Congo hemorrhagic fever virus, cytomegalovirus, Dengue virus, ebola virus, echinovirus, echovirus, enterovirus, Epstein-Barr virus, flavivirus, foot-and-mouth disease virus, hantavirus, hepatitis A, hepatitis B, hepatitis C, herpes simplex virus I, herpes simplex virus II, human herpes virus, human immunodeficiency virus type I (HIV-I), human immunodeficiency vims type II (HIV-II),human papillomavirus, human T-cell leukemia virus type I, human T-cell leukemia virus type II, influenza, Japanese encephalitis, JC

virus, Junin virus, lentivirus, Machupo virus, Marburg virus, measles virus, mumps virus, naples virus, norovirus, Norwalk virus, orbiviruses, orthomyxovirus, papillomavirus, papovavirus, parainfluenza virus, paramyxovirus, parvovirus, picornaviridae, poliovirus, polyomavirus, poxvirus, rabies virus, reovirus, respiratory syncytial virus, rhinovirus, rotavirus, rubella virus, sapovirus, smallpox, togaviruses, Toscana virus, varicella zoster virus, West Nile virus, or Yellow Fever virus.

53. The particle of claim 51 or 52, wherein the viral protein is a viral capsid protein or a viral envelope protein.

54. The particle of any one or claims 1 to 50, wherein the target is a bacterial protein or a component of a bacterial cell wall.

55. The particle of claim 54, wherein the bacterial protein or cell wall component is from Actinomyces israelii, Bacillus anthracis, Bacillus cereus, Bacteroides fragilis, Bartonella henselae, Bartonella Quintana, Bordetella pertussis, Borrelia burgdorferi, Borrelia garinii, Borrelia afzelii, Borrelia recurrentis, Brucella abortus, Brucella canis, Brucella melitensis, Brucella suis, Campylobacter jejuni, Chlamydia pneumoniae, Chlamydia trachomatis, Chlamydophila psittaci, Clostridium botulinum, Clostridium difficile, Clostridium perfringens, Clostridium tetani, Corynebacterium diptheriae, Ehrlichia canis, Ehrlichia chaffeensis, Enterococcus faecalis, Enterococcus faecium, Escherichia coli, Francisella tularensis, Haemophilus influenzae, Haemophilus vaginalis, Helicobacter pylori, Klebsiella pneumoniae, Legionella pneumophila, Leptospira interrogans, Leptospira santarosai, Leptospira weilii, Leptospira noguchii, Listeria monocytogenes, Mycobacterium leprae, Mycobacterium tuberculosis, Mycobacterium ulcer ans, Mycoplasma pneumoniae, Neisseria gonorrhoeae, Neisseria meningitidis, Pseudomonas aeruginosa, Nocardia asteroides, Rickettsia rickettsii, Salmonella typhi, Salmonella typhimurium, Shigella sonnei, Shigella dysenteriae, Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus saprophyticus, Streptococcus agalactiae, Streptococcus pneumoniae, Streptococcus pyogenes, Streptococcus viridans, Treponema pallidum, Ureaplasma urealyticum, Vibrio cholerae, Yersinia pestis, Yersinia enterocolitica, or Yersinia pseudotuberculosis.

56. The particle of any one of claims 1 to 50, wherein the target is a yeast or fungal protein or a component of a yeast or fungal cell wall.

57. The particle of claim 56, wherein the yeast or fungal protein or cell wall component is from Apophysomyces variabilis, Aspergillus clavatus, Aspergillus flavus, Aspergillus fumigatus, Basidiobolus ranarum, Candida albicans, Candida glabrata,

Candida guilliermondii, Candida krusei, Candida lusitaniae, Candida parapsilosis, Candida tropicalis, Candida stellatoidea, Candida viswanathii, Conidiobolus coronatus, Conidiobolus incongruous, Cryptococcus albidus, Cryptococcus gattii, Cryptococcus laurentii, Cryptococcus neoformans, Encephalitozoon intestinalis, Enter ocytozoon bieneusi, Exophiala jeanselmei, Fonsecaea compacta, Fonsecaea pedrosoi, Geotrichum candidum, Histoplasma capsulatum, Lichtheimia corymbifera, Mucor indicus, Paracoccidioides brasiliensis, Phialophora verrucosa, Pneumocystis carinii, Pneumocystis jirovecii,

Pseudallescheria boydii, Rhinosporidium seeberi, Rhodotorula mucilaginosa, Stachybotrys chartarum, Syncephalastrum racemosum, or Rhizopus oryzae.

58. The particle of any one of claims 1 to 50, wherein the target is a protozoan protein.

59. The particle of claim 58, wherein the protozoan protein is from Cryptosporidium, Giardia intestinalis, Giardia lamblia, Leishmania aethiopica, Leishmania braziliensis, Leishmania donovani, Leishmania infantum, Leishmania major, Leishmania mexicana, Leishmania tropica, Plasmodium coatneyi, Plasmodium falciparum, Plasmodium garnhami, Plasmodium inui, Plasmodium odocoilei, Trichomonas gallinae, Trichomonas vaginalis, Tritrichomonas foetus, Trypanosoma brucei, Trypanosoma cruzi, Trypanosoma equiperdum, Trypanosoma evansi, Trypanosoma lewisi, Trypanosoma pestanai, Trypanosoma suis, or Trypanosoma vivax,

60. The particle of any one of claims 1 to 50, wherein the target is a toxin.

61. The particle of claim 60, wherein the toxin is a bacterial toxin, a plant toxin, or a zootoxin.

62. The particle of claim 60 or 61, wherein the toxin is melittin, brevetoxin, tetrodotoxin, chlorotoxin, tetanus toxin, bungarotoxin, Clostridium botulinum toxin, ricin, epsilon toxin of Clostridium perfringens, Staphylococcus enterotoxin B, or endotoxin.

63. The particle of any one of claims 1 to 50, wherein the target is a poison, venom, allergen, carcinogen, psychoactive drug, or an agent of a chemical weapon.

64. The particle of any one of claims 1 to 50, wherein the target is selected from TNFa, TNFP, a soluble TNF receptor, soluble T FR-1, soluble TNFR-2, lymphotoxin, lymphotoxin alpha, lymphotoxin beta, 4-lBB Ligand, CD30 Ligand, EDA-Al, LIGHT, TL1A, TWEAK, TRAIL, soluble TRAIL receptor, IL-1, soluble IL-1 receptor, IL-1A, soluble IL-1 A receptor, IL-1B, soluble IL-1B receptor, IL-2, soluble IL-2 receptor, IL-5, soluble IL-5 receptor, IL-6, soluble IL-6 receptor, IL-8, IL-10, soluble IL-10 receptor,

~~CXCLl, CXCL8, CXCL9, CXCLIO, CX3CL1, FAS ligand, soluble death receptor-3, soluble death receptor-4, soluble death receptor-5, TNF-related weak inducer of apoptosis, MMP1, MMP2, MMP3, MMP9, MMP10, MMP12, CD28, a soluble member of the B7 family, soluble CD80/B7-1, soluble CD86/B7-2, soluble CTLA4, soluble PD-L1, soluble PD-1, soluble Tim3, Tim3L, galectin 3, galectin 9, soluble CEACAM1, soluble LAG3, TGF-β, TGF-βI, TGF-P2, TGF-P3, anti-miillerian hormone, artemin, glial cell-derived neurotrophic factor, a bone morphogenic protein (e.g., BMP2, BMP3, BMP3B, BMP4, BMP 5, BMP6, BMP7, BMP8A, BMP8B, BMP10, BMP 1 1, BMP 12, BMP13, BMP 15), a growth differentiation factor (e.g., GDF 1, GDF2, GDF3, GDF3A, GDF5, GDF6, GDF7, GDF8, GDF9, GDF 10, GDF 1 1, GDF 15), inhibin alpha, inhibin beta (e.g., inhibin beta A, B, C, E), lefty, nodal, neurturin, persephin, myostatin, ghrelin, sLRl l, CCL2, CCL5, CCL1 1, CCL12, CCL19, interferon alpha, interferon beta, interferon gamma, clusterin, VEGF-A, granulocyte colony-stimulating factor (G-CSF), granulocyte-macrophage colony-stimulating factor (GM-CSF), prostaglandin E2, hepatocyte growth factor, nerve growth factor, sclerostin, complement C5, angiopoietin 2, angiopoietin 3, PCSK9, amyloid beta, activin, activin A, activin B, β2 microglobulin, soluble NOTCH1, soluble NOTCH2, soluble NOTCH3, soluble NOTCH4, haptoglobin, fibrinogen alpha chain, corticotropin releasing factor, corticotropin releasing factor type 1, corticotropin releasing factor type 2, urocortin 1, urocortin 2, urocortin 3, CD47, an anti-interferon γ autoantibody, an anti-interleukin 6 autoantibody, an anti-interleukin 17 autoantibody, an anti-ghrelin autoantibody, wnt, indoleamine 2,3-di oxygenase, C-reactive protein, and HIV-1 gpl20.~~

~~65. The particle of any one of claims 1 to 50 and 64, wherein the agent comprises an antibody, or an antigen-binding portion thereof, which specifically binds to TNFa, TNFP, a soluble TNF receptor, soluble TNFR-1, soluble TNFR-2, lymphotoxin, lymphotoxin alpha, lymphotoxin beta, 4-1BB Ligand, CD30 Ligand, EDA-A1, LIGHT, TL1A, TWEAK, TRAIL, soluble TRAIL receptor, IL-1, soluble IL-1 receptor, IL-1 A, soluble IL-1 A receptor, IL-IB, soluble IL-IB receptor, IL-2, soluble IL-2 receptor, IL-5, soluble IL-5 receptor, IL-6, soluble IL-6 receptor, IL-8, IL-10, soluble IL-10 receptor, CXCLl, CXCL8, CXCL9, CXCLIO, CX3CL1, FAS ligand, soluble death receptor-3, soluble death receptor-4, soluble death receptor-5, TNF-related weak inducer of apoptosis, MMPl, MMP2, MMP3, MMP9, MMP10, MMPl 2, CD28, a soluble member of the B7 family, soluble~~

~~CD80/B7-1, soluble CD86/B7-2, soluble CTLA4, soluble PD-L1, soluble PD-1, soluble Tim3, Tim3L, galectin 3, galectin 9, soluble CEACAM1, soluble LAG3, TGF-β, TGF-β I, TGF-P2, TGF-P3, anti-miillerian hormone, artemin, glial cell-derived neurotrophic factor, a bone morphogenic protein (e.g., BMP2, BMP3, BMP3B, BMP4, BMP5, BMP6, BMP7, BMP8A, BMP8B, BMP10, BMP 1 1, BMP 12, BMP13, BMP 15), a growth differentiation factor (e.g., GDF 1, GDF2, GDF3, GDF3A, GDF5, GDF6, GDF7, GDF8, GDF9, GDF 10, GDF 1 1, GDF 15), inhibin alpha, inhibin beta (e.g., inhibin beta A, B, C, E), lefty, nodal, neurturin, persephin, myostatin, ghrelin, sLRl l, CCL2, CCL5, CCLl l, CCL12, CCL19, interferon alpha, interferon beta, interferon gamma, clusterin, VEGF-A, granulocyte colony-stimulating factor (G-CSF), granulocyte-macrophage colony-stimulating factor (GM-CSF), prostaglandin E2, hepatocyte growth factor, nerve growth factor, sclerostin, complement C5, angiopoietin 2, angiopoietin 3, PCSK9, amyloid beta, activin, activin A, activin B, β2 microglobulin, soluble NOTCH1, soluble NOTCH2, soluble NOTCH3, soluble NOTCH4, haptoglobin, fibrinogen alpha chain, corticotropin releasing factor, corticotropin releasing factor type 1, corticotropin releasing factor type 2, urocortin 1, urocortin 2, urocortin 3, CD47, an anti -interferon γ autoantibody, an anti-interleukin 6 autoantibody, an anti-interleukin 17 autoantibody, an anti -ghrelin autoantibody, wnt, indoleamine 2,3 -di oxygenase, C-reactive protein, or HIV-1 gpl20.~~

~~66. The particle of any one of claims 1 to 50 and 64, wherein the agent comprises TNFa, T Fp, a soluble TNF receptor, soluble TNFR-1, soluble TNFR-2, vTNF, lymphotoxin, lymphotoxin alpha, lymphotoxin beta, 4-1BB Ligand, CD30 Ligand, EDA-Al, LIGHT, TLIA, TWEAK, TRAIL, soluble TRAIL receptor, IL-1, soluble IL-1 receptor, IL-1 A, soluble IL-1 A receptor, IL-1B, soluble IL-1B receptor, IL-2, soluble IL-2 receptor, IL-5, soluble IL-5 receptor, IL-6, soluble IL-6 receptor, IL-8, IL-10, soluble IL-10 receptor, CXCL1, CXCL8, CXCL9, CXCL10, CX3CL1, FAS ligand, soluble death receptor-3, soluble death receptor-4, soluble death receptor-5, T F-related weak inducer of apoptosis, MMP1, MMP2, MMP3, MMP9, MMP10, MMP12, CD28, a soluble member of the B7 family, soluble CD80/B7-1, soluble CD86/B7-2, soluble CTLA4, soluble PD-L1, soluble PD-1, soluble Tim3, Tim3L, galectin 3, galectin 9, soluble CEACAM1, soluble LAG3, TGF-β, TGF-βI, TGF-p2, TGF-p3, sLRl l, CCL2, CCL5, CCLl l, CCL12, CCL19, activin, activin A, activin B, soluble NOTCH1, soluble NOTCH2, soluble NOTCH3, soluble NOTCH4, soluble Jagged 1, soluble Jagged2, soluble DLL1, soluble DLL3, soluble DLL4, or haptoglobin.~~

67. The particle of any one of claims 1 to 50, 64, and 65, wherein the agent comprises ipilimumab, pembrolizumab, nivolumab, infliximab, adalimumab, certolizumab, golimumab, etanercept, stamulumab, fresolimumab, metelimumab, demcizumab, tarextumab, brontictuzumab, mepolizumab, urelumab, canakinumab, daclizumab, belimumab, denosumab, eculizumab, tocilizumab, atlizumab, ustekinumab, palivizumab, bevacizumab, brolucizumab, ranibizumab, aflibercept, actoxumab, elsilimomab, siltuximab, afelimomab, nerelimomab, ozoralizumab, pateclizumab, sirukumab, omalizumab, aducanumab, bapineuzumab, crenezumab, gantenerumab, ponezumab, solanezumab, dapirolizumab, ruplizumab, toralizumab, enoticumab, alacizumab, cetuximab, futuximab, icrucumab, imgatuzumab, matuzumab, necitumumab, nimotuzumab, panitumumab, ramucirumab, zalutumumab, duligotumab, patritumab, ertumaxomab, pertuzumab, trastuzumab, alirocumab, anrukinzumab, diridavumab, drozitumab, dupilumab,
dusigitumab, eculizumab, edobacomab, efungumab, eldelumab, enoblituzumab, enokizumab, evinacumab, evolocumab, exbivirumab, exbivirumab, fasinumab, felvizumab, fezakinumab, ficlatuzumab, firivumab, fletikumab, foralumab, foravirumab, fulranumab, faliximab, ganitumab, gevokizumab, fuselkumab, idarucizumab, imalumab, inolimomab, iratumumab, ixekizumab, lampalizumab, lebrikizumab, lenzilumab, lerdelimumab, lexatumumab, libivirumab, ligelizumab, lodelcizumab, lulizumab, mapatumumab, motavizumab, namilumab, nebacumab, nesvacumab, obiltoxaximab, olokizumab, orticumab, pagibaximab, palivizumab, panobacumab, pascolizumab, perakizumab, pidilizumab, pexelizumab, pritoxaximab, quilizumab, radretumab, rafivirumab,
ralpancizumab, raxibacumab, regavirumab, reslizumab, rilotumumab, romosozumab, rontalizumab, sarilumab, secukinumab, setoxaximab, sevirumab, sifalimumab, siltuximab, suvizumab, tabalumab, tacatuzumab, talizumab, tanezumab, tefibazumab, TGN1412, tildrakizumab, tigatuzumab, TNX-650, tosatoxumab, tralokinumab, tremelimumab, trevogrumab, tuvirumab, urtoxazumab, vantictumab, vanucizumab, or an antigen-binding portion of any one of the foregoing.

68. The particle of any one of the preceding claims, wherein the target is a soluble biomolecule.

69. The particle of any one of the preceding claims, wherein the target is:

a target as described anywhere herein, supra;

a biomolecule as described anywhere herein, supra;

a soluble biomolecule as described anywhere herein, supra; or

an antigen of an antibody as described anywhere herein, supra.

70. The particle of any one of the preceding claims, wherein:

the agent is an agent as described anywhere herein, supra;

the agent comprises an antibody, wherein the antibody is described anywhere herein, supra;

the agent comprises an antigen-binding portion of an antibody, wherein the antibody is described anywhere herein, supra; or

the agent comprises an antibody, or an antigen-binding portion thereof, that specifically binds to a target, biomolecule, or soluble biomolecule, wherein the target, biomolecule, or soluble biomolecule is described anywhere herein, supra.

71. The particle of any one of the preceding claims, wherein the longest dimension of the particle is no greater than about 1 μπι.

72. The particle of any one of the preceding claims, wherein:

the target is a soluble biomolecule;

the soluble biomolecule is a form of a cell surface receptor protein; and

the agent is oriented on the particle such that it is sterically inhibited from binding or activating the cell surface receptor protein on the surface of a cell.

73. A particle having at least one surface and an agent immobilized on the surface, wherein:

the agent selectively binds to a soluble biomolecule;

the soluble biomolecule is a form of a cell surface receptor protein; and

the agent is oriented on the particle such that the agent is sterically inhibited from binding or activating the cell surface receptor protein on the surface of a cell.

74. The particle of any one of the preceding claims, wherein the agent is a ligand of a cell surface receptor protein.

75. The particle of claim 74, wherein the agent is a natural ligand of the cell surface receptor protein.

76. The particle of any one of claims 72 to 75, wherein the cell surface receptor protein is expressed by a cancer cell.

77. The particle of any one of claims 72 to 76, wherein the cell surface receptor protein is a protein shed by a cancer cell as a soluble form of the cell surface receptor protein.

78. The particle of any one of claims 72 to 77, wherein the cell surface receptor protein, when activated on a cell surface, induces apoptosis.

79. The particle of any one of claims 72 to 78, wherein the cell surface receptor protein is a tumor necrosis factor receptor (TNFR) protein.

80. The particle of any one of claims 72 to 78, wherein the cell surface receptor protein is a Fas receptor protein.

81. The particle of any one of claims 72 to 78, wherein the cell surface receptor protein is a TNF-related apoptosis-inducing ligand receptor (TRAILR) protein, 4- IBB receptor protein, CD30 protein, EDA receptor protein, HVEM protein, lymphotoxin beta receptor protein, DR3 protein, or TWEAK receptor protein.

82. The particle of any one of claims 72 to 81, wherein the agent comprises a tumor necrosis factor (TNF) family ligand or a variant thereof.

83. The particle of claim 82, wherein the TNF family ligand is TNFoc.

84. The particle of claim 82, wherein the TNF family ligand is selected from Fas ligand, lymphotoxin, lymphotoxin alpha, lymphotoxin beta, 4-lBB Ligand, CD30 Ligand, EDA-Al, LIGHT, TL1A, TWEAK, TNF , and TRAIL.

85. The particle of any one of claims 72 to 78, wherein the cell surface receptor protein is an interleukin receptor protein.

86. The particle of claim 85, wherein the interleukin receptor protein is an IL-2 receptor protein.

87. The particle of claim 85 or 86, wherein the agent is an interleukin protein or variant thereof.

88. The particle of claim 87, wherein the interleukin protein is an IL-2 protein.

89. A plurality of particles according to any one of the preceding claims.

90. The plurality of particles of claim 89, wherein the mean particle size is greater than 1 μιη.

91. The plurality of particles of claim 89, wherein the mean particle size is 1 μιη to 5 μιη.

92. A method for treating a subject afflicted with a cancer, comprising administering to the subject the plurality of particles of any one of claims 89 to 91, wherein:

the cancer comprises cells that shed a soluble form of at least one cell surface receptor protein; and

the plurality of particles inhibits the biological activity of the shed soluble form of the at least one cell surface receptor protein, thereby treating the cancer.

93. The method of claim 92, wherein the cancer cells shed a soluble form of TNF receptor.

94. The method of claim 93, wherein each particle of the plurality comprises an agent comprising a T Foc polypeptide or a variant thereof.

95. The method of claim 92, wherein the cancer cells shed a soluble form of IL-2 receptor.

96. The method of claim 95, wherein each particle of the plurality comprises an agent comprising a IL-2 polypeptide or a variant thereof.

97. The method of any one of claims 92 to 96, wherein the subject has received adoptive cell transfer therapy (ACT).

98. The method of any one of claims 92 to 97, further comprising administering adoptive cell transfer therapy to the subject.

99. The method of claim 97 or 98, wherein the adoptive cell transfer therapy is the administration of a composition comprising lymphocytes to the subject.

100. The method of claim 99, wherein the lymphocytes are tumor-infiltrating lymphocytes (TILs).

101. The method of claim 99 or 100, wherein the lymphocytes comprise a chimeric antigen receptor (CAR).

102. A method for treating a subject afflicted with an autoimmune disease, comprising administering to the subject a plurality of particles of any one of claims 89 to 91.

103. The method of claim 102, wherein the target is interleukin 1A, interleukin IB, interleukin 2, interleukin 5, interleukin 6, interleukin 8, tumor necrosis factor alpha, fas ligand, TNF-related apoptosis inducing ligand, CXCL8, CXCLl, CD80/B7-1, CD86/B7-2, or PD-L1.

104. A method for treating a subject afflicted with a neurodegenerative disease, comprising administering to the subject a plurality of particles of any one of claims 89 to 91.

105. The method of claim 104, wherein the target is amyloid β.

106. A method of promoting healthy aging in a subject, comprising administering to the subject a plurality of particles of any one of claims 89 to 91.

107. The method of claim 106, wherein the target is TGF βI, CCLl 1, MCP-1/CCL2, beta-2 microglobulin, GDF-8/myostatin, or haptoglobin.

108. A method for treating a metabolic disorder in a subject, comprising administering to the subject a plurality of particles of any one of claims 89 to 91.

~~109. The method of claim 108, wherein the target is ghrelin, an anti-ghrelin autoantibody, or Cortisol.~~

~~110. A method for increasing muscle mass in a subject, comprising administering to the subject a plurality of particles of any one of claims 89 to 91.~~

~~111. The method of claim 110, wherein the target is myostatin or TGF-βI .~~

~~112. The method of any one of claims 92 to 111, wherein the subject is a mammal.~~

~~113. The method of claim 112, wherein the subject is a human.~~

1. A particle having at least one surface and an agent immobilized on the surface, wherein:

the agent selectively binds to a target that is a first member of a specific binding pair;

binding of the target to the particle inhibits the interaction of the target with a second member of the specific binding pair; and

(i) the particle comprises a coating, wherein the coating inhibits the agent from binding to a molecule on the surface of a cell, or

(ii) the particle comprises a core subparticle and a plurality of protecting subparticles;

the agent is immobilized on the core subparticle; and

the plurality of protecting subparticles inhibits the agent from binding to a molecule on the surface of a cell.

2. A particle, comprising a surface and an agent immobilized on the surface, wherein:

the agent can selectively bind to a target;

binding of the agent to the target inhibits interactions between the target and a cell; and

(i) the particle comprises a coating, wherein the coating inhibits the agent from binding to a molecule on the surface of a cell, or

(ii) the particle comprises a core subparticle and a plurality of protecting subparticles;

the agent is immobilized on the core subparticle; and

the plurality of protecting subparticles inhibits the agent from binding to and a molecule on the surface of a cell.

3. The particle of claim 1 or 2, wherein

the particle comprises a coating, and

the coating comprises a plurality of coating moieties or coating molecules.

4. The particle of claim 3, wherein the plurality of coating moieties or coating molecules inhibits interactions between the agent and molecules on a cell surface.

5. The particle of claim 3 or 4, wherein the plurality of coating moieties or coating molecules increases the clearance of the particle *in vivo*.

6. The particle of claim 5, wherein the plurality of coating moieties or coating molecules increase the clearance of the particle by phagocytosis, renal clearance, or hepatobiliary clearance.

7. The particle of claim 3 or 4, wherein the plurality of coating moieties or coating molecules decreases the clearance of the particle *in vivo*.

8. The particle of any one of claims 3 to 7, wherein the plurality of coating moieties or coating molecules comprises a polymer.

9. The particle as claimed in claim 8, wherein the polymer is selected from polyethylene glycol (PEG), a sugar, a lipid, a poly(amino acid), polyglutamic acid, polylactate, a polylactic acid, polyglycolic acid (PGA), polylactic acid (PLA), poly(lactic-co-glycolic acid) (PLGA), polyvinyl acetate (PVA), and a combination or copolymer thereof.

10. The particle of any one of claims 3 to 8, wherein the plurality of coating moieties or coating molecules is biodegradable.

11. The particle of any one of claims 3 to 10, wherein:
the particle comprises an interior surface and an exterior surface;
the agent is immobilized on the interior surface and the exterior surface;
the plurality of coating moieties or coating molecules are bound to the exterior surface; and
the coating moieties or coating molecules inhibit interactions between the agent and molecules on a cell surface.

12. The particle of any one of claims 1-11, wherein:
the particle is porous;
the surface comprises exterior surfaces and interior surfaces; and
the inner surfaces consist of the interior walls of the pores of the particle.

13. The particle of claim 12, wherein the agent is immobilized on the interior surfaces.

14. The particle of any one of claims 1-13,
wherein the particle is dendritic;
wherein the particle is substantially cubic, pyramidal, conic, spherical, tetrahedral, hexahedral, octahedral, dodecahedral, or icosahedral;
wherein the particle comprises one or more outward-facing protrusions;
wherein the particle comprises two intersecting ridges extending from the surface of the particle;
wherein the particle comprises a tube; or
wherein the particle is a 2-dimensional shape.

15. The particle of any one of claims 1-14, wherein:
the particle comprises a core subparticle and a plurality of protecting subparticles; and
the agent is immobilized on the core subparticle.

16. The particle of claim 15, wherein the core subparticle is about 100 nm to about 2 μm in size.

17. The particle of claim 15 or claim 16, wherein the protecting subparticles are about 10 nm to about 1 μm in size.

18. The particle of any one of claims 15 to 17, wherein the particle comprises 4 to 10^6 protecting subparticles.

19. The particle of any one of claims 15 to 18, wherein the particle comprises more than one core subparticle.

20. The particle of any one of claims 1-19, wherein

(i) the coating sterically inhibits the agent from binding to a molecule on the surface of a cell, or

(ii) the plurality of protecting subparticles sterically inhibits the agent from binding to a molecule on the surface of a cell.

21. The particle of claim 20, wherein

(i) the coating sterically inhibits the agent from binding to a target on the surface of a cell, or

(ii) the plurality of protecting subparticles sterically inhibits the agent from binding to a target on the surface of a cell.

22. The particle of any one of the preceding claims, wherein

(i) the coating reduces the agent's ability to activate a cell surface receptor protein on the surface of a cell, relative to the ability of a natural ligand of the cell surface receptor protein, or

(ii) the plurality of protecting subparticles reduces the agent's ability to activate a cell surface receptor protein on the surface of a cell, relative to the ability of a natural ligand of the cell surface receptor protein.

23. The particle of claim 22, wherein the agent does not activate the cell surface receptor protein on the surface of a cell.

24. The particle of any one of claims 1-23, wherein the target is a viral protein, a bacterial protein or a component of a bacterial cell wall, a yeast or fungal protein or a component of a yeast or fungal cell wall, a protozoan protein, a toxin, a poison, venom, allergen, carcinogen, psychoactive drug, or an agent of a chemical weapon.

25. The particle of any one of claims 1-23, wherein the target is selected from TNFα, TNFβ, a soluble TNF receptor, soluble TNFR-1, soluble TNFR-2, lymphotoxin, lymphotoxin alpha, lymphotoxin beta, 4-1BB Ligand, CD30 Ligand, EDA-A1, LIGHT, TL1A, TWEAK, TRAIL, soluble TRAIL receptor, IL-1, soluble IL-1 receptor, IL-1A, soluble IL-1A receptor, IL-1B, soluble IL-1B receptor, IL-2, soluble IL-2 receptor, IL-5,

soluble IL-5 receptor, IL-6, soluble IL-6 receptor, IL-8, IL-10, soluble IL-10 receptor, CXCL1, CXCL8, CXCL9, CXCL10, CX3CL1, FAS ligand, soluble death receptor-3, soluble death receptor-4, soluble death receptor-5, TNF-related weak inducer of apoptosis, MMP1, MMP2, MMP3, MMP9, MMP10, MMP12, CD28, a soluble member of the B7 family, soluble CD80/B7-1, soluble CD86/B7-2, soluble CTLA4, soluble PD-L1, soluble PD-1, soluble Tim3, Tim3L, galectin 3, galectin 9, soluble CEACAM1, soluble LAG3, TGF-β, TGF-β1, TGF-β2, TGF-β3, anti-müllerian hormone, artemin, glial cell-derived neurotrophic factor, a bone morphogenic protein (*e.g.*, BMP2, BMP3, BMP3B, BMP4, BMP5, BMP6, BMP7, BMP8A, BMP8B, BMP10, BMP 11, BMP 12, BMP13, BMP15), a growth differentiation factor (*e.g.*, GDF1, GDF2, GDF3, GDF3A, GDF5, GDF6, GDF7, GDF8, GDF9, GDF10, GDF11, GDF15), inhibin alpha, inhibin beta (*e.g.*, inhibin beta A, B, C, E), lefty, nodal, neurturin, persephin, myostatin, ghrelin, sLR11, CCL2, CCL5, CCL11, CCL12, CCL19, interferon alpha, interferon beta, interferon gamma, clusterin, VEGF-A, granulocyte colony-stimulating factor (G-CSF), granulocyte-macrophage colony-stimulating factor (GM-CSF), prostaglandin E2, hepatocyte growth factor, nerve growth factor, sclerostin, complement C5, angiopoietin 2, angiopoietin 3, PCSK9, amyloid beta, activin, activin A, activin B, β2 microglobulin, soluble NOTCH1, soluble NOTCH2, soluble NOTCH3, soluble NOTCH4, haptoglobin, fibrinogen alpha chain, corticotropin releasing factor, corticotropin releasing factor type 1, corticotropin releasing factor type 2, urocortin 1, urocortin 2, urocortin 3, CD47, an anti-interferon γ autoantibody, an anti-interleukin 6 autoantibody, an anti-interleukin 17 autoantibody, an anti-ghrelin autoantibody, wnt, indoleamine 2,3-dioxygenase, C-reactive protein, and HIV-1 gp120.

26. The particle of claim 25, wherein the target is soluble PD-1 or soluble PD-L1.

27. The particle of any one of claims 1-26, wherein the target is a soluble biomolecule.

28. The particle of any one of claims 1-27, wherein:
the target is a soluble biomolecule;
the soluble biomolecule is a form of a cell surface receptor protein; and
(i) the coating sterically inhibits the agent from binding or activating the cell surface receptor protein on the surface of a cell, or

(ii) the plurality of protecting subparticles inhibits the agent from binding or activating the cell surface receptor protein on the surface of a cell.

29. A particle having at least one surface and an agent immobilized on the surface, wherein:
the agent selectively binds to a soluble biomolecule;
the soluble biomolecule is a form of a cell surface receptor protein; and
(i) the particle comprises a coating, wherein the coating sterically inhibits the agent from binding or activating the cell surface receptor protein on the surface of a cell, or
(ii) the particle comprises a core subparticle and a plurality of protecting subparticles;
the agent is immobilized on the core subparticle; and
the plurality of protecting subparticles sterically inhibits the agent from binding or activating the cell surface receptor protein on the surface of a cell.

30. The particle of any one of claims 1-29, wherein the agent is a small molecule, a macrocycle compound, a polypeptide, a protein, a peptide, a peptidomimetic compound, an antibody, a biomolecule-binding fragment of an antibody, a non-antibody scaffold protein, an aptamer, a nucleic acid, or a nucleic acid analog.

31. The particle of any one of claims 1-30, wherein the agent comprises:
(i) an antibody or a biomolecule-binding fragment of an antibody,
(ii) a non-antibody scaffold protein,
(iii) a nucleic acid or an aptamer,
(iv) an interleukin protein or variant thereof,
(v) a tumor necrosis factor (TNF) family ligand or a variant thereof,
(vi) a cytokine or a chemokine,
(vii) an enzyme,
(viii) a cell surface receptor protein;
(ix) a ligand of a cell surface receptor protein; or
(viii) a natural ligand of the target.

32. The particle of any one of claims 1-30, wherein the agent comprises
(i) an antibody or an antigen-binding portion of an antibody that specifically binds to PD-1 or PD-L1, or

(ii) PD1 or ligand of PD1.

33. The particle of any one of claims 1-30, wherein the agent comprises nivolumab, pidilizumab or pembrolizumab.

34. The particle of any one of claims 1-30, wherein the agent

(i) is a biomolecule-binding fragment of an antibody, wherein the biomolecule-binding fragment is selected from a Fab fragment, a $F(ab)_2$ fragment, an scFv fragment, and a domain antibody;

(ii) is the Z domain of *S. aureus* protein A, human transferrin, human tenth fibronectin type III domain, kunitz domain of a human trypsin inhibitor, human CTLA-4, an ankyrin repeat protein, a human lipocalin, human crystallin, human ubiquitin, or a trypsin inhibitor from *E. elaterium*;

(iii) is an IL-2 protein or variant thereof;

(iv) comprises a tumor necrosis factor (TNF) family ligand, wherein the TNF family ligand is TNFα or a variant thereof or is selected from Fas ligand, lymphotoxin, lymphotoxin alpha, lymphotoxin beta, 4-IBB Ligand, CD30 Ligand, EDA-Al, LIGHT, TLA1, TWEAK, TNF, TRAIL, and a variant of any of the foregoing; or

(v) is an aptamer.

35. The particle of any one of claims 1-30, wherein the agent is a ligand of a cell surface receptor protein.

36. The particle of claim 35, wherein the agent is a natural ligand of the cell surface receptor protein.

37. The particle of claim 35 or 36, wherein the cell surface receptor protein is expressed by a cancer cell.

38. The particle of any one of claims 35-37, wherein the cell surface receptor protein is a protein shed by a cancer cell as a soluble form of the cell surface receptor protein.

39. The particle of any one of claims 35-38, wherein the cell surface receptor protein, when activated on a cell surface, induces apoptosis.

40. The particle of any one of claims 35-39, wherein the cell surface receptor protein is a tumor necrosis factor receptor (TNFR) protein.

41. The particle of any one of claims 1-40, wherein the longest average dimension of the particle is no greater than 300 nm.

42. Use of the particle of any one of claims 1-41 in the manufacture of a medicament for treating a subject afflicted with cancer, an autoimmune disease, a neurodegenerative disease, a metabolic disorder, or for promoting healthy aging or increasing muscle mass in a subject.

43. The particle of any one of claims 1-41 for use in therapy.