

-continued

(C) STRANDEDNESS: single
(D) TOPOLOGY: Not Relevant

(i i) MOLECULE TYPE: peptide

(i i i) HYPOTHETICAL: NO

(x i) SEQUENCE DESCRIPTION: SEQ ID NO:20:

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Asp  Glu  Leu  Pro  Gln  Leu  Val  Thr  Leu  Pro  His  Pro  Asn  Leu  His  Gly
 1          5          10          15
Pro  Glu  Ile  Leu  Asp  Val  Pro  Ser  Thr
 20          25

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(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 10 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: Not Relevant

(i i) MOLECULE TYPE: protein

(i i i) HYPOTHETICAL: NO

(v) FRAGMENT TYPE: internal

(x i) SEQUENCE DESCRIPTION: SEQ ID NO:21:

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His  Ala  Ile  Arg  Gly  Thr  Phe  Ala  Thr
 1          5          10

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We claim:

1. A composition for transfecting a eukaryotic cell produced by first forming a composition comprising a peptide-nucleic acid complex, followed by addition of a cationic lipid capable of aggregating said peptide-nucleic acid complex to said complex-containing composition wherein said peptide comprises a nuclear localization signal sequence, or an RGD peptide sequence.
2. The composition of claim 1 wherein said peptide is a nuclear localization signal peptide, or comprises an RGD peptide sequence.
3. The composition of claim 1 wherein said peptide is a mixture of two or more peptides.
4. The composition of claim 1 wherein said peptide comprises an RGD peptide sequence.
5. The composition of claim 1 wherein said peptide comprises a nuclear localization signal sequence.
6. The composition of claim 1 wherein said nuclear localization signal sequence is derived from a simian virus 40.
7. The composition of claim 6 wherein said nuclear localization signal sequence is derived from the SV40 large T antigen.
8. The composition of claim 1 wherein said peptide binds to a binding site on the surface of a cell optionally inducing endocytosis of the whole complex.
9. The composition of claim 1 wherein said peptide is a cell adhesion peptide comprising an RGD peptide.
10. The composition of claim 1 wherein said cationic lipid is a polyvalent cationic lipid.
11. The composition of claim 10 wherein said polyvalent cationic lipid is 2,3-dioleyloxy-N-[2(spermincarboxamido)ethyl]-N,N-dimethyl-1-propanaminium trifluoroacetate.
12. The composition of claim 1 wherein after said peptide-nucleic acid-complex is formed, it is added to a mixture of a cationic lipid and a neutral lipid.
13. The composition of claim 12 wherein said neutral lipid is dioleoylphosphatidylethanolamine.
14. A composition for transfecting a eukaryotic cell which comprises a peptide-nucleic acid complex, wherein said peptide is conjugated to a DNA binding group, and a cationic lipid capable of aggregating said peptide-nucleic acid complex.
15. The composition of claim 14 wherein said DNA binding group is a polyamine.
16. The composition of claim 15 wherein said polyamine is spermine.
17. The composition of claim 16 wherein said peptide is a K5 peptide or an E5 peptide of a hemagglutinin.
18. The composition of claim 16 wherein said peptide comprises a nuclear localization signal sequence.
19. The composition of claim 16 wherein said peptide comprises a VSVG peptide sequence.
20. The composition of claim 16 wherein said peptide comprises an RGD peptide sequence.
21. The composition of claim 14 wherein said peptide is a cell adhesion-peptide comprising a RGD peptide sequence.
22. The composition of claim 14 wherein said cationic lipid is a polyvalent cationic lipid.
23. The composition of claim 22 wherein said polyvalent cationic lipid is 2,3-dioleyloxy-N-[2(spermincarboxamido)ethyl]-N,N-dimethyl-1-propanaminium trifluoroacetate.
24. The composition of claim 14 further comprising a neutral lipid.
25. The composition of claim 24 wherein said neutral lipid is dioleoyl phosphatidylethanolamine.
26. The composition of claim 14 wherein said peptide comprises a nuclear localization signal sequence.
27. The composition of claim 14 wherein said peptide comprises an NLS peptide sequence, a VSVG peptide sequence, an E5 peptide sequence, a K5 peptide or an RGD peptide sequence.