CLAIMS

What is claimed:

1. A nucleic acid molecule comprising a nucleotide sequence encoding at least one synthetic African swine fever virus (ASFV) antigen.

2. The nucleic acid molecule of claim 1 comprising at least one nucleotide sequence encoding a peptide comprising an amino acid sequence selected from the group consisting of

a) an amino acid sequence having at least about 90% identity over an entire length of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30,

b) an immunogenic fragment comprising at least about 90% identity over at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30,

c) the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30, and

d) an immunogenic fragment comprising at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30.

3. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule is selected from the group consisting of a DNA molecule and an RNA molecule.

4. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule comprises at least one nucleotide sequence selected from the group consisting of

a) a nucleotide sequence having at least about 90% identity over an entire length of a nucleotide sequence selected from the group consisting of SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:21, SEQ ID NO:23 and SEQ ID NO:29,

b) an immunogenic fragment of a nucleotide sequence having at least about 90% identity over at least 60% of the nucleotide sequence selected from the group consisting of SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:21, SEQ ID NO:23 and SEQ ID NO:29,

c) a nucleotide sequence selected from the group consisting of SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:21, SEQ ID NO:23 and SEQ ID NO:29, and

d) an immunogenic fragment of a nucleotide sequence selected from the group consisting of SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:21, SEQ ID NO:23 and SEQ ID NO:29.

5. The nucleic acid molecule of claim 1, wherein the encoded peptide is operably linked to at least one regulatory sequence selected from the group consisting of a start codon, an IgE leader sequence and a stop codon.

6. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule encodes at least two peptides comprising an amino acid sequence selected from the group consisting of

a) an amino acid sequence having at least about 90% identity over an entire length of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30,

b) an immunogenic fragment comprising at least about 90% identity over at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30,

c) the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30, and

d) an immunogenic fragment comprising at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30.

7. The nucleic acid molecule of claim 6, wherein the nucleic acid molecule encodes an amino acid sequence selected from the group consisting of

a) an amino acid sequence having at least about 90% identity over an entire length of the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:18 and SEQ ID NO:20,

b) an immunogenic fragment comprising at least about 90% identity over at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:18 and SEQ ID NO:20,

c) the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ

ID NO:14, SEQ ID NO:16, SEQ ID NO:18 and SEQ ID NO:20, and

d) an immunogenic fragment comprising at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:18 and SEQ ID NO:20.

8. The nucleic acid molecule of claim 7, wherein the nucleic acid molecule comprises a nucleotide sequence selected from the group consisting of

a) a nucleotide sequence having at least about 90% identity over an entire length of a nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17 and SEQ ID NO:19,

b) an immunogenic fragment of a nucleotide sequence having at least about 90% identity over at least 60% of the nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17 and SEQ ID NO:19,

c) a nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17 and SEQ ID NO:19, and

d) an immunogenic fragment of a nucleotide sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17 and SEQ ID NO:19.

9. The nucleic acid molecule of any one of claims 1-8, wherein the nucleic acid molecule comprises an expression vector.

10. The nucleic acid molecule of any one of claims 1-8, wherein the nucleic acid molecule comprises a viral particle.

11. An immunogenic composition comprising at least one nucleic acid molecule of any one of claims 1-10.

12. The immunogenic composition of claim 11, further comprising a pharmaceutically acceptable excipient.

13. The immunogenic composition of claim 11, further comprising an adjuvant.

14. A peptide comprising at least one amino acid sequence selected from the group consisting of

a) an amino acid sequence having at least about 90% identity over an entire length of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30,

b) an immunogenic fragment comprising at least about 90% identity over at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30,

c) the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30, and

d) an immunogenic fragment comprising at least 60% of the amino acid sequence selected from the group consisting of SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:22, SEQ ID NO:24 and SEQ ID NO:30.

15. An immunogenic composition comprising a peptide of claim 14.

16. A method of inducing an immune response against an ASFV antigen in a subject in need thereof, the method comprising administering a nucleic acid molecule of any one of claims 1-10 or the immunogenic composition of any one of claims 11-13 to the subject.

17. The method of claim 16, wherein administering includes at least one of electroporation and injection.

18. A method of treating or preventing an ASFV associated pathology in subject in need thereof, the method comprising administering a nucleic acid molecule of any one of claims 1-10 or the immunogenic composition of any one of claims 11-13 to the subject.

19. The method of claim 18, wherein administering includes at least one of electroporation and injection.

20. The method of claim 18, wherein the ASFV associated pathology is lethal hemorrhagic fever.