CLAIMS

1. Use of one or more primed red blood cell components in the manufacture of a medicament for modulating the levels of at least one protein in a subject, the one or more primed red blood cell components are produced by contacting red blood cells with at least one agent or at least one condition that modulates the level of one or more red blood cell proteins, the one or more primed red blood cell components selected from the group consisting of:

(i) the primed red blood cells;

(ii) supernatant obtained from incubation or culture of the primed red blood cells;

(iii) lysate obtained from the primed red blood cells;

(iv) membranes obtained from the primed red blood cells; and

(v) red blood cell ghosts produced from the primed red blood cells, and

wherein administration of the one or more primed red blood cell components to the subject modulates the levels of at least one protein in the subject.

2. The use of claim 1, wherein the red blood cells are obtained from the subject.

3. The use of claim 1, wherein the red blood cells are not obtained from the subject.

4. The use of one or more of claims 1 to 3, wherein the at least one agent is one or more agents selected from the group consisting of proteins, enzymes, nucleic acids, protease inhibitors, protein denaturation agents, RNA stabilizers, anticoagulants, and cells.

5. The use of one or more of claims 1 to 3, wherein the at least one condition is shear stress, hypoxia, or hyperoxia.

6. The use of one or more of claims 1 to 5, wherein the subject is a human or a non-human mammal.

7. The use of one or more of claims 1 to 6, wherein the one or more primed red blood cell components are to be administered to the subject through one or more methods

selected from the group consisting of systemically, locally, intravenously, subcutaneously, intra-articularly, intramuscularly, intrathecally, and intraperitoneally.

8. The use of one or more of claims 1 to 7, wherein the one or more red blood cell proteins are cytokines, chemokines, or growth factors.

9. A method of modulating the activity of target cells comprising:

a.) producing primed red blood cells by contacting red blood cells with at least one agent or condition that modulates the level of one or more red blood cell proteins; and

b.) mixing the target cells with one or more primed red blood cell components selected from the group consisting of:

(i) the primed red blood cells;

(ii) supernatant obtained from incubating or culturing the primed red blood cells;

(i) lysate obtained from the primed red blood cells;

(iv) membranes obtained from the primed red blood cells; and

(v) red blood cell ghosts produced from the primed red blood cells,

wherein mixing the target cells with the one or more primed red blood cell components modulates the activity of the target cells.

10. The method of claim 9, wherein the primed red blood cells modulate one or more activities of the target cells selected from the group consisting of cell signalling, immune response, cell development, cell growth, cell death, inhibition of cell growth, and cell repair.

11. The method of claim 10, wherein the target cells are one or more selected from the group consisting of immune cells, immortalized cells, cancer cells, stem cells, endothelial cells, fibroblasts, and synovial cells.

12. The method of one or more of claims 9 to 1 1, wherein the target cells are from a subject.

13. The method of one or more of claims 9 to 12, wherein the target cells are to be administered to a subject.

14. The method of claim 13, wherein one or more target cell components selected from the group consisting of target cells, target cell ghosts, target cell membranes, target cell lysates, target cell fractions, and supernatant produced by incubating or culturing target cells are to be administered to a subject.

15. The method of one or more of claims 9 to 14, wherein one or more of the primed red blood cells, primed red blood cell components, target cells or target cell components are to be administered to the subject by one or more routes selected from the group consisting of systemically, locally, intravenously, subcutaneously, intra- articularly, intramuscularly, intrathecally, and intraperitoneally.

16. The method of one or more of claims 9 to 14, wherein the subject has a disease or disorder.

17. Use of red blood cells and/or target cells according to one or more of claims 1 to 16 in the manufacture of a medicament for preventing, treating, or ameliorating a disease or disorder in a subject

18. The use of claim 17, wherein the red blood cells and/or target cells are to be administered to the subject by one or more routes selected from the group consisting of systemically, locally, intravenously, subcutaneously, intra-articularly, intramuscularly, intrathecally, and intraperitoneally.

19. The use of claim 17, wherein the subject is a human or non-human mammal.

20. The use of claim 17, wherein the disease or disorder is selected from the group consisting of cancer, infectious disease, organ failure, autoimmune disease, autoimmune disorders, inflammation, and immune deficiency.