CLAIMS:

[Claim 1]. A glycoconjugate for use as a medicament triggering the production of anti-SARS-CoV-2 antibodies, the glycoconjugate comprising one or more carbohydrate antigens conjugated to a carrier protein or peptide, wherein the one or more carbohydrate antigens comprise or consist of sialylated Thomsen-Friedenreich (TF) antigen, unsialylated TF antigen, sialylated Tn antigen, unsialylated Tn antigen, or any combination thereof, wherein said anti-SARS-CoV-2 antibodies bind to the one or more carbohydrate antigens present on glycosylated spike (S) protein expressed on SARS-CoV-2 virions.

[Claim 2]. The glycoconjugate for use according to claim 1, wherein the one or more carbohydrate antigens comprise unsialylated TF antigen and/or unsialylated Tn antigen.

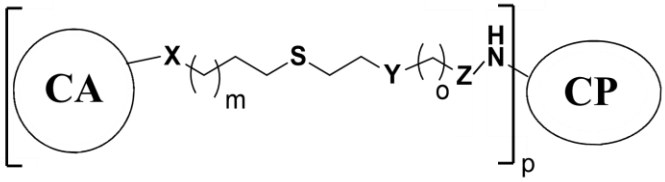
[Claim 3]. The glycoconjugate for use according to claim 1 or 2, wherein:

- the one or more carbohydrate antigen are conjugated to the carrier protein or peptide under non-denaturing conditions such that
- the carrier protein or peptide in the glycoconjugate has a native or non-denatured conformation.

[Claim 4]. The glycoconjugate for use according to any one of claims 1 to 3, wherein the one or more carbohydrate antigens are conjugated to the carrier protein or peptide at one or more amine groups on the carrier protein or peptide.

[Claim 5]. The glycoconjugate for use according to claim 4, wherein at least some of the one or more amine groups are epsilon amino groups of lysine residues comprised in the carrier protein or peptide.

[Claim 6]. The glycoconjugate for use according to claim 4 or 5, wherein the glycoconjugate has the structure:

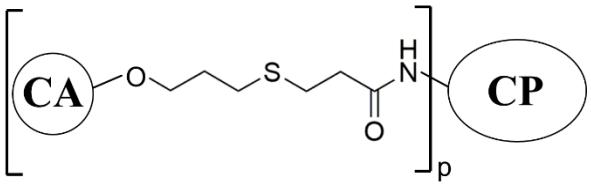


wherein:

- CA is the carbohydrate antigen;
- CP-NH is the carrier protein or peptide having one or more amine groups;
- X is O, S, NR_1, or CH_2 ;
- R_1 is H, COH (formamide), COMe, or COEt ;
- m is 1, 2, 3, 4, or 5 ;
- Y is $-(CH_2)_n-$ or $-(OCH_2CH_2O)_n-$ and n is 0, 1, 2, 3, 4, or 5 ;
- o is 0, 1, 2, 3, 4, or 5 ; or o is 0 and Z is -CO- and Y is $-(OCH_2CH_2O)_n-$; or o is 0 and Z is $-SO_2-$ and Y is $-(OCH_2CH_2O)_n-$;

- Z is -CO- , -NR_2SO_2- , -OCO- , -NR_2CO- , or -NR_2CS- ;
- R_2 is H, Me, or Et ; and
- p is an integer corresponding to the total number of carbohydrate antigens conjugated to the carrier protein or peptide at said one or more amine groups.

[Claim 7]. The glycoconjugate for use according to claim 6, wherein the glycoconjugate has the structure:



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[Claim 8]. The glycoconjugate for use according to any one of claims 1 to 3, wherein the one or more carbohydrate antigens are conjugated to the carrier protein or peptide at one or more thiol groups on the carrier protein or peptide.

[Claim 9]. The glycoconjugate for use according to claim 8, wherein at least some of the one or more thiol groups are found on cysteine residues comprised in the carrier protein or peptide.

[Claim 10]. The glycoconjugate for use according to any one of claims 1 to 9, wherein the carrier protein or peptide is, is from, or comprises: Tetanus Toxoid (TT), Diphtheria Toxoid (DT), cross-reacting material 197 (CRM197), Meningococcal Outer Membrane Protein Complex (OMPC), H. Influenzae Protein D (HiD), a cytokine, an immunogenic peptide, Tetanus Toxin 831-844 (**SEQ ID NO: 1 or 2**), albumin, keyhole limpet hemocyanin (KLH), or an immunogenic fragment thereof.

[Claim 11]. The glycoconjugate for use according to any one of claims 1 to 9, wherein the carrier protein or peptide is, is from, or comprises TT or CRM197, or an immunogenic fragment thereof.

[Claim 12]. The glycoconjugate for use according to any one of claims 1 to 3, wherein the one or more carbohydrate antigens are covalently conjugated to positions 4 and/or 6 of the peptide of **SEQ ID NO: 3**, or to a variant of the peptide of **SEQ ID NO: 3** comprising a cysteine or lysine at positions 4 and/or 6.

[Claim 13]. The glycoconjugate for use according to any one of claims 1 to 3, wherein the carrier protein or peptide comprises an immunogenic fragment of the SARS-CoV-2 S protein sequence of **SEQ ID NO: 4**, the fragment comprising one or more carbohydrate antigens conjugated to position 323, 325, and/or 678 of **SEQ ID NO: 4**.

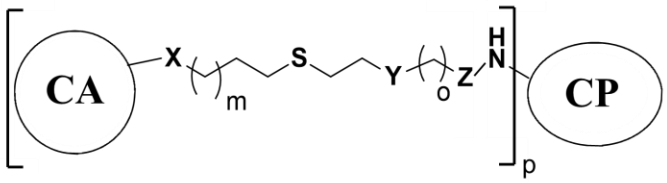
[Claim 14]. The glycoconjugate for use according to any one of claims 1 to 3, wherein the carrier protein or peptide comprises an immunogenic fragment of a variant of the SARS-CoV-2 S protein sequence of **SEQ ID NO: 4** having a lysine or cysteine at positions 323, 325, and/or 678, the fragment comprising one or more carbohydrate antigens conjugated to the lysine or cysteine residues at position 323, 325, and/or 678 of **SEQ ID NO: 4**.

[Claim 15]. A SARS-CoV-2 vaccine comprising the glycoconjugates as defined in any one of claims 1 to 14, and a pharmaceutically acceptable excipient and/or an adjuvant.

[Claim 16]. Use of a ligand in the manufacture of a medicament for treating or reducing the risk of SARS-CoV-2 viral infection in a subject, the one or more ligands having binding specificity for an O-linked glycan expressed on the SARS-CoV-2 S protein, wherein the O-linked glycan is sialylated TF antigen, unsialylated TF antigen, sialylated Tn antigen, or unsialylated Tn antigen, and wherein the ligand is an antibody, an antibody fragment, or a lectin.

[Claim 17]. An immune complex comprisinga SARS-CoV-2 S protein, or fragment thereof, expressing an O-linked glycan bound to a ligand having binding specificity for said O-linked glycan, wherein the O-linked glycan is sialylated TF antigen, unsialylated TF antigen, sialylated Tn antigen, or unsialylated Tn antigen; and wherein the ligand is an antibody, an antibody fragment, or a lectin.

[Claim 18]. A synthetic neoglycoconjugate comprising one or more carbohydrate antigens (CA) conjugated to one or more amine groups of a carrier protein or peptide (CP-NH) via a linker, the synthetic neoglycoconjugate having the structure:



wherein:

- X is O, S, NR_1, or CH_2 ;
- R_1 is H, COH (formamide), COMe, or COEt ;
- m is 1, 2, 3, 4, or 5 ;
- Y is $-(CH_2)_n-$ or $-(OCH_2CH_2O)_n-$ and n is 0, 1, 2, 3, 4, or 5 ;
- o is 0, 1, 2, 3, 4, or 5 ; or o is 0 and Z is -CO- and Y is $-(OCH_2CH_2O)_n-$; or o is 0 and Z is $-SO_2-$ and Y is $-(OCH_2CH_2O)_n-$;
- Z is -CO- , $-NR_2SO_2-$, -OCO- , $-NR_2CO-$, or $-NR_2CS-$;
- R_2 is H, Me, or Et ; and
- p is an integer corresponding to the total number of carbohydrate antigens conjugated to the carrier protein or peptide at said one or more amine groups, and

wherein the carrier protein or peptide in the synthetic neoglycoconjugate has a native or non-denatured conformation, and conjugation of the carbohydrate antigen to the carrier protein or peptide increases the immunogenicity of the carbohydrate antigen upon administration to the subject as compared to a corresponding administration of the unconjugated carbohydrate antigen.

[Claim 19]. The synthetic neoglycoconjugate of claim 18, wherein the one or more carbohydrate antigens comprise a tumor associated carbohydrate antigen (TACA), a viral polysaccharide antigen, or a bacterial capsular polysaccharide (CPS).

[Claim 20]. The synthetic neoglycoconjugate of claim 18 or 19, wherein the one or more carbohydrate antigens comprise sialylated TF antigen, unsialylated TF antigen, sialylated Tn antigen, unsialylated Tn antigen, or any combination thereof.

[Claim 21]. The synthetic neoglycoconjugate of any one of claims 18 to 20, wherein the carrier protein or peptide is, is from, or comprises: Tetanus Toxoid (TT), Diphtheria Toxoid (DT), cross-reacting material 197 (CRM197), Meningococcal Outer Membrane Protein Complex (OMPC), H. Influenzae

Protein D (HiD), a cytokine, an immunogenic peptide, Tetanus Toxin 831-844 (**SEQ ID NO: 1 or 2**), albumin, keyhole limpet hemocyanin (KLH), or an immunogenic fragment thereof.

[Claim 22]. The synthetic neoglycoconjugate of any one of claims 18 to 21, wherein p is 1 to 50.

[Claim 23]. A vaccine composition comprising the synthetic neoglycoconjugate of any one of claims 18 to 22, and a pharmaceutically acceptable excipient and/or an adjuvant.

[Claim 24]. Use of the synthetic neoglycoconjugate as defined in any one of claims 18 to 21 for the manufacture of a vaccine composition for immunizing a subject against a TACA-expressing cancer.