CLAIM(S):

1. A biological fluid filter device comprising:

(a) a housing comprising an inlet port and an outlet port and defining a first fluid flow path between the inlet port and the outlet port, the housing further comprising an elution fluid inlet port and a drain port and defining a second fluid flow path between the elution fluid inlet port and the inlet port, and defining a third fluid flow path between the outlet port and the drain port;

(b) a porous fibrous leukocyte depletion filter having an upstream surface and a downstream surface, disposed in the housing across the fluid flow paths;

wherein the inlet port is upstream of the upstream surface of the leukocyte depletion filter, and,

the outlet port, the elution fluid inlet port, and the drain port, are downstream of the downstream surface of the leukocyte depletion filter; and

(c) a perforated diffusing plate having a first surface and a second surface, disposed in the housing across the first and second fluid flow paths, wherein the diffusing plate is disposed in the housing between the downstream surface of the leukocyte depletion filter and the outlet port.

2. The device of claim 1, wherein the housing has a wall downstream of the downstream surface of the leukocyte depletion filter, the wall including the elution fluid inlet port, the outlet port, and the drain port, and the elution fluid inlet port is located between the outlet port and the drain port in the wall.

3. The device of claim 1 or 2, further comprising a vent device in communication with the outlet port.

4. A method for processing a biological fluid comprising passing biological fluid through the biological fluid filter device of any one of claims 1-3.

5. A method for processing a biological fluid comprising

(a) passing a biological fluid from a first container through a biological fluid filter device comprising:

a housing comprising an inlet port and an outlet port, and defining a fluid path between the inlet and the outlet, the housing further comprising an elution fluid inlet port and a drain port and defining a fluid flow path between the elution fluid inlet port and the inlet port, a porous fibrous leukocyte depletion filter having an upstream surface and a downstream surface, disposed in the housing across the fluid flow paths, and a perforated diffusing plate having a first surface and a second surface, disposed in the housing across the fluid flow paths, such that the diffusing plate is disposed in the housing between the downstream surface of the leukocyte depletion filter and the outlet port; wherein the inlet port is upstream of the upstream surface of the leukocyte depletion filter, and the outlet, the elution fluid inlet port, and the drain port, are downstream of the downstream surface of the leukocyte depletion filter;

and passing leukocyte-depleted biological fluid from the outlet port into a second container;

(b) passing gas through the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into the second container or into a third container;

(c) passing elution solution from an elution solution delivery device through the elution fluid inlet port, the perforated diffusing plate, the leukocyte depletion filter, and the inlet port, into an eluted target cell container; wherein the elution solution elutes leukocytes and/or stem cells from the filter into the eluted target cell container.

6. The method of claim 5, comprising passing gas from the second container through the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into the third container.

7. The method of claim 5, wherein passing leukocyte-depleted biological fluid from the outlet including displacing gas into a gas collection container, and the method further comprises passing collected gas from the gas collection container through the outlet

port and displacing biological fluid in the downstream chamber from the housing through the drain port into the second container.

8. The method of claim 5, comprising passing gas through a vent into the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into the second container.

9. A method for processing a biological fluid comprising

(a) passing a biological fluid from a first container through a biological fluid filter device comprising:

a housing comprising an inlet port and an outlet port, and defining a fluid path between the inlet and the outlet, the housing further comprising an elution fluid inlet port and a drain port, a porous fibrous leukocyte depletion filter having an upstream surface and a downstream surface, disposed in the housing across the fluid flow path, and a perforated diffusing plate having a first surface and a second surface, disposed in the housing across the fluid flow paths; wherein the inlet port is upstream of the upstream surface of the leukocyte depletion filter, and the outlet port, the elution fluid inlet port, and the drain port, are downstream of the downstream surface of the leukocyte depletion filter;

and passing leukocyte-depleted biological fluid from the outlet port into a second container;

(b) passing gas from the second container through the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into a third container; and,

(c) passing elution solution from an elution solution delivery device through the elution fluid inlet port, the perforated diffusing plate, the leukocyte depletion filter, and the inlet port, into a fourth container; wherein the elution solution elutes leukocytes and/or stem cells from the filter into the fourth container.

10. The method of any one of claims 4-9, carried out while maintaining a closed system.

11. A biological fluid processing system comprising

(a) the biological fluid filter device of any one of claims 1-3;

(b) a container for receiving leukocyte-depleted biological fluid, in fluid communication with the outlet port;

(c) a container for receiving gas displaced biological fluid, in fluid communication with the drain port; and,

(d) a container for receiving elution fluid and eluted leukocytes, in fluid communication with the inlet port.

12. The system of claim 11, further comprising (e) an elution fluid delivery device, in fluid communication with the elution fluid inlet port.

13. The system of claim 11 or 12, further comprising (f) a biological fluid source container, in fluid communication with the inlet.

14. The system of claim 12 or 13, wherein the elution fluid delivery device comprises a prefilled syringe containing elution solution or a syringe pump.

15. The system of any one of claims 11-14, wherein the container for receiving elution fluid and eluted leukocytes is a freezable container.

CLAIM(S):

1. A biological fluid filter device (1000) comprising:

(a) a housing (600) comprising an inlet port (101a) and an outlet port (201a) and defining a first fluid flow path between the inlet port and the outlet port, the housing further comprising an elution fluid inlet port (300) and a drain port (631) and defining a second fluid flow path between the elution fluid inlet port and the inlet port, and defining a third fluid flow path between the outlet port and the drain port;

(b) a porous fibrous leukocyte depletion filter (500, 510) having an upstream surface (501) and a downstream surface (502), disposed in the housing across the first and second fluid flow paths;

wherein the inlet port is upstream of the upstream surface of the leukocyte depletion filter, and,

the outlet port, the elution fluid inlet port, and the drain port, are downstream of the downstream surface of the leukocyte depletion filter; and

(c) a perforated diffusing plate (400) having a first surface (410) and a second surface (420), disposed in the housing across the first and second fluid flow paths, wherein the diffusing plate is disposed in the housing between the downstream surface of the leukocyte depletion filter and the outlet port.

2. The device of claim 1, wherein the housing has a wall (203) downstream of the downstream surface of the leukocyte depletion filter, the wall including the elution fluid inlet port, the outlet port, and the drain port, and the elution fluid inlet port is located between the outlet port and the drain port in the wall.

3. The device of any one of claims 1 or 2, further comprising a vent device (700) in communication with the outlet port.

4. A method for processing a biological fluid comprising passing biological fluid through the biological fluid filter device of any one of claims 1-3.

5. A method for processing a biological fluid comprising

(a) passing a biological fluid from a first container through a biological fluid filter device comprising:

a housing comprising an inlet port and an outlet port, and defining a fluid path between the inlet port and the outlet port, the housing further comprising an elution fluid inlet port and a drain port and defining a fluid flow path between the elution fluid inlet port and the inlet port, a porous fibrous leukocyte depletion filter having an upstream surface and a downstream surface, disposed in the housing across the fluid flow paths, and a perforated diffusing plate having a first surface and a second surface, disposed in the housing across the fluid flow paths, such that the diffusing plate is disposed in the housing between the downstream surface of the leukocyte depletion filter and the outlet port; wherein the inlet port is upstream of the upstream surface of the leukocyte depletion filter, and the outlet port, the elution fluid inlet port, and the drain port, are downstream of the downstream surface of the leukocyte depletion filter;

and passing leukocyte-depleted biological fluid from the outlet port into a second container;

(b) passing gas through the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into the second container or into a third container;

(c) passing elution solution from an elution solution delivery device through the elution fluid inlet port, the perforated diffusing plate, the leukocyte depletion filter, and the inlet port, into an eluted target cell container; wherein the elution solution elutes leukocytes and/or stem cells from the filter into the eluted target cell container.

6. The method of claim 5, comprising passing gas from the second container through the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into the third container.

7. The method of claim 5, wherein passing leukocyte-depleted biological fluid from the outlet port includes displacing gas into a gas collection container, and the method further comprises passing collected gas from the gas collection container through the outlet

port and displacing biological fluid in the downstream chamber from the housing through the drain port into the second container.

8. The method of claim 5, comprising passing gas through a vent into the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into the second container.

9. A method for processing a biological fluid comprising

(a) passing a biological fluid from a first container through a biological fluid filter device comprising:

a housing comprising an inlet port and an outlet port, and defining a fluid path between the inlet port and the outlet port, the housing further comprising an elution fluid inlet port and a drain port, a porous fibrous leukocyte depletion filter having an upstream surface and a downstream surface, disposed in the housing across the fluid flow path, and a perforated diffusing plate having a first surface and a second surface, disposed in the housing across the fluid flow path; wherein the inlet port is upstream of the upstream surface of the leukocyte depletion filter, and the outlet port, the elution fluid inlet port, and the drain port, are downstream of the downstream surface of the leukocyte depletion filter;

and passing leukocyte-depleted biological fluid from the outlet port into a second container;

(b) passing gas from the second container through the outlet port and displacing biological fluid in the downstream chamber from the housing through the drain port into a third container; and,

(c) passing elution solution from an elution solution delivery device through the elution fluid inlet port, the perforated diffusing plate, the leukocyte depletion filter, and the inlet port, into a fourth container; wherein the elution solution elutes leukocytes and/or stem cells from the filter into the fourth container.

10. The method of any one of claims 5-9, carried out while maintaining a closed system.

11. A biological fluid processing system (1500) comprising

(a) the biological fluid filter device (1000) of any one of claims 1-3;

(b) a container (30) for receiving leukocyte-depleted biological fluid, in fluid communication with the outlet port (201a);

(c) a container (40) for receiving gas displaced biological fluid, in fluid communication with the drain port (631); and,

(d) a container (20) for receiving elution fluid and eluted leukocytes, in fluid communication with the inlet port (101a).

12. The system of claim 11, further comprising (e) an elution fluid delivery device (50), in fluid communication with the elution fluid inlet port (300).

13. The system of claim 11 or 12, further comprising (f) a biological fluid source container (10), in fluid communication with the inlet port (101a).

14. The system of claim 12 or 13, wherein the elution fluid delivery device comprises a prefilled syringe containing elution solution or a syringe pump.

15. The system of any one of claims 11-14, wherein the container for receiving elution fluid and eluted leukocytes is a freezable container.