

CLAIMS

1. A method for producing an afucosylated protein in a host cell comprising introducing a nucleic acid encoding at least one modified enzyme of the fucosylation pathway to the host cell to produce the afucosylated protein.
2. The method according to claim 1, wherein the modified enzyme is derived from GDP-mannose 4,6-dehydratase (GMD), GDP-4-keto-6-deoxy-D-mannose epimerase-reductase (FX), or fucosyltransferase (FUT).
3. The method according to claim 1, wherein the modified enzyme is derived from fucosyltransferase (FUT).
4. The method according to claim 1, wherein the modified enzyme is derived from α -1,6-fucosyltransferase (FUT8).
5. The method according to claim 1, wherein the modified enzyme reduces or inhibits the activity of the wild-type enzyme, from which the modified enzyme is derived, in the host cell.
6. The method according to claim 1, wherein the modified enzyme inhibits or reduces fucosylation in the host cell.
7. The method according to claim 1, wherein the afucosylated protein that is produced in the host cell is an afucosylated antibody or a fragment thereof.
8. The method according to claim 7, wherein the afucosylated antibody or fragment thereof is at least 90% afucosylated.
9. The method according to claim 7, wherein the afucosylated antibody has increased antibody-dependent cellular cytotoxicity (ADCC) activity compared to its fucosylated counterpart.
10. The method according to claim 7, wherein the complement dependent cytotoxicity

(CDC) activity of the afucosylated antibody is not reduced or suppressed compared to its fucosylated counterpart.

11. A method for producing a protein that is afucosylated in a host cell comprising transfecting a host cell with a first nucleic acid sequence encoding a modified enzyme of the fucosylation pathway and a second nucleic acid sequence encoding the protein to be produced.
12. The method according to claim 11, wherein the host cell is transfected with the first nucleic acid and the second nucleic acid at the same time.
13. The method according to claim 12, wherein the afucosylated protein that is produced is an antibody and/or fragment thereof.
14. The method according to claim 11, wherein the first nucleic acid encodes a modified enzyme derived from GDP-mannose 4,6-dehydratase (GMD), GDP-4-keto-6-deoxy-D-mannose epimerase-reductase (FX), and/or fucosyltransferase (FUT).
15. The method according to claim 11, wherein the first nucleic acid encodes a modified enzyme derived from α -1,6-fucosyltransferase (FUT8).
16. The method according to claim 11 comprising the steps of:
 - a) transfecting the host cell with the first nucleic acid encoding the modified enzyme;
 - b) selecting and isolating transfected cells having low fucosylation;
 - c) transfecting the low fucosylation cells with the second nucleic acid encoding the protein to be produced;
 - d) expressing the protein to be produced in the low fucosylation cells.
17. The method according to claim 16, wherein the afucosylated protein that is produced is an antibody and/or fragment thereof.
18. The method according to claim 11 comprising the steps of:
 - a) transfecting the host cell with the second nucleic acid encoding the protein to be produced;

- b) selecting and isolating cells transfected with the second nucleic acid;
- c) transfecting the cells in step (b) with the first nucleic acid encoding the modified enzyme;
- d) selecting and isolating transfected cells having low fucosylation;
- e) expressing the protein to be produced in the low fucosylation cells.

19. The method according to claim 18, wherein the afucosylated protein that is produced is an antibody and/or fragment thereof.