from common general knowledge. Likewise, the single antibodies themselves did not have these problems, suggesting that the local environment around these areas differed in the context of bispecific antibodies. Thus, pharmacological intervention with a bispecific antibody that neutralizes both BAFF and IL-17 is needed.

The present ~~invention~~disclosure provides a bispecific antibody comprising two first polypeptides and two second polypeptides. In one aspect, there is provided a bispecific antibody comprising two first polypeptides and two second polypeptides wherein the amino acid sequence of the first polypeptide is SEQ ID NO:1 and the amino acid sequence of the second polypeptide is SEQ ID NO:2.

The present ~~invention~~disclosure also provides a DNA molecule comprising a polynucleotide sequence encoding the first polypeptide.

The present ~~invention~~disclosure also provides a DNA molecule comprising a polynucleotide sequence encoding the second polypeptide.

The present ~~invention~~disclosure also provides a DNA molecule comprising a polynucleotide sequence encoding the first polypeptide and the second polypeptide. In another aspect, there is provided a DNA molecule comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:1 and comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:2.

The present ~~invention~~disclosure also provides a mammalian cell transformed with DNA molecule(s) which cell is capable of expressing a bispecific antibody comprising the first polypeptide and the second polypeptide. In another aspect, there is provided a mammalian cell comprising a DNA molecule comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:1 and a DNA molecule comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:2, which cell is capable of expressing a bispecific antibody comprising a first polypeptide having an amino acid sequence of SEQ ID NO:1 and a second polypeptide having an amino acid sequence of SEQ ID NO:2.

In another aspect, there is provided a mammalian cell transformed with the DNA molecule as defined above, which cell is capable of expressing a bispecific antibody comprising a first polypeptide whose amino acid sequence is SEQ ID NO:1 and a second polypeptide whose amino acid sequence is SEQ ID NO:2.

The present ~~invention~~disclosure also provides a process for producing a bispecific antibody comprising the first polypeptide and the second polypeptide, comprising

cultivating the mammalian cell under conditions such that the bispecific antibody is expressed. In another aspect, there is provided a process for producing a bispecific antibody comprising a first polypeptide whose amino acid sequence is SEQ ID NO:1 and a second polypeptide whose amino acid sequence is SEQ ID NO:2, comprising cultivating the mammalian cell as defined above under conditions such that the bispecific antibody is expressed, and recovering the expressed bispecific antibody.

In another aspect, ~~The present invention also~~there is provide~~ds~~ a bispecific antibody produced by ~~said~~the process as defined above.

The present ~~invention~~disclosure also provides a method of treating Systemic Lupus Erythematosus, Lupus Nephritis, Rheumatoid Arthritis, Psoriasis, Ankylosing Spondylitis, Psoriatic Arthritis, primary Sjögren's syndrome, or Mulitple Myeloma comprising administering to a patient in need thereof an effective amount of a bispecific antibody.

In another aspect, ~~The present invention also~~there is provide~~ds~~ a bispecific antibody as defined above for use in therapy.

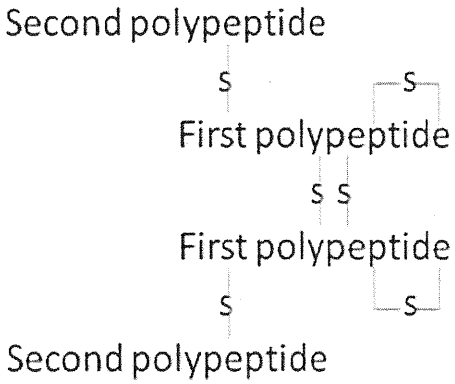
In another aspect, ~~The present invention also~~there is provide~~ds~~ a bispecific antibody as defined above for use in the treatment of Systemic Lupus Erythematosus, Lupus Nephritis, Rheumatoid Arthritis, Psoriasis, Ankylosing Spondylitis, Psoriatic Arthritis, primary Sjögren's syndrome, or Multiple Myeloma.

In another aspect, ~~The present invention also~~there is provideds a pharmaceutical composition comprising ~~the~~a bispecific antibody as defined above and one or more pharmaceutically acceptable carriers, diluents or excipients.

Human IL-17 is understood to mean a homodimeric protein comprising two human IL-17A proteins. A human IL-17A/F heterodimer is a human IL-17A protein and a human IL-17F protein.

A bispecific antibody is understood to mean an immunoglobulin molecule comprising four antigen binding sites, which binds two different antigens with specificity for each antigen in the MAb-scFV format. The bispecific antibody is capable of binding each antigen alone or each antigen simultaneously.

The bispecific antibody of the present ~~invention~~disclosure comprises two first polypeptides and two second polypeptides. Each of the first polypeptides forms an inter-chain disulfide bond with each of the second polypeptides, and the first polypeptide forms two inter-chain disulfide bonds with the other first polypeptide, and each of the first polypeptides forms several intra-chain disulfide bonds. The relationship of the polypeptides and the disulfide bonds are shown in the following schematic:



The amino acid sequence of the first polypeptide is:

QVQLQQWGAG LLKPSETLSL TCAVYGGSFS GYYWSWIRQP PGKGLEWIGE 50
INHSGSTNYN PSLKSRVTIS VDTSKNQFSL KLSSVTAADT AVYYCARGYY 100
DILTGYYYYF DYWGQGTLVT VSSASTKGPS VFPLAPCSRS TSESTAALGC 150
LVKDYFPEPV TVSWNSGALT SGVHTFPAVL QSSGLYSLSS VVTVPSSSLG 200
TKTYTCNVDH KPSNTKVDKR VESKYGPPCP PCPAPEFLGG PSVFLFPPKP 250
KDTLMISRTP EVTCVVVDVS QEDPEVQFNW YVDGVEVHNA KTKPREEQFN 300
STYRVVSVLT VLHQDWLNGK EYKCKVSNKG LPSSIEKTIS KAKGQPREPQ 350

We Claim:

1. A bispecific antibody comprising two first polypeptides and two second polypeptides wherein the amino acid sequence of the first polypeptide is SEQ ID NO:1 and the amino acid sequence of the second polypeptide is SEQ ID NO:2.

2. The bispecific antibody of Claim 1, wherein the intra-chain disulfide bond between cysteine residue 507 of SEQ ID NO: 1 and cysteine residue 707 of SEQ ID NO: 1.

3. A DNA molecule comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:1 and comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:2.

4. A mammalian cell comprising a DNA molecule comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:1 and a DNA molecule comprising a polynucleotide sequence encoding a polypeptide having the amino acid sequence of SEQ ID NO:2, which cell is capable of expressing a bispecific antibody comprising a first polypeptide having an amino acid sequence of SEQ ID NO:1 and a second polypeptide having an amino acid sequence of SEQ ID NO:2.

5. A mammalian cell transformed with the DNA molecule of Claim 3 , which cell is capable of expressing a bispecific antibody comprising a first polypeptide whose amino acid sequence is SEQ ID NO:1 and a second polypeptide whose amino acid sequence is SEQ ID NO:2.

6. The mammalian cell of Claims 4 and 5 , wherein the mammalian cell is CHO.

7. A process for producing a bispecific antibody comprising a first polypeptide whose amino acid sequence is SEQ ID NO:1 and a second polypeptide whose amino acid sequence is SEQ ID NO:2, comprising cultivating the mammalian cell of Claim 4 or the mammalian cell of Claim 5 under conditions such that the bispecific antibody is expressed, and recovering the expressed bispecific antibody.

8. A bispecific antibody produced by the process of Claim 7.

~~9. A method of treating Systemic Lupus Erythematosus, Lupus Nephritis, Rheumatoid Arthritis, Psoriasis, Ankylosing Spondylitis, Psoriatic Arthritis, primary Sjögren's syndrome, or Multiple Myeloma comprising administering to a patient in need thereof an effective amount of a bispecific antibody of Claims 1 or 8.~~

~~10~~9. A bispecific antibody of Claims 1 or 8 for use in therapy.

~~11~~10. A bispecific antibody of Claims 1 or 8 for use in the treatment Systemic Lupus Erythematosus, Lupus Nephritis, Rheumatoid Arthritis, Psoriasis, Ankylosing Spondylitis, Psoriatic Arthritis, primary Sjögren's syndrome, or Multiple Myeloma.

~~12~~11. A pharmaceutical composition comprising a bispecific antibody of Claims 1 or 8 and one or more pharmaceutically acceptable carriers, diluents or excipients.