

- 43 -

WHAT IS CLAIMED IS:

1. A humanized antibody specifically recognizing platelet glycoprotein I(b) α (GPIb α), wherein the humanized antibody lacks a Fc moiety and:
 - is capable of preventing platelet activation, aggregation, and/or thrombus growth;
 - lacks the ability to activate platelets;
 - lacks the ability to induce thrombocytopenia; and/or
 - at a therapeutic dose, lacks the ability to prolong bleeding time.
2. The humanized antibody of claim 1 being capable of recognizing a human GPIb α , a mouse GPIb α , a dog GPIb α , a rat GPIb α , a rabbit GPIb α and/or a monkey GPIb α .
3. The humanized antibody of claim 1 or 2 being an antibody fragment.
4. The humanized antibody of claim 3 being a F(ab)₂ fragment.
5. The humanized antibody of claim 3, wherein the antibody is a monovalent antibody.
6. The humanized antibody of claim 5 being is a Fab antibody fragment.
7. The humanized antibody of claim 5 being a single chain variable fragment (scFv).
8. The humanized antibody of any one of claims 1 to 7 having a heavy chain.
9. The humanized antibody of claim 8, wherein the heavy chain comprises:
 - a first CDR having an amino acid sequence of GFTFSSFAMS (SEQ ID NO: 37), a variant thereof or a fragment thereof;
 - a second CDR having an amino acid sequence of SITSAGTPYYPDSVLG (SEQ ID NO: 38), a variant thereof or a fragment thereof; and/or
 - a third CDR having an amino acid sequence of SRGYEDYFDY (SEQ ID NO: 39), a variant thereof or a fragment thereof.
10. The humanized antibody of claim 8 or 9, wherein the heavy chain further comprises a CH1 region of a human IgG₁ antibody.
11. The humanized antibody of claim 10, wherein the CH1 region of the human IgG₁ antibody has the amino acid sequence of SEQ ID NO: 40, 47, 54 or 61, a variant thereof or a fragment thereof.
12. The humanized antibody of claim 11, wherein the heavy chain has the amino acid sequence of SEQ ID NO: 36, 43, 50 or 57, a variant thereof or a fragment thereof.

- 44 -

13. The humanized antibody of any one of claims 1 to 12 having a light chain.
14. The humanized antibody of claim 13, wherein the light chain comprises:
- a first CDR having an amino acid sequence of KSSQSLLNSRNQKNYLA (SEQ ID NO: 65), a variant thereof or a fragment thereof;
 - 5 – a second CDR having an amino acid sequence of FTSTRES (SEQ ID NO: 66), a variant thereof or a fragment thereof; and/or
 - a third CDR having an amino acid sequence of QQHYSSPWT (SEQ ID NO: 67), a variant thereof or a fragment thereof.
15. The humanized antibody of claim 13 or 14, wherein the light chain further comprises
10 a kappa chain C region of a human IgG₁ antibody.
16. The humanized antibody of claim 15, wherein the kappa chain C region has the amino acid sequence of SEQ ID NO: 68, 75, 82, or 89, a variant thereof or a fragment thereof.
17. The humanized antibody of claim 16, wherein the light chain has the amino acid
15 sequence of SEQ ID NO: 64, 71, 78 or 85, a variant thereof or a fragment thereof.
18. The humanized antibody of any one of claims 1 to 17 having:
- the heavy chain of SEQ ID NO: 36, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 64, a variant thereof or a fragment thereof;
 - the heavy chain of SEQ ID NO: 36, a variant thereof or a fragment thereof and
20 the light chain of SEQ ID NO: 71, a variant thereof or a fragment thereof;
 - the heavy chain of SEQ ID NO: 36, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 78, a variant thereof or a fragment thereof;
 - the heavy chain of SEQ ID NO: 36, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 85, a variant thereof or a fragment thereof;
 - 25 – the heavy chain of SEQ ID NO: 43, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 64, a variant thereof or a fragment thereof;
 - the heavy chain of SEQ ID NO: 43, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 71, a variant thereof or a fragment thereof;
 - the heavy chain of SEQ ID NO: 43, a variant thereof or a fragment thereof and
30 the light chain of SEQ ID NO: 78, a variant thereof or a fragment thereof;

- 45 -

- the heavy chain of SEQ ID NO: 43, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 85, a variant thereof or a fragment thereof;
- the heavy chain of SEQ ID NO: 50, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 64, a variant thereof or a fragment thereof;
- 5 – the heavy chain of SEQ ID NO: 50, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 71, a variant thereof or a fragment thereof;
- the heavy chain of SEQ ID NO: 50, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 78, a variant thereof or a fragment thereof;
- 10 – the heavy chain of SEQ ID NO: 50, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 85, a variant thereof or a fragment thereof;
- the heavy chain of SEQ ID NO: 57, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 64, a variant thereof or a fragment thereof;
- the heavy chain of SEQ ID NO: 57, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 71, a variant thereof or a fragment thereof;
- 15 – the heavy chain of SEQ ID NO: 57, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 78, a variant thereof or a fragment thereof; or
- the heavy chain of SEQ ID NO: 57, a variant thereof or a fragment thereof and the light chain of SEQ ID NO: 85, a variant thereof or a fragment thereof.
- 19. A chimeric protein comprising the humanized antibody of any one of claims 1 to 18
- 20 and a carrier protein.
- 20. A pharmaceutical composition comprising (i) the humanized antibody of any one of claims 1 to 18 or the chimeric protein of claim 19 and (ii) a pharmaceutical excipient.
- 21. A method of preventing or limiting the interaction between glycoprotein I(b)α (GPIbα) present on a platelet and a GPIbα ligand, the method comprising contacting the
- 25 humanized antibody of any one of claims 1 to 18, the chimeric protein of claim 19 or the pharmaceutical composition of claim 20 with the platelet.
- 22. The method of claim 21 for preventing or limiting platelet activation.
- 23. The method of claim 21 or 22, wherein the GPIbα ligand is von Willebrand factor (VWF) and/or thrombin.
- 30 24. The method of any one of claims 21 to 23, wherein the contacting occurs under low or high shear rates.

- 46 -

25. The method of any one of claims 21 to 24, wherein the humanized antibody, the chimeric protein or the pharmaceutical composition is contacted with the platelet prior to, at the same time or after the GPIIb/IIIa ligand is contacted with the platelet.
26. The method of any one of claims 21 to 25 for preventing or limiting the interaction *in vivo* in a subject in need thereof.
27. The method of claim 26 for preventing the formation or the growth of a thrombus in the subject in need thereof.
28. The method of claim 26 for reducing the size of a thrombus or the number of thrombi in the subject in need thereof.
29. The method of any one of claims 26 to 28 further comprising determining the presence, the location and/or the size of the thrombus in the subject.
30. The method of any one of claims 26 to 28, wherein the subject is at risk of experiencing or has experienced a pathological thrombosis.
31. The method of any one of claims 26 to 28, wherein the subject is at risk of experiencing or has experienced an ischemic stroke, a thrombotic thrombocytopenic purpura, a myocardial infarct, an acute coronary syndrome, atherothrombosis, a peripheral vascular disease, deep vein thrombosis, sepsis, and/or a vascular inflammation.
32. The method of any one of claims 26 to 28 for reducing or limiting tumor metastasis in the subject in need thereof.
33. The method of claim 32 further comprising determining the presence, the location and/or the size of the tumor metastasis in the subject.