

What is 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, and wherein the engineered *E. coli* host cell comprises a sbcB gene, a recB gene, a recD gene, and a recJ gene, and wherein there are no engineered viability- or yield-reducing mutations in any of the sbcB, recB, recD, and recJ genes.
2. The engineered *E. coli* host cell of claim 1, 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.
3. The engineered *E. coli* host cell of claim 1, further comprising a genomic nucleic acid sequence encoding a temperature-sensitive lambda repressor.
4. The engineered *E. coli* host cell of claim 3, wherein the temperature-sensitive lambda repressor is cITs857.
5. The engineered *E. coli* host cell of claim 3, wherein the temperature-sensitive lambda repressor comprises an amino acid sequence with at least 90% sequence identity to SEQ ID NO: 37.
6. The engineered *E. coli* host cell of claim 3, wherein the temperature-sensitive lambda repressor is a phage ϕ 80 attachment site chromosomally integrated copy of a arabinose inducible CITS857 gene.
7. The engineered *E. coli* host cell of claim 1, wherein the engineered *E. coli* host cell does not include any engineered viability- or yield-reducing mutations in at least one of uvrC, mcrA, and mcrBC-hsd-mrr.
8. The engineered *E. coli* host cell of claim 1, 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 claim 1, 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 claim 1, 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 claim 1, 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 starting *E. Coli* cell comprises a sbcB gene, a recB gene, a recD gene, and a recJ gene, and wherein there are no engineered viability- or yield-reducing mutations in any of the sbcB, recB, recD, and recJ genes in the engineered *E. coli* cell.

15. The method of claim 14, wherein the starting *E. coli* cell does not include an engineered viability- or yield-reducing mutation in at least one of *uvrC*, *mcrA*, *mcrBC-hsd-mrr*, and combinations thereof.

16. A method for improved vector production, comprising:

providing an engineered *Escherichia coli* (*E. coli*) host cell comprising a gene knockout of at least one gene selected from the group consisting of *SbcC*, *SbcD* and *SbcCD*, and wherein the engineered *E. coli* host cell comprises a *sbcB* gene, a *recB* gene, a *recD* gene, and a *recJ* gene, and wherein there are no viability- or yield-reducing mutations in any of the *sbcB*, *recB*, *recD*, and *recJ* genes, and wherein the engineered *Escherichia coli* (*E. coli*) host cell comprises a vector;

incubating the engineered *E. coli* host cell under conditions sufficient to replicate the vector.

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

18. The engineered *E. coli* host cell of claim 1, further comprising a gene selected from the group consisting of *fhuA2* and *glnV*.

19. The engineered *E. coli* host cell of claim 1, further comprising a *fhuA2* gene and a *glnV* gene.

20. The engineered *E. coli* host cell of claim 1, further comprising a gene knockout of a *dcm* gene.

21. The engineered *E. coli* host cell of claim 1, wherein the host cell does not contain a *supE44* gene.
22. The engineered *E. coli* host cell of claim 1, further comprising a *fhuA2* gene and a *glnV* gene, and wherein the host cell does not contain a *supE44* gene.