the present disclosure. The present disclosure having been generally described is explained in more detail in the aspects and examples below and in the detailed description.

In one aspect, the present disclosure refers to a use of a pharmaceutical composition in the manufacture of a medicament for treating a disease or disorder, wherein: the pharmaceutical composition comprises (i) whole blood and (ii) a therapeutic agent selected from the group consisting of carboplatin, oxaliplatin, imipenem, and paclitaxel, the pharmaceutical composition is to be parenterally administered to a patient in need thereof to treat the disease or the disorder, and the disease or the disorder is cancer, sepsis, or the disease or the disorder involves an infection.

In another aspect, the present disclosure refers to a use of a pharmaceutical composition in the manufacture of a medicament for treating a disease or a disorder involving sepsis or an infection, wherein: the pharmaceutical composition comprises (i) whole blood and (ii) a therapeutic agent, the therapeutic agent is imipenem, the pharmaceutical composition is to be parenterally administered to a patient in need thereof, and the disease or the disorder involving the infection is a microbial infection.

In a further aspect, the present disclosure refers to a use of carboplatin, oxaliplatin, or paclitaxel in the manufacture of a medicament for the treatment of cancer in a patient in need thereof, wherein: the medicament comprises (i) whole blood and (ii) the carboplatin, the oxaliplatin, or the paclitaxel, and the cancer is selected from the group consisting of ovarian cancer, breast cancer, lung cancer, Kaposi sarcoma, cervical cancer, pancreatic cancer, head and neck cancer, brain cancer, neuroblastoma, and colorectal cancer.

The present disclosure also provides a method for administering a therapeutic agent to a patient. The method comprises parenterally administering to a patient in need thereof a pharmaceutical composition that comprises (i) a blood product and (ii) a therapeutic agent selected from the group consisting of an anthracycline anti-cancer agent, a topoisomerase inhibitor, an

oxazaphosphinanyl anti-cancer agent, a nitro-aryl anti-cancer agent, a thiol-reactive functional-group agent, a nitric oxide modulator, a platinum-based antineoplastic compound, acrylamide, acrylonitrile, bis(4-fluorobenzyl)trisulfide, a cardiac glycoside, an anti-mitotic agent, a nucleoside analog, an EGFR inhibitor, and an anti-microbial agent. The blood product may be an erythrocyte cell, or may be whole blood. Desirably, the pharmaceutical composition can be administered by intravenous administration. Exemplary anthracycline anti-cancer agents include doxorubicin and epirubicin.

The present disclosure also provides a method for administering a therapeutic agent to a patient. The method comprises parenterally administering to a patient in need thereof a pharmaceutical composition that comprises (i) a blood product and (ii) a therapeutic agent selected from the group consisting of an anthracycline anti-cancer agent, a topoisomerase inhibitor, an oxazaphosphinanyl anti-cancer agent, a nitro-aryl anti-cancer agent, a thiol-reactive functional-group agent, a nitric oxide modulator, a platinum-based antineoplastic compound, acrylamide, acrylonitrile, bis(4-fluorobenzyl)trisulfide, a cardiac glycoside, an anti-mitotic agent, a nucleoside analog, and an anti-microbial agent. The blood product may be an erythrocyte cell, or may be whole blood. Desirably, the pharmaceutical composition can be administered by intravenous administration. Exemplary anthracycline anti-cancer agents include doxorubicin and epirubicin.

The present disclosure further provides a method for administering a therapeutic agent to a patient. The method comprises parenterally administering to a patient in need thereof a pharmaceutical composition that comprises (i) a blood product and (ii) a therapeutic agent selected from the group consisting of an anthracycline anti-cancer agent, a topoisomerase inhibitor, an oxazaphosphinanyl anti-cancer agent, a nitro-aryl anti-cancer agent, a thiol-reactive functional-group agent, a nitric oxide modulator, a platinum-based antineoplastic compound, acrylamide, acrylonitrile, bis(4-fluorobenzyl)trisulfide, a cardiac glycoside, an anti-mitotic agent, and an anti-microbial agent. The blood product may be an erythrocyte cell, or may be whole blood. Desirably, the pharmaceutical composition can be administered by intravenous administration. Exemplary anthracycline anti-cancer agents include doxorubicin and epirubicin.

Claims:

1. Use of a pharmaceutical composition in the manufacture of a medicament for treating a disease or a disorder, wherein:

the pharmaceutical composition comprises (i) whole blood and (ii) a therapeutic agent selected from the group consisting of carboplatin, oxaliplatin, imipenem, and paclitaxel,

the pharmaceutical composition is to be parenterally administered to a patient in need thereof to treat the disease or the disorder, and

the disease or the disorder is cancer, sepsis, or the disease or the disorder involves an infection.

2. The use of claim 1, wherein the whole blood comprises erythrocyte cells.

3. The use of claim 1 or 2, wherein the disease or the disorder is cancer.

4. The use of claim 3, wherein the therapeutic agent is selected from the group consisting of carboplatin, oxaliplatin, and paclitaxel.

5. The use of claim 3, wherein the cancer is:

(a) a solid tumor, wherein the solid tumor is a sarcoma or carcinoma;

(b) brain cancer, bladder cancer, breast cancer, cervical cancer, cholangiocarcinoma, colon cancer, colorectal cancer, endometrial cancer, esophageal cancer, lung cancer, liver cancer, melanoma, ovarian cancer, pancreatic cancer, prostate cancer, rectal cancer, renal cancer, stomach cancer, testicular cancer, uterine cancer, or Kaposi's sarcoma;

(c) a leukemia or lymphoma;

(d) breast cancer, bladder cancer, or Kaposi's sarcoma; or

(e) lymphoma or acute lymphocytic leukemia.

6. The use of claim 3, wherein:

the cancer is selected from the group consisting of ovarian cancer, lung cancer, head and neck cancer, brain cancer, and neuroblastoma, and

the therapeutic agent is carboplatin.

7. The use of claim 3, wherein:

the cancer is colorectal cancer, and

the therapeutic agent is oxaliplatin.

8. The use of claim 3, wherein:

the cancer is selected from the group consisting of ovarian cancer, breast cancer, lung cancer, Kaposi sarcoma, cervical cancer, and pancreatic cancer, and

the therapeutic agent is paclitaxel.

9. The use of any one of claims 1-2, wherein the disease or the disorder is sepsis, or the disease or the disorder involves the infection.

10. The use of claim 9, wherein the therapeutic agent is imipenem.

11. Use of a pharmaceutical composition in the manufacture of a medicament for treating sepsis or a disease or a disorder involving an infection, wherein:

the pharmaceutical composition comprises (i) whole blood and (ii) a therapeutic agent,

the therapeutic agent is imipenem,

the pharmaceutical composition is to be parenterally administered to a patient in need thereof, and

the disease or the disorder involving the infection is a microbial infection.

12. The use of claim 11, wherein the whole blood comprises erythrocyte cells.

13. The use of claim 11 or 12, wherein the pharmaceutical composition is to be intravenously administered.

14. The use of claim 11, wherein the microbial infection is:

(a) an intracellular infection with a microbial species, wherein the microbial species is *Mycobacterium tuberculosis*, *Mycobacterium leprae*, *Mycobacterium bovis*, *Klebsiella pneumonia*, *Salmonella*, *Chlamydia muridarum*, *Chlamydia pneumonia*, *Burkholderia cenocepacia*, *Staphylococcus aureus*, *Coxiella burnetti*, or *Shigella flexneri;* or

(b) antibiotic resistant, wherein the antibiotic resistant microbial infection is methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin intermediate resistant *Staphylococcus aureus* (VISA), vancomycin resistant *Staphylococcus aureus* (VRSA), vancomycin-resistant *Enterococci* (VRE), antibiotic resistant *Neisseria gonorrhoeae*, carbapenem-resistant *Enterobacteriaceae* (CRE), VRE endocarditis, pan-resistant *Acinetobacter*, drug resistant *Escherichia coli*, chronic osteomyelitis, extensively drug resistant tuberculosis, Shiga toxin-producing *Escherichia coli*, antimicrobial-resistant sepsis, or multi-drug resistant *Pseudomonas*.

15. The use of any one of claims 1-14, wherein the pharmaceutical composition is prepared by mixing the whole blood and the therapeutic agent, wherein:

(a) the pharmaceutical composition is incubated for a time period in a range of 30 minutes to 240 minutes at a temperature that ranges from 18°C to 25°C after mixing and before being administered to the patient, or

(b) the pharmaceutical composition is incubated for over the time period of 4 hours at a refrigerated condition, or for the time period of up to 60 minutes at the temperature of 37°C, after mixing and before being administered to the patient.

16. The use of any one of claims 1-14, wherein:

the pharmaceutical composition further comprises an anticoagulant,

the anticoagulant comprises one or more of heparin and a citrate salt, and

the anticoagulant is present in an amount ranging from 0.1% wt./wt. to 15% wt./wt. in the pharmaceutical composition.

17. The use of any one of claims 1-14 and 16, wherein the therapeutic agent is present at a concentration of at least 10 μg/mL in the pharmaceutical composition.

18. The use of any one of claims 1-14 and 16-17, wherein the whole blood comprises at least 30% wt./wt. of the pharmaceutical composition, or is in a range from 60% wt./wt .to 99% wt./wt. of the pharmaceutical composition.

19. The use of any one of claims 1-14 and 16-18, wherein an aliquot of the whole blood is to be obtained from the patient and is used to prepare the pharmaceutical composition.

20. The use of any one of claims 1-14 and 16-19, wherein the patient is an adult human.

21. The use of any one of claims 1-14 and 16-20, wherein the patient does not suffer from anemia or have reduced blood volume, or the patient has at least 95% of the amount of their average daily blood volume.

22. Use of carboplatin, oxaliplatin, or paclitaxel in the manufacture of a medicament for the treatment of cancer in a patient in need thereof, wherein:

the medicament comprises (i) whole blood and (ii) the carboplatin, the oxaliplatin, or the paclitaxel, and

the cancer is selected from the group consisting of ovarian cancer, breast cancer, lung cancer, Kaposi sarcoma, cervical cancer, pancreatic cancer, head and neck cancer, brain cancer, neuroblastoma, and colorectal cancer.

23. The use of claim 22, wherein:

the whole blood comprises erythrocyte cells, and

the erythrocyte cells have not undergone any manipulation selected from the group consisting of genetic modification, electroporation, conjugation through biotin, conjugation to a cell-

penetrating peptide, conjugation to hemoglobin, dimethyl sulfoxide osmotic pulse, endocytosis and hypotonic preswelling, hypotonic dilution, and hypo-osmotic dialysis.

24. The use of claim 22 or 23, wherein:

the medicament further comprises an anticoagulant, and

the anticoagulant comprises one or more of heparin and a citrate salt, or the anticoagulant is present in an amount ranging from 0.1% wt./wt. to 15% wt./wt. in the medicament.

25. The use of any one of claims 22-24, wherein the carboplatin, the oxaliplatin, or the paclitaxel is present at a concentration of at least 10 μg/mL in the medicament.

26. The use of any one of claims 22-25, wherein the whole blood comprises at least 30% wt./wt. of the medicament.

27. The use of any one of claims 22-26, wherein the whole blood is autologous whole blood.

28. The use of any one of claims 1-21, wherein the whole blood is autologous whole blood.

29. The use of any one of claims 22-28, wherein:

the paclitaxel is used in the manufacture of the medicament, and

the cancer is selected from the group consisting of ovarian cancer, breast cancer, lung cancer, Kaposi sarcoma, cervical cancer, and pancreatic cancer.

30. The use of any one of claims 22-28, wherein:

the carboplatin is used in the manufacture of the medicament, and

the cancer is selected from the group consisting of ovarian cancer, lung cancer, head and neck cancer, brain cancer, and neuroblastoma.

31. The use of any one of claims 22-28, wherein:

the oxaliplatin is used in the manufacture of the medicament, and the cancer is colorectal cancer.