CLAIMS

1. A bispecific antibody comprising (i) a first binding arm comprising a first antigen-binding region which binds to human CD3ϵ (epsilon), wherein said first antigen-binding region comprises the VH sequence set forth in SEQ ID NO:6, and the VL sequence set forth in SEQ ID NO:10, and (ii) a second binding arm comprising a second antigen-binding region which binds to human CD20.

2. The bispecific antibody according to claim 1, wherein the second antigen-binding region which binds to human CD20 comprises:

(i) the VH CDR1 region of SEQ ID NO:32, the VH CDR2 region of SEQ ID NO:33, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:35, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:36,

(ii) the VH CDR1 region of SEQ ID NO:38, the VH CDR2 region of SEQ ID NO:39, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:35, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:36,

(iii) the VH CDR1 region of SEQ ID NO:42, the VH CDR2 region of SEQ ID NO:43, the VH CDR3 region of SEQ ID NO:44, the VL CDR1 region of SEQ ID NO:45, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:46,

(iv) the VH CDR1 region of SEQ ID NO:49, the VH CDR2 region of SEQ ID NO:50, the VH CDR3 region of SEQ ID NO:51, the VL CDR1 region of SEQ ID NO:52, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:53,

(v) the VH CDR1 region of SEQ ID NO:32, the VH CDR2 region of SEQ ID NO:33, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:45, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:46,

(vi) the VH CDR1 region of SEQ ID NO:32, the VH CDR2 region of SEQ ID NO:33, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:52, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:53,

(vii) the VH CDR1 region of SEQ ID NO:38, the VH CDR2 region of SEQ ID NO:39, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:45, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:46,

(viii) the VH CDR1 region of SEQ ID NO:38, the VH CDR2 region of SEQ ID NO:39, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:52, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:53,

(ix) the VH CDR1 region of SEQ ID NO:42, the VH CDR2 region of SEQ ID NO:43, the VH CDR3 region of SEQ ID NO:44, the VL CDR1 region of SEQ ID NO:35, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:36,

(x) the VH CDR1 region of SEQ ID NO:42, the VH CDR2 region of SEQ ID NO:43, the VH CDR3 region of SEQ ID NO:44, the VL CDR1 region of SEQ ID NO:52, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:53,

(xi) the VH CDR1 region of SEQ ID NO:49, the VH CDR2 region of SEQ ID NO:50, the VH CDR3 region of SEQ ID NO:51, the VL CDR1 region of SEQ ID NO:35, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:36, or

(xii) the VH CDR1 region of SEQ ID NO:49, the VH CDR2 region of SEQ ID NO:50, the VH CDR3 region of SEQ ID NO:51, the VL CDR1 region of SEQ ID NO:45, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:46.

3. The bispecific antibody according to claim 1, wherein the second antigen-binding region which binds to human CD20 comprises:

(i) the VH sequence of SEQ ID NO:27, and the VL sequence of SEQ ID NO:28,

(ii) the VH sequence of SEQ ID NO:37, and the VL sequence of SEQ ID NO:28,

(iii) the VH sequence of SEQ ID NO:40, and the VL sequence of SEQ ID NO:41,

(iv) the VH sequence of SEQ ID NO:47, and the VL sequence of SEQ ID NO:48,

(v) the VH sequence of SEQ ID NO:27, and the VL sequence of SEQ ID NO:41,

(vi) the VH sequence of SEQ ID NO:27, and the VL sequence of SEQ ID NO:48,
(vii) the VH sequence of SEQ ID NO:37, and the VL sequence of SEQ ID NO:41,
(viii) the VH sequence of SEQ ID NO:37, and the VL sequence of SEQ ID NO:48,
(ix) the VH sequence of SEQ ID NO:40, and the VL sequence of SEQ ID NO:28,
(x) the VH sequence of SEQ ID NO:40, and the VL sequence of SEQ ID NO:48,
(xi) the VH sequence of SEQ ID NO:47, and the VL sequence of SEQ ID NO:28, or
(xii) the VH sequence of SEQ ID NO:47, and the VL sequence of SEQ ID NO:41.

4. A bispecific antibody comprising (a) a first binding arm comprising a first antigen-binding region which binds to human CD3ϵ (epsilon), wherein the first antigen-binding region comprises the VH sequence set forth in SEQ ID NO:6, and a VL sequence set forth in SEQ ID NO:10, and (b) a second binding arm comprising a second antigen-binding region which binds to human CD20, wherein the second antigen-binding region comprises the VH sequence set forth in SEQ ID NO:27, and the VL sequence set forth in SEQ ID NO:28.

5. The bispecific antibody according to claim 4, wherein the bispecific antibody comprises a first and second constant heavy chain (HC) and a first and second constant light chain (LC), wherein each of said first and second heavy chain comprises at least a hinge region, a CH2 and CH3 region, wherein in said first heavy chain at least one of the amino acids in the positions corresponding to a positions selected from the group consisting of T366, L368, K370, D399, F405, Y407, and K409 in a human IgG1 heavy chain has been substituted, and in said second heavy chain at least one of the amino acids in the positions corresponding to a position selected from the group consisting of T366, L368, K370, D399, F405, Y407, and K409 in a human IgG1 heavy chain has been substituted, and wherein said first and said second heavy chains are not substituted in the same positions.

6. The bispecific antibody according to claim 4, wherein (i) the amino acid in the position corresponding to F405 in a human IgG1 heavy chain is L in said first heavy chain, and the amino acid in the position corresponding to K409 in a human IgG1 heavy chain is R in said second heavy chain, or (ii) the amino acid in the position corresponding to K409 in a human IgG1 heavy chain is R in said first heavy chain, and the amino acid in the position corresponding to F405 in a human IgG1 heavy chain is L in said second heavy chain.

7. The bispecific antibody according to claim 4, wherein the bispecific antibody comprises a first constant heavy chain (HC) and a first constant light chain (LC), wherein the positions corresponding to positions L234, L235, and D265 in the human IgG1 heavy chain of SEQ ID NO:15 of both the first heavy chain and the second heavy chain are F, E, and A, respectively.

8. The bispecific antibody according to claim 4, wherein the bispecific antibody comprises a first and second constant heavy chain (HC) and a first and second constant light chain (LC), wherein the positions corresponding to positions L234, L235, and D265 in the human IgG1 heavy chain of SEQ ID NO:15 of both the first constant heavy chain and the second constant heavy chain are F, E, and A, respectively, and wherein the position corresponding to F405 in the human IgG1 heavy chain of SEQ ID NO:15 of the first constant heavy chain is L, and the position corresponding to K409 in the human IgG1 heavy chain of SEQ ID NO:15 of the second constant heavy chain is R.

9. A composition comprising a bispecific antibody according to claim 1, and a carrier.

10. A kit for detecting cross-linking between CD3- and CD20-expressing cells, in a sample derived from a patient comprising:

i) the bispecific antibody according to claim 1; and

ii) instructions for use of said kit.

11. A composition comprising a bispecific antibody according to claim 4 and a carrier.

12. A bispecific antibody comprising (i) a first binding arm comprising a first antigen-binding region which binds to human CD3ϵ (epsilon), wherein said first antigen-binding region comprises the VH sequence set forth in SEQ ID NO:6 and the VL sequence set forth in SEQ ID NO:10, and (ii) a second binding arm comprising a second antigen-binding region which binds to human CD20, wherein the second antigen-binding region which binds to human CD20 comprises the VH CDR1 region of SEQ ID NO:32, the VH CDR2 region of SEQ ID NO:33, the VH CDR3 region of SEQ ID NO:34, the VL CDR1 region of SEQ ID NO:35, the VL CDR2 region of DAS, and the VL CDR3 region of SEQ ID NO:36.

13. The composition according to claim 9 or 11 for use as a medicament.

14. Use of the composition according to claim 9 or 11 in the manufacture of a medicament for the treatment of cancer, wherein the medicament is to be administered to a subject in need thereof.

15. The bispecific antibody according to any one of claims 1 to 8 or claim 12 for use as a medicament.

16. Use of the bispecific antibody according to any one of claims 1 to 8 or claim 12 in the manufacture of a medicament for the treatment of cancer, wherein the medicament is to be administered to a subject in need thereof.

17. The use according to claims 14 or 16, wherein the cancer is B cell malignancies.

18. The use according to claims 14 or 16, wherein the cancer is NHL or B cell leukemia.