

Claims

1. An isolated antibody or antigen-binding fragment thereof capable of binding to IL-11 and inhibiting IL-11 mediated signaling, comprising
 - i) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 33, an H-CDR2 comprising SEQ ID NO: 34, and an H-CDR3 comprising SEQ ID NO: 35 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 37, an L-CDR2 comprising SEQ ID NO: 38, and an L-CDR3 comprising SEQ ID NO:39; or
 - ii) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 43, an H-CDR2 comprising SEQ ID NO: 44, and an H-CDR3 comprising SEQ ID NO: 45 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 47, an L-CDR2 comprising SEQ ID NO: 48, and an L-CDR3 comprising SEQ ID NO:49; or
 - iii) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 55, an H-CDR2 comprising SEQ ID NO: 56, and an H-CDR3 comprising SEQ ID NO: 57 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 59, an L-CDR2 comprising SEQ ID NO: 60, and an L-CDR3 comprising SEQ ID NO:61; or
 - iv) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 65, an H-CDR2 comprising SEQ ID NO: 66, and an H-CDR3 comprising SEQ ID NO: 67 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 69, an L-CDR2 comprising SEQ ID NO: 70, and an L-CDR3 comprising SEQ ID NO:71; or
 - v) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 83, an H-CDR2 comprising SEQ ID NO: 84, and an H-CDR3 comprising SEQ ID NO: 85 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 87, an L-CDR2 comprising SEQ ID NO: 88, and an L-CDR3 comprising SEQ ID NO:89; or
 - vi) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 107, an H-CDR2 comprising SEQ ID NO: 108, and an H-CDR3 comprising SEQ ID NO: 109 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 111, an L-CDR2 comprising SEQ ID NO: 112, and an L-CDR3 comprising SEQ ID NO:113; or

- 5 vii) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 121, an H-CDR2 comprising SEQ ID NO: 122, and an H-CDR3 comprising SEQ ID NO: 123 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 125, an L-CDR2 comprising SEQ ID NO: 126, and an L-CDR3 comprising SEQ ID NO:127; or
- 10 viii) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 137, an H-CDR2 comprising SEQ ID NO: 138, and an H-CDR3 comprising SEQ ID NO: 139 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 141, an L-CDR2 comprising SEQ ID NO: 142, and an L-CDR3 comprising SEQ ID NO:143; or
- 15 ix) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 149, an H-CDR2 comprising SEQ ID NO: 150, and an H-CDR3 comprising SEQ ID NO: 151 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 153, an L-CDR2 comprising SEQ ID NO: 154, and an L-CDR3 comprising SEQ ID NO:155; or
- 20 x) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 161, an H-CDR2 comprising SEQ ID NO: 162, and an H-CDR3 comprising SEQ ID NO: 163 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 165, an L-CDR2 comprising SEQ ID NO: 166, and an L-CDR3 comprising SEQ ID NO:167; or
- 25 xi) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 173, an H-CDR2 comprising SEQ ID NO: 174, and an H-CDR3 comprising SEQ ID NO: 175 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 177, an L-CDR2 comprising SEQ ID NO: 178, and an L-CDR3 comprising SEQ ID NO:179; or
- 30 xii) a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 185, an H-CDR2 comprising SEQ ID NO: 186, and an H-CDR3 comprising SEQ ID NO: 187 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 189, an L-CDR2 comprising SEQ ID NO: 190, and an L-CDR3 comprising SEQ ID NO:191.

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

- xiii) a variable heavy chain domain comprising SEQ ID NO: 32 and a variable light chain domain comprising SEQ ID NO: 36; or

- xiv) a variable heavy chain domain comprising SEQ ID NO: 42 and a variable light chain domain comprising SEQ ID NO: 46; or
 - xv) a variable heavy chain domain comprising SEQ ID NO: 54 and a variable light chain domain comprising SEQ ID NO: 58; or
 - 5 xvi) a variable heavy chain domain comprising SEQ ID NO: 64 and a variable light chain domain comprising SEQ ID NO: 68; or
 - xvii) a variable heavy chain domain comprising SEQ ID NO: 82 and a variable light chain domain comprising SEQ ID NO: 86; or
 - 10 xviii) a variable heavy chain domain comprising SEQ ID NO: 106 and a variable light chain domain comprising SEQ ID NO: 110; or
 - xix) a variable heavy chain domain comprising SEQ ID NO: 120 and a variable light chain domain comprising SEQ ID NO: 124; or
 - xx) a variable heavy chain domain comprising SEQ ID NO: 136 and a variable light chain domain comprising SEQ ID NO: 140; or
 - 15 xxi) a variable heavy chain domain comprising SEQ ID NO: 148 and a variable light chain domain comprising SEQ ID NO: 152; or
 - xxii) a variable heavy chain domain comprising SEQ ID NO: 160 and a variable light chain domain comprising SEQ ID NO: 164; or
 - 20 xxiii) a variable heavy chain domain comprising SEQ ID NO: 172 and a variable light chain domain comprising SEQ ID NO: 176; or
 - xxiv) a variable heavy chain domain comprising SEQ ID NO: 184 and a variable light chain domain comprising SEQ ID NO: 188.
3. The isolated antibody according to claim 1 or 2, which is an IgG antibody, in particular an IgG1 or an IgG4 antibody.
- 25 4. The isolated antibody according to any one of claims 1-3 comprising
- xxv) a heavy chain comprising SEQ ID NO: 40 and a light chain comprising SEQ ID NO: 41; or
 - xxvi) a heavy chain comprising SEQ ID NO: 90 and a light chain comprising SEQ ID

NO: 91; or

xxvii) a heavy chain comprising SEQ ID NO: 92 and a light chain comprising SEQ ID NO: 33; or

xxviii) a heavy chain comprising SEQ ID NO: 116 and a light chain comprising SEQ ID NO: 117; or

xxix) a heavy chain comprising SEQ ID NO: 130 and a light chain comprising SEQ ID NO: 131; or

xxx) a heavy chain comprising SEQ ID NO: 146 and a light chain comprising SEQ ID NO: 147; or

xxxi) a heavy chain comprising SEQ ID NO: 158 and a light chain comprising SEQ ID NO: 159; or

xxxii) a heavy chain comprising SEQ ID NO: 170 and a light chain comprising SEQ ID NO: 171; or

xxxiii) a heavy chain comprising SEQ ID NO: 182 and a light chain comprising SEQ ID NO: 183; or

xxxiv) a heavy chain comprising SEQ ID NO: 192 and a light chain comprising SEQ ID NO: 193; or

xxxv) a heavy chain comprising SEQ ID NO: 194 and a light chain comprising SEQ ID NO: 195; or

xxxvi) a heavy chain comprising SEQ ID NO: 196 and a light chain comprising SEQ ID NO: 197.

5. An isolated antibody or antigen-binding fragment thereof capable of binding to IL-11 and inhibiting IL-11 mediated signaling, wherein said isolated antibody or antigen-binding fragment thereof is a bispecific antibody or antigen-binding fragment thereof capable of binding to two different IL-11 epitopes comprising

xxxvii) a first chain comprising a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 33, an H-CDR2 comprising SEQ ID NO: 34, and an H-CDR3 comprising SEQ ID NO: 35 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 37, an L-CDR2 comprising SEQ ID NO: 38, and an L-CDR3 comprising SEQ ID NO: 39 and

a second chain comprising a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 55, an H-CDR2 comprising SEQ ID NO: 56, and an H-CDR3 comprising SEQ ID NO: 57 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 59, an L-CDR2 comprising SEQ ID NO: 60, and an L-CDR3 comprising SEQ ID NO: 61; or

xxxviii) a first chain comprising a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 121, an H-CDR2 comprising SEQ ID NO: 122, and an H-CDR3 comprising SEQ ID NO: 123 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 125, an L-CDR2 comprising SEQ ID NO: 126, and an L-CDR3 comprising SEQ ID NO: 127 and

a second chain comprising a heavy chain antigen-binding region that comprises an H-CDR1 comprising SEQ ID NO: 107, an H-CDR2 comprising SEQ ID NO: 108, and an H-CDR3 comprising SEQ ID NO: 109 and a light chain antigen-binding region that comprises an L-CDR1 comprising SEQ ID NO: 111, an L-CDR2 comprising SEQ ID NO: 112, and an L-CDR3 comprising SEQ ID NO: 113.

6. The isolated bispecific antibody or antigen-binding fragment thereof according to claim 5 comprising

xxxix) a first chain comprising a variable heavy chain domain comprising SEQ ID NO: 32 and a variable light chain domain comprising SEQ ID NO: 36 and a second chain comprising a variable heavy chain domain comprising SEQ ID NO: 54 and a variable light chain domain comprising SEQ ID NO: 58; or

xl) a first chain comprising a variable heavy chain domain comprising SEQ ID NO: 120 and a variable light chain domain comprising SEQ ID NO: 124 and a second chain comprising a variable heavy chain domain comprising SEQ ID NO: 106 and a variable light chain domain comprising SEQ ID NO: 110.

7. The isolated bispecific antibody according to claim 5 or 6 comprising

xli) a first chain comprising SEQ ID NO: 74 and a second chain comprising SEQ ID NO: 75; or

xlii) a first chain comprising SEQ ID NO: 132 and a second chain comprising SEQ ID NO: 133.

8. The antigen-binding fragment according to any one of claims 1, 2, 5, or 6, which is an scFv, Fab, Fab' fragment or a F(ab')₂ fragment.
9. The isolated antibody or antigen-binding fragment according to any one of claims 1-8, which is a monoclonal antibody or antigen-binding fragment.
- 5 10. The isolated antibody or antigen-binding fragment according to any one of claims 1-9, which is a human, humanized or chimeric antibody or antigen-binding fragment.
11. An antibody conjugate, comprising the isolated antibody or antigen binding fragment according to any one of claims 1 - 10.
- 10 12. An isolated nucleic acid sequence that encodes the antibody or antigen-binding fragment according to any one of claims 1 to 10.
13. A vector comprising a nucleic acid sequence according to claim 12.
14. An isolated cell expressing the antibody or antigen-binding fragment according to any one of claims 1 to 10 and/or comprising the nucleic acid according to claim 12 or the vector according to claim 13.
- 15 15. The isolated cell according to claim 14, wherein said cell is a prokaryotic or a eukaryotic cell.
16. A method of producing the isolated antibody or antigen-binding fragment according to any one of claims 1 to 10 comprising culturing of the cell according to any one of claims 14 or 15 and optionally purification of the antibody or antigen-binding fragment.
- 20 17. A pharmaceutical composition comprising the isolated antibody or antigen-binding fragment according to any one of claims 1 to 10 or the antibody conjugate according to claim 11 and optionally one or more pharmaceutically acceptable excipients.
18. An isolated antibody or antigen-binding fragment according to any one of claims 1 to 10 or the conjugate according to claim 11 or the pharmaceutical composition according to claim 17 for use in the treatment or prophylaxis of a disease.
- 25 19. An isolated antibody or antigen-binding fragment according to any one of claims 1 to 10 or the conjugate according to claim 11 or the pharmaceutical composition according to claim 17 for use in the for treatment or prevention of abnormal uterine bleeding (AUB), dysmenorrhea, leiomyoma, or endometriosis.
20. A kit comprising the isolated antibody or antigen-binding fragment according to any one of

claims 1 to 10 or the conjugate according to claim 11 or the pharmaceutical composition according to claim 17 and instructions for use.