CLAIMS

What is claimed is:

1. A Gram-negative host prokaryotic organism comprising:

(i) a nucleotide sequence encoding at least one glycosyltransferase from a Gram-positive bacterium, wherein said Gram-positive bacterium is *S. aureus*;

(ii) a nucleotide sequence encoding at least one glycosyltransferase from a Gram-negative bacterium;

(iii) a nucleotide sequence encoding a carrier protein, wherein said carrier protein comprises the amino acid consensus sequence D/E-X-N-Z-S/T, wherein X and Z may be any natural amino acid except proline; and

(iv) a nucleotide sequence encoding an oligosaccharyl transferase.

2. The host prokaryotic organism of claim 1, wherein said glycosyltransferase from a Gram-negative bacterium is a *P. aeruginosa* glycosyltransferase.

3. The host prokaryotic organism of claim 1, wherein said *S. aureus* is a capsular polysaccharide 5 strain or a capsular polysaccharide 8 strain.

4. The host prokaryotic organism of claim 1 or 3, wherein said *S. aureus* is a methicillin-resistant strain.

5. The host prokaryotic organism of any one of claims 1-4, comprising at least two glycosyltransferases from different Gram-positive bacterium strains.

6. The host prokaryotic organism of any one of claims 1-5, wherein said carrier protein is *P. aeruginosa* Exotoxin, *S. aureus* alpha hemolysin or *S. aureus* clumping factor A.

7. The host prokaryotic organism of any one of claims 1-6, wherein said oligosaccharyl transferase is from *Campylobacter jejuni*.

8. The host prokaryotic organism of any one of claims 1-7, wherein said host organism is *E. coli*.

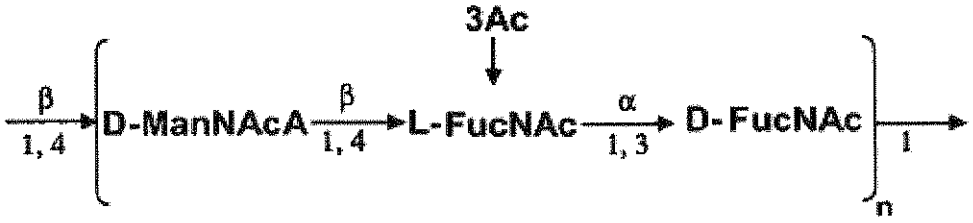
9. A method of producing a recombinant N-glycosylated protein comprising culturing the host prokaryotic organism of any one of claims 1-8 under conditions suitable for the production of proteins.

10. A recombinant N-glycosylated protein produced by the method of claim 9, wherein said protein comprises at least one *S. aureus* polysaccharide linked to said amino acid consensus sequence.

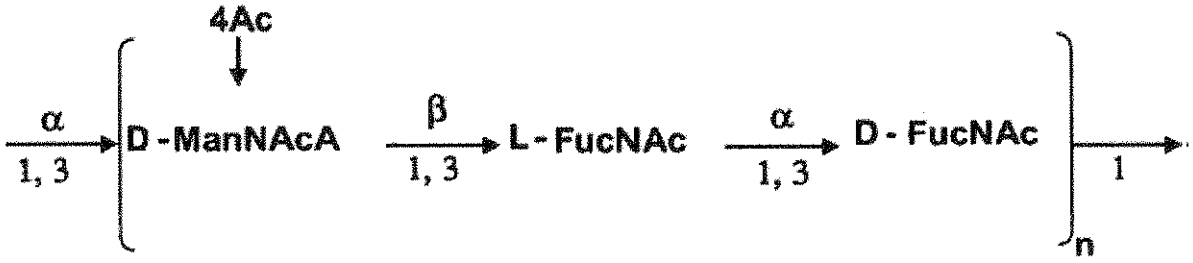
11. The recombinant N-glycosylated protein of claim 10, wherein said at least one *S. aureus* polysaccharide comprises capsular polysaccharide 5 or capsular polysaccharide 8.

12. The recombinant N-glycosylated protein of claim 10, wherein said at least one *S. aureus* polysaccharide comprises structure:

(A)



or (B)



13. The host prokaryotic organism of claim 3, wherein said *S. aureus* is a capsular polysaccharide 5 strain.

14. The host prokaryotic organism of claim 13, wherein said carrier protein is *P. aeruginosa* Exotoxin.

15. The host prokaryotic organism of claim 13, wherein said carrier protein is *S. aureus* alpha hemolysin.

16. The host prokaryotic organism of claim 13, wherein said carrier protein is *S. aureus* clumping factor A.

17. The host prokaryotic organism of claim 3, wherein said *S. aureus* is a capsular polysaccharide 8 strain.

18. The host prokaryotic organism of claim 17, wherein said carrier protein is *P. aeruginosa* Exotoxin.

19. The host prokaryotic organism of claim 17, wherein said carrier protein is *S. aureus* alpha hemolysin.

20. The host prokaryotic organism of claim 17, wherein said carrier protein is *S. aureus* clumping factor A.

21. The host prokaryotic organism of any one of claims 13-20, wherein said oligosaccharyl transferase is from *Campylobacter jejuni*.

CLAIMS

What is claimed is:

1. A Gram-negative host prokaryotic organism comprising:

(i) a nucleotide sequence encoding at least one glycosyltransferase from a Gram-positive bacterium;

(ii) a nucleotide sequence encoding at least one glycosyltransferase from a Gram-negative bacterium;

(iii) a nucleotide sequence encoding a carrier protein, wherein said carrier protein comprises the amino acid consensus sequence D/E-X-N-Z-S/T, wherein X and Z may be any natural amino acid except proline; and

(iv) a nucleotide sequence encoding an oligosaccharyl transferase.

2. The host prokaryotic organism of claim 1, wherein said glycosyltransferase from a Gram-positive bacterium is an *S. aureus* glycosyltransferase.

3. The host prokaryotic organism of claim 1 or 2, wherein said glycosyltransferase from a Gram-negative bacterium is a *P. aeruginosa* glycosyltransferase.

4. The host prokaryotic organism of claim 2 or 3, wherein said *S. aureus* is a capsular polysaccharide 5 strain or a capsular polysaccharide 8 strain.

5. The host prokaryotic organism of any one of claims 2-4, wherein said *S. aureus* is a methicillin-resistant strain.

6. The host prokaryotic organism of any one of claims 1-5, comprising at least two glycosyltransferases from different Gram-positive bacterium strains.

7. The host prokaryotic organism of any one of claims 1-6, wherein said carrier protein is *P. aeruginosa* Exotoxin, *S. aureus* alpha hemolysin or *S. aureus* clumping factor A.

8. The host prokaryotic organism of any one of claims 1-7, wherein said oligosaccharyl transferase is from *Campylobacter jejuni*.

9. The host prokaryotic organism of any one of claims 1-8, wherein said carrier protein is engineered to comprise the amino acid sequence D/E-X-N-Z-S/T, wherein X and Z may be any natural amino acid except proline.

10. The host prokaryotic organism of any one of claims 1-9, wherein said host organism is *E. coli*.

11. A method of producing a recombinant N-glycosylated protein comprising culturing the host prokaryotic organism of any one of claims 1-10 under conditions suitable for the production of proteins.

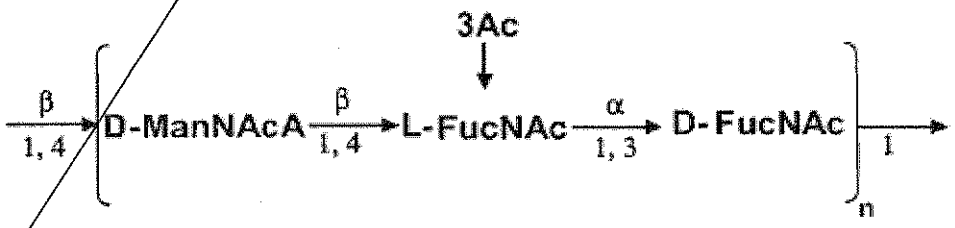
12. A recombinant N-glycosylated protein produced by the method of claim 11.

13. The recombinant N-glycosylated protein of claim 12, wherein said protein comprises at least one *S. aureus* polysaccharide linked to said amino acid consensus sequence.

14. The recombinant N-glycosylated protein of claim 13, wherein said at least one *S. aureus* polysaccharide comprises capsular polysaccharide 5 or capsular polysaccharide 8.

15. The recombinant N-glycosylated protein of claim 13, wherein said at least one *S. aureus* polysaccharide comprises structure:

(A)



or (B)

