

WHAT IS CLAIMED IS:

1. A CDV F polypeptide having signal peptide sequence that is less than 75 amino acid residues in length.
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2. The CDV F polypeptide of claim 1, wherein said signal peptide sequence comprises no more than 75 amino acid residues of SEQ ID NO:6.
3. The CDV F polypeptide of any one of claims 1-2, wherein said CDV F
10 polypeptide comprises SEQ ID NO:4 with the proviso that said CDV F polypeptide lacks at least amino acid residues 1 to 60 or lacks at least amino acid residues 1 to 105 of SEQ ID NO:4.
4. The CDV F polypeptide of any one of claims 1-3, wherein a recombinant virus
15 comprising said CDV F polypeptide and a CDV H polypeptide exhibits increased fusogenic activity as compared to a comparable control recombinant virus comprising a full length, wild-type CDV F polypeptide and said CDV H polypeptide.
5. A nucleic acid molecule encoding a CDV F polypeptide of any one of claims 1-4.
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6. A recombinant virus comprising a CDV F polypeptide of any one of claims 1-4.
7. A recombinant virus comprising a nucleic acid molecule of claim 5.
- 25 8. A CDV H polypeptide comprising 454A, 464A, 479A, 494A, 510A, 520A, 525A, 526A, 527S, 528A, 529A, 537A, 539A, 547A, 548A, or a combination thereof according to the amino acid numbering of SEQ ID NO:2.
- 30 9. The CDV H polypeptide of claim 8, wherein said CDV H polypeptide comprises a combination of two, three, four, five, or six of 454A, 464A, 479A, 494A, 510A, 520A, 525A, 526A, 527S, 528A, 529A, 537A, 539A, 547A, and 548A.

10. The CDV H polypeptide of claim 8, wherein said CDV H polypeptide comprises a combination of seven, eight, nine, ten, or eleven of 454A, 464A, 479A, 494A, 510A, 520A, 525A, 526A, 527S, 528A, 529A, 537A, 539A, 547A, and 548A.

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11. The CDV H polypeptide of claim 8, wherein said CDV H polypeptide comprises a combination of 12, 13, or 14 of 454A, 464A, 479A, 494A, 510A, 520A, 525A, 526A, 527S, 528A, 529A, 537A, 539A, 547A, and 548A.

10 12. The CDV H polypeptide of claim 8, wherein said CDV H polypeptide comprises 454A, 464A, 479A, 494A, 510A, 520A, 525A, 526A, 527S, 528A, 529A, 537A, 539A, 547A, and 548A.

13. The CDV H polypeptide of claim 8, wherein said CDV H polypeptide comprises
15 M437 according to the amino acid numbering of SEQ ID NO:5.

14. A CDV H polypeptide comprising the sequence set forth in Figure 11 except that said sequence comprises a mutation of a presented amino acid residue selected from the group consisting of P454, V/L/F460, L/F/W479, I494, I/L/V510, Y520, Y/N525, D/G526,
20 I/V527, S/T528, R529, Y/D537, Y539, Y/F547, and T/M548 according to the amino acid numbering of SEQ ID NO:5.

15. The CDV H polypeptide of claim 14, wherein said CDV H polypeptide comprises a mutation of two, three, four, five, or six presented amino acid residues selected from
25 said group.

16. The CDV H polypeptide of claim 14, wherein said CDV H polypeptide comprises a mutation of seven, eight, nine, ten, or eleven presented amino acid residues selected from said group.

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17. The CDV H polypeptide of claim 14, wherein said CDV H polypeptide comprises a mutation of 12, 13, or 14 presented amino acid residues selected from said group.
18. The CDV H polypeptide of claim 14, wherein said CDV H polypeptide comprises
5 a mutation of the presented amino acid residues of said group.
19. The CDV H polypeptide of claim 14, wherein said CDV H polypeptide comprises M437 according to the amino acid numbering of SEQ ID NO:5.
- 10 20. A nucleic acid molecule encoding a CDV H polypeptide of any one of claims 8-19.
21. A recombinant virus comprising a CDV H polypeptide of any one of claims 8-19.
- 15 22. The recombinant virus of claim 21, wherein said virus comprises a CDV F polypeptide of any one of claims 1-4.
23. A recombinant virus comprising a nucleic acid molecule of claim 20.
- 20 24. The recombinant virus of claim 23, wherein said virus comprises a nucleic acid molecule of claim 5.
25. The recombinant virus of any one of claims 6, 7, and 21-24, wherein said recombinant virus is hybrid virus of (a) CDV and (b) VSV, MeV, or Adenovirus.
- 25 26. A replication-competent vesicular stomatitis virus comprising an RNA molecule, wherein said RNA molecule comprises a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV N polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV P polypeptide, a nucleic acid
30 sequence that is a template for a positive sense transcript encoding a VSV M polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a CDV

F polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a CDV H polypeptide, and a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV L polypeptide, wherein said RNA molecule lacks a nucleic acid sequence that is a template for a positive sense transcript encoding a functional VSV G polypeptide.

27. The virus of claim 26, wherein said CDV F polypeptide is a CDV F polypeptide of any one of claims 1-4.
28. The virus of any one of claims 26-27, wherein said CDV H polypeptide is a CDV H polypeptide of any one of claims 8-19.
29. The virus of any one of claims 26-28, wherein said CDV H polypeptide comprises an amino acid sequence of a single chain antibody.
30. The virus of claim 29, wherein said single chain antibody is a single chain antibody directed to CD19, CD20, CD38, CD46, EGFR, α FR, HER2/neu, or PSMA.
31. The virus of any one of claims 26-30, wherein said RNA molecule comprises a nucleic acid sequence that is a template for a positive sense transcript encoding a NIS polypeptide.
32. A composition comprising a virus of any one of claims 6, 7, and 21-31.
33. A nucleic acid molecule comprising a nucleic acid strand comprising a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV N polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV P polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV M polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a CDV F polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a CDV H polypeptide,

and a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV L polypeptide, wherein said nucleic acid strand lacks a nucleic acid sequence that is a template for a positive sense transcript encoding a functional VSV G polypeptide.

5 34. The nucleic acid molecule of claim 33, wherein said CDV F polypeptide is a CDV F polypeptide of any one of claims 1-4.

35. The nucleic acid molecule of any one of claims 33-34, wherein said CDV H polypeptide is a CDV H polypeptide of any one of claims 8-19.

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36. The nucleic acid molecule of any one of claims 33-35, wherein said CDV H polypeptide comprises an amino acid sequence of a single chain antibody.

37. The nucleic acid molecule of claim 36, wherein said single chain antibody is a
15 single chain antibody directed to CD19, CD20, CD38, CD46, EGFR, α FR, HER2/neu, or PSMA.

38. The nucleic acid molecule of any one of claims 33-37, wherein said RNA molecule comprises a nucleic acid sequence that is a template for a positive sense
20 transcript encoding a NIS polypeptide.

39. A composition comprising a nucleic acid molecule of any one of claims 5, 20, and 33-38.

25 40. A method for treating cancer, wherein said method comprises administering a composition of any one of claims 32 and 39 to a mammal comprising cancer cells, wherein the number of cancer cells within said mammal is reduced following said administration.

30 41. The method of claim 40, wherein said mammal is a human.

42. The method of any one of claims 40-41, wherein said cancer is myeloma, melanoma, glioma, lymphoma, mesothelioma, lung cancer, brain cancer, stomach cancer, colon cancer, rectum cancer, kidney cancer, prostate cancer, ovary cancer, breast cancer, pancreas cancer, liver cancer, or head and neck cancer.

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43. A method for inducing tumor regression in a mammal, wherein said method comprises administering a composition of any one of claims 32 and 39 to a mammal comprising a tumor, wherein the size of said tumor is reduced following said administration.

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44. The method of claim 43, wherein said mammal is a human.

45. The method of any one of claims 43-44, wherein said cancer is myeloma, melanoma, glioma, lymphoma, mesothelioma, lung cancer, brain cancer, stomach cancer, colon cancer, rectum cancer, kidney cancer, prostate cancer, ovary cancer, breast cancer, pancreas cancer, liver cancer, or head and neck cancer.

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46. A method for rescuing replication-competent vesicular stomatitis viruses from cells, wherein said vesicular stomatitis viruses comprise an RNA molecule comprising a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV N polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV P polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV M polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a CDV F polypeptide, a nucleic acid sequence that is a template for a positive sense transcript encoding a CDV H polypeptide, and a nucleic acid sequence that is a template for a positive sense transcript encoding a VSV L polypeptide, wherein said RNA molecule lacks a nucleic acid sequence that is a template for a positive sense transcript encoding a functional VSV G polypeptide, wherein said method comprises:

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- (a) inserting nucleic acid encoding said RNA molecule into said cells under conditions wherein replication-competent vesicular stomatitis viruses are produced, and
- (b) harvesting said replication-competent vesicular stomatitis viruses.

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