WHAT IS CLAIMED IS:

1. A method of producing a rotavirus like particle (RLP) in a plant, portion of a plant or plant cell, comprising:

a) introducing a first nucleic acid comprising a first regulatory region active in the plant operatively linked to a first nucleotide sequence encoding a first rotavirus structural protein selected from one of VP2, VP6 and VP4 or VP7, a second nucleic acid comprising a second regulatory region active in the plant operatively linked to a second nucleotide sequence encoding a second rotavirus structural protein selected from one of VP2, VP6 and VP4 or VP7 and a third nucleic acid comprising a third regulatory region active in the plant operatively linked to a third nucleotide sequence encoding a third rotavirus structural protein selected from one of VP2, VP6 and VP4 or VP7, wherein each of VP2, VP6 and VP4 or VP7 are introduced into the plant, portion of a plant or plant cell,

wherein the first, second or third nucleotide sequence encoding the VP7 comprises a truncated signal peptide or non-native signal peptide;

b) incubating the plant, portion of a plant or plant cell under conditions that permit the transient expression of the first, second and third nucleic acid, thereby producing the RLP,

c) harvesting the plant, portion of the plant or plant cell, and

d) extracting and purifying the RLPs from the plant, portion of the plant or plant cell, in the presence of calcium.

2. The method of claim 1, wherein a fourth nucleic acid comprising a fourth regulatory region active in the plant and operatively linked to a fourth nucleotide sequence encoding a fourth rotavirus structural protein selected from VP4 or VP7 is introduced in step a), wherein each of VP2, VP6, VP4 and VP7 are introduced into the plant, portion of a plant or plant cell, and are expressed when incubating the plant, portion of a plant or plant cell in step b).

3. The method of claim 1, wherein the first rotavirus structural protein is VP2, the second rotavirus structural protein is VP6 and the third rotavirus structural protein is VP4 or VP7.

4. The method of claim 2, wherein the first rotavirus structural protein is VP2, the second rotavirus structural protein is VP6, the third rotavirus structural protein is VP4 and the fourth rotavirus structural protein is VP7.

5. The method of claim 1, wherein the first, second or third nucleotide sequence or a combination thereof is operatively linked to a Cowpea Mosaic Virus (CPMV) regulatory region.

6. The method of claim 2, wherein the first, second, third or fourth nucleotide sequence or a combination thereof is operatively linked to a Cowpea Mosaic Virus (CPMV) regulatory region.

7. The method of claim 1, wherein the non-native signal peptide is a protein disulfide isomerase signal (PDI) peptide.

8. A RLP produced by the method of claim 1, wherein the RLP comprises a VP4 rotavirus structural protein,

the RLP is of a size from 70-100 nm and wherein the RLP comprises one or more rotavirus structural protein that comprise plant-specific N-glycans, or modified N-glycans.

9. A RLP produced by the method of claim 4, wherein the RLP is of a size from 70-100 nm and comprises one or more rotavirus structural protein that comprise plant-specific N-glycans, or modified N-glycans.

10. A composition comprising an effective dose of the RLP of claim 8 for inducing an immune response in a subject, and a pharmaceutically acceptable carrier.

11. A composition comprising an effective dose of the RLP of claim 9 for inducing an immune response in a subject, and a pharmaceutically acceptable carrier.

12. The method of claim 3 wherein the nucleotide sequence encoding VP2 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:13, SEQ ID NO:14, or SEQ ID NO: 45, the nucleotide sequence encoding VP6 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:17, SEQ ID NO:18 or SEQ ID NO:46, the nucleotide sequence encoding VP7 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 19, 20, 48, 49, 52, 53, 54 or 57, the VP4 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 15, 16, 47, 50, or 51.

13. The method of any claim 4 wherein the nucleotide sequence encoding VP2 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:13, SEQ ID NO:14, or SEQ ID NO: 45, the nucleotide sequence encoding VP6 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:17, SEQ ID NO:18 or SEQ ID NO:46, the nucleotide sequence encoding VP7 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 19, 20, 48, 49, 52, 53, 54 or 57, the VP4 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 15, 16, 47, 50, or 51.

14. A method of producing a rotavirus like particle (RLP) in a plant, portion of a plant or plant cell comprising:

a) providing a plant, portion of a plant or plant cell comprising a first nucleic acid comprising a first regulatory region active in the plant operatively linked to a first nucleotide sequence encoding a first rotavirus structural protein selected from one of VP2, VP6 and VP4 or VP7, a second nucleic acid comprising a second regulatory region active in the plant operatively linked to a second nucleotide sequence encoding a second rotavirus structural protein selected from one of VP2, VP6 and VP4 or VP7 and a third nucleic acid comprising a third regulatory region active in the plant operatively linked to a third nucleotide sequence encoding a third rotavirus structural protein selected from one of VP2, VP6 and VP4 or VP7, wherein the plant, portion of a plant or plant cell comprises each of VP2, VP6 and VP4 or VP7; and

wherein the first, second or third nucleotide sequence encoding the VP7 comprises a truncated signal peptide or non-native signal peptide;

b) incubating the plant, portion of a plant or plant cell under conditions that permit the transient expression of the first, second and third nucleic acid, thereby producing the RLP;

c) harvesting the plant, portion of a plant or plant cell, and

d) extracting and purifying the RLPs from the plant, portion of a plant or plant cell, in the presence of calcium.

15. The method of claim 14 wherein the plant, portion of a plant or plant cell is provided with a fourth nucleic acid comprising a fourth regulatory region active in the plant and operatively linked to a fourth nucleotide sequence encoding a fourth rotavirus structural protein selected from VP4 or VP7, wherein the plant, portion of a plant or plant cell comprises each of VP2, VP6, VP4 and VP7 in step a), and the fourth rotavirus structural protein is expressed when incubating the plant, portion of a plant or plant cell in step b).

16. The method of claim 14, wherein the first rotavirus structural protein is VP2, the second rotavirus structural protein is VP6 and the third rotavirus structural protein is VP4 or VP7.

17. The method of claim 15, wherein the first rotavirus structural protein is VP2, the second rotavirus structural protein is VP6, the third rotavirus structural protein is VP4 and the fourth rotavirus structural protein is VP7.

18. The method of claim 14, wherein the non-native signal peptide is a protein disulfide isomerase signal (PDI) peptide.

19. A RLP produced by the method of claim 14, wherein the RLP comprises aVP4 rotavirus structural protein the RLP is of a size from 70-100 nm and wherein the RLP comprises one or more rotavirus structural protein that comprise plant-specific N-glycans, or modified N-glycans.

20. A RLP produced by the method of claim 15, wherein the RLP is of a size from 70-100 nm and wherein the RLP comprises one or more rotavirus structural protein that comprise plant-specific N-glycans, or modified N-glycans.

21. A composition comprising an effective dose of the RLP of claim 19 for inducing an immune response in a subject, and a pharmaceutically acceptable carrier.

22. A composition comprising an effective dose of the RLP of claim 20 for inducing an immune response in a subject, and a pharmaceutically acceptable carrier.

23. Composition of claim 21 for use in the treatment of a rotavirus infection in a subject.

24. Composition of claim 10 for use in the treatment of a rotavirus infection in a subject.

25. Composition of claim 11 for use in the treatment of a rotavirus infection in a subject.

26. Composition of claim 22 for use in the treatment of a rotavirus infection in a subject.

WHAT IS CLAIMED IS:

1. A method of producing a rotavirus like particle (RLP) in a plant, portion of a plant or plant cell, comprising:

a) introducing a first nucleic acid comprising a first regulatory region active in the plant operatively linked to a first nucleotide sequence encoding a first rotavirus structural protein selected from one of VP2, VP6 and VP7, a second nucleic acid comprising a second regulatory region active in the plant operatively linked to a second nucleotide sequence encoding a second rotavirus structural protein selected from one of VP2, VP6 and VP7 and a third nucleic acid comprising a third regulatory region active in the plant operatively linked to a third nucleotide sequence encoding a third rotavirus structural protein selected from one of VP2, VP6 and VP7, wherein each of VP2, VP6 and VP7 are introduced into the plant, portion of the plant or plant cell,

wherein the first, second or third nucleotide sequence encoding the VP7 comprises a truncated signal peptide or non-native signal peptide;

b) incubating the plant, portion of the plant or plant cell under conditions that permit the transient expression of the first, second and third nucleic acid, thereby producing the RLP,

c) harvesting the plant, portion of the plant or plant cell, and

d) extracting and purifying the RLPs from the plant, portion of the plant or plant cell, in the presence of calcium.

2. The method of claim 1, wherein a fourth nucleic acid comprising a fourth regulatory region active in the plant and operatively linked to a fourth nucleotide sequence encoding a fourth rotavirus structural protein is introduced in step a), and is expressed when incubating the plant, portion of the plant or plant cell in step b), wherein the fourth rotavirus structural protein is VP4.

3. The method of claim 1, wherein the first, second and third nucleic acid are introduced into the plant, portion of the plant or plant cell in a ratio of 1:1:1.

4. The method of claim 2, wherein the first, second, third and fourth nucleic acid are introduced into the plant, portion of the plant or plant cell in a ratio of 1:1:1:1.

5. The method of claim 1 or 2, wherein the codon usage of the nucleotide sequence is adjusted to preferred human codon usage, increased GC content, or a combination thereof.

6. The method of claim 1, wherein the first, second and third nucleotide sequence is operatively linked to a translation enhancer element.

7. The method of claim 6, wherein the translation enhancer element comprises a Cowpea Mosaic Virus (CPMV) regulatory region.

8. The method of claim 1, wherein the first, second or third nucleotide sequence or a combination thereof is operatively linked to a Cowpea Mosaic Virus (CPMV) regulatory region.

9. The method of claim 2, wherein the first, second, third or fourth nucleotide sequence or a combination thereof is operatively linked to a Cowpea Mosaic Virus (CPMV) regulatory region.

10. The method of claim 1, wherein the non-native signal peptide is a signal peptide obtained from a plant.

11. The method of claim 10, wherein the non-native signal peptide is a protein disulfide isomerase signal (PDI) peptide.

12. The method of claim 1 wherein the nucleotide sequence encoding VP2 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:13, SEQ ID NO:14, or SEQ ID NO: 45, the nucleotide sequence encoding VP6 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:17, SEQ ID NO:18 or SEQ ID NO:46, the nucleotide sequence encoding VP7 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 19, 20, 48, 49, 52, 53, 54 or 57.

13. The method of claim 2 wherein the nucleotide sequence encoding VP2 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:13, SEQ ID NO:14, or SEQ ID NO: 45, the nucleotide sequence encoding VP6 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO:17, SEQ ID NO:18 or SEQ ID NO:46, the nucleotide sequence encoding VP7 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 19, 20, 48, 49, 52, 53, 54 or 57, the VP4 comprises from 80% to 100% identity with a nucleotide sequence as defined by SEQ ID NO: 15, 16, 47, 50, or 51.

14. A method of producing a rotavirus like particle (RLP) in a plant, portion of a plant or plant cell comprising:

a) providing a plant, portion of a plant or plant cell comprising a first nucleic acid comprising a first regulatory region active in the plant operatively linked to a first nucleotide sequence encoding a first rotavirus structural protein selected from one of VP2, VP6 and VP7, a second nucleic acid comprising a second regulatory region active in the plant operatively linked to a second nucleotide sequence encoding a second rotavirus structural protein selected from one of VP2, VP6 and VP7 and a third nucleic acid comprising a third regulatory region active in the plant operatively linked to a third nucleotide sequence encoding a third rotavirus structural protein selected from one of VP2, VP6 and VP7, wherein the plant, portion of the plant or plant cell comprises each of VP2, VP6 and VP7; and

wherein the first, second or third nucleotide sequence encoding the VP7 comprises a truncated signal peptide or non-native signal peptide;

b) incubating the plant, portion of a plant or plant cell under conditions that permit the transient expression of the first, second and third nucleic acid, thereby producing the RLP;

c) harvesting the plant, portion of the plant or plant cell, and

d) extracting and purifying the RLPs from the plant, portion of the plant or plant cell, in the presence of calcium.

15. The method of claim 14, wherein the plant, portion of the plant or plant cell is provided with a fourth nucleic acid comprising a fourth regulatory region active in the plant and operatively linked to a fourth nucleotide sequence encoding a fourth rotavirus structural protein in step a), and the fourth rotavirus structural protein is expressed when incubating the plant, portion of the plant or plant cell in step b), wherein the fourth rotavirus structural protein is VP4.

16. The method of claim 14 or 15, wherein the codon usage of the nucleotide sequence is adjusted to preferred human codon usage, increased GC content, or a combination thereof.

17. The method of claim 14, wherein the first, second and third nucleotide sequence is operatively linked to a translation enhancer element.

18. The method of claim 17, wherein the translation enhancer element comprises a Cowpea Mosaic Virus (CPMV) regulatory region.

19. The method of claim 15, wherein the first, second, third or fourth nucleotide sequence or a combination thereof is operatively linked to a Cowpea Mosaic Virus (CPMV) regulatory region.

20. The method of claim 14, wherein the non-native signal peptide is a signal peptide obtained from a plant.

21. The method of claim 14, wherein the non-native signal peptide is a protein disulfide isomerase signal (PDI) peptide.

22. A RLP produced by the method of claim 15, wherein the RLP is of a size from 70-100 nm and wherein the RLP comprises one or more rotavirus structural protein that comprise plant-specific N-glycans, or modified N-glycans.

23. A composition comprising an effective dose of the RLP of claim 22 for inducing an immune response in a subject, and a pharmaceutically acceptable carrier.

24. Composition of claim 23 for use in the treatment of a rotavirus infection in a subject.