

Claims

1. A genetically modified cell capable of producing one or more Human Milk Oligosaccharides (HMOs), wherein said cell comprises a recombinant nucleic acid encoding a protein of SEQ ID NO: 1, or a functional homologue thereof which amino acid sequence is at least 80 % identical, preferably at least 85 % identical, more preferably at least 90 % identical to SEQ ID NO: 1.

2. The genetically modified cell according to claim 1, wherein the oligosaccharide is selected from the list of 2'-fucosyllactose (2'-FL), 3-fucosyllactose (3-FL), difucosyllactose (DFL), 3'-sialyllactose (3'-SL), 6'-sialyllactose (6'-SL), Lacto-N-Triose-2 (LNT-2), Lacto-N-neotetraose (LNnT), Lacto-N-tetraose (LNT), Lacto-N-fucopentaose I (LNFP-I), Lacto-N-fucopentaose II (LNFP-II), Lacto-N-fucopentaose III (LNFP-III), Lacto-N-fucopentaose IV (LNFP-IV), and Lacto-N-fucopentaose V (LNFP-V), and/or para-lacto-N-neohexaose (pLNnH).

3. The genetically modified cell according to any one of the preceding claims, wherein the genetically modified cell is *Escherichia coli*.

4. The genetically modified cell according to any one of the preceding claims, wherein the cell further comprises a recombinant DNA sequence comprising a regulatory element for the regulation of the expression of the recombinant nucleic acid.

5. The genetically modified cell according to claim 4, wherein the regulatory element for the regulation of the expression of the recombinant nucleic acid is a promoter element such as a *lac* promoter, *Plac*, or a *gfp* promoter, *Pgfp*.

6. A nucleic acid construct comprising a nucleic acid sequence encoding a protein of SEQ ID NO: 1, or a functional homologue thereof, having more than 80 % sequence identity to SEQ ID NO: 1, wherein the nucleic acid sequence encoding a protein of SEQ ID NO: 1, has at least 70 % sequence identity to SEQ ID NO: 2.

7. A nucleic acid construct according to claim 6, wherein the construct further comprises a nucleic acid sequence comprising a regulatory element.

8. A nucleic acid construct according to claim 7, wherein the regulatory element regulates the expression of the nucleic acid sequence having at least 70 % sequence identity to SEQ ID NO: 2.

5

9. A nucleic acid construct according to any of claims 7 - 8, wherein the regulatory element for the regulation of the expression of the recombinant nucleic acid is an expression element such as a lac promoter, *Plac*, or a glp promoter, *PglpF*.

10

10. A method for the production of one or more oligosaccharide, the method comprising the steps of:

- (i) providing a genetically modified cell capable of producing an HMO, wherein said cell comprises a recombinant nucleic acid encoding a protein of SEQ ID NO: 1, or a functional homologue thereof having an amino acid sequence that is at least 80 % identical, preferably at least 85 % identical, more preferably at least 90 % identical to SEQ ID NO: 1;
- (ii) culturing the cell according to (i) in a suitable cell culture medium to express said recombinant nucleic acid;
- (iii) harvesting one or more HMOs produced in step (ii).

20

11. Use of a genetically modified cell according to any one of claims 1 to 5, or a nucleic acid construct according any one of claims 6-9, for the production of one or more oligosaccharides, preferably one or more human milk oligosaccharides.

25

12. Use of a genetically modified cell according to any one of claims 1 to 5, or a nucleic acid construct according any one of claims 6-9, for the production of an HMO selected from the group consisting of 2'-FL, 3-FL, DLF, LNT, LNT-II, LNnT, pLNH-II and pLNnH.

30

13. Use of a genetically modified cell according to any one of claims 1 to 5, or a nucleic acid construct according any one of claims 6-9, for the production of an HMO selected from the group consisting of LNT, LNT-II, LNnT, and pLNH-II and pLNnH.