CLAIMS

1. Use of pluripotent stem cells positive for SSEA-3 isolated from biological mesenchymal tissue or cultured mesenchymal cells for the manufacture of a pharmaceutical composition for treatment of myocardial infarction,

wherein the pharmaceutical composition is to be administered into a vein or coronary artery of a subject within 1 month after ischemia one to ten times in a therapeutically effective amount of 1×10^3 cells/individual to 1×10^6 cells/individual, or 1.7×10^5 to 2.5×10^5 cells/kg per individual and

wherein said pluripotent stem cells have a plurality of properties, said plurality of the properties comprising:

(i) SSEA-3-positive;

(ii) CD105-positive;

(iii) low or absent telomerase activity;

(iv) ability to differentiate into any of the three germ layers;

(v) absence of demonstration of neoplastic proliferation; and

(vi) self-renewal ability.

2. The use according to claim 1, wherein the pharmaceutical composition contains a cell fraction wherein the pluripotent stem cells positive for SSEA-3 have been concentrated by external stress stimulation.

3. The use according to claim 1 or 2 for prevention and/or treatment of heart failure following serious massive myocardial infarction in humans.

4. The use according to any one of claims 1 to 3, wherein the pluripotent stem cells are CD117-negative and CD146-negative.

5. The use according to any one of claims 1 to 4, wherein the pluripotent stem cells are CD117-negative, CD146-negative, NG2-negative, CD34-negative, vWF-negative and CD271-negative.

6. The use according to any one of claims 1 to 5, wherein the pluripotent stem cells are CD34-negative, CD117-negative, CD146-negative, CD271-negative, NG2-negative, vWF-negative, Sox10-negative, Snail-negative, Slug-negative, Tyrp1-negative and Dct-negative.

7. The use according to any one of claims 1 to 6, wherein the pluripotent stem cells have the ability to accumulate at the site of myocardial infarction.

8. The use according to any one of claims 1 to 7, wherein the pluripotent stem cells have the ability to differentiate into myocardial cells.

9. The use according to any one of claims 1 to 7, wherein the pluripotent stem cells have the ability to differentiate into vascular endothelial cells.

10. The use according to any one of claims 1 to 9, wherein the size of the myocardial infarct is reduced in comparison with a non-administered control.

11. The use according to any one of claims 1 to 10, wherein at least one cardiac function indicator, selected from the group consisting of change in left ventricular pressure over time, left ventricular end-diastolic dimension (LVDd), ejection fraction (EF), left ventricular fractional shortening (FS) and left ventricular end-systolic dimension (LVDs), is restored to the normal value.