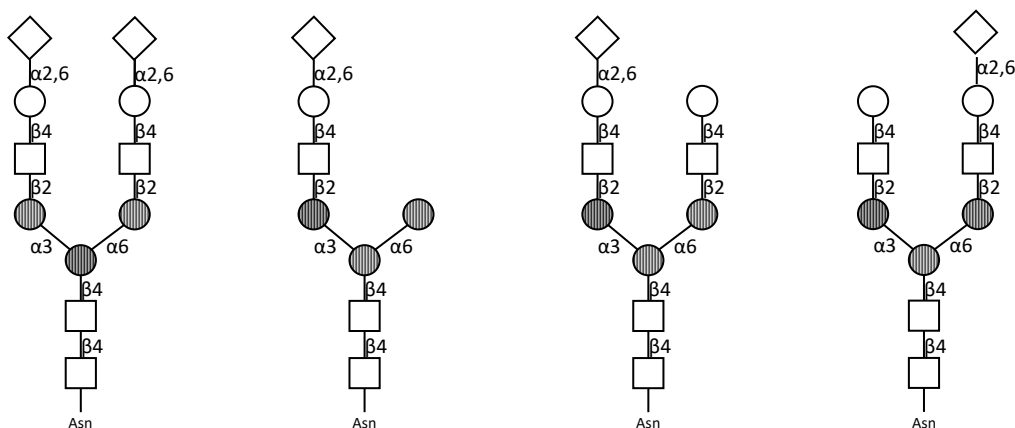


What is claimed is:

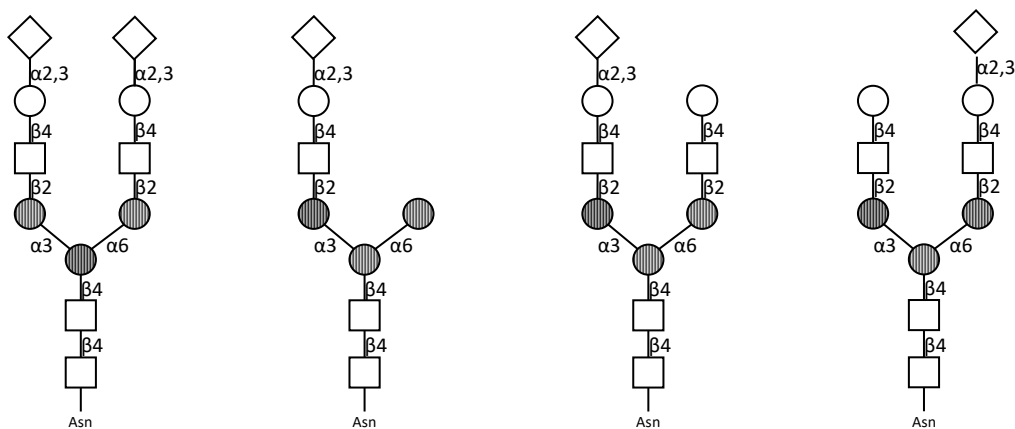
1. A monoclonal antibody comprising a higher amount of sialic acid in the Fab region of the monoclonal antibody as compared to an antibody found in human serum or a control monoclonal antibody produced by a Chinese hamster ovary (CHO) cell line.
2. A monoclonal antibody comprising a higher amount of sialic acid in a Fab region and/or a higher amount of sialic acid in an Fc region of the monoclonal antibody as compared to an antibody found in human serum or a control monoclonal antibody produced by a Chinese hamster ovary (CHO) cell line.
3. A monoclonal antibody comprising a higher amount of sialic acid in a Fab region and/or a higher amount of afucosylated glycan in an Fc region of the monoclonal antibody as compared to an antibody found in human serum or a control monoclonal antibody produced by a Chinese hamster ovary (CHO) cell line.
4. A monoclonal antibody comprising a higher amount of sialic acid in a Fab region and/or higher amount of G0 glycan in an Fc region of the monoclonal antibody as compared to an antibody found in human serum or a control monoclonal antibody produced by a Chinese hamster ovary (CHO) cell line.
5. The monoclonal antibody of any one of claims 1 to 4 comprising sialylated glycans at one or more point mutations in the variable domain of the heavy chain and/or light chain of the monoclonal antibody.
6. The monoclonal antibody of any one of claims 1 to 5 comprising sialylated glycans at one or more inserted or mutated amino acids leading to an N-glycosylation site in the framework region of the variable domain of the heavy chain of the monoclonal antibody, wherein the monoclonal antibody retains its ability to bind its antigen.
7. The monoclonal antibody of any one of claims 1 to 5 comprising sialylated glycans at one or more inserted or mutated amino acids leading to an N-glycosylation site in the framework region of the variable domain of the light chain of the monoclonal antibody, wherein the monoclonal antibody retains its ability to bind its antigen.

8. The monoclonal antibody of any one of claims 1 to 5 comprising sialylated glycans at one or more inserted or mutated amino acids leading to an N-glycosylation site in the framework region of the variable domain of the heavy chain and sialylated glycans at one or more inserted or mutated amino acids leading to an N-glycosylation site in the framework region on the variable domain of the light chain, wherein the monoclonal antibody retains its ability to bind its antigen.
9. The monoclonal antibody of any one of claims 1 to 8 comprising afucosylated glycan structures at the Fc region of the monoclonal antibody.
10. The monoclonal antibody of any one of claims 1 to 8 comprising afucosylated glycan structures at the conserved Fc glycosite N297 (according to IMGT database and Eu numbering).
11. The monoclonal antibody of any one of claims 1 to 10, wherein the monoclonal antibody is an anti-TNF α antibody.
12. The monoclonal antibody of claim 11, wherein the anti-TNF α antibody is a variant of adalimumab.
13. The monoclonal antibody of claim 12 comprising sialylated glycans at N84 (according to IMGT database numbering) on the variable domain of the heavy chain of the monoclonal antibody.
14. The monoclonal antibody of claim 12 comprising sialylated glycans at N86 (according to IMGT database numbering) -on the variable domain of the light chain of the monoclonal antibody.
15. The monoclonal antibody of claim 12 comprising sialylated glycans at N84 (according to IMGT database numbering) on the variable domain of the heavy chain and sialylated glycans at N86 on the variable domain of the light chain of the monoclonal antibody.
16. The monoclonal antibody of any one of claims 1 to 15, comprising one or more of the following structures:



wherein the diamond represents a sialic acid residue, the empty circle represents a galactose residue, the square represents an N-acetylglucosamine residue and the grey circle represents a mannose residue, and wherein the Asn is an Asn of an N-linked glycosylation consensus sequence in a variable domain of the monoclonal antibody.

17. The monoclonal antibody of any one of claims 1 to 15, comprising one or more of the following structures:



wherein the diamond represents a sialic acid residue, the empty circle represents a galactose residue, the square represents an N-acetylglucosamine residue and the grey circle represents a mannose residue, and wherein the Asn is an Asn of an N-linked glycosylation consensus sequence in a variable domain of the monoclonal antibody.

18. The monoclonal antibody of any one of claims 1 to 17, comprising one or more of the following structures:

	Oxford/Unifi nomenclature ¹	Short IgG nomenclature ²	Symbol Nomenclature for Glycan structure ³
1	M3	Man3	
2	A1	G0-N	
3	A1G1	G1-N	
4	A1[3]G(4)1	G1-N	
5	A2	G0	
6	A2[6]G(4)1	G1(6')	
7	A2[3]G(4)1	G1(3')	
8	A2G1	G1	
9	A1G1S1	G1S1-N	
10	A1[3]G(4)1S1	G1S1-N	
11	A2G(4)2	G2	
12	A2G1S1	G1S1	
13	A2[6]G(4)1S(6)1	G1S1	
14	A2[3]G(4)1S(6)1	G1S1	
15	A2G2S1	G2S1	
16	A2G2S2	G2S2	
17	A2G(4)2S(6,6)2	G2S2	

¹Mx: number (x) of residues within the oligomannose series; Ax: number (x) of antennae; F: core fucose; Gx: number (x) of galactoses; B: bisecting GlcNAc; S: number (x) of sialic acids. Note: Linkage information is given in () parentheses if applicable, e.g. F(6)A2 – α 1-6 linked fucose. A2G1S1(6) – α 2-6 linked sialic acid. Brackets [x] before G indicate which arm of the mannosyl core is galactosylated e.g. [3]G1 indicates that the galactose is on the antenna of the

α 1-3 mannose. ²This typically with IgG associated naming system indicates the presence of core fucose, the number of galactoses and the presence of biantennary glycans. It is limited in the number of structures and linkages it can describe but is often used for simplicity. ³ Grey circle represents mannose (Man), white square is N-acetyl glucosamine (GlcNAc), white circle is galactose (Gal), white diamond is sialic acid, N-acetyl neuraminic acid (Neu5Ac).

wherein the diamond represents a sialic acid residue, the empty circle represents a galactose residue, the square represents an N-acetylglucosamine residue and the grey circle represents a mannose residue; and wherein the reducing end is on Asn of an N-linked glycosylation consensus sequence in the monoclonal antibody.

19. The monoclonal antibody of claim 11, wherein the anti-TNF α antibody has an antibody-dependent cell mediated cytotoxicity (ADCC) activity that is at least 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, 1.5-fold, 2-fold, 3-fold, 4-fold, 5-fold, 6-fold, 7-fold, 8-fold, 9-fold, 10-fold, 12-fold, 15-fold, 18-fold, 20-fold, 25-fold, or 30-fold higher than that of the same anti-TNF α antibody having a different glycosylation profile.

20. The monoclonal antibody of claim 11, wherein the anti-TNF α antibody has an antibody-dependent cell mediated cytotoxicity (ADCC) activity against primary inflammatory target cells that is at least 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, 1.5-fold, 2-fold, 3-fold, 4-fold, 5-fold, 6-fold, 7-fold, 8-fold, 9-fold, 10-fold, 12-fold, 15-fold, 18-fold, 20-fold, 25-fold, or 30-fold higher than that of the same anti-TNF α antibody having a different glycosylation profile.

21. The monoclonal antibody of claim 11, wherein the anti-TNF α antibody has a reduced (lower) immunogenicity that is at least 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, 1.5-fold, 2-fold, 3-fold, 4-fold, 5-fold, 6-fold, 7-fold, 8-fold, 9-fold, 10-fold, 12-fold, 15-fold, 18-fold, 20-fold, 25-fold, or 30-fold lower than that of the same anti-TNF α antibody having a different glycosylation profile.

22. The monoclonal antibody of claim 11, wherein the anti-TNF antibody has an increase wound healing M2 macrophages induction activity that is at least 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%, 1.5-fold, 2-fold, 3-fold, 4-fold, 5-fold, 6-fold, 7-fold, 8-fold, 9-fold, 10-fold, 12-fold, 15-fold, 18-fold, 20-fold, 25-fold, or 30-fold higher than that of the same anti-TNF α antibody having a different glycosylation profile.

23. A *Leishmania* host cell genetically engineered as described in Example X comprising the monoclonal antibody of any one of claims 1 to 22.

24. The *Leishmania* host cell of claim 23, wherein the *Leishmania* host cell is *Leishmania tarentolae*.

25. A method for making a monoclonal antibody comprising culturing the *Leishmania* host cell of claim 23 or 24 and isolating the monoclonal antibody.

26. A monoclonal antibody produced by the method of claim 25.

27. A pharmaceutical composition comprising the monoclonal antibody of any one of claims 1 to 22 and a pharmaceutically acceptable carrier.

28. ~~A method of treating or preventing a disease in a patient comprising administering to the patient the~~The monoclonal antibody of any one of claims 1 to 22, or the pharmaceutical composition of claim 27 for use in treating or preventing a disease in a patient, wherein the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 is to be administered to the patient.

29. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating~~The method of claim 28, wherein the disease is an inflammatory bowel disease~~in a patient.

30. ~~The method~~use of claim 29, wherein the inflammatory bowel disease is selected from Crohn's disease, pediatric Crohn's disease, ulcerative colitis, microscopic colitis, diverticulosis-associated colitis, collagenous colitis, lymphocytic colitis, and Behçet's disease.

31. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient~~The method of claim 28~~, wherein the disease is selected from rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, chronic psoriasis, hidradenitis suppurativa, adult uveitis, pediatric uveitis, plaque psoriasis, and juvenile idiopathic arthritis.

32. The ~~method~~use of any one of claims 29 and 31, wherein the ~~administration step comprises~~ monoclonal antibody or the pharmaceutical composition is to be administered to the patient via intravenous injection, intraperitoneal injection, subcutaneous injection, transdermal injection, or intramuscular injection.

33. The ~~method~~use of any one of claims ~~28~~29 to 32, wherein the ~~method~~monoclonal antibody or the pharmaceutical composition:

~~requires~~is to be administered at a lower dose and/or lower administration frequency to achieve the same effect as compared to the same antibody having a different glycosylation profile; and/or

~~can be administered~~is to be administered for an extended period of time (at least 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or at least 12 months, at least 2, 3, 4, 5, 6, 7, 8, 9, or at least 10 years); and/or

does not trigger an immune response against the monoclonal antibody in the patient.

34. The ~~method~~use of any one of claims ~~28~~29 to 33, wherein the ~~method~~requires monoclonal antibody or the pharmaceutical composition is to be administered with a lower immunosuppressant co-medication.

35. The ~~method~~use of claim 34, wherein the immunosuppressant is selected from corticosteroids, cyclophosphamide, tacrolimus, azathioprine, cyclosporine, and tofacitinib.

36. ~~The method~~Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient, of claim 28, wherein the disease is rheumatoid arthritis, psoriatic arthritis, or ankylosing spondylitis, and wherein ~~the method comprises administering to the patient the medicament comprises~~ less than or equal to 40 mg of the anti-TNF α antibody on and the medicament is to be administered to the patient on an administration frequency less than or equal to every other week.

37. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient~~The method of claim 28~~, wherein the disease is Crohn's disease or ulcerative colitis, and wherein ~~the method comprises administering to the patient~~ medicament comprises less than or

equal to 160 mg of the anti-TNF α antibody on day 1, less than or equal to 80 mg of the anti-TNF α antibody on day 15, and less than or equal to 40 mg of the anti-TNF α antibody, and the medicament is to be administered to the patient -on an administration frequency less than or equal to every other week starting on day 29.

38. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient~~The method of claim 28~~, wherein the disease is pediatric Crohn's disease, and wherein ~~the method comprises administering to the patient~~ medicament comprises:

less than or equal to 80 mg of the anti-TNF α antibody on day 1, less than or equal to 40 mg of the anti-TNF α antibody on day 15, and less than or equal to 20 mg of the anti-TNF α antibody and the medicament is to be administered to the patient on an administration frequency less than or equal to every other week starting on day 29 in a patient having a body weight between 17 kg and 40 kg, or

less than or equal to 160 mg of the anti-TNF α antibody on day 1, less than or equal to 80 mg of the anti-TNF α antibody on day 15, and less than or equal to 40 mg of the anti-TNF α antibody and the medicament is to be administered on an administration frequency less than or equal to every other week starting on day 29 in a patient having a body weight equal to or higher than 40 kg.

39. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient~~The method of claim 28~~, wherein the disease is juvenile idiopathic arthritis or pediatric uveitis, and wherein ~~the method comprises administering to the patient~~ medicament comprises:

less than or equal to 10 mg of the anti-TNF α antibody, the medicament is to be administered to the patient -on an administration frequency less than or equal to every other week in a patient having a body weight between 10 kg and 15 kg,

less than or equal to 20 mg of the anti-TNF α antibody, the medicament is to be administered to the patient on an administration frequency less than or equal to every other week in a patient having a body weight between 15 kg and 30 kg, or

less than or equal to 40 mg of the anti-TNF α antibody, and the medicament is to be administered on an administration frequency less than or equal to every other week in a patient having a body weight equal to or higher than 30 kg.

40. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient~~The method of claim 28~~, wherein the disease is plaque psoriasis or adult uveitis, and wherein the ~~method comprises administering to the patient~~ medicament comprises less than or equal to 80 mg of the anti-TNF α antibody on day 1, and less than or equal to 40 mg and the medicament is to be administered on an administration frequency less than or equal to every other week starting on day 8.

41. Use of the monoclonal antibody of any one of claims 1 to 22 or the pharmaceutical composition of claim 27 in the manufacture of a medicament for treating a disease in a patient~~The method of claim 28~~, wherein the disease is hidradenitis suppurativa, and wherein the ~~method comprises administering to the patient~~ medicament comprises:

less than or equal to 80 mg of the anti-TNF α antibody on day 1, and less than or equal to 40 mg of the anti-TNF α antibody and the medicament is to be administered –on an administration frequency less than or equal to every other week starting on day 8 in an adolescent patient who are 12 years and older having a body weight between 30 kg and 60 kg, or

less than or equal to 160 mg of the anti-TNF α antibody on day 1, and less than or equal to 80 mg of the anti-TNF α antibody on day 15, and less than or equal to 40 mg of the anti-TNF α antibody and the medicament is to be administered on an administration frequency less than or equal to every week starting on day 29 in an adolescent patient who are 12 years and older having a body weight equal to or higher than 60 kg or an adult patient.

42. A single dosage form of a monoclonal antibody of any one of claims 1 to 22, wherein the single dosage form consists of about 2 mg, about 5 mg, about 7 mg, about 10 mg, about 12 mg, about 15 mg, about 18 mg, about 20 mg, about 25 mg, about 30 mg, about 35 mg, about 40 mg, about 45 mg, about 50 mg, about 55 mg, about 60 mg, about 65 mg, about 70 mg, about 75 mg, or about 80 mg of the anti-TNF α antibody.

43. The single dosage form of claim 42, wherein the single dosage form is a prefilled syringe, an injection pen, a vial, a tablet, or a capsule.

44. The single dosage form of claim 42, wherein the single dosage form comprises the anti-TNF α antibody in a lyophilized form or in a liquid solution.