CLAIMS

1. A particle comprising a first plurality of reactive groups, wherein:

each reactive group of the first plurality of reactive groups can selectively react with a first agent comprising a first predetermined functional group;

each reactive group of the first plurality of reactive groups is disposed on the particle such that after the first agent is linked to that reactive group through the first predetermined functional group, the first agent has a reduced ability to bind to a molecule on the surface of a cell;

the particle comprises a plurality of coating molecules, wherein the plurality of coating molecules comprises a polymer; and

the longest dimension of the particle is about 50 nm to about 5 μm.

2. The particle of claim 1, wherein each reactive group of the first plurality of reactive groups comprises an alkene, alkyl halide, alkyne, amine, aryl azide, aryl halides, azide, carbodiimide, carboxyl, diene, dienophile, glyoxal, haloacyl, imidoester, isocyanide, maleimide, N-hydroxysuccinimidyl ester, phosphine, tetrazine, thiol, nucleic acid, biotin, or biotin-binding protein.

3. The particle of claim 1, further comprising a second plurality of reactive groups, wherein:

each reactive group of the second plurality of reactive groups can selectively react with a second agent comprising a second predetermined functional group;

each reactive group of the second plurality of reactive groups is disposed on the particle such that after the second agent is linked to that reactive group through the second predetermined functional group, the second agent has a reduced ability to bind to a molecule on the surface of a cell; and

the longest dimension of the particle is about 50 nm to about 5 μm.

4. The particle of claim 3, wherein the first predetermined functional group is different from the second predetermined functional group.

5. The particle of claim 3, wherein:

the first predetermined functional group is the same as the second predetermined functional group; and

at least one reactive group of the first plurality of reactive groups and the second plurality of reactive groups is protected by a protecting group.

6. The particle of claim 1, wherein the particle is shaped and sized to circulate in the vasculature of a subject.

7. The particle of claim 1, wherein:

the particle comprises an interior surface and an exterior surface;

the plurality of coating molecules is bound to the exterior surface;

each reactive group of the first plurality of reactive groups is located on the interior surface or the exterior surface; and

after the first agent is linked to a member of the first plurality of reactive groups through the first predetermined functional group, the coating molecules inhibit the first agent linked to a member of the first plurality of reactive groups located on the exterior surface from binding to a molecule on the surface of a cell.

8. The particle of claim 1, wherein:

the particle is porous;

the particle comprises outer surfaces and inner surfaces;

the inner surfaces consist of the inner walls of the pores of the particle; and

the reactive groups of the first plurality of the reactive groups are located on the inner surfaces of the particle.

9. The particle of claim 1, wherein:

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

the reactive groups of the first plurality of the reactive groups are located on the core subparticle.

10. The particle of claim 9, wherein the particle comprises 4 to 10^6 protecting subparticles.

11. The particle of claim 9, wherein the particle comprises more than one core subparticle.

12. The particle of claim 1, wherein the reactive groups of the first plurality of the reactive groups are disposed on the particle such that after the first agent is linked to a member of the first plurality of reactive groups through the first predetermined functional group, the first agent has a reduced ability to bind to a target on the surface of a cell, or to bind or activate a cell surface receptor protein on the surface of a cell.

13. The particle of claim 1, wherein each reactive group of the first plurality of reactive groups is configured such that after the first agent is linked to a member of the first plurality of reactive groups through the first predetermined functional group, the first agent has a lower binding affinity for membrane-associated forms of a target biomolecule than the binding affinity of the first agent that is free in solution for the same target biomolecule.

14. The particle of claim 13, wherein

the association constant of the first agent linked to a member of the first plurality of reactive groups and a membrane-associated form of a target biomolecule ($k_{a,\ particle}$) is less than 0.1 times the association constant of the first agent and the membrane-associated form of a target biomolecule when the first agent is free in solution ($k_{a,\ free}$; $k_{a,\ particle} \div k_{a,\ free} \leq 0.1$); or wherein

the equilibrium constant of the first agent linked to a member of the first plurality of reactive groups and a membrane-associated form of a target biomolecule ($K_{D,\ particle}$) is greater than 5 times the equilibrium constant of the first agent and the membrane-associated form of a target biomolecule when the first agent is free in solution ($K_{D,\ free}$; $K_{D,\ particle} \div K_{D,\ free} > 5$).

15. The particle of claim 1, wherein each reactive group of the first plurality of reactive groups is configured such that after the first agent is linked to a member of the first plurality of reactive groups through the first predetermined functional group, the first agent has about the same binding affinity for soluble forms of a target biomolecule relative to the binding affinity of the first agent that is free in solution for the same target biomolecule.

16. The particle of claim 15, wherein:

the association constant of the first agent linked to a member of the first plurality of reactive groups and a soluble form of a target biomolecule ($k_{a,\ particle}$) is from 0.1 to 10 times the association constant of the first agent and the soluble form of a target biomolecule when the first agent is free in solution ($k_{a,\ free}$; $0.1 \leq k_{a,\ particle} \div k_{a,\ free} \leq 10$); or wherein:

the equilibrium constant of the first agent linked to a member of the first plurality of reactive groups and a soluble form of a target biomolecule ($K_{D,\ particle}$) is from 0.1 to 10 times the equilibrium constant of the first agent and the soluble form of a target biomolecule when the first agent is free in solution ($K_{D,\ free}$; $0.1 \leq K_{D,\ particle} \div K_{D,\ free} \leq 10$).

17. A method for making a scavenging particle, comprising reacting the particle of claim 1 with a plurality of first agents, wherein:

each first agent of the plurality of first agents is coupled to a member of the first plurality of reactive groups through the first predetermined functional group.

18. The particle of claim 1, wherein:

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

the reactive groups of the first plurality of reactive groups are located on the interior surface.

19. The particle of claim 1, wherein:

the particle comprises an interior surface and an exterior surface;

the particle comprises a first plurality of reactive groups and a second plurality of reactive groups;

the reactive groups of the first plurality of reactive groups are located on the interior surface; and

the reactive groups of the second plurality of reactive groups are located on the exterior surface.

20. The particle of claim 1, wherein at least one of the reactive groups of the first plurality of reactive groups is oriented on the particle relative to the plurality of coating molecules such that after the first agent is linked to that reactive group through the first predetermined functional group, the plurality of coating molecules sterically inhibits the first agent from binding to a molecule on the surface of a cell.