CLAIMS

1. A method of producing a polypeptide comprising culturing a cell that expresses APES and into which a DNA encoding a desired polypeptide has been introduced, thereby producing the desired polypeptide.

2. The method according to Claim 1, wherein the APES is a nucleic acid molecule comprising a nucleotide sequence that can bind to the DNA or mRNA of NfkBia gene derived from human, mouse, rat or hamster by base pairing and can suppress the expression of the NfkBia gene.

3. The method according to Claim 2, wherein the APES is a small RNA of at most 30 nucleotides in length comprising a sequence of 19 to 25 nucleotides in length that can bind to a part of the NfkBia mRNA by base pairing.

4. The method according to Claim 2, wherein the APES is an mRNA type non-coding RNA of at most 561 nucleotides in length comprising a sequence of 19 to 25 nucleotides in length that can bind to a part of the NfkBia mRNA by base pairing.

5. The method according to Claim 2, wherein the APES is an mRNA type non-coding RNA of 561 to 1579 nucleotides in length comprising a sequence of 19 to 25 nucleotides in length that can bind to a part of the NfkBia mRNA by base pairing.

6. The method according to any of Claims 3 to 5, wherein the continuous sequence of 19 to 25 nucleotides in length is any partial sequence in the nucleotide sequence represented by SEQ ID NO: 2.

7. The method according to Claim 6, wherein the APES is selected from nucleic acid molecules each comprising any of the following nucleotide sequences:

(a) a DNA consisting of the nucleotide sequence of any of SEQ ID NOs:1 to 16 and 29;

(b) a DNA that comprises the sequence of (a) above and is a partial sequence of the 3' untranslated region of the NfkBia gene;

(c) a DNA consisting of the nucleotide sequence identical to the sequence of (a) or

(b) above except for one or several nucleotides;

(d) an RNA that is a transcript of (a), (b) or (c) above; and

(e) a DNA or RNA consisting of the sequence that can bind to the sequence of (a) above by base pairing.

8. The method according to Claim 1, wherein the cell is a strongly APES-expressing cell.

9. The method according to Claim 1, wherein an exogenous DNA encoding the desired polypeptide has been introduced into the cell and the APES has been artificially introduced into the cell.

10. The method according to Claim 9, wherein the cell into which the APES has been artificially introduced is a cell transfected with the APES.

11. The method according to Claim 9, wherein the cell into which the APES has been artificially introduced is a cell in which the transcription of endogenous APES has been activated.

12. The method according to Claim 9, wherein a DNA encoding a taurine transporter has been further introduced into the cell.

13. The method according to Claim 9, wherein a DNA encoding cysteine sulfinic acid decarboxylase has been further introduced into the cell.

14. The method according to Claim 9, wherein a DNA encoding alanine transferase has been further introduced into the cell.

15. The method according to Claim 1, wherein the polypeptide is an antibody.

16. The method according to Claim 1, wherein the cell is a Chinese hamster ovary cell.

17. A method of producing a pharmaceutical comprising the polypeptide produced by the method according to any of Claims 1 to 16.

18. A nucleic acid molecule that comprises any of the following nucleotide sequences and has APES activity, provided that the nucleic acid molecule of SEQ ID NO: 1 is excluded:

(a) a DNA consisting of the nucleotide sequence of any of SEQ ID NOs: 2 to 16 and 29;

(b) a DNA that comprises the sequence of (a) above and is a partial sequence of the 3' untranslated region of NfkBia gene;

(c) a DNA consisting of the nucleotide sequence identical to the sequence of any of SEQ ID NOs: 1 to 16 and 29 or the sequence of (b), except for one or several nucleotides;

(d) an RNA that is a transcript of (a), (b) or (b) above; or

(e) a DNA or RNA consisting of the sequence that can bind to the sequence of (a) above by base pairing.

19. A vector comprising the nucleic acid molecule according to Claim 18.

20. A cell into which the nucleic acid molecule according to Claim 18 or the vector according to Claim 19 has been artificially introduced.

CLAIMS

1. A method of producing an antibody comprising culturing a cell that expresses an antibody production enhancing sequence (APES) which has been artificially introduced into the cell and into which an exogenous DNA encoding a desired antibody has been introduced, thereby producing the desired antibody; and

wherein the APES is a nucleic acid molecule comprising a nucleotide sequence that can bind to the DNA or mRNA of NfkBia gene derived from human, mouse, rat or hamster by base pairing and can suppress the expression of the NfkBia gene.

2. The method according to Claim 1, wherein the APES is a small RNA of at most 30 nucleotides in length comprising a sequence of 19 to 25 nucleotides in length that can bind to a part of the NfkBia mRNA by base pairing and wherein the sequence of 19 to 25 nucleotides in length is any partial sequence in the nucleotide sequence represented by SEQ ID NO: 2.

3. The method according to Claim 1, wherein the APES is an mRNA type non-coding RNA of at most 561 nucleotides in length comprising a sequence of 19 to 25 nucleotides in length that can bind to a part of the NfkBia mRNA by base pairing and wherein the sequence of 19 to 25 nucleotides in length is any partial sequence in the nucleotide sequence represented by SEQ ID NO: 2.

4. The method according to Claim 1, wherein the APES is an mRNA type non-coding RNA of 561 to 1579 nucleotides in length comprising a sequence of 19 to 25 nucleotides in length that can bind to a part of the NfkBia mRNA by base pairing and wherein the sequence of 19 to 25 nucleotides in length is any partial sequence in the nucleotide sequence represented by SEQ ID NO: 2.

5. The method according to Claim 4, wherein the APES is selected from nucleic acid molecules each comprising any of the following nucleotide sequences:
(a) a DNA consisting of the nucleotide sequence of any of SEQ ID NOs:1 to 16 and 29;
(b) a DNA that comprises the sequence of (a) above and is a partial sequence of the 3' untranslated region of the NfkBia gene;

(c) a DNA consisting of the nucleotide sequence identical to the sequence of (a) or (b) above except for one or several nucleotides;
(d) an RNA that is a transcript of (a), (b) or (c) above; and
(e) a DNA or RNA consisting of the sequence that can bind to the sequence of (a) above by base pairing.

6. The method according to Claim 1, wherein the cell is a strongly APES-expressing cell.

7. The method according to Claim 1, wherein the cell into which the APES has been artificially introduced is a cell transfected with the APES.

8. The method according to Claim 1, wherein the cell into which the APES has been artificially introduced is a cell in which the transcription of endogenous APES has been activated.

9. The method according to Claim 1, wherein a DNA encoding a taurine transporter has been further introduced into the cell.

10. The method according to Claim 1, wherein a DNA encoding cysteine sulfinic acid decarboxylase has been further introduced into the cell.

11. The method according to Claim 1, wherein a DNA encoding alanine transferase has been further introduced into the cell.

12. The method according to Claim 1, wherein the cell is a Chinese hamster ovary cell.

13. A method of producing a pharmaceutical comprising the step of formulating the polypeptide produced by the method according to any of Claims 1 to 12 into a pharmaceutical composition.

14. A nucleic acid molecule that consists of any of the following nucleotide sequences and has APES activity:
(a) a DNA consisting of the nucleotide sequence of any of SEQ ID NOs: 2, 4 to 16 and 29;
(b) a DNA consisting of the nucleotide sequence identical to the sequence of any of SEQ ID NOs: 1

to 16 and 29, except for one nucleotide; or

(c) an RNA that is a transcript of (a) or (b) above.

15. Use of a vector comprising the nucleic acid molecule according to Claim 14 or a nucleic acid molecule that comprises any of the following nucleotide sequences and has APES activity:

(a) a DNA consisting of the nucleotide sequence of any of SEQ ID NOs: 2 to 16 and 29;

(b) a DNA that comprises the sequence of (a) above and is a partial sequence of the 3' untranslated region of NfkBia gene;

(c) a DNA consisting of the nucleotide sequence identical to the sequence of any of SEQ ID NOs: 1 to 16 and 29 or the sequence of (b), except for one or several nucleotides;

(d) an RNA that is a transcript of (a), (b) or (c) above; or

(e) a DNA or RNA consisting of the sequence that can bind to the sequence of (a) above by base pairing

in a method according to claims 1 to 13.

16. Use of a cell into which the nucleic acid molecule according to Claim 14 or the vector according to Claim 15 has been artificially introduced in a method according to claims 1 to 13.