CLAIMS

1. A method for separating blood cell components from a biological fluid, comprising:

(a) capturing white blood cells and platelets on a blood cell separation material by contacting the biological fluid with the blood cell separation material, thereby providing a red blood cell-rich fraction whose white blood cell recovery rate is not more than 10%; and

(b) separating a white blood cell-rich fraction from the resulting blood cell separation material using a separation solution.

2. The separation method according to claim 1,

wherein the blood cell separation material is packed in a container having an inlet and an outlet for the biological fluid, and

the contact of the biological fluid with the blood cell separation material is accomplished by introducing the biological fluid from the inlet.

3. The separation method according to claim 1 or 2,

wherein in the step (a), after the contact of the biological fluid with the blood cell separation material, remaining red blood cells are washed out of the resulting blood cell separation material with a washing solution.

4. The separation method according to claim 2 or 3,

wherein in the step (b), the separation solution is introduced from the outlet for the biological fluid to separate and recover white blood cells.

5. The separation method according to any one of claims 1 to 4,

wherein the separation solution comprises physiological saline, a buffer, dextran, a culture medium, or an infusion.

19. The separation method according to any one of claims 1 to 15,

wherein the white blood cell-rich fraction or the mononuclear cell-rich fraction comprises a hematopoietic stem cell, a mesenchymal stem cell, or a CD34-positive cell.

20. A red blood cell-rich fraction whose red blood cell recovery rate is not less than 80%, white blood cell recovery rate is not more than 10%, and platelet recovery rate is not more than 40%;, a white blood cell-rich fraction whose white blood cell recovery rate is not less than 45%, red blood cell recovery rate is not more than 10%, and platelet recovery rate is not more than 50%, or a platelet-rich fraction separated by the method according to any one of claims 1 to 13.

21. A blood cell separation material comprising

a nonwoven fabric that allows separation of a mononuclear cell-rich fraction from a biological fluid,

wherein the nonwoven fabric has a density K of 2.0×10^4 to 1.9×10^5 and has a fiber diameter of 1 μm to 15 μm, and wherein the nonwoven fabric comprises a polyethylene terephthalate fiber and/or a polybutylene terephthalate fiber.

~~22. The blood cell separation material according to claim 21,~~

~~wherein the nonwoven fabric comprises a nylon fiber, a polypropylene fiber, or a polybutylene terephthalate fiber.~~

~~23.~~22. A blood cell separation device comprising

the blood cell separation material according to claim 21 ~~or 22~~,

wherein a laminate of layers of the blood cell separation material is packed in a container having an inlet and an outlet for a biological fluid.

~~24.~~23. The blood cell separation device according to

claim ~~23~~22, further comprising:

a flow-path opening and closing means located upstream of the inlet of the container;

a white blood cell-rich fraction recovery means connected to the flow-path opening and closing means; and

a separation solution introducing means located downstream of the outlet of the container.

~~25. A separation solution for recovering white blood cells captured on a blood cell separation material or a nonwoven fabric,~~

~~which has a viscosity of from 1 mPa·s or higher to lower than 5 mPa·s.~~

~~26. The separation solution according to claim 25,~~

~~which is free from dextran.~~