WHAT IS CLAIMED IS:

1. A system for removing cytokines and other substances from blood of a subject in a closed fluid circuit, said system comprising ~~components~~ a centrifugal apheresis pump connected to a catheter; a plasma separator connected to the pump; an adsorption chamber having an adsorption material comprising 50 to 70 % by weight of activated carbon and 30 to 50 % by weight of non-ionic resin; and a combining chamber, wherein the system is effective and configured to perform the following method steps:

(i) passing venous blood from the subject from a catheter connected to the centrifugal apheresis pump through ~~a~~ the plasma separator, thereby separating the blood into blood cells and plasma;

(ii) passing the plasma directly received from the plasma separator directly through ~~an~~ the adsorption chamber located in the circuit to form processed plasma, wherein the adsorption materials in the adsorption chamber are configured to adsorb cytokines in the plasma to form the processed plasma~~, said materials comprising, by weight, 50-70% activated carbon and 30-50% non-ionic resin~~;

(iii) combining the processed plasma, received directly from the adsorption chamber, with the blood cells in ~~a~~ the combining chamber to form processed blood, wherein the combining chamber is configured to form processed blood without exchanging any of the plasma for another fluid; and

(iv) subjecting the processed blood to be transfused into the subject directly after combining the processed plasma, ~~transfusing the processed blood from the circuit directly into the subject, wherein~~ , such that no fluid besides the subject's blood is added to the circuit ~~before the transfusing of the processed blood into the subject is completed~~.

2. The system according to claim 1, wherein the non-ionic resin comprises at least one resin material selected from the group consisting of a non-ionic aliphatic ester resin, a non-ionic polystyrene divinyl benzene resin, an agarose media with hydrophobic interactive chromatography, and other non-biologic adsorptive resins.

3. The system according to claim 2, wherein the non-ionic aliphatic ester resin is AMBERLITE® XAD-7HP.

4. The system according to claim 2, wherein the non-ionic polystyrene divinyl benzene resin is AMBERCHROM® GC300C.

5. The system according to claim 2, wherein the activated carbon comprises at least one activated carbon material selected from the group consisting of uncoated coconut shell granule charcoal, uncoated organic granule charcoal, and uncoated synthetic carbon.

6. The system according to claim 1, wherein the adsorption chamber is constructed from a polymer selected from the group consisting of polycarbonate, polypropylene, a Lexan co-polymer, polytetrafluoroethylene, and other medical grade polymers suitable for injection or blow molding.

7. The system according to claim 1, wherein the adsorption chamber comprises:

a housing comprising a hollow tube with opposing open ends, said housing containing the activated carbon and non-ionic resin;

porous membrane filters covering each of the ends of the housing, each porous membrane filter creating a barrier for maintaining the activated carbon and non-ionic resin within the housing while allowing for passage therethrough of the plasma during performance of the method steps; and

endcaps fitted to each of the ends of the housing, wherein each endcap is configured to keep its corresponding porous membrane filter in place and to maintain a seal between the endcap and the corresponding end of the housing.

8. The system according to claim 7, wherein each endcap includes a groove molded into its entire inner circumference, said groove being configured to facilitate mating of each endcap with the corresponding end of the housing.

9. The system according to claim 8, wherein said groove is configured to receive a quantity of adhesive, and said adhesive being deposited in the groove so as to aid in adhering the porous membrane filter to the endcap.

10. The system according to claim 9, wherein another quantity of adhesive is deposited between each endcap and its corresponding porous membrane filter to provide further adhesion between the endcap and the corresponding end of the housing.

11. The system according to claim 7, wherein the ends of the housing are threaded and the corresponding endcaps are also threaded so as to mate with one another.

12. The system according to claim 7, wherein the housing is in the form of a tube comprising at least one of polypropylene, polytetrafluoroethylene, or other medical grade tubing materials.

13. The system according to claim 1, wherein the adsorption chamber and/or the materials in the adsorption chamber are coated with human serum albumin and an anticoagulant added to physiological saline as a delivery solution prior to clinical use.

14. The system according to claim 13, wherein the anticoagulant is selected from the group consisting of sodium heparin and citrate dextrose solution ACD-A.

15. The system according to claim 1, wherein said adsorption chamber is effective to remove toxins other than cytokines from blood of the subject.

~~16. A system for use in the therapeutic treatment of a disease or condition selected from the group consisting of sepsis, liver failure, viral infection, acute respiratory distress, renal failure, inflammation, poisoning, drug overdose, autoimmune disease, tick-borne illness, chemical or nerve agent exposure, burn biliary obstruction, post-surgery inflammation, bacterial infection, complications caused by smoke inhalation, complications as a result of any form of injury or trauma, and complications as a result of any form of cancer or cancer treatment,~~

wherein said system comprises a plasma separator, an adsorption chamber, and a combining chamber, and

wherein said system is used for said therapeutic treatment of the disease or condition by removing cytokines and other substances from blood of a subject in a closed fluid circuit, said system being effective to perform the following method steps:

(i) passing venous blood from the subject through the plasma separator, thereby separating the blood into blood cells and plasma;

(ii) passing the plasma received from the plasma separator through the adsorption chamber located in the circuit to form processed plasma, wherein materials in the adsorption chamber adsorb cytokines in the plasma to form the processed plasma, said materials comprising, by weight, 50-70% activated carbon and 30-50% non-ionic resin;

(iii) combining the processed plasma, received directly from the adsorption chamber, with the blood cells in the combining chamber to form processed blood, without exchanging any of the plasma for another fluid; and

(iv) transfusing the processed blood from the circuit directly into the subject, wherein no fluid besides the subject's blood is added to the circuit before the transfusing of the processed blood into the subject is completed.

17. The system according to claim 16, wherein said autoimmune disease is selected from the group consisting of inflammatory arthritis, psoriasis, Crohn's disease, ulcerative colitis, inflammatory bowel disease, and uveitis.

18. The system according to claim 16, wherein the non-ionic resin comprises at least one resin material selected from the group consisting of a non-ionic aliphatic ester resin, a non-ionic polystyrene divinyl benzene resin, an agarose media with hydrophobic interactive chromatography, and other non-biologic adsorptive resins.

19. The system according to claim 18, wherein the non-ionic aliphatic ester resin is AMBERLITE® XAD-7HP.

20. The system according to claim 18, wherein the non-ionic polystyrene divinyl benzene resin is AMBERCHROM® GC300C.

21. The system according to claim 18, wherein the activated carbon comprises at least one activated carbon material selected from the group consisting of uncoated coconut shell granule charcoal, uncoated organic granule charcoal, and uncoated synthetic carbon.

22. The system according to claim 16, wherein the adsorption chamber is constructed from a polymer selected from the group consisting of polycarbonate, polypropylene, a Lexan co-polymer, polytetrafluoroethylene, and other medical grade polymers suitable for injection or blow molding.

23. The system according to claim 16, wherein the adsorption chamber comprises:

a housing comprising a hollow tube with opposing open ends, said housing containing the activated carbon and non-ionic resin;

porous membrane filters covering each of the ends of the housing, each porous membrane filter creating a barrier for maintaining the activated carbon and non-ionic resin within the housing while allowing for passage therethrough of the plasma during performance of the method steps; and

endcaps fitted to each of the ends of the housing, wherein each endcap is configured to keep its corresponding porous membrane filter in place and to maintain a seal between the endcap and the corresponding end of the housing.

24. The system according to claim 23, wherein each endcap includes a groove molded into its entire inner circumference, said groove being configured to facilitate mating of each endcap with the corresponding end of the housing.

25. The system according to claim 24, wherein said groove is configured to receive a quantity of adhesive, and said adhesive being deposited in the groove so as to aid in adhering the porous membrane filter to the endcap.

~~26. The system according to claim 25, wherein another quantity of adhesive is deposited between each endcap and its corresponding porous membrane filter to provide further adhesion between the endcap and the corresponding end of the housing.~~

~~27. The system according to claim 23, wherein the ends of the housing are threaded and the corresponding endcaps are also threaded so as to mate with one another.~~

~~28. The system according to claim 23, wherein the housing is in the form of a tube comprising at least one of polypropylene, polytetrafluoroethylene, or other medical grade tubing materials.~~

~~29. The system according to claim 16, wherein the adsorption chamber and/or the materials in the adsorption chamber are coated with human serum albumin and an anticoagulant added to physiological saline as a delivery solution prior to clinical use.~~

~~30. The system according to claim 29, wherein the anticoagulant is selected from the group consisting of sodium heparin and citrate dextrose solution ACD-A.~~

~~31. The system according to claim 16, wherein said adsorption chamber is effective to remove toxins other than cytokines from blood of the subject.~~

~~32. Use of an adsorption chamber for the manufacture of a system according to any one of claims 16-31 for the therapeutic treatment of a disease or condition selected from the group consisting of sepsis, liver failure, viral infection, acute respiratory distress, renal failure, inflammation, poisoning, drug overdose, autoimmune disease, tick-borne illness, chemical or nerve agent exposure, burn biliary obstruction, post-surgery inflammation, bacterial infection, complications caused by smoke inhalation, complications as a result of any form of injury or trauma, and complications as a result of any form of cancer or cancer treatment.~~

33. The use according to claim 32, wherein said autoimmune disease is selected from the group consisting of inflammatory arthritis, psoriasis, Crohn's disease, ulcerative colitis, inflammatory bowel disease, and uveitis.

34. A method of removing cytokines and other substances from blood, said method comprising:

passing venous blood through a plasma separator, thereby separating the blood into blood cells and plasma;

passing the plasma received from the plasma separator through an adsorption chamber to form processed plasma, wherein materials in the adsorption chamber adsorb cytokines in the plasma to form the processed plasma, said materials comprising, by weight, 50-70% activated carbon and 30-50% non-ionic resin; and

combining the processed plasma, received directly from the adsorption chamber, with the blood cells in a combining chamber to form processed blood, without exchanging any of the plasma for another fluid.

35. The method according to claim 34, wherein the non-ionic resin comprises at least one resin material selected from the group consisting of a non-ionic aliphatic ester resin, a non-ionic polystyrene divinyl benzene resin, an agarose media with hydrophobic interactive chromatography, and other non-biologic adsorptive resins.

36. The method according to claim 35, wherein the non-ionic aliphatic ester resin is AMBERLITE® XAD-7HP.

37. The method according to claim 35, wherein the non-ionic polystyrene divinyl benzene resin is AMBERCHROM® GC300C.

38. The method according to claim 35, wherein the activated carbon comprises at least one activated carbon material selected from the group consisting of uncoated coconut shell granule charcoal, uncoated organic granule charcoal, and uncoated synthetic carbon.

~~39. The method according to claim 34, wherein the adsorption chamber is constructed from a polymer selected from the group consisting of polycarbonate, polypropylene, a Lexan co-polymer, polytetrafluoroethylene, and other medical grade polymers suitable for injection or blow molding.~~

~~40. The method according to claim 34, wherein the adsorption chamber comprises:~~

~~a housing comprising a hollow tube with opposing open ends, said housing containing the activated carbon and non-ionic resin;~~

~~porous membrane filters covering each of the ends of the housing, each porous membrane filter creating a barrier for maintaining the activated carbon and non-ionic resin within the housing while allowing for passage therethrough of the plasma during performance of the method; and~~

~~endcaps fitted to each of the ends of the housing, wherein each endcap is configured to keep its corresponding porous membrane filter in place and to maintain a seal between the endcap and the corresponding end of the housing.~~

~~41. The method according to claim 40, wherein each endcap includes a groove molded into its entire inner circumference, said groove being configured to facilitate mating of each endcap with the corresponding end of the housing.~~

~~42. The method according to claim 41, wherein said groove is configured to receive a quantity of adhesive, and said adhesive being deposited in the groove so as to aid in adhering the porous membrane filter to the endcap.~~

~~43. The method according to claim 42, wherein another quantity of adhesive is deposited between each endcap and its corresponding porous membrane filter to provide further adhesion between the endcap and the corresponding end of the housing.~~

~~44. The method according to claim 41, wherein the ends of the housing are threaded and the corresponding endcaps are also threaded so as to mate with one another.~~

~~45. The method according to claim 40, wherein the housing is in the form of a tube comprising at least one of polypropylene, polytetrafluoroethylene, or other medical-grade tubing materials.~~

~~46. The method according to claim 34, wherein the adsorption chamber and/or the materials in the adsorption chamber are coated with human serum albumin and an anticoagulant added to physiological saline as a solution prior to clinical use.~~

~~47. The method according to claim 46, wherein the anticoagulant is selected from the group consisting of sodium heparin and citrate dextrose solution ACD-A.~~

~~48. The method according to claim 34, wherein said adsorption chamber is effective to remove toxins other than cytokines from blood.~~

16. Use of materials comprising 50 to 70 % by weight of activated carbon and 30 to 50 % by weight of non-ionic resin for removing cytokines and other substances from blood of a subject in a closed fluid circuit, said materials being in an adsorption chamber of the system according to any one of claims 1-15.

17. Use of the system according to any one of claims 1-15 for removing cytokines and other substances from blood of a subject in a closed fluid circuit, said system being an extracorporeal plasma system.

18. Use of materials comprising 50 to 70 % by weight of activated carbon and 30 to 50 % by weight of non-ionic resin for treating disease or condition selected from the group consisting of sepsis, liver failure, viral infection, acute respiratory distress, renal failure, inflammation, poisoning, drug overdose, autoimmune disease, tick-borne illness, chemical or nerve agent exposure, burn biliary obstruction, post-surgery inflammation, bacterial infection, complications caused by smoke inhalation, complications as a result of any form of injury or trauma, and complications as a result of any form of cancer or cancer treatment, said materials being in an adsorption chamber of the system according to any one of claims 1 to 15.

~~49. A method for therapeutic treatment of a subject, said method comprising:~~

~~performing the method according to any one of claims 34-47 to remove cytokines and other substances from the blood, thereby providing therapeutic treatment.~~

19. A method of using the system according to any one of claims 1 to 15 for treating disease or condition selected from the group consisting of sepsis, liver failure, viral infection, acute respiratory distress, renal failure, inflammation, poisoning, drug overdose, autoimmune disease, tick-borne illness, chemical or nerve agent exposure, burn biliary obstruction, post-surgery inflammation, bacterial infection, complications caused by smoke inhalation, complications as a result of any form of injury or trauma, and complications as a result of any form of cancer or cancer treatment, wherein the method comprising the steps of:

(i) passing venous blood from the subject from a catheter connected to a centrifugal apheresis pump through a plasma separator, thereby separating the blood into blood cells and plasma;

(ii) passing the plasma directly received from the plasma separator directly through an adsorption chamber located in the circuit to form processed plasma, wherein the adsorption materials in the adsorption chamber adsorb cytokines in the plasma to form the processed plasma, said materials comprising, by weight, 50 70% activated carbon and 30 50% non-ionic resin; and

(iii) combining the processed plasma, received directly from the adsorption chamber, with the blood cells in a combining chamber to form processed blood, without exchanging any of the plasma for another fluid; and

(iv) subjecting the processed blood to be transfused into the subject directly after combining the processed plasma, such that no fluid besides the subject's blood is added to the circuit.

~~50. The method according to claim 49, wherein the therapeutic treatment is for a disease or condition selected from the group consisting of sepsis, liver failure, viral infection, acute respiratory distress, renal failure, inflammation, poisoning, drug overdose, autoimmune disease, tick-borne illness, chemical or nerve agent exposure, burn biliary obstruction, post-surgery inflammation, bacterial infection, complications caused by smoke inhalation, complications as a result of any form of injury or trauma, and complications as a result of any form of cancer or cancer treatment.~~

~~51.~~20. The method according to claim ~~50~~19, wherein said autoimmune disease is selected from the group consisting of inflammatory arthritis, psoriasis, Crohn's disease, ulcerative colitis, inflammatory bowel disease, and uveitis.

~~52~~21. The method according to claim ~~50~~19, wherein said inflammation is treated using an age defying anti-inflammation application selected from the group consisting of cosmetic, pain, and discomfort applications.

~~53~~22. The method according to claim ~~49~~19~~, wherein said therapeutic treatment~~ is administered via use of a standard venous access in an outpatient treatment setting.

~~54~~23. The method according to claim ~~49~~ 19 further comprising a step of introducing an anticoagulant into the circuit.

~~55~~24. The method according to claim ~~54~~23, wherein the anticoagulant is a citrate dextrose solution ACD-D.

~~56~~25. The method according to claim ~~49~~ 19 further comprising a step of removing toxins from the venous blood with the adsorption chamber.

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