Patent Claims

1. A bispecific antibody for binding human CD20 and human transferrin receptor comprising

   a) one antibody comprising two pairs each of an antibody light chain and an antibody heavy chain, wherein the binding sites formed by each of the pairs of the heavy chain and the light chain specifically bind to a first antigen, and

   b) one additional Fab fragment, wherein the binding site of the additional Fab fragment specifically binds to a second antigen,

   said bispecific antibody comprising

   - SEQ ID NO: 06 to 09, or

   - SEQ ID NO: 11 to 13 and SEQ ID NO: 22, or

   - SEQ ID NO: 14 to 17.

2. The antibody according to claim 1, wherein

   a) the heavy chain that is fused to the additional Fab fragments has as C-terminal heavy chain amino acid residues the tripeptide LSP wherein the proline thereof is directly fused to the first amino acid residue of the additional Fab fragment or of the peptidic linker via a peptide bond, and

   b) the heavy chain that is not fused to the additional Fab fragments has as C-terminal heavy chain amino acid residues the tripeptide LSP, or SPG, or PGK.

3. The antibody according to claim 1, wherein the antibody is monoclonal.

4. A pharmaceutical formulation for binding human CD20 and human transferrin receptor comprising the antibody according to any one of claims 1 to 3 and a pharmaceutically acceptable carrier.

5. The antibody according to any one of claims 1 to 3 for use as a medicament.

6. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of a proliferative disease.

7. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of a B-cell proliferative disease.

8. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of a B-cell lymphoma.

9. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of a primary central nervous system lymphoma.

10. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of a tumor.

11. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of human carcinoma.

12. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of an autoimmune disease.

13. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of an autoimmune disease selected from the group consisting of inflammatory responses such as inflammatory skin diseases including psoriasis and dermatitis (e.g. atopic dermatitis); systemic scleroderma and sclerosis; responses associated with inflammatory bowel disease (such as Crohn's disease and ulcerative colitis); respiratory distress syndrome (including adult respiratory distress syndrome; ARDS); dermatitis; meningitis; encephalitis; uveitis; colitis; glomerulonephritis; allergic conditions such as eczema and asthma and other conditions involving infiltration of T-cells and chronic inflammatory responses; atherosclerosis; leukocyte adhesion deficiency; rheumatoid arthritis; systemic lupus erythematosus (SLE); diabetes mellitus (e.g. Type I diabetes mellitus or insulin dependent diabetes mellitus); multiple sclerosis; Reynaud's syndrome; autoimmune thyroiditis; allergic encephalomyelitis; Sjogren's syndrome; juvenile onset diabetes; and immune responses associated with acute and delayed hypersensitivity mediated by cytokines and T-lymphocytes typically found in tuberculosis, sarcoidosis, polymyositis, granulomatosis and

vasculitis; pernicious anemia (Addison's disease); diseases involving leukocyte diapedesis; central nervous system (CNS) inflammatory disorder; multiple organ injury syndrome; hemolytic anemia (including, but not limited to cryoglobinemia or Coombs positive anemia); myasthenia gravis; antigen-antibody complex mediated diseases; anti-glomerular basement membrane disease; anti-phospholipid syndrome; allergic neuritis; Graves' disease; Lambert-Eaton myasthenic syndrome; pemphigoid bullous; pemphigus; autoimmune polyendocrinopathies; Reiter's disease; stiff-man syndrome; Bechet disease; giant cell arteritis; immune complex nephritis; IgA nephropathy; IgM polyneuropathies; immune thrombocytopenic purpura (ITP) or autoimmune thrombocytopenia.

14. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of multiple sclerosis.

15. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the treatment of secondary progressive multiple sclerosis.

16. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the depletion of tumor cells expressing CD20.

17. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the depletion of tumor cells expressing CD20 in the brain.

18. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the depletion of circulating B-cells expressing CD20.

19. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the depletion of circulating B-cells expressing CD20 in the brain.

20. Use of the antibody according to any one of claims 1 to 3 in the manufacture of a medicament for the depletion of brain sequestered B-cells expressing CD20.