CLAIMS

1. A genetically modified cell expressing a heterologous polynucleotide sequence operably linked to a promoter sequence encoding an RNase III mutant from *E. coli* or *Enterobacter* adapted for enhanced generation of small RNA (sRNA) from catalytic cutting of double stranded RNA (dsRNA), wherein said RNase III mutant comprises:

- an E38A-R107A-R108A RNase III mutant, wherein a glutamic acid is replaced with an alanine at residue 38, and an arginine is replaced with an alanine at residue 107, and an arginine is replaced with an alanine at residue 108, or a homologous RNase III mutant thereof, wherein the homologous RNase III's wild-type sequence includes the conserved residues E38, R107 and R108.

2. The genetically modified cell of claim 1, wherein said genetically modified cell is selected from the group consisting of: a genetically modified prokaryotic cell, and a genetically modified eukaryotic cell.

3. The genetically modified cell of claim 1, wherein said heterologous polynucleotide sequence operably linked to a promoter sequence encoding an RNase III mutant is selected from:

- a heterologous polynucleotide sequence, operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 7, or a fragment thereof;
- a heterologous polynucleotide sequence, operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 11, or a fragment thereof; and
- a heterologous polynucleotide sequence, operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 15, or a fragment thereof.

4. The genetically modified cell of claim 1, wherein said heterologous polynucleotide sequence operably linked to a promoter sequence encoding an RNase III mutant is selected from:

- a heterologous polynucleotide sequence, operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant polypeptide according to SEQ ID NO. 8, or a fragment thereof;
- a heterologous polynucleotide sequence, operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant polypeptide according to SEQ ID NO. 12, or a fragment thereof; and
- a heterologous polynucleotide sequence, operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant polypeptide according to SEQ ID NO. 16, or a fragment thereof.

5. The genetically modified cell of claim 1, wherein the E38A-R107A-R108A RNase III mutant exhibits discrete dsRNA cutting size preferences of 22 and 23 nucleotides (nt).

6. The genetically modified cell of claim 1, wherein said genetically modified cell co-expresses a heterologous polynucleotide sequence operably linked to a promoter sequence encoding a dsRNA.

7. The genetically modified cell of claim 6, wherein said co-expressed dsRNA comprises a dsRNA directed to an essential pathogen gene.

8. The genetically modified cell of claim 7, wherein said essential pathogen gene comprises an essential viral pathogen gene.

9. The genetically modified cell of claim 1, wherein said genetically modified cell is introduced to a target host and cuts said co-expressed dsRNA into sRNA which initiates an RNA interference (RNAi) response pathway in said target host.

10. A composition comprising an E38A-R107A-R108A RNase III mutant from *E. coli* or *Enterobacter*, wherein a glutamic acid is replaced with an alanine at residue 38, and an arginine is replaced with an alanine at residue 107, and an arginine is replaced with an alanine at residue 108.

11. A composition comprising polynucleotide sequence operably linked to a promoter sequence encoding an E38A-R107A-R108A RNase III mutant selected from:

- an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 7, or a fragment thereof;
- an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 11, or a fragment thereof;
- an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 15, or a fragment thereof.

12. A composition comprising an E38A-R107A-R108A RNase III mutant polypeptide mutant selected from:

- an E38A-R107A-R108A RNase III mutant polypeptide according to SEQ ID NO. 12, or a fragment thereof;
- an E38A-R107A-R108A RNase III mutant polypeptide according to SEQ ID NO. 16, or a fragment thereof;
- an E38A-R107A-R108A RNase III mutant polypeptide according to SEQ ID NO. 8, or a fragment thereof.

13. The composition of claim 10, wherein said E38A-R107A-R108A RNase III mutant exhibits at least one of the following enhanced characteristics compared to a wild type RNase III:

- a discrete dsRNA cutting size preferences of 22, and 23 nucleotides (nt);
- enhanced stabilization of dsRNA cutting patterns; and
- enhanced catalytic efficiency of dsRNA cutting.

14. The composition of claim 10, wherein said E38A-R107A-R108A RNase III mutant comprises at least one of the following:

- a polynucleotide sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 7;
- a polynucleotide sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 11;

- a polynucleotide sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 15;
- an amino acid sequence encoding an E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 8;
- an amino acid sequence encoding E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 12; and
- an amino acid sequence encoding E38A-R107A-R108A RNase III mutant according to SEQ ID NO. 16.

15. The composition of claim 10, wherein said E38A-R107A-R108A RNase III mutant is co-expressed in a prokaryotic or eukaryotic cell with a heterologous polynucleotide sequence operably linked to a promoter sequence encoding a dsRNA.

16. The composition of claim 15, wherein said co-expressed dsRNA comprises a dsRNA directed to an essential pathogen gene.

17. The composition of claim 16, wherein said essential pathogen gene comprises an essential viral pathogen gene.

18. The composition of claim 17, wherein the cell comprises a bacteria that is introduced to a target host and wherein the RNase III mutant cuts said co-expressed dsRNA into 22 and 23 nucleotides (nt) sRNA fragments that initiate an RNA interference (RNAi) response pathway in said target host.

19. The composition of claim 18, wherein said RNAi response pathway in said target host is initiated independently of a DICER enzyme.

20. The genetically modified cell of claim 9, wherein said RNAi response pathway in said target host is initiated independently of said DICER enzyme.