

What is claimed is:

1. A process for preparing a treated red blood cell composition comprising:
 - (a) mixing
 - (i) an effective amount of a pathogen-inactivating compound comprising a functional group which is, or which forms, a reactive electrophilic group;
 - (ii) an effective amount of a quencher comprising a thiol group, wherein the thiol is capable of reacting with the reactive electrophilic group of the pathogen-inactivating compound;
 - (iii) a composition comprising red blood cells; and
 - (iv) about 0.5 to 1.5 equivalents of base, wherein an equivalent means a molar amount that is equivalent to the molar amount of quencher in the mixture;

in a treatment solution or diluent solution;

wherein the treatment solution or diluent solution comprises one or more of dextrose, adenine, mannitol, citrate, and citric acid; and

wherein the mixture of step (a) after addition of the treatment solution or diluent solution comprises between about 40 mM and 100 mM chloride ion; and

 - (b) replacing the solution used during the treatment of the red blood cell composition in step (a) with a final additive solution, such that the concentration of the quencher in the mixture is decreased to an amount which reduces the level of red blood cell dehydration resulting from storage of the mixture relative to the level of red blood cell dehydration resulting from storage of the mixture at the original concentration of quencher.
2. The process of claim 1, wherein the treatment solution further comprises one or more of phosphate and chloride.
3. The process of claim 1 or 2, wherein the diluent solution further comprises phosphate.
4. The process of any one of claims 1-3, wherein in (iii), the composition comprising red blood cells further comprises an additive solution.
5. The process of any one of claims 1-4, wherein the base is NaOH.
6. The process of any one of claims 1-5, wherein the base:

- (i) comprises about 0.75 to 1.25 equivalents of base, wherein an equivalent means a molar amount that is equivalent to the molar amount of quencher in step (a) of the mixture; or
 - (ii) comprises about 1 equivalent of base, wherein an equivalent means a molar amount that is equivalent to the molar amount of quencher in step (a) of the mixture.
- 7. The process of any one of claims 1-6, wherein the resulting mixture of step (a) has a pH at 37 °C of about 6.0 to 7.5.
- 8. The process of any one of claims 1-7, wherein the quencher comprises cysteine or a derivative of cysteine.
- 9. The process of claim 8, wherein the quencher is:
 - (i) glutathione or a pharmaceutically acceptable salt thereof; or
 - (ii) glutathione monosodium salt.
- 10. The process of any one of claims 1-9, wherein the quencher in the resulting mixture of step (a) is at a concentration of about 20 mM.
- 11. The process of any one of claims 1-10, wherein step (b) comprises centrifugation of the mixture followed by removal of the supernatant of the mixture.
- 12. The process of any one of claims 1-10, wherein step (b) comprises size-exclusion separation.
- 13. The process of any one of claims 1-10, wherein step (b) comprises use of expression devices.
- 14. The process of any one of claims 1-13, wherein the quencher in the resulting mixture of step (b) is at a concentration of less than about 10 mM.
- 15. The process of any one of claims 1-14, wherein the pathogen-inactivating compound comprises a nucleic acid binding ligand that is an intercalator.
- 16. The process of claim 15, wherein the intercalator is an acridine.
- 17. The process of claim 15 or 16, wherein the pathogen-inactivating compound is β -alanine, N-(acridin-9-yl), 2-[bis(2-chloroethyl)amino]ethyl ester.
- 18. The process of any one of claims 1-17, wherein the concentration of the pathogen inactivating compound in the resulting mixture of step (a) is about 0.1 μ M to about 5 mM.
- 19. The process of any one of claims 1-18, wherein the concentration of the pathogen-inactivating compound in the resulting mixture of step (a) is sufficient to

inactivate at least 3 logs of a pathogen in the red blood cell composition, if present.

20. The process of any one of claims 1-19, wherein the time between step (a) and step (b) is about 1 to 48 hours or about 4 to 30 hours.
21. The process of any one of claims 1-20, wherein following step (a), the red blood cells of the resulting mixture have an antibody binding capacity (ABC) of less than 55% compared to the ABC value of red blood cells from the same method under the same conditions, but without the use of base.
22. The process of any one of claims 1-21, wherein the red blood cells of the resulting mixture:
 - (i) have less than 1% hemolysis at a time of 42 days at 4 °C following step (b); and/or
 - (ii) have a Packed Cell Volume of greater than 50% at a time of 42 days at 4 °C following step (b); and/or
 - (iii) have a Median Corpuscular Fragility value greater than 140 mOsm after 42 days at 4 °C following step (b).
23. The process of any one of claims 1-22, wherein the final additive solution comprises one or more of dextrose, sodium chloride, adenine, guanosine, glucose, citrate, citric acid, phosphate, and mannitol.
24. Use of a red blood cell composition in the manufacture of a medicament for infusing red blood cells into an individual, wherein the red blood cell composition is produced by the method of any one of claims 1-23.
25. A method of reducing dehydration in a red blood cell composition wherein the composition is a mixture comprising a quencher capable of reacting with a pathogen-inactivating compound, about 0.5 to 1.5 equivalents of base, wherein an equivalent means a molar amount that is equivalent to the molar amount of quencher in the mixture, red blood cells, and a treatment solution or diluent solution; wherein the treatment solution or diluent solution comprises one or more of dextrose, adenine, mannitol, citrate, and citric acid; and wherein the red blood cell composition comprises between about 40 mM and 100 mM chloride ion; the method comprising replacing the solution in the mixture with a final additive solution, such that the concentration of the quencher in the mixture is decreased to an amount which reduces the level of red blood cell dehydration resulting from storage of the mixture relative to the level of red blood cell dehydration resulting from storage of the mixture at the original concentration of quencher.
26. A composition comprising red blood cells produced by the method of any one of claims 1-23.
27. A composition comprising red blood cells preparable by the method of any one of claims 1-23.

28. A composition comprising:
- (a) red blood cells, wherein the red blood cells have covalently reacted with an electrophilic group of a pathogen-inactivating compound; and
 - (b) a quencher comprising a thiol group that is capable of reacting with the pathogen-inactivating compound;
- wherein the red blood cells have a Median Corpuscular Fragility value greater than 150 mOsm after 28 days at 4°C.
29. The composition of claim 28, wherein at least 3 logs of a pathogen is inactivated, if present.
30. The composition of claim 28 or 29, wherein the pathogen-inactivating compound comprises a nucleic acid binding ligand.
31. The composition of claim 30, wherein the nucleic acid binding ligand is:
- (i) an intercalator; or
 - (ii) an acridine.
32. The composition of claim 30 or 31, wherein the pathogen-inactivating compound is β -alanine, N-(acridin-9-yl), 2-[bis(2-chloroethyl)amino]ethyl ester.
33. The composition of any one of claims 28-32, wherein the quencher comprises cysteine or a derivative of cysteine.
34. The composition of claim 33, wherein the quencher is:
- (i) glutathione or a pharmaceutically acceptable salt thereof; or
 - (ii) glutathione monosodium salt.
35. The composition of any one of claims 28-34, wherein the quencher is at a concentration of less than about 10 mM.
36. The composition of any one of claims 28-35, wherein the red blood cells have a Packed Cell Volume of greater than 55%.
37. The composition according to claim 36, wherein the red blood cells have:
- (i) an average antibody binding capacity (ABC) of less than about 50,000; or
 - (ii) an average antibody binding capacity (ABC) of between about 25,000 and 70,000.

38. The composition of any one of claims 28-37, wherein the red blood cells of the composition have a Median Corpuscular Fragility value greater than 150 mOsm after 42 days at 4°C.