3. SUMMARY

[006] Provided herein in some examples is a method of treating a coagulopathy in a subject, the method including administering to the subject in need thereof an effective amount of a composition including platelets or platelet derivatives and an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent.

[007] In some examples, provided herein is a method of treating a coagulopathy in a subject, the method including administering to the subject in need thereof an effective amount of a composition prepared by a process including incubating platelets with an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent, to form the composition.

[007a] In one aspect, the present disclosure refers to use of a composition comprising freeze-dried platelet derivative particles (FDPDs) in the manufacture of a medicament for controlling bleeding in a subject,

wherein the medicament is to be administered to the subject in need thereof because the subject is being treated with an antiplatelet agent,

wherein the freeze-dried platelets are rehydrated prior to administration,

wherein the medicament is to be administered parenterally,

wherein the composition comprises an effective amount of the FDPDs and an incubating agent comprising one or more salts, a buffer, and a saccharide,

wherein the antiplatelet agent is selected from the group consisting of aspirin, cangrelor, ticagrelor, prasugrel, abciximab, terutroban, picotamide, elinogrel, vorapaxar, atopaxar, cilostazol, epoprostenol, dipyridamole, treprostinil sodium, sarpogrelate, clopidogrel, eptifibatide, tirofiban, ticlopidine, ibuprofen, prostaglandin E1, and a combination thereof,

wherein the effective amount is between about 5.0×10^7 to about 1.0×10^8, about 1.0×10^8 to about 5.0×10^8, about 5.0×10^8 to about 1.0×10^9, about 1.0×10^9 to about 5.0×10^9, or about 5.0×10^9 to about 1.0×10^{10} FDPDs/kg weight of the subject, and

wherein prior to the administering, the peak thrombin of the subject is below 60 nM, and after the administering, the peak thrombin of the subject is above 66 nM.

[008] In some examples, provided herein is a method of restoring normal hemostasis in a subject, the method including administering to the subject in need thereof an effective amount of a composition including platelets or platelet derivatives and an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent.

[009] In some examples, provided herein is a method of restoring normal hemostasis in a subject, the method including administering to the subject in need thereof an effective amount of a composition prepared by a process including incubating platelets with an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent, to form the composition.

[0010] In some examples, provided herein is a method of preparing a subject for surgery, the method including administering to the subject in need thereof an effective amount of a composition including platelets or platelet derivatives and an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent. Implementations can include one or more of the following features. The surgery can be an emergency surgery. The surgery can be a scheduled surgery.

[0011] In some examples, provided herein is a method of preparing a subject for surgery, the method including administering to the subject in need thereof an effective amount of a composition prepared by a process including incubating platelets with an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic

solvent, to form the composition. Implementations can include one or more of the following features. The surgery can be an emergency surgery. The surgery can be a scheduled surgery.

[0012] In some examples of the above methods, the subject has been treated or is being treated with an antiplatelet agent. In some examples, treatment with the antiplatelet agent can be stopped. In some examples, treatment with the antiplatelet agent can be continued.

[0013] In some examples, provided herein is a method of ameliorating the effects of an antiplatelet agent in a subject, the method including administering to the subject in need thereof an effective amount of a composition including platelets or platelet derivatives and an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent.

[0014] In some examples, provided herein is a method of ameliorating the effects of an antiplatelet agent in a subject, the method including administering to the subject in need thereof an effective amount of a composition prepared by a process including incubating platelets with an incubating agent including one or more salts, a buffer, optionally a cryoprotectant, and optionally an organic solvent, to form the composition.

[0014a] In one example, the present disclosure refers to use a composition comprising freeze-dried platelet derivative particles (FDPDs) in the manufacture of a medicament for ameliorating the effects of an antiplatelet agent in a subject, wherein the medicament is to be administered to the subject in need thereof because the subject has been treated or is being treated with an antiplatelet agent, wherein the freeze-dried platelets are rehydrated prior to administration, wherein the composition comprises an effective amount of the FDPDs and an incubating agent comprising one or more salts, a buffer, and a saccharide, and wherein the effective amount is between about 5.0×10^7 to about 1.0×10^8, about 1.0×10^8 to about 5.0×10^8, about 5.0×10^8 to about 1.0×10^9, about 1.0×10^9 to about 5.0×10^9, or about 5.0×10^9 to about 1.0×10^{10} FDPDs/kg weight of the subject.

[0015] In some examples, the effects of the antiplatelet agent can be the result of an overdose of the antiplatelet agent.

[0016] In some examples, the antiplatelet agent can be selected from the group consisting of aspirin, cangrelor, ticagrelor, clopidogrel, prasugrel, eptifibatide, tirofiban, abciximab, and a supplement.

[0017] Some examples of any of the methods herein can include one or more of the following features. Administering can include administering topically. Administering can include administering parenterally. Administering can include administering intravenously. Administering can include administering intramuscularly. Administering can include administering intrathecally. Administering can include administering subcutaneously. Administering can include administering intraperitoneally. The composition can be dried prior to the administration step. The composition can be rehydrated following the drying step. The composition can be freeze-dried prior to the administration step. The composition can be rehydrated following the freeze-drying step. The incubating agent can include one or more salts selected from phosphate salts, sodium salts, potassium salts, calcium salts, magnesium salts, and

What is claimed is:

1. Use of a composition comprising freeze-dried platelet derivative particles (FDPDs) in the manufacture of a medicament for controlling bleeding in a subject,

wherein the medicament is to be administered to the subject in need thereof because the subject is being treated with an antiplatelet agent,

wherein the freeze-dried platelets are rehydrated prior to administration,

wherein the medicament is to be administered parenterally,

wherein the composition comprises an effective amount of the FDPDs and an incubating agent comprising one or more salts, a buffer, and a saccharide,

wherein the antiplatelet agent is selected from the group consisting of aspirin, cangrelor, ticagrelor, prasugrel, abciximab, terutroban, picotamide, elinogrel, vorapaxar, atopaxar, cilostazol, epoprostenol, dipyridamole, treprostinil sodium, sarpogrelate, clopidogrel, eptifibatide, tirofiban, ticlopidine, ibuprofen, prostaglandin E1, and a combination thereof,

wherein the effective amount is between about 5.0×10^7 to about 1.0×10^8, about 1.0×10^8 to about 5.0×10^8, about 5.0×10^8 to about 1.0×10^9, about 1.0×10^9 to about 5.0×10^9, or about 5.0×10^9 to about 1.0×10^{10} FDPDs/kg weight of the subject, and

wherein prior to the administering, the peak thrombin of the subject is below 60 nM, and after the administering, the peak thrombin of the subject is above 66 nM.

2. The use of any of the preceding claims, wherein the subject is being treated with an antiplatelet agent, such that the treatment is continued before and after the administering without stopping the treatment.

3. The use of any one of claims 1 or 2, wherein the effective amount is about 5.0×10^8 to about 1.0×10^9, about 1.0×10^9 to about 5.0×10^9, or about 5.0×10^9 to about 1.0×10^{10} FDPDs/kg weight of the subject.

4. The use of any one of claims 1 or 2, wherein the effective amount is about 1.0×10^9 to about 5.0×10^9, or about 5.0×10^9 to about 1.0×10^{10} FDPDs/kg weight of the subject.

5. The use of any one of claims 1 or 2, wherein the effective amount is about 5.0×10^9 to about 1.0×10^{10} FDPDs/kg weight of the subject.

6. The use of any of the preceding claims, wherein the saccharide is trehalose in an amount in the range of 10 mM to 500 mM.

7. The use of any of the preceding claims, wherein the composition further comprises polysucrose in an amount in the range of 3 % to 7% and ethanol from 0.1% to 5.0% (v/v).

8. The use of any of the preceding claims, wherein the FDPDs have a particle size of at least about 0.6 μm, the FDPDs have a particle size of at least 1 μm, or at least 50% of the FDPDs have a particle size of about 0.5 μm to 2.5 μm.

9. The use of any of the preceding claims, wherein the medicament is to be administered intravenously.

10. The use of any of the preceding claims, wherein the antiplatelet agent is selected from the group consisting of aspirin, cangrelor, clopidogrel, eptifibatide, tirofiban, ibuprofen, and a combination thereof.

11. The use of any one of claims 1 to 9, wherein the antiplatelet agent is selected from the group consisting of aspirin, cangrelor, ticagrelor, clopidogrel, prasugrel, terutroban, picotamide, elinogrel, ticlopidine, ibuprofen, vorapaxar, atopaxar, cilostazol, prostaglandin E1, epoprostenol, dipyridamole, treprostinil sodium, sarpogrelate, and a combination thereof.

12. The use of any one of claims 1 to 9, wherein the antiplatelet agent is selected from the group consisting of cangrelor, ticagrelor, prasugrel, abciximab, ibuprofen, elinogrel, cilostazol, vorapaxar, atopaxar, terutroban, picotamide, prostaglandin E1, epoprostenol, dipyridamole, treprostinil sodium, sarpogrelate, and a combination thereof.

13. The use of any one of claims 1 to 9, wherein the antiplatelet agent is selected from the group consisting of cangrelor, ticagrelor, prasugrel, ibuprofen, elinogrel, cilostazol, vorapaxar, atopaxar, terutroban, picotamide, prostaglandin E1, epoprostenol, dipyridamole, treprostinil sodium, sarpogrelate, and a combination thereof.

14. The use of any of the preceding claims, wherein the subject is in need thereof because the subject is being treated with two antiplatelet agents.

15. The use of any one of claims 1 to 9, wherein the subject is being treated with aspirin and an antiplatelet agent selected from the group consisting of cangrelor, ticagrelor, prasugrel, abciximab, terutroban, picotamide, elinogrel, vorapaxar, atopaxar, cilostazol, epoprostenol, dipyridamole, treprostinil sodium, sarpogrelate, clopidogrel, eptifibatide, tirofiban, ticlopidine, ibuprofen, and prostaglandin E1, and wherein the effective amount is about 5.0×10^9 to about 1.0×10^{10} particles/kg weight of the subject.

16. The use of any of the preceding claims, wherein the composition is prepared by a process comprising incubating platelets with an incubating agent comprising one or more salts, a buffer, and a saccharide to form incubated platelets, and freeze-drying the incubated platelets, wherein the saccharide comprises trehalose in an amount in the range of 10 mM to 500 mM.

17. The use of claim 16, wherein the process further comprises after the freeze-drying, heating the freeze-dried platelet derivative composition at a temperature in the range of 70°C to 85°C for at least 1 hour to not more than 36 hours to thermally treat the freeze-dried platelet derivative composition.

18. The use of any of the preceding claims, wherein a surgery is to be performed on the subject after administration of the medicament to the subject, wherein the dose of the antiplatelet agent is not reduced before the surgery.

19. The use of any one of the preceding claims, wherein after the administering, the peak thrombin of the subject is between 66 nM and 166 nM.

20. The use of any of the preceding claims, wherein at least 90% of the FDPDs have a particle size of about 0.5 μm to 2.5 μm.