-continued

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What is claimed is:

1. A method for producing a fucosylated oligosaccharide in a bacterium, comprising

providing a bacterium, said bacterium comprising a functional β-galactosidase gene, an exogenous fucosyltransferase gene, a GDP-fucose synthesis pathway, a functional lactose permease gene;

culturing said bacterium in the presence of lactose; and

retrieving a fucosylated oligosaccharide from said bacterium or from a culture supernatant of said bacterium.

2. The method of claim **1**, wherein said β-galactosidase gene comprises an *E. coli* lacZ gene.

3. The method of claim **1**, wherein said β-galactosidase gene is an endogenous β-galactosidase gene or an exogenous β-galactosidase gene.

4. The method of claim **1**, wherein said bacterium accumulates an increased intracellular lactose pool, and produces a low level of β-galactosidase.

5. The method of claim **1**, wherein said exogenous fucosyltransferase gene encodes α(1,2) fucosyltransferase or α(1,3) fucosyltransferase.

6. The method of claim **5**, wherein said α(1,2) fucosyltransferase gene comprises a *Bacteroides fragilis* wcfW gene.

7. The method of claim **5**, wherein said α(1,3) fucosyltransferase gene comprises a *Helicobacter pylori* 26695 futA gene.

8. The method of claim **5**, wherein said bacterium comprises both an exogenous fucosyltransferase gene encoding α(1,2) fucosyltransferase and an exogenous fucosyltransferase gene encoding α(1,3) fucosyltransferase.

9. The method of claim **1**, wherein said GDP-fucose synthesis pathway comprises endogenous enzymes or exogenous enzymes.

10. The method of claim **1**, wherein said lactose permease gene is an endogenous lactose permease gene or an exogenous lactose permease gene.

11. A method for producing a fucosylated oligosaccharide in a bacterium, comprising

providing an enteric bacterium, said bacterium comprising a functional β-galactosidase gene, an exogenous fucosyltransferase gene, a mutation in a colanic acid synthesis gene, and a functional lactose permease gene;