Claims

[Claim 1] A nucleic acid comprising:

a nucleotide sequence encoding a chimeric protein,

wherein the nucleotide sequence is a nucleotide sequence comprising the following nucleotide sequences in this order:

a nucleotide sequence encoding a signal peptide;

a nucleotide sequence encoding an intra-organelle stabilizing domain of LAMP;

a nucleotide sequence encoding an allergen domain comprising Der p 1, Der p 2, Der p 23, and Der p 7 in this order;

a nucleotide sequence encoding a transmembrane domain; and

a nucleotide sequence encoding an endosomal/lysosomal targeting domain of LAMP.

[Claim 2] The nucleic acid according to claim 1, wherein the signal peptide is a signal peptide of LAMP.

[Claim 3] The nucleic acid according to claim 1 or 2, wherein the transmembrane domain is a transmembrane domain of LAMP.

[Claim 4] The nucleic acid according to any one of claims 1 to 3, wherein the signal peptide consists of the amino acid sequence of amino acid numbers 1 to 27 of SEQ ID NO: 2, the intra-organelle stabilizing domain consists of an amino acid sequence of amino acid numbers 28 to 380 of SEQ ID NO: 2, the allergen domain is an allergen domain comprising Der p 1 consisting of the amino acid sequence of amino acid numbers 383 to 594 of SEQ ID NO: 2, Der p 2 consisting of the amino acid sequence of amino acid numbers 599 to 727 of SEQ ID NO: 2, Der p 23 consisting of the amino acid sequence of amino acid numbers 732 to 800 of SEQ ID NO: 2, and Der p 7 consisting of the amino acid sequence of amino acid numbers 805 to 1002 of SEQ ID NO: 2, the transmembrane domain consists of the amino acid sequence of amino acid numbers 1006 to 1028 of SEQ ID NO: 2, and the endosomal/lysosomal targeting domain consists of the an amino acid sequence of amino acid numbers 1037 to 1040 of SEQ ID NO: 2.

[Claim 5] A nucleic acid comprising:

a nucleotide sequence encoding a chimeric protein consisting of an amino acid

sequence having at least 90% identity to the amino acid sequence shown by SEQ ID NO: 2, wherein the nucleic acid has an action of inducing Th1-type immunity to an allergen selected from the group consisting of Der p 1, Der p 2, Der p 23, and Der p 7.

[Claim 6] A nucleic acid comprising:

a) a nucleotide sequence encoding a chimeric protein consisting of the amino acid sequence shown by SEQ ID NO: 2; or

b) a nucleotide sequence encoding a chimeric protein consisting of an amino acid sequence in which 1 to 10 amino acids are deleted, substituted, inserted and/or added in the amino acid sequence shown by SEQ ID NO: 2, wherein the nucleic acid has an action of inducing Th1-type immunity to an allergen selected from the group consisting of Der p 1, Der p 2, Der p 23, and Der p 7.

[Claim 7] A nucleic acid comprising:

a nucleotide sequence encoding a chimeric protein consisting of an amino acid sequence shown by SEQ ID NO: 2.

[Claim 8] An expression vector comprising:

the nucleic acid according to any one of claims 1 to 7.

[Claim 9] An expression vector comprising:

the nucleic acid according to claim 7.

[Claim 10] A host cell transformed with the nucleic acid according to any one of claims 1 to 7.

[Claim 11] A method for producing a nucleic acid, comprising:

culturing a host cell transformed with the nucleic acid according to any one of claims 1 to 7.

[Claim 12] A pharmaceutical composition comprising:

the expression vector according to claim 9 and a pharmaceutically acceptable excipient.

[Claim 13] The pharmaceutical composition according to claim 12, which is a pharmaceutical composition for preventing or treating mite allergy.

[Claim 14] The expression vector according to claim 9, for use in preventing or

treating mite allergy.

[Claim 15] Use of the expression vector according to claim 9 for the manufacture of a pharmaceutical composition for preventing or treating mite allergy.