PATENT CLAIMS

1. An antibody fusion protein comprising a first and a second heavy chain domain each domain comprising at least a portion of an immunoglobulin constant region, wherein at least one of said first or second heavy chain domain is fused to a biologically active molecule, and only one of said first or second heavy chain domain comprises a mutation of the amino acid sequence within the constant region, wherein the mutation results in a partial or complete loss of binding FcRn.

2. An antibody fusion protein of claim 1, wherein the mutation is a substitution of an amino acid residue at one or more of the positions 386, 388, 400, 415, 433, 435, 436, 439 and 447.

3. An antibody fusion protein of claim 2, wherein the mutation is at least a substitution of H435.

4. An antibody fusion protein of claim 2, wherein the mutation is H435A.

5. An antibody fusion protein according to any of the claims 1 – 4, wherein the biologically active molecule is linked to the amino-terminus of the immunoglobulin constant region.

6. An antibody fusion protein according to any of the claims 1 – 4, wherein the biologically active molecule is linked to the carboxy-terminus of the immunoglobulin constant region.

7. An antibody fusion protein according to any of the claims 1 – 6, wherein the first and the second heavy chain domain comprises a biologically active molecule.

8. An antibody fusion protein according to any of the claims 1 – 7, wherein the first and the second heavy chain domain are CH2 and CH3 domains including a hinge region and constitute a Fc fragment.

9. An antibody fusion protein according to any of the claims 1 – 8, wherein the first and / or the second heavy chain domain includes an antibody variable domain thus forming a full antibody.

10. An antibody fusion protein according to any of the claims 1 – 9, wherein the immunoglobulin is IgG.

11. An antibody fusion protein according to claim 10, wherein the IgG is IgG1, IgG2 or IgG4.

12. A heterodimeric antibody fusion protein according to any of the claims 1 – 4, wherein

(i) the first and the second heavy chain domain are CH2 and CH3 domains of IgG including a hinge region and constitute a Fc fragment;

(ii) the first heavy chain domain is fused via its C-terminal to a biologically active molecule; and

(iii) the second heavy chain domain is not fused to a biologically active molecule.

13. An antibody fusion protein of claim 12, wherein the mutation leading to loss or reduction of FcRn binding is located in the heavy chain domain which is not fused to the biologically active molecule.

14. An antibody fusion protein of claim 12, wherein the mutation leading to loss or reduction of FcRn binding is located in the heavy chain domain which is fused to the biologically active molecule.

15. An antibody fusion protein according to any of the claims 1 – 14, wherein the biologically active molecule is selected from the group consisting of a cytokine, a growth factor, a growth hormone and a therapeutically effective polypeptide.

16. An antibody fusion protein of claim 15, wherein the biologically active molecule is a human interferon or human erythropoietin.

17. An antibody fusion protein of claim 16, wherein the human interferon is interferon-β (IFNß).

18. An antibody fusion protein of claim 15, wherein the amino acid sequence of human IFNß is altered.

19. An antibody fusion protein of claim 18, wherein the IFNß sequence comprises an amino acid substitution at one or more of the positions 17, 50, 57, 130, 131, 136, and 140 corresponding to native mature human IFNß.

20. The protein of claim 19, wherein the amino acid substitution is selected from the group consisting of C17S, C17A, C17V, C17M, F50H, L57A, L130A, H131A, K136A, H140A, and H140T.

Patent Claims:

1. An antibody fusion protein comprising a first and a second heavy chain domain, each comprising a -CH2 - CH3 domain of an IgG immunoglobulin including a hinge region, thus constituting with each other a Fc fragment, wherein

(i) the first heavy chain domain is fused via its C-terminal to human interferon and
(ii) the second heavy chain domain is not fused to a biologically active molecule, and

comprises a H435 mutation of the amino acid sequence within said heavy chain constant region, wherein this mutation results in a partial or complete loss of binding FcRn.

2. An antibody fusion protein of claim 1, wherein the IgG immunoglobulin is IgG2 or IgG4.

3. The antibody fusion protein of claim 2, wherein the hinge region is presented by an IgG1 hinge region.

4. An antibody fusion protein of any of the claims 1 - 3, wherein the mutation in said heavy chain constant region is H435A.

5. An antibody fusion protein of any of the claims 1 - 4, wherein the interferon is human Interferon-ß (IFNß).

6. An antibody fusion protein of claim 5, wherein the amino acid sequence of human IFNß is altered by amino acid substitutions, wherein these substitutions are selected from the group consisting of C17S, C17A, C17V, C17M, F50H, L57A, L130A, H131A, K136A, H140A, and H140T.

7. An antibody fusion protein of claim 3, wherein the amino acid sequence of the heavy chain domain fused to human IFNß is designated as huFcy4-L-DI- IFNß and specified by SEQ ID NO:5 without the signal peptide sequence at the N-terminal.

8. A nucleic acid molecule encoding an antibody fusion protein of any of the claims 1 - 7.

9. A pharmaceutical composition suitable for the treatment of cancer, viral infections, anemia or multiple sclerosis comprising the antibody fusion protein of any of the claims 1 or 7 and a pharmaceutically acceptable carrier, excipient or diluents.

10. Use of an antibody fusion protein of any of the claims 1 - 7 for the manufacture of a medicament for the treatment of cancer, viral infections, anemia, or multiple sclerosis.