CLAIMS

1. A method for distinguishing and isolating a cardiomyocyte sub-type population from a heterogeneous population of mature cardiomyocytes that were differentiated from human pluripotent stem cells in a sample, the method comprising:

(a) contacting the sample with a first agent that specifically binds to a cell surface marker selected from Row A of Table 1 to provide a first population of ventricular cardiomyocytes, and/or a second agent that specifically binds to a cell surface marker selected from Row B of Table 1 to provide a second population of atrial cardiomyocytes; and

(b) isolating the cells bound to the said agents,

wherein the first and second agents are coupled with a binding agent against SIRPA.

2. The method according to claim 1, wherein the method comprising:

(a) contacting the sample with a first agent that specifically binds to a cell surface marker selected from the group consisting of JAK2 and CD200 to provide a first population of ventricular cardiomyocytes and/or a second agent that specifically binds to a cell surface marker selected from the group consisting of CHRND and CD181 to provide a second population of atrial cardiomyocytes.

3. The method according to any one of the preceding claims, wherein the method further comprises the step of, prior to isolating the cardiomyocyte population, generating a culture of the sample and causing differentiation of the cells in the sample.

4. The method according to any one of the preceding claims, wherein the binding agent is an antibody or a fragment thereof.

5. The method according to claim 4, wherein the antibody is labelled with a detectable moiety.

6. The method according to claim 5, wherein the detectable moiety is selected from the group consisting of: a fluorescent moiety, a luminescent moiety, a chemiluminescent moiety, a radioactive moiety, an enzymatic moiety and a secondary antibody.

7. The method according to any one of the preceding claims, wherein the isolated cells comprise a population of cells having at least about 85% purity.

8. The method according to any one of the preceding claims, wherein the cardiomyocyte population is isolated using fluorescent activated cell sorting.

9. The method according to any one of the preceding claims, wherein the cells are ES03 cells and/or BJ iPS cells.

10. An isolated cardiomyocyte population isolated by the method according to any one of claims 1 to 9.

11. The isolated cardiomyocyte population according to claim 10, wherein at least 85% of the cells are cardiomyocytes comprising a surface marker selected from Table 1.

12. An isolated cardiomyocyte population according to any one of claims 10 or 11 for use in medicine.

13. A pharmaceutical composition comprising a therapeutically effective amount of a population of cells according to any one of claims 10 or 11, together with a pharmaceutically acceptable carrier.

14. Use of a population of cells according to any one of claims 10 or 11, or a pharmaceutical composition according to claim 13, in the manufacture of a medicament for treating a cardiovascular disease or disorder.

15. A kit comprising binding agents that specifically binds to each of a cardiomyocyte surface marker comprising JAK2, CD200, CHRND and CD181, the

agents are coupled with a binding agent against SIRPA, together with instructions for use in distinguishing and isolating a cardiomyocyte sub-type population.