[Means for Solving the Problems]

The present inventors prepared a fragment peptide (1-44) of an HMGB1 protein which has a cell migration activity, and revealed in the myocardial infarction model for the first time that systemic administration of the fragment peptide enhances the accumulation of PDGFRα-positive cells in infarction sites and vicinities thereof. Further, long-standing improvement of the heart function was demonstrated in the myocardial infarction model animals administered with the fragment peptide (1-44). The above suggests that the fragment peptide (1-44) induces tissue regeneration by making use of the mechanism of inducing damaged tissue regeneration *in vivo*, and suppresses the development of acute myocardial infarction. Thus, it is shown that the fragment peptide of the present invention can be a useful therapeutic agent for poor-prognosis human acute myocardial infarction.

Thus in a first aspect, the present invention refers to a pharmaceutical composition for use in the treatment of myocardial infarction, comprising an HMGB1 fragment peptide consisting of the amino acid sequence of SEQ ID NO: 3.

In another aspect, the present invention refers to the use of a HMBG1 fragment peptide consisting of the amino acid sequence of SEQ ID NO: 3 in the manufacture of a medicament for use in treating myocardial infarction.

Also disclosed herein are novel pharmaceutical compositions for treating myocardial infarction comprising an HMGB1 fragment peptide, and uses thereof.

Specifically, the present inventors produced a peptide consisting of amino acids at positions 1 to 44 of an HMGB1 protein (SEQ ID NO: 3) by peptide synthesis. To model mice that enable evaluation of the therapeutic effect on myocardial infarction, each of the produced HMGB1 fragments was administered, and the therapeutic effects of the fragments on myocardial infarction were confirmed.

Based on these findings, the present application discloses the following:

[1] a pharmaceutical composition for use in the treatment of myocardial infarction, comprising an HMGB1 fragment peptide;

[2] the pharmaceutical composition of [1], wherein the HMGB1 fragment peptide is a peptide comprising the amino acid sequence of SEQ ID NO: 3;

[3] the pharmaceutical composition of [1], wherein the HMGB1 fragment peptide is a peptide consisting of the amino acid sequence of SEQ ID NO: 3;

[4] a method for treating myocardial infarction, comprising the step of administering an HMGB1 fragment peptide;

[5] the method of [4], wherein the HMGB1 fragment peptide is a peptide comprising the amino acid sequence of SEQ ID NO: 3;

CLAIMS

~~1. A pharmaceutical composition for use in the treatment of myocardial infarction, comprising an HMGB1 fragment peptide.~~

~~2. The pharmaceutical composition of claim 1, wherein the HMGB1 fragment peptide is a peptide comprising the amino acid sequence of SEQ ID NO: 3.~~

~~3~~1. ~~The pharmaceutical composition of claim 1, wherein the HMGB1 fragment peptide is a peptide~~ A pharmaceutical composition for use in the treatment of myocardial infarction, comprising an HMGB1 fragment peptide consisting of the amino acid sequence of SEQ ID NO: 3.

~~4. Use of a HMBG1 fragment peptide in the manufacture of a medicament for use in treating myocardial infaretion.~~

~~5. The use of claim 4, wherein the HMBG1 fragment peptide is a peptide comprising the amino acid sequence of SEQ ID NO: 3.~~

~~6~~2. ~~The use of claim 4, wherein the HMBG1 fragment peptide is a peptide~~ Use of an HMBG1 fragment peptide consisting of the amino acid sequence of SEQ ID NO: 3 in the manufacture of a medicament for use in treating myocardial infarction.