

What it claimed is:

1. An engineered *Escherichia coli* (*E. coli*) host cell, wherein the engineered *E. coli* host cell comprises a gene knockout of at least one gene selected from the group consisting of SbcC and SbcD, wherein the engineered *E. coli* host cell is otherwise isogenic to the strain from which it is derived, the strain from which it is derived being selected from the group consisting of DH5a, DH1, JM107, JM108, JM109, MG1655 and XL1Blue, and wherein the engineered *E. coli* host cell comprises a sbcB gene, a recB gene, a recD gene, a recJ gene, an uvrC gene, a mcrA gene, and mcrBC-hsd-mrr genes, and wherein the engineered *E. coli* host cell does not comprise any engineered mutation in any of the sbcB, recB, recD, recJ, uvrC, mcrA, and mcrBC-hsd-mrr genes.
2. The engineered *E. coli* host cell of claim 1, wherein the engineered *E. coli* host cell does not include a genomic antibiotic resistance marker.
3. The engineered *E. coli* host cell of claim 1 or 2, wherein the engineered *E. coli* host cell further comprises a genomic nucleic acid sequence encoding a Rep protein, wherein the Rep protein comprises an amino acid sequence of at least 90% sequence identity to a sequence selected from the group consisting of SEQ ID NO: 39, SEQ ID NO: 40, SEQ ID NO: 41, SEQ ID NO: 42, SEQ ID NO: 34, and SEQ ID NO: 35.
4. The engineered *E. coli* host cell of claim 1 or 3, further comprising a genomic nucleic acid sequence encoding a temperature-sensitive lambda repressor.
5. The engineered *E. coli* host cell of claim 4, wherein the temperature-sensitive lambda repressor is cITs857.
6. The engineered *E. coli* host cell of claim 4, wherein the temperature-sensitive lambda repressor comprises an amino acid sequence with at least 90% sequence identity to SEQ ID NO: 37.
7. The engineered *E. coli* host cell of claim 4, wherein the temperature-sensitive lambda repressor is a phage ϕ 80 attachment site chromosomally integrated copy of an arabinose inducible CITS857 gene.

8. The engineered *E. coli* host cell of any one of claims 1 to 7, wherein *sbcB* gene comprises a sequence having at least 90% sequence identity to SEQ ID NO: 11, wherein the *recB* gene comprises a sequence having at least 90% sequence identity to SEQ ID NO: 12, wherein the *recD* gene comprises a sequence having at least 90% sequence identity to SEQ ID NO: 13, and wherein the *recJ* gene comprises a sequence having at least 90% sequence identity to SEQ ID NO: 65.

9. The engineered *E. coli* host cell of any one of claims 1 to 8, further comprising a vector, wherein the vector comprises a nucleic acid sequence having an inverted repeat, a direct repeat, or a palindrome.

10. The engineered *E. coli* host cell of any one of claims 1 to 8, further comprising a vector, wherein the vector is an AAV vector, a lentiviral vector, a retroviral vector, or a mRNA vector containing a polyA repeat.

11. The engineered *E. coli* host cell of any one of claims 1 to 8, further comprising a plasmid vector.

12. The engineered *E. coli* host cell of claim 11, wherein the plasmid vector is a eukaryotic pUC-free minicircle expression vector that comprises: (i) a eukaryotic region sequence encoding a gene of interest and having 5' and 3' ends; and (ii) a spacer region having a length of less than 1000 basepairs that links the 5' and 3' ends of the eukaryotic region sequence and that comprises a R6K bacterial replication origin and a RNA selectable marker.

13. The engineered *E. coli* host cell of claim 12, wherein the gene of interest comprises a structured DNA sequence selected from the group consisting of an inverted repeat sequence, a direct repeat sequence, a homopolymeric repeat sequence, an eukaryotic origin of replication, a polyA repeat, a SV40 origin of replication, a viral LTR, a Lentiviral LTR, a Retroviral LTR, a transposon IR/DR repeat, a Sleeping Beauty transposon IR/DR repeat, and an AAV ITR.

14. A method for producing an engineered *Escherichia coli* (*E. coli*) cell, comprising:
knocking out at least one gene selected from the group consisting of *SbcC* and *SbcD* in a starting *E. coli* cell to yield the engineered *E. coli* cell, wherein the engineered *E. coli* host cell is

otherwise isogenic to the strain from which it is derived, the strain from which it is derived being selected from the group consisting of DH5a, DH1, JM107, JM108, JM109, MG1655 and XL1Blue, wherein the starting *E. Coli* cell comprises a *sbcB* gene, a *recB* gene, a *recD* gene, a *recJ* gene, an *uvrC* gene, a *mcrA* gene, and *mcrBC-hsd-mrr* genes, and wherein the engineered *E. coli* host cell does not comprise any engineered mutation in any of the *sbcB*, *recB*, *recD*, *recJ*, *uvrC*, *mcrA*, and *mcrBC-hsd-mrr* genes.

15. A method for vector production, comprising:

providing an engineered *Escherichia coli* (*E. coli*) host cell according to any one of claims 1 to 13, wherein the engineered *Escherichia coli* (*E. coli*) host cell comprises a vector; and
incubating the engineered *E. coli* host cell under conditions sufficient to replicate the vector.

16. The method of claim 15, wherein the step of incubating the engineered *E. coli* host cell under conditions sufficient to replicate the vector is performed by a fed-batch fermentation, wherein the fed-batch fermentation comprises growing the engineered *E. coli* host cells at a first temperature of 25°C to 32°C during a first portion of the fed-batch phase, followed by a temperature up-shift to a second temperature of 37°C to 42°C during a second portion of the fed-batch phase.

17. The engineered *E. coli* host cell of any one of claims 1 to 13, further comprising a gene selected from the group consisting of *fhuA2* and *glnV*.

18. The engineered *E. coli* host cell of any one of claims 1 to 13, further comprising a *fhuA2* gene and a *glnV* gene.

19. The engineered *E. coli* host cell of any one of claims 1 to 13 and 17 to 18, further comprising a gene knockout of a *dcm* gene.

20. The engineered *E. coli* host cell of any one of claims 1 to 13 and 17 to 19, wherein the host cell does not contain a *supE44* mutation.

21. The engineered *E. coli* host cell of any one of claims 1 to 13, further comprising a *fhuA2* gene and a *glnV* gene, and wherein the host cell does not contain a *supE44* mutation.