CLAIMS

1. An isolated antibody, or antigen-binding fragment thereof, specifically binding to a bile salt stimulated lipase (BSSL), preferably human BSSL (hBSSL), and comprising:

three complementarity determining regions (CDRs) of a heavy chain variable region (HCVR) (HCDRs); and

three CDRs of a light chain variable region (LCVR) (LCDRs), wherein

the first HCDR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 7;

the second HCDR comprises, preferably consists of, an amino acid sequence selected from the group consisting of SEQ ID NO: 8, SEQ ID NO: 18 and SEQ ID NO: 19;

the third HCDR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 9;

the first LCDR comprises, preferably consists of, an amino acid sequence selected from the group consisting of SEQ ID NO: 10 and SEQ ID NO: 20;

the second LCDR comprises, preferably consists of, an amino acid sequence selected from the group consisting of ATS and AAS; and

the third LCDR comprises, preferably consists of, an amino acid sequence selected from the group consisting of SEQ ID NO: 11, SEQ ID NO: 21 and SEQ ID NO: 22.

2. The isolated antibody, or antigen-binding fragment thereof, according to claim 1, wherein

the first HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 7;

the second HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 8;

the third HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 9;

the first LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 10;

the second LCDR comprises, preferably consists of, the amino acid sequence ATS; and

the third LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 11.

3. The isolated antibody, or antigen-binding fragment thereof, according to claim 2, wherein the isolated antibody, or antigen-binding fragment thereof, comprises:

an extended second HCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 12;

an extended first LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 14; and

an extended second LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 15.

4. The isolated antibody, or antigen-binding fragment thereof, according to claim 2 or 3, wherein

the HCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 36; and/or

the LCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 37.

5. The isolated antibody, or antigen-binding fragment thereof, according to claim 2, wherein the isolated antibody, or antigen-binding fragment thereof, comprises:

an extended second HCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 12;

an extended first LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 16; and

an extended second LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 17.

6. The isolated antibody, or antigen-binding fragment thereof, according to claim 2 or 5, wherein

the HCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 36; and/or

the LCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 38.

7. The isolated antibody, or antigen-binding fragment thereof, according to claim 1, wherein

the first HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 7;

the second HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 18;

the third HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 9;

the first LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 10;

the second LCDR comprises, preferably consists of, the amino acid sequence ATS; and

the third LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 21.

8. The isolated antibody, or antigen-binding fragment thereof, according to claim 7, wherein the isolated antibody, or antigen-binding fragment thereof, comprises:

an extended second HCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 23;

an extended first LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 16; and

an extended second LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 15.

9. The isolated antibody, or antigen-binding fragment thereof, according to claim 7 or 8, wherein

the HCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 30; and/or

the LCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 31.

10. The isolated antibody, or antigen-binding fragment thereof, according to claim 1, wherein

the first HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 7;

the second HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 8;

the third HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 9;

the first LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 20;

the second LCDR comprises, preferably consists of, the amino acid sequence AAS; and

the third LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 11.

11. The isolated antibody, or antigen-binding fragment thereof, according to claim 10, wherein the isolated antibody, or antigen-binding fragment thereof, comprises:

an extended second HCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 24;

an extended first LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 27; and

an extended second LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 29.

12. The isolated antibody, or antigen-binding fragment thereof, according to claim 10 or 11, wherein

the HCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 32; and/or

the LCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 33.

13. The isolated antibody, or antigen-binding fragment thereof, according to claim 1, wherein

the first HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 7;

the second HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 19;

the third HCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 9;

the first LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 20;

the second LCDR comprises, preferably consists of, the amino acid sequence ATS; and

the third LCDR comprises, preferably consists of, the amino acid sequence according to SEQ ID NO: 22.

14. The isolated antibody, or antigen-binding fragment thereof, according to claim 13, wherein the isolated antibody, or antigen-binding fragment thereof, comprises:

an extended second HCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 25;

an extended first LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 26; and

an extended second LCDR comprising, preferably consisting of, the amino acid sequence according to SEQ ID NO: 28.

15. The isolated antibody, or antigen-binding fragment thereof, according to claim 13 or 14, wherein the HCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 34; and/or

the LCVR comprises, preferably consists of, an amino acid sequence according to SEQ ID NO: 35.

16. The isolated antibody, or antigen-binding fragment thereof, according to claim 1, wherein the HCVR comprises, preferably consists of, an amino acid sequence selected from the group consisting of SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, and SEQ ID NO: 36.

17. The isolated antibody, or antigen-binding fragment thereof, according to claim 1, wherein the LCVR comprises, preferably consists of, an amino acid sequence selected from the group consisting of SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37 and SEQ ID NO: 38.

18 The isolated antibody, or antigen-binding fragment thereof, according to any one of the preceding claims, wherein the antibody, or antigen-binding fragment thereof, is selected from the group consisting of a human antibody, a humanized antibody and a chimeric antibody, or an antigen-binding fragment thereof.

19. The isolated antibody, or antigen-binding fragment thereof, according to any one of the preceding claims, wherein the antigen-binding fragment is selected from the group consisting of a single chain fragment variable (scFv), a Fab fragment, $F(ab')_2$ fragment, a $F(ab')_3$ fragment, a Fab' fragment, a Fd fragment, a Fv fragment, a dAb fragment, and a nanobody, preferably a scFv.

20. The isolated antibody, or antigen-binding fragment thereof according to any one of the preceding claims, wherein the isolated antibody, or antigen-binding fragment thereof, is a monoclonal antibody, or an antigen-binding fragment thereof.

21. The isolated antibody, or antigen-binding fragment thereof, according to any one of the preceding claims, having an isotype class selected from the group consisting of IgG, IgA, IgM, IgD and IgE, preferably IgG, and more preferably IgG1 or IgG4.

22. The isolated antibody, or antigen-binding fragment thereof, according to any one of the preceding claims, wherein the isolated antibody, or antigen-binding fragment thereof, comprises at least one Fc silencing mutation inhibiting interaction with Fc receptors (FcγRs).

23. The isolated antibody, or antigen-binding fragment thereof, according to claim 22, wherein the isolated antibody, or antigen-binding fragment thereof, is of IgG isotype class and the at least one Fc silencing mutation is selected from the group consisting of L234A, L235A and P329G.

24. The isolated antibody, or antigen-binding fragment thereof, according to any one of the preceding claims, wherein the isolated antibody, or antigen-binding fragment thereof comprises, at least one stabilizing mutation which prevents or reduces *in vivo* Fab arm exchange.

25. The isolated antibody, or antigen-binding fragment thereof, according to claim 24, wherein the isolated antibody, or antigen-binding fragment thereof, is of IgG4 isotype subclass and the at least one stabilizing mutation is S228P.

26. A pharmaceutical composition comprising an isolated antibody and/or an antigen-binding fragment thereof according to any one of the preceding claims and a pharmaceutically acceptable carrier or excipient.

27. An isolated antibody, or an antigen-binding fragment thereof, according to any one of claims 1 to 25, or a pharmaceutical composition according to claim 26, for use as a medicament.

28. An isolated antibody, or an antigen-binding fragment thereof, according to any one of claims 1 to 25, or a pharmaceutical composition according to claim 26, for use in the treatment of an inflammatory disease.

29. The isolated antibody, or antigen-binding fragment thereof, or the pharmaceutical composition, for use according to claim 28, wherein the inflammatory disease is a chronic inflammatory disease.

30. The isolated antibody, or antigen-binding fragment thereof, or the pharmaceutical composition, for use according to claim 28, wherein the inflammatory disease is a systemic inflammatory disease.

31. The isolated antibody, or antigen-binding fragment thereof, or the pharmaceutical composition, for use according to claim 28, wherein the inflammatory disease is an autoimmune disease.

32. The isolated antibody, or antigen-binding fragment thereof, or the pharmaceutical composition, for use according to claim 28, wherein the inflammatory disease is an autoinflammatory disease.

33. The isolated antibody, or antigen-binding fragment thereof, or the pharmaceutical composition, for use according to claim 28, wherein the inflammatory disease is a natural killer (NK) cell mediated inflammatory disease.

34. The isolated antibody, or antigen-binding fragment thereof, or the pharmaceutical composition, for use according to claim 28, wherein the inflammatory disease is selected from the group consisting of rheumatoid arthritis (RA), juvenile idiopathic arthritis (JIA), psoriatic arthritis, an inflammatory bowel disease (IBD), such as Crohn's disease or ulcerative colitis (UC), and hepatic steatosis.

35. A polynucleotide encoding an antibody, or antigen-binding fragment thereof, according to any one of claims 1 to 25.

36. An expression vector comprising a polynucleotide according to claim 35.

37. A cell comprising an antibody, or antigen-binding fragment thereof, according to any one of claims 1 to 25, a polynucleotide according to claim 35 and/or an expression vector according to claim 36.

38. A method of producing an antibody, or an antigen-binding fragment thereof, the method comprising:

culturing a cell according to claim 37 comprising an expression vector according to claim 36 under conditions where the antibody, or antigen-binding fragment thereof, is expressed by the cell; and

optionally, isolating the antibody, or antigen-binding fragment thereof, from the cell or a culture medium, in which the cell is cultured.

39. A method for detecting the presence or absence of a bile salt stimulated lipase (BSSL) and/or quantifying the amount of BSSL in a sample, the method comprising:

contacting the sample with an isolated antibody, or an antigen-binding fragment thereof, according to any one of claims 1 to 25; and

detecting the presence or absence of BSSL in the sample and/or quantifying the amount of BSSL in the sample based on an amount of isolated antibody, or antigen-binding fragment thereof bound to BSSL.

40. A method for diagnosis of a bile salt stimulated lipase (BSSL) related disorder, the method comprising:

a) contacting a sample from a subject with an isolated antibody, or an antigen-binding fragment thereof, according to any one of claims 1 to 25;

b) detecting the presence or absence of BSSL and/or quantifying the amount of BSSL in the sample based on an amount of isolated antibody, or antigen-binding fragment thereof bound to BSSL; and

c) concluding, based on the results in step b), whether the subject is suffering from a BSSL-related disorder or not.