CLAIMS

1. ~~A pharmaceutically acceptable composition comprising:~~

~~a molecular fusion that comprises a tolerogenic antigen and an erythrocyte-binding moiety that specifically binds an erythrocyte in the patient,~~

~~wherein the erythrocyte-binding moiety specifically binds to a biomolecule chosen from the group consisting of Band 3 (CD233), aquaporin-1, Glut-1, Kidd antigen, RhAg/Rh50 (CD241), Rh (CD240), Rh30CE (CD240CE), Rh30D (CD240D), Kx, glycophorin B (CD235b), glycophorin C (CD235c), glycophorin D (CD235d), Kell (CD238), Duffy/DARCi (CD234), CR1 (CD35), DAF (CD55), Globoside, CD44, ICAM-4 (CD242), Lu/B-CAM (CD239), XG1/XG2 (CD99), EMMPRIN/neurothelin (CD147), JMH, Glycosyltransferase, Cartwright, Dombrock, C4A/CAB, Scianna, MER2, stomatin, BA-1 (CD24), GPIV (CD36), CD108, CD139, and H antigen (CD173).~~

A pharmaceutically acceptable composition comprising an erythrocyte-binding moiety, a linker, and a tolerogenic antigen or a second binding moiety, which are recombinantly fused or chemically conjugated, wherein:

said erythrocyte-binding moiety is a peptide ligand, an antibody, an antibody fragment or a single chain antigen binding domain (scFv) moiety having the ability to non-covalently specifically bind to a human erythrocyte *in situ* in blood,

said linker is a peptide, a linear or branched polymer, a covalent bond, an ionic bond, an aptamer, a nucleic acid or a particle;

said tolerogenic antigen is a foreign antigen to which patients develop an unwanted immune response, a portion of a therapeutic protein to which patients develop an unwanted immune response, a self antigen to which patients develop an unwanted immune response, or a foreign transplant antigen against which transplant recipients develop an unwanted immune response; and

said second binding moiety having the ability to specifically bind a foreign antigen to which patients develop an unwanted immune response, a therapeutic protein to which patients develop an unwanted immune response, a self antigen to which patients develop

an unwanted immune response, or a foreign transplant antigen against which transplant recipients develop an unwanted immune response, or

said second binding moiety being a ligand for an endogenous circulating antibody.

2. ~~The composition of claim 1 wherein the erythrocyte-binding moiety is covalently bonded to the antigen~~. The pharmaceutically acceptable composition of claim 1 wherein said erythrocyte-binding moiety has the ability to specifically bind Band 3, glycophorin A, glycophorin B, glycophorin C or glycophorin D.

3. ~~The composition of claim 1 or 2 wherein the erythrocyte-binding moiety is chosen from the group consisting of a peptide ligand, an antibody, an antibody fragment, and a single-chain antigen-binding domain (ScFv)~~. The pharmaceutically acceptable composition of claim 1 wherein said erythrocyte-binding moiety comprises a 10F7 antibody, antibody fragment or ScFv, or a peptide having at least 5 consecutive amino acid residues of a sequence chosen from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16 and SEQ ID NO:17 and conservative substitutions thereof.

4. ~~The composition of any of claims 1-3 wherein the erythrocyte-binding moiety comprises an antibody, an antibody fragment or an ScFv derived from a hybridoma that produces an antibody against an erythrocyte, with the hybridoma being chosen from the group consisting of BRIC 4, BRIC 5, BRIC 6, BRIC 10, BRIC 14, BRIC 18, BRIC 39, BRIC 66, BRIC 68, BRIC 69, BRIC 87, BRIC 108, BRIC 110, BRIC 111, BRIC 125, BRIC 126, BRIC 128, BRIC 145, BRIC 155, BRIC 157, BRIC 163, BRIC 170, BRIC 198, BRIC 203, BRIC 216, BRIC 220, BRIC 221, BRIC 222, BRIC 229, BRIC 230, BRIC 231, BRIC 235, BRIC 256, BRAC 17, BRAC 18, BGRL 1, BGRL 2, BGRL 11, BGRL 100, BRAD 3, BIRMA D6, BIRMA D10, BIRMA K3, BIRMA K3, BIRMA 84B; 6A7; COE; and KZ1~~. The pharmaceutically acceptable composition of claim 1 characterized by having the ability to induce apoptotic- or exhausted-fate proliferation and/or deletion of $CD4^+$ and/or $CD8^+$ T-cells specific for the antigen, or the ability to induce regulatory cell phenotypes.

5. ~~The composition of any of claims 1-4 wherein the tolerogenic antigen comprises a mimotope of a protein~~. The pharmaceutically acceptable composition of claim 1 wherein the

tolerogenic antigen is selected from the groups:

a) insulin, proinsulin, preproinsulin, glutamic acid decarboxylase-65 (GAD-65), GAD-67, insulinoma-associated protein 2 (IA-2), insulinoma-associated protein 2β (IA-2β), ICA69, ICA12 (SOX-13), carboxypeptidase H, Imogen 38, GLIMA 38, chromogranin-A, HSP-60, caboxypeptidase E, peripherin, glucose transporter 2, hepatocarcinoma-intestine-pancreas/pancreatic associated protein, S100β, glial fibrillary acidic protein, regenerating gene II, pancreatic duodenal homeobox 1, dystrophia myotonica kinase, islet-specific glucose-6-phosphatase catalytic subunit-related protein, and SST G-protein coupled receptors 1-5;

b) thyroglobulin (TG), thyroid peroxidase (TPO), thyrotropin receptor (TSHR), sodium iodine symporter (NIS) and megalin;

c) thyroglobulin (TG), thyroid peroxidase (TPO), thyrotropin receptor (TSHR), sodium iodine symporter (NIS), megalin, and insulin-like growth factor 1 receptor;

d) calcium sensitive receptor;

e) 21-hydroxylase, 17α-hydroxylase, P450 side chain cleavage enzyme (P450scc), ACTH receptor, P450c21 and P450c17;

f) FSH receptor and α-enolase;

g) pituitary gland-specific protein factor (PGSF) 1a, PGSF 2, and type 2 iodothyronine deiodinase;

h) myelin basic protein, myelin oligodendrocyte glycoprotein and proteolipid protein;

i) collagen II;

j) H^+,K^+-ATPase;

k) intrinsic factor;

l) tissue transglutaminase and gliadin;

m) tyrosinase, and tyrosinase related protein 1 and 2;

n) acetylcholine receptor;

o) desmoglein 3, desmoglein 1, desmoglein 4, pemphaxin, desmocollins, plakoglobin, perplakin, desmoplakins, and acetylcholine receptor;

p) BP180, BP230, plectin and laminin 5;

q) endomysium and tissue transglutaminase;

r) collagen VII;

s) matrix metalloproteinase 1 and 3, the collagen-specific molecular chaperone heat-shock protein 47, fibrillin-1, PDGF receptor, Scl-70, U1 RNP, Th/To, Ku, Jo1, NAG-2, centromere proteins, topoisomerase I, nucleolar proteins, RNA polymerase I, II and III, PM-Slc, fibrillarin, and B23;

t) U1snRNP;

u) SS-A, SS-B, fodrin, poly(ADP-ribose) polymerase, and topoisomerase

v) SS-A, high mobility group box 1 (HMGB1), nucleosomes, histone proteins and double-stranded DNA;

w) glomerular basement membrane proteins including collagen IV;

x) cardiac myosin; and

y) aromatic L-amino acid decarboxylase, histidine decarboxylase, cysteine sulfinic acid decarboxylase, tryptophan hydroxylase, tyrosine hydroxylase, phenylalanine hydroxylase, hepatic P450 cytochromes P4501A2 and 2A6, SOX-9, SOX-10, calcium-sensing receptor protein, and the type 1 interferons interferon alpha, beta and omega;

z) antithrombin-III, protein C, factor VIII, factor IX, growth hormone, somatotropin, insulin, pramlintide acetate, mecasermin (IGF-1), β-gluco cerebrosidase, alglucosidase-α, laronidase (α-L-iduronidase), idursuphase (iduronate-2-sulphatase), galsulphase, agalsidase-β (α-galactosidase), α-1 proteinase inhibitor, and albumin;

aa) adenosine deaminase, pancreatic lipase, pancreatic amylase, lactase, botulinum toxin type A, botulinum toxin type B, collagenase, hyaluronidase, papain, L-Asparaginase, uricase, lepirudin, streptokinase, anistreplase (anisoylated plasminogen streptokinase activator complex), antithymocyte globulin, crotalidae polyvalent immune Fab, digoxin immune serum Fab, L-arginase, and L-methionase;

ab) conarachin (Ara h 1), allergen II (Ara h 2), arachis agglutinin, conglutin (Ara h 6), 31 kda major allergen/disease resistance protein homolog (Mal d 2), lipid transfer protein precursor (Mal d 3), major allergen Mal d 1.03D (Mal d 1), α-lactalbumin (ALA), lactotransferrin, actinidin (Act c 1, Act d 1), phytocystatin, thaumatin-like protein (Act d 2), kiwellin (Act d 5), 2S albumin (Sin a 1), 11S globulin (Sin a 2), lipid transfer protein (Sin a 3), profilin (Sin a 4), profilin (Api g 4), high molecular weight glycoprotein (Api g

5). Pen a 1 allergen (Pen a 1), allergen Pen m 2 (Pen m 2), tropomyosin fast isoform, high molecular weight glutenin, low molecular weight glutenin, alpha- and gamma-gliadin, hordein, secalin, avenin, major strawberry allergy Fra a 1-E (Fra a 1), and profilin (Mus xp 1); and

ac) subunits of MHC class I and MHC class II haplotype proteins, and single-amino-acid polymorphisms on minor blood group antigens including RhCE, Kell, Kidd, Duffy and Ss.

6. ~~The composition of any of claims 1-5 wherein the tolerogenic antigen is chosen from the group consisting of a protein, a portion of a protein, a human protein or portion thereof, a nonhuman protein or portion thereof, a glycan, a glycan of a protein that comprises nonhuman glycosylation, a human autoimmune antigen, a protein therapeutic for a human or a portion thereof, and a portion of a human food.~~ The pharmaceutically acceptable composition of claim 1 wherein the tolerogenic antigen comprises a mimotope of a protein.

7. ~~The composition of any of claims 1-5 wherein the tolerogenic antigen is chosen from the group consisting of proteins deficient by genetic disease, proteins with nonhuman glycosylation, nonhuman proteins, synthetic proteins not naturally found in humans, human food antigens, human transplantation antigens, and human autoimmune antigens~~. The pharmaceutically acceptable composition of claim 1 wherein said linker is a branched polymer that increases the affinity of erythrocyte binding by avidity effects.

8. ~~The composition of any of claims 1-5 wherein the tolerogenic antigen comprises an antigen chosen from the group consisting of factor VIII, factor IX, adenosine deaminase, L-asparaginase, rasburicase, antithymocyte globulin, L-arginase, L-methionase, preproinsulin, proinsulin, insulin, GAD65, GAD67, IA-2, IA-2β, thyroglobulin, thyroid peroxidase, thyrotropin receptor, myelin basic protein, myelin oligodendrocyte glycoprotein, proteolipid protein, collagen II, collagen IV, acetylcholine receptor, matrix metalloprotein 1 and 3, molecular chaperone heat-shock protein 47, fibrillin 1, PDGF receptor α, PDGF receptor β, nuclear protein SS-A, conarachin (Ara h 1), allergen II (Ara h 2), arachis agglutinin (Ara h 6), α-lactalbumin (ALA), lactotransferrin, glutein, low molecular weight glutein, α-gliadin , γ-gliadin, hordein, secalin, and avenin~~. The pharmaceutically acceptable composition of claim 7 wherein said branched polymer

is conjugated to more than one erythrocyte-binding moiety.

9. ~~The composition of claim 8 wherein the antigen is a mimotope.~~ The pharmaceutically acceptable composition of claim 1 wherein the erythrocyte-binding moiety comprises an antibody, an antibody fragment or an ScFv derived from a hybridoma that produces an antibody against an erythrocyte, with the hybridoma being chosen from the group consisting of BRIC 4, BRIC 5, BRIC 6, BRIC 10, BRIC 14, BRIC 18, BRIC 39, BRIC 66, BRIC 68, BRIC 69, BRIC 87, BRIC 108, BRIC 110, BRIC 111, BRIC 125, BRIC 126, BRIC 128, BRIC 145, BRIC 155, BRIC 157, BRIC 163, BRIC 170, BRIC 198, BRIC 203, BRIC 216, BRIC 220, BRIC 221, BRIC 222, BRIC 229, BRIC 230, BRIC 231, BRIC 235, BRIC 256, BRAC 17, BRAC 18, BGRL 1, BGRL 2, BGRL 11, BGRL 100, BRAD 3, BIRMA D6, BIRMA D10, BIRMA K3, BIRMA K3, BIRMA 84B; 6A7; COE; and KZ1.

10 ~~The composition of any of claims 1-9 for use in treating a pathologic condition chosen from the group consisting of transplant rejection, autoimmune disease, food allergy, and immune response against a therapeutic agent~~. The pharmaceutically acceptable composition of claim 1 having an erythrocyte-binding moiety, a linker and a second binding moiety that together form a bi-specific protein construct.

11. ~~A molecular fusion that comprises a tolerogenic antigen and an erythrocyte-binding moiety selected from Band 3 (CD233), glycophorin B (CD235b), glycophorin C (CD235c) and glycophorin D (CD235d)~~. The pharmaceutically acceptable composition of claim 10 wherein said second binding moiety is a ligand for an endogenous circulating antibody.

12. ~~A molecular fusion according to claim 11 for use in producing immunotolerance.~~ A method of treating an unwanted immune response comprising administering to a patient in need thereof a therapeutically effective amount of a pharmaceutically acceptable composition, the composition being an erythrocyte-binding moiety, a linker, and a tolerogenic antigen or a second binding moiety, which are recombinantly fused or chemically conjugated, wherein:

said erythrocyte-binding moiety is a peptide ligand, an antibody, an antibody fragment or a single chain antigen binding domain (scFv) moiety having the ability to non-

covalently specifically bind to a human erythrocyte *in situ* in blood,

said linker is a peptide, a linear or branched polymer, a covalent bond, an ionic bond, an aptamer, a nucleic acid or a particle;

said tolerogenic antigen is a foreign antigen to which patients develop an unwanted immune response, a therapeutic protein to which patients develop an unwanted immune response, a self antigen to which patients develop an unwanted immune response, or a foreign transplant antigen against which transplant recipients develop an unwanted immune response; and

said second binding moiety being a ligand for an endogenous circulating antibody.

13. ~~A molecular fusion that comprises a tolerogenic antigen selected from: a protein, a portion of a protein, a human protein or portion thereof, a nonhuman protein or portion thereof, a glycan, a glycan of a protein that comprises nonhuman glycosylation, a human autoimmune antigen, a protein therapeutic for a human or a portion thereof, and a portion of a human food, proteins deficient by genetic disease, proteins with nonhuman glycosylation, nonhuman proteins, synthetic proteins not naturally found in humans, human food antigens, human transplantation antigens, and human autoimmune antigens; and an erythrocyte-binding moiety selected from Band 3 (CD233), glycophorin B (CD235b), glycophorin C (CD235c), glycophorin D (CD235d).~~ The method of claim 12 wherein said erythrocyte-binding moiety has the ability to specifically bind Band 3, glycophorin A, glycophorin B, glycophorin C or glycophorin D

14. ~~A method of producing immunotolerance, the method comprising administering a composition comprising a molecular fusion that comprises a tolerogenic antigen and an erythrocyte-binding moiety that specifically binds an erythrocyte in the patient, wherein the molecular fusion is administered in an amount effective to produce immunotolerance to a substance that comprises the tolerogenic antigen.~~ The method of claim 12 wherein said erythrocyte-binding moiety comprises a 10F7 antibody, antibody fragment or ScFv, or a peptide having at least 5 consecutive amino acid residues of a sequence chosen from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16 and SEQ ID NO:17 and conservative substitutions thereof.

15. ~~A pharmaceutically acceptable composition for use in immunoreversal of an immune response against a substance comprising a fusion molecule that comprises an erythrocyte-binding moiety and an antigen of the substance~~. The method of claim 12 characterized by having the ability to induce apoptotic- or exhausted-fate proliferation and/or deletion of $CD4^+$ and/or $CD8^\pm$ Tcells specific for the antigen, or the ability to induce regulatory cell phenotypes.

16. ~~The composition of claim 15 wherein the tolerogenic antigen is chosen from the group consisting of a protein, a portion of a protein, a human protein or portion thereof, a nonhuman protein or portion thereof, a glycan, a glycan of a protein that comprises nonhuman glycosylation, a human autoimmune antigen, a protein therapeutic for a human or a portion thereof, and a portion of a human food.~~ The method of claim 12 wherein said composition is administered to a patient prior to an unwanted immune response to the antigen, wherein said treatment prevents or minimizes the unwanted immune response.

17. ~~The composition of claim 15 wherein the tolerogenic antigen is chosen from the group consisting of proteins deficient by genetic disease, proteins with nonhuman glycosylation, nonhuman proteins, synthetic proteins not naturally found in humans, human food antigens, human transplantation antigens, and human autoimmune antigens~~. The method of claim 12 wherein said composition is administered to a patient having an unwanted immune response to the antigen, wherein said treatment reverses or minimizes the unwanted immune response.

18. ~~The composition of any of claims 15-17 wherein the erythrocyte-binding moiety specifically binds to a biomolecule chosen from the group consisting of Band 3 (CD233), aquaporin-1, Glut-1, Kidd antigen, RhAg/Rh50 (CD241), Rh (CD240), Rh30CE (CD240CE), Rh30D (CD240D), Kx, glycophorin A, glycophorin B (CD235b), glycophorin C (CD235c), glycophorin D (CD235d), Kell (CD238), Duffy/DARCi (CD234), CR1 (CD35), DAF (CD55), Globoside, CD44, ICAM-4 (CD242), Lu/B-CAM (CD239), XG1/XG2 (CD99), EMMPRIN/neurothelin (CD147), JMH, Glycosyltransferase, Cartwright, Dombrock, C4A/CAB, Scianna, MER2, stomatin, BA-1 (CD24), GPIV (CD36), CD108, CD139, and H antigen (CD173).~~

The method of claim 12 where the unwanted immune response is selected from the group: type 1 diabetes mellitus; autoimmune diseases of the thyroid, including Hashimoto's thyroiditis and Graves' disease; thyroid-associated ophthalmopathy and dermopathy; hypoparathyroidism; Addison's disease; premature ovarian failure; autoimmune hypophysitis or pituitary autoimmune disease; multiple sclerosis; rheumatoid arthritis; immunogastritis; pernicious angemis; celiac disease; vitiligo; myasthenia gravis; pemphigus vulgaris and variants; bullous pemphigoid; dermatitis herpetiformis Duhring; epidermolysis bullosa acquisita; systemic sclerosis; mixed connective tissue disease; Sjogren's syndrome; systemic lupus erythematosus; Goodpasture's syndrome; rheumatic heart disease; and autoimmune polyglandular syndrome type 1.

19. ~~The composition of any of claims 15-17 wherein the erythrocyte-binding moiety is chosen from the group consisting of a peptide ligand, an antibody, an antibody fragment, and a single chain antigen binding domain (ScFv).~~ The method of claim 12 where the tolerogenic antigen is selected from the groups:

a) insulin, proinsulin, preproinsulin, glutamic acid decarboxylase-65 (GAD-65), GAD-67, insulinoma-associated protein 2 (IA-2), insulinoma-associated protein 2β (IA-2β), ICA69, ICA12 (SOX-13), carboxypeptidase H, Imogen 38, GLIMA 38, chromogranin-A, HSP-60, caboxypeptidase E, peripherin, glucose transporter 2, hepatocarcinoma-intestine-pancreas/pancreatic associated protein, S100β, glial fibrillary acidic protein, regenerating gene II, pancreatic duodenal homeobox 1, dystrophia myotonica kinase, islet-specific glucose-6-phosphatase catalytic subunit-related protein, and SST G-protein coupled receptors 1-5;

b) thyroglobulin (TG), thyroid peroxidase (TPO), thyrotropin receptor (TSHR), sodium iodine symporter (NIS) and megalin;

c) thyroglobulin (TG), thyroid peroxidase (TPO), thyrotropin receptor (TSHR), sodium iodine symporter (NIS), megalin, and insulin-like growth factor 1 receptor;

d) calcium sensitive receptor;

e) 21-hydroxylase, 17α-hydroxylase, P450 side chain cleavage enzyme (P450scc), ACTH receptor, P450c21 and P450c17;

f) FSH receptor and α-enolase;

g) pituitary gland-specific protein factor (PGSF) 1a, PGSF 2, and type 2 iodothyronine deiodinase;

h) myelin basic protein, myelin oligodendrocyte glycoprotein and proteolipid protein;

i) collagen II;

j) H^+,K^+-ATPase;

k) intrinsic factor;

l) tissue transglutaminase and gliadin;

m) tyrosinase, and tyrosinase related protein 1 and 2;

n) acetylcholine receptor;

o) desmoglein 3, desmoglein 1, desmoglein 4, pemphaxin, desmocollins, plakoglobin, perplakin, desmoplakins, and acetylcholine receptor;

p) BP180, BP230, plectin and laminin 5;

q) endomysium and tissue transglutaminase;

r) collagen VII;

s) matrix metalloproteinase 1 and 3, the collagen-specific molecular chaperone heat-shock protein 47, fibrillin-1, PDGF receptor, Scl-70, U1 RNP, Th/To, Ku, Jo1, NAG-2, centromere proteins, topoisomerase I, nucleolar proteins, RNA polymerase I, II and III, PM-Slc, fibrillarin, and B23;

t) U1snRNP;

u) SS-A, SS-B, fodrin, poly(ADP-ribose) polymerase, and topoisomerase

v) SS-A, high mobility group box 1 (HMGB1), nucleosomes, histone proteins and double-stranded DNA;

w) glomerular basement membrane proteins including collagen IV;

x) cardiac myosin; and

y) aromatic L-amino acid decarboxylase, histidine decarboxylase, cysteine sulfinic acid decarboxylase, tryptophan hydroxylase, tyrosine hydroxylase, phenylalanine hydroxylase, hepatic P450 cytochromes P4501A2 and 2A6, SOX-9, SOX-10, calcium-sensing receptor protein, and the type 1 interferons interferon alpha, beta and omega;

z) antithrombin-III, protein C, factor VIII, factor IX, growth hormone, somatotropin, insulin, pramlintide acetate, mecasermin (IGF-1), β-gluco cerebrosidase, alglucosidase-α,

laronidase (α-L-iduronidase), idursuphase (iduronate-2-sulphatase), galsulphase, agalsidase-β (α-galactosidase), α-1 proteinase inhibitor, and albumin;

aa) adenosine deaminase, pancreatic lipase, pancreatic amylase, lactase, botulinum toxin type A, botulinum toxin type B, collagenase, hyaluronidase, papain, L-Asparaginase, uricase, lepirudin, streptokinase, anistreplase (anisoylated plasminogen streptokinase activator complex), antithymocyte globulin, crotalidae polyvalent immune Fab, digoxin immune serum Fab, L-arginase, and L-methionase;

ab) conarachin (Ara h 1), allergen II (Ara h 2), arachis agglutinin, conglutin (Ara h 6), 31 kda major allergen/disease resistance protein homolog (Mal d 2), lipid transfer protein precursor (Mal d 3), major allergen Mal d 1.03D (Mal d 1), α-lactalbumin (ALA), lactotransferrin, actinidin (Act c 1, Act d 1), phytocystatin, thaumatin-like protein (Act d 2), kiwellin (Act d 5), 2S albumin (Sin a 1), 11S globulin (Sin a 2), lipid transfer protein (Sin a 3), profilin (Sin a 4), profilin (Api g 4), high molecular weight glycoprotein (Api g 5), Pen a 1 allergen (Pen a 1), allergen Pen m 2 (Pen m 2), tropomyosin fast isoform, high molecular weight glutenin, low molecular weight glutenin, alpha- and gamma-gliadin, hordein, secalin, avenin, major strawberry allergy Fra a 1-E (Fra a 1), and profilin (Mus xp 1); and

subunits of MHC class I and MHC class II haplotype proteins, and single-amino-acid polymorphisms on minor blood group antigens including RhCE, Kell, Kidd, Duffy and Ss.

~~20. The composition of any of claims 15-17 wherein the erythrocyte-binding moiety comprises an antibody, an antibody fragment or an ScFv derived from a hybridoma that produces an antibody against an erythrocyte, with the hybridoma being chosen from the group consisting of BRIC 4, BRIC 5, BRIC 6, BRIC 10, BRIC 14, BRIC 18, BRIC 39, BRIC 66, BRIC 68, BRIC 69, BRIC 87, BRIC 108, BRIC 110, BRIC 111, BRIC 125, BRIC 126, BRIC 128, BRIC 145, BRIC 155, BRIC 157, BRIC 163, BRIC 170, BRIC 198, BRIC 203, BRIC 216, BRIC 220, BRIC 221, BRIC 222, BRIC 229, BRIC 230, BRIC 231, BRIC 235, BRIC 256, BRAC 17, BRAC 18, BGRL 1, BGRL 2, BGRL 11, BGRL 100, BRAD 3, BIRMA D6, BIRMA D10, BIRMA K3, BIRMA K3, BIRMA 84B; 6A7; COE; and KZ1.~~

~~21. The composition of any of claims 15-20 wherein the tolerogenic antigen comprises a mimotope of a protein.~~

~~22. A fusion molecule comprising an erythrocyte-binding moiety and an antigen of asparaginase.~~

~~23. The fusion molecule of claim 22 wherein the erythrocyte-binding moiety comprises an scFv that binds a human erythrocyte or a peptidic binding ligand chosen from the group consisting of SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, and conservative substitutions thereof, wherein said sequence specifically binds an erythrocyte.~~

~~24. A composition comprising the fusion molecule of claim 22 or 23 used for inducing tolerance to asparaginase.~~

~~25. A fusion molecule comprising an erythrocyte-binding moiety and an antigen of chromogranin-A~~

~~26. The fusion molecule of claim 25 wherein the erythrocyte-binding moiety comprises an scFv that binds a human erythrocyte or a peptidic binding ligand chosen from the group consisting of SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, and conservative substitutions thereof, wherein said sequence specifically binds an erythrocyte.~~

~~27. A composition comprising the fusion molecule of claim 25 or 26 used for inducing tolerance to chromogranin-A.~~

~~28. A pharmaceutically acceptable composition comprising:~~

~~an erythrocyte-binding moiety joined to a domain that specifically binds a target.~~

~~29. The composition of claim 28 wherein the target comprises a protein, with the protein further comprising a tolerogenic antigen.~~

~~30. The composition of claim 28 or 29 wherein the erythrocyte-binding moiety comprises a peptide ligand,~~

~~31. The composition of claim 28 or 29 wherein the erythrocyte-binding moiety is chosen from the group consisting of an antibody, an antibody fragment, and a single chain antigen binding domain (ScFv).~~

~~32. The composition of any of claims 28-31 wherein the domain is chosen from the group consisting of an antibody, an antibody fragment, and a single chain antigen binding domain (ScFv).~~

~~33. The composition of any of claim s 28-32 wherein the composition comprises a member of the group chosen from a molecular fusion, a tandem scFv, a diabody, and a tandem scFv-IgG molecule, with the erythrocyte-binding moiety and the domain being part of said member.~~

~~34. A pharmaceutically acceptable composition comprising:~~

~~an erythrocyte-binding moiety joined to an antigen.~~

~~35. The composition of claim 34 wherein the antigen is a native auto-antigen.~~

~~36. The composition of claim 34 or 35 wherein the auto-antigen is chosen from the group consisting of a lupus erythematosis antigens.~~

~~37. The composition of any of claims 34-36 wherein the antigen is for a therapeutic protein.~~

~~38. The composition of claim 37 wherein the antigen is a Factor VIII antigen.~~

~~39. A use of the composition of any of claims 34-37 for removing undesired antibodies from circulation.~~