[CLAIMS]

1. A method for producing a peptide, comprising a step of translating an mRNA encoding a peptide comprising one or more types of unnatural amino acids in a translation system that comprises a ribosome comprising an engineered L31 protein, wherein the ribosome comprising the engineered L31 protein has greater activity for translation of the peptide comprising the unnatural amino acids, as compared to a ribosome comprising wild-type *Escherichia coli* L31 that comprises the amino acid sequence of SEQ ID NO: 1.

2. A method for producing a peptide, comprising a step of translating an mRNA encoding a peptide comprising one or more types of unnatural amino acids in a translation system that comprises a ribosome comprising an engineered L31 protein, wherein the engineered L31 protein is selected from the group consisting of the proteins of (1) to (3) below:
(1) a protein comprising an amino acid sequence with deletion of 6 or more amino acid residues from the C terminus in the amino acid sequence set forth in SEQ ID NO: 1;
(2) a protein comprising an amino acid sequence with one or more amino acid insertions, substitutions, deletions, and/or additions in the amino acid sequence of the protein of (1); and
(3) a protein comprising an amino acid sequence having 80% or more sequence identity to the amino acid sequence of the protein of (1).

3. The method of any one of claim 2, wherein the ribosome comprising the protein of (2) and (3) has greater activity for translation of the peptide comprising the unnatural amino acids, as compared to the ribosome comprising the wild-type *Escherichia coli* L31 that comprises the amino acid sequence of SEQ ID NO: 1.

4. The method of any one of claims 1 to 3, wherein the proportion of ribosomes comprising the engineered L31 protein relative to all ribosomes in the translation system is 50% or more.

5. The method of any one of claims 1 to 4, further comprising a step of cyclizing the peptide.

6. The method of any one of claims 1 to 5, wherein the peptide comprises an unnatural amino acid at a position corresponding to its initial amino acid.

7. A method of screening for a peptide that binds to a target substance, comprising steps (a), (b) and (c) below:
(a) producing a peptide using the method of any one of claims 1 to 6;

(b) contacting a target substance with the peptide or a library comprising the peptides; and
(c) selecting a peptide that binds to the target substance.

8. An engineered L31 protein selected from the group consisting of proteins described in the following (1), (2) or (3):
(1) a protein comprising an amino acid sequence with deletion of 9 or more amino acid residues from the C terminus in the amino acid sequence set forth in SEQ ID NO: 1;
(2) a protein comprising an amino acid sequence with 1-9 amino acid insertions, substitutions, deletions, and/or additions in the amino acid sequence of the protein of (1); and
(3) a protein comprising an amino acid sequence having 90% or more sequence identity to the amino acid sequence of the protein of (1).

9. The engineered L31 protein of claim 8, where the protein has a greater activity for translation of the peptide comprising the unnatural amino acid, as compared to a ribosome comprising the wild-type *E. coli* L31 that comprises the amino acid sequence of SEQ ID NO: 1.

10. An isolated nucleic acid encoding the engineered L31 protein of claim 8 or 9.

11. A vector or cell comprising the nucleic acid of claim 10.

12. A method for producing a ribosome comprising an engineered L31 protein, comprising steps (a) to (c) below:
(a) culturing the cell of claim 11;
(b) producing a lysate from culture of the cell; and
(c) purifying a ribosome from the lysate.

13. A ribosome comprising the engineered L31 protein of claim 8 or 9.

14. A composition comprising the ribosome of claim 13.

15. A method for producing a cell-free translation system, comprising the steps of:
(a) producing a ribosome by the method of claim 12; and
(b) mixing the ribosome and an initiator tRNA acylated with an unnatural amino acid.

16. A method for producing a cell-free translation system, comprising the following steps

(a), (b) and (c):

(a) producing a lysate from a wild-type *Escherichia coli* culture using a French press under a condition where the magnesium ion concentration is 5 mM or less,

(b) purifying a ribosome from the lysate; and

(c) mixing the ribosome and an initiator tRNA acylated with an unnatural amino acid.

17. A method for producing a peptide, comprising steps (i) and (ii):

(i) producing a cell-free translation system using the method of claim 15 or 16; and

(ii) translating the mRNA encoding a peptide comprising one or more types of unnatural amino acids using the cell-free translation system.

18. A method for screening a peptide that can bind to the target molecule, comprising steps (I), (II) and (III):

(I) producing a peptide using the method of claim 17;

(II) contacting a target molecule with the peptide or a library comprising the peptide; and

(III) selecting the peptide that can bind to the target molecule.