CLAIMS

1. A nucleotide sequence encoding a human nuclear factor E2-related factor 2 (Nrf2) protein, wherein the nucleotide sequence is selected from the group consisting of:

(a) the nucleotide sequence as set forth in SEQ ID NO.: 1; and

(b) the nucleotide sequence having ≥95%, preferably ≥98%, and more preferably ≥99% identity with the nucleotide sequence as set forth in SEQ ID NO.: 1.

2. A vector, comprising the nucleotide sequence of claim 1.

3. A host cell, comprising the vector of claim 2, or having an exogenous nucleotide sequence of claim 1 integrated in its chromosome.

4. Use of the vector of claim 2 in preparing a preparation or composition for the treatment of optic nerve related diseases.

5. The use of claim 4, wherein the preparation or composition is also used for one or more items selected from the group consisting of:

(a) activating anti-inflammatory or antioxidant responses of cells;

(b) increasing the survival rate of ganglion cells;

(c) preventing or delaying apoptosis of ganglion cells;

(d) causing stable high expression of Nrf2 gene in retinal ganglion cells; and

(e) scavenging free radicals from diseased cells.

6. The use of claim 4, wherein the optic nerve related diseases include optic nerve injury.

7. The use of claim 4, wherein the optic nerve related diseases are selected from the group consisting of glaucoma, autosomal dominant optic atrophy (DOA), Leber's hereditary optic neuropathy (LHON), ischemic optic neuropathy, or a combination thereof.

8. A pharmaceutical preparation, comprising (a) the vector of claim 2, and (b) a pharmaceutically acceptable carrier or excipient.

9. The pharmaceutical preparation of claim 8, wherein the content of the vector in the

pharmaceutical preparation is 1 x 10^9 - 1 x 10^{16} viruses/ml, and preferably 1 x 10^{10} - 1 x 10^{12} viruses/ml.

10. A method of preparing a recombinant human nuclear factor E2-related factor 2 (Nrf2) protein, comprising the step of culturing the host cell of claim 3 to obtain the recombinant human nuclear factor E2-related factor 2 (Nrf2) protein.

CLAIMS

1. A nucleic acid encoding a human nuclear factor E2-related factor 2 (Nrf2) protein, comprising a nucleotide sequence having ≥95% identity with SEQ ID NO: 1.
2. The nucleic acid of claim 1, wherein the nucleotide sequence has ≥98% identity with SEQ ID NO: 1.
3. The nucleic acid of claim 1, wherein the nucleotide sequence has ≥99% identity with SEQ ID NO: 1.
4. The nucleic acid of claim 1, wherein the nucleotide sequence is SEQ ID NO: 1.
5. A vector, comprising the nucleic acid of any one of claims 1-4.
6. The vector of claim 5, wherein the vector is an adeno-associated virus (AAV) vector.
7. The vector of claim 6, wherein the AAV has a serotype of AAV2, AAV5, AAV7, AAV8, or a combination thereof.
8. The vector of any one of claims 5-7, wherein the vector further comprises a promoter and an enhancer, wherein the promoter is selected from SYN, CMV or CAG.
9. The vector of claim 8, wherein the promoter comprises a sequence selected form SEQ ID NOs: 4-6.
10. A host cell, comprising the vector of any one of claims 5-9 or the nucleic acid of any one of claims 1-4 integrated in its chromosome.
11. Use of the vector of any one of claims 5-9 in the manufacture of a pharmaceutical composition for the treatment of an optic nerve related disease.
12. The use of claim 11, wherein the composition is also used for one or more items selected from the group consisting of:

    (a) activating anti-inflammatory or antioxidant responses of cells;

(b) increasing the survival rate of ganglion cells;

(c) preventing or delaying apoptosis of ganglion cells;

(d) causing stable high expression of Nrf2 gene in retinal ganglion cells; and

(e) scavenging free radicals from diseased cells.

13. The use of claim 11, wherein the optic nerve related disease comprises optic nerve injury.

14. The use of claim 11, wherein the optic nerve related disease is selected from the group consisting of glaucoma, autosomal dominant optic atrophy (DOA), Leber's hereditary optic neuropathy (LHON), ischemic optic neuropathy, or a combination thereof.

15. A pharmaceutical preparation, comprising (a) the vector of any one of claims 5-9, and (b) a pharmaceutically acceptable carrier or excipient.

16. The pharmaceutical preparation of claim 15, wherein the preparation is a liquid pharmaceutical preparation.

17. The pharmaceutical preparation of any one of claims 15-16, wherein the content of the vector in the pharmaceutical preparation is 1×10^9 - 1×10^{16} viruses/ml, and preferably 1×10^{10} - 1×10^{12} viruses/ml.

18. A method of preparing a recombinant human nuclear factor E2-related factor 2 (Nrf2) protein, comprising the step of culturing the host cell of claim 10 to obtain the recombinant human Nrf2 protein.

19. The vector of any one of claims 5-9 for use in therapy.