CLAIMS

What is claimed is:

1. A cell line deficient in mannosyl (alpha-1,3-)-glycoprotein beta-1,2-N-acetylglucosaminyltransferase I (Mgat1).

2. The cell line of claim 1, wherein the cell line comprises an inactivated chromosomal sequence encoding Mgat1.

3. The cell line of claim 2, wherein the chromosomal sequence is inactivated with a targeting endonuclease.

4. The cell line of claim 3, wherein the targeting endonuclease is a zinc finger nuclease.

5. The cell line of any one of claims 2 to 4, wherein the inactivated chromosomal sequence comprises a deletion from of 2 bp to 55 bp.

6. The cell line of any one of the preceding claims, wherein the cell line produces no Mgat1.

7. The cell line of any one of the preceding claims, wherein the cell line further comprises a deficiency in glutamine synthase (GS), dihydrofolate reductase (DHFR), hypoxanthine-guanine phosphoribosyltransferase (HPRT), or a combination thereof.

8. The cell line of any one of the preceding claims, wherein the cell line is a Chinese Hamster Ovary (CHO) cell line.

9. The cell line of claim 8, wherein the CHO cell line is a GS -/- cell line.

10. The cell line of any one of the preceding claims, wherein the cell line expresses at least one glycoprotein comprising one or more terminal mannose residues.

11. The cell line of any one of the preceding claims, wherein the cell line has a growth rate comparable to that of a cell line having no deficiency in Mgat1.

12. The cell line of any one of the preceding claims, wherein the cell line produces a level of protein comparable to that of a cell line having no deficiency in Mgat1.

13. A method for producing a cell deficient in Mgat1 comprising transfecting a host cell with a targeting endonuclease that targets a specific sequence in a chromosomal sequence encoding Mgat1.

14. The method of claim 13, wherein the targeting endonuclease is a zinc finger nuclease.

15. The method of either claims 13 or 14 further comprising incubating the transfected cell with *Ricinus communis* agglutinin-I (RCA-I).

16. The method of any one of claims 13 to 15 further comprising:
    a) introducing a nucleic acid encoding a recombinant protein into the cell; and
    b) expressing the recombinant protein.

17. A method for producing a recombinant protein having one or more terminal mannose residues, the method comprising:
    a) introducing a nucleic acid encoding the recombinant protein into a cell line in which a targeting endonuclease inactivated all chromosomal sequences encoding Mgat1 such that the cell line produces no Mgat1; and
    b) expressing the recombinant protein.

CLAIMS

What is claimed is:

1. A genetically modified cell line deficient in mannosyl (alpha-1,3-)-glycoprotein beta-1,2-N-acetylglucosaminyltransferase I (Mgat1) and glutamine synthetase (GS), wherein the deficiency in Mgat1 is due to a deletion of less than 200 base pairs, with an optional insertion in addition to the deletion, within the coding region of the chromosomal sequence encoding Mgat1.

2. The genetically modified cell line of claim 1, wherein the deficiency in GS is due to inactivation of all chromosomal sequences encoding GS.

3. The genetically modified cell line of claim 2, wherein the chromosomal sequences are inactivated with a targeting endonuclease.

4. The genetically modified cell line of claim 3, wherein the targeting endonuclease is a zinc finger nuclease.

5. The genetically modified cell line of claim 1, wherein the cell line produces no Mgat1 or GS.

6. The genetically modified cell line of claim 5, wherein the cell line is a Chinese Hamster Ovary (CHO) cell line, and the CHO cell line has a genotype of Mgat1 (-/0) and GS (-/-).

7. The genetically modified cell line of claim 1, wherein the cell line expresses at least one glycoprotein comprising one or more terminal mannose residues.

8. The genetically modified cell line of claim 1, wherein the cell line has a growth rate comparable to that of a cell line having no deficiency in Mgat1.

9. The genetically modified cell line of claim 1, wherein the cell line produces a level of protein comparable to that of a cell line having no deficiency in Mgat1.

10. A method for producing a recombinant protein having one or more terminal mannose residues, the method comprising: a) introducing a nucleic acid encoding the recombinant protein into the cell line of claim 1; and b) expressing the recombinant protein.