expressing fibroblasts for purposes other than the use as a cardiac cell culture material, and usefulness of an injectable composition containing VCAM-1-expressing fibroblasts for diseases other than heart diseases, have been unclear.

PRIOR ART DOCUMENTS

[Patent Documents]

[0005]

[Patent Document 1] WO 2016/006262

[Patent Document 2] WO 2018/155651

[Non-patent Documents]

[0006]

[Non-patent Document 1] Nephron, 1997; 77(2): 176-185

[Non-patent Document 2] Proc Natl Acad Sci., 2004; 101(41): 14907-14912

[Non-patent Document 3] J Renal Inj Prev., 2013; 2(1): 29-30

SUMMARY ~~OF THE INVENTION~~

[0006a]

In one aspect, disclosed herein is a CD106 positive kidney derived fibroblast having enhanced erythropoietin (EPO) productivity, wherein EPO production of the fibroblast is not less than 1.65 times higher than in a CD106 negative kidney derived fibroblast as a control.

[0006b]

In another aspect, disclosed herein is a cell population of fibroblast comprising the fibroblast disclosed herein.

[0006c]

In another aspect, disclosed herein is a method of producing kidney derived fibroblasts having enhanced EPO productivity, the method comprising: bringing kidney derived fibroblasts into contact with TNF-α and IL-4; and culturing, under conditions allowing enhancement of EPO productivity, the fibroblasts that have been brought into contact, wherein EPO production of the fibroblast is not less than 1.65 times higher than in a control fibroblast.

[0006d]

In another aspect, disclosed herein is a pharmaceutical composition comprising the fibroblast disclosed herein or the cell population disclosed herein.

[0006e]

In another aspect, disclosed herein is a use of the fibroblast disclosed herein, the cell population disclosed herein, or the pharmaceutical composition disclosed herein in the manufacture of a medicament for improvement of a state where EPO productivity is decreased.

[0006f]

In another aspect, disclosed herein is a use of the fibroblast disclosed herein, the cell population disclosed herein, or the pharmaceutical composition disclosed here in the manufacture of a medicament for the treatment of a renal disorder.

[0006g]

In another aspect, disclosed herein is a use of the fibroblast disclosed herein, the cell population disclosed herein, or the pharmaceutical composition disclosed herein in the manufacture of a medicament for the treatment of renal anemia.

[0006h]

In another aspect, disclosed herein is the fibroblast disclosed herein, the cell population disclosed herein, or the pharmaceutical composition disclosed herein for use in therapy.

PROBLEMS TO BE SOLVED BY THE INVENTION

[0007]

An object of the present invention is to provide fibroblasts having enhanced EPO productivity, and means for improving a state where EPO productivity is decreased, by use of the fibroblasts.

MEANS FOR SOLVING THE PROBLEMS

[0008]

In order to solve the above problems, the present inventors studied to discover that, by culturing human fibroblasts using a medium supplemented with TNF-α and IL-4, fibroblasts having enhanced EPO productivity can be obtained, thereby completing the present invention.

[0009]

More specifically, the present invention includes the following first aspect (Invention A).

(A1) A fibroblast having enhanced EPO productivity.

(A2) The fibroblast according to (A1), which is positive for CD106.