Claims:

1. An isolated anti-FXI and/or anti-FXIa antibody or fragment thereof that binds within the catalytic domain of FXI and/or FXIa.

2. An isolated antibody or fragment thereof that binds to one or more epitopes of anti-FXI and/or FXIa, wherein the epitope comprises two or more amino acid residues of Pro410, Arg413, Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Lys527, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

3. The isolated antibody or fragment of Claim 2, wherein the epitope comprises four or more amino acid residues of Pro410, Arg413, Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Lys527, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

4. The isolated antibody or fragment of Claim 2, wherein the epitope comprises six or more amino acid residues of Pro410, Arg413, Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Lys527, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

5. The isolated antibody or fragment of Claim 2, wherein the epitope comprises eight or more amino acid residues of Pro410, Arg413, Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Lys527, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

6. The isolated antibody or fragment of Claim 2, wherein the epitope comprises the residues of Pro410, Arg413, Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Lys527, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

7. The isolated antibody or fragment of Claim 2, wherein the epitope comprises amino acid residues of Pro410, Arg413, Lys527 and one or more amino acid residues of Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

8. The isolated antibody or fragment of Claim 2, wherein the epitope comprises amino acid residues of Pro410, Arg413, Lys527 and four or more amino acid residues of Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

9. The isolated antibody or fragment of Claim 2, wherein the epitope comprises amino acid residues of Pro410, Arg413, Lys527 and six or more amino acid residues of Leu415, Cys416, His431, Cys432, Tyr434, Gly435, Glu437, Tyr472, Lys473, Met474, Ala475, Glu476, Tyr521, Arg522, Lys523, Leu524, Arg525, Asp526, Arg548, His552, Ser575, Ser594, Trp595, Gly596, Glu597, Arg602, Glu603, and Arg604.

10. An isolated anti-FXI and/or anti-FXIa antibody or fragment thereof that binds within the catalytic domain of FXI and/or FXIa, wherein said antibody or fragment blocks FXI and/or FXIa binding to one or more of Factor IX, Factor XIIa, and thrombin.

11. The isolated antibody or fragment of Claim 10, wherein said antibody or fragment blocks FXI and/or FXIa binding to one or more of Factor IX, Factor XIIa, or thrombin, and other components of the coagulation pathway.

12. The isolated antibody or fragment of Claim 1, wherein said antibody or fragment blocks one or more of FIX, FXI, and FXIa binding to platelet receptors.

13. The isolated antibody or fragment of Claim 1, wherein said antibody or fragment prevents activation of the intrinsic or common coagulation pathways.

14. An isolated antibody or fragment thereof that binds to a human FXI and/or FXIa protein with a K_D of less than or equal to 34 nM, as measured by BIACORE™ assay, or less than or equal to 4 pM, as measured by solution equilibrium titration assay (SET).

15. The isolated antibody or fragment of Claim 1, wherein said antibody or fragment comprises at least one complementarity determining region having at least 90% identity to at least one of the CDRs recited in Table 1.

16. The isolated antibody or fragment of Claim 1, wherein said antibody or fragment comprises a CDR1, CDR2, and CDR3 from Table 1.

17. An isolated variant of the antibody or fragment of Claim 1, wherein said antibody or fragment comprises a CDR1, CDR2, and CDR3 from Table 1, and wherein the variant has at least one to four amino acid changes in one of CDR1, CDR2, or CDR3.

18. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain CDR3 selected from the group consisting of SEQ ID NO: 5 and 25.

19. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a VH selected from the group consisting of SEQ ID NO: 9 and 29 or an amino acid sequence with 90% identity thereof; and a VL selected from the group consisting of SEQ ID NO: 19 and 39 or an amino acid sequence with 90% identity thereof.

20. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a VH selected from the group consisting of SEQ ID NO: 9 and 29 or an amino acid sequence with 95% identity thereof; and a VL selected from the group consisting of SEQ ID NO: 19 and 39 or an amino acid sequence with 95% identity thereof.

21. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a VH selected from the group consisting of SEQ ID NO: 9 and 29 or an amino acid sequence with 97% identity thereof; and a VL selected from the group consisting of SEQ ID NO: 19 and 39 or an amino acid sequence with 97% identity thereof.

22. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a variable heavy chain sequence selected from the group consisting of SEQ ID NO: 9 and 29.

23. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a variable light chain sequence selected from the group consisting of SEQ ID NO: 19 and 39.

24. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a variable heavy chain selected from the group consisting of SEQ ID NO: 9 and 29; and variable light chain sequence selected from the group consisting of SEQ ID NO: 19 and 39.

25. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment selected from the group consisting of an antibody or fragment comprising a variable heavy chain of SEQ ID NO: 9 and a variable light chain sequence of SEQ ID NO: 19 and an antibody or fragment comprising a variable heavy chain of SEQ ID NO: 29 and a variable light chain sequence of SEQ ID NO: 39.

26. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 selected from the group consisting of SEQ ID NO: 46; CDR2 selected from the group consisting of SEQ ID NO: 4; CDR3 selected from the group consisting of 5; a light chain variable region CDR1 selected from the group consisting of SEQ ID NO: 33; CDR2 selected from the group consisting of SEQ ID NO: 14; and CDR3 selected from the group consisting of SEQ ID NO: 15.

27. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 selected from the group

consisting of SEQ ID NO: 3 and 23; CDR2 selected from the group consisting of SEQ ID NO: 4 and 24; CDR3 selected from the group consisting of 5 and 25; a light chain variable region CDR1 selected from the group consisting of SEQ ID NO: 13 and 33; CDR2 selected from the group consisting of SEQ ID NO: 14 and 34; and CDR3 selected from the group consisting of SEQ ID NO: 15 and 35.

28. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 selected from the group consisting of SEQ ID NO: 6 and 26; CDR2 selected from the group consisting of SEQ ID NO: 7 and 27; CDR3 selected from the group consisting of 8 and 28; a light chain variable region CDR1 selected from the group consisting of SEQ ID NO: 16 and 36; CDR2 selected from the group consisting of SEQ ID NO: 17 and 37; and CDR3 selected from the group consisting of SEQ ID NO: 18 and 38.

29. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 of SEQ ID NO: 3; a heavy chain variable region CDR2 of SEQ ID NO: 4; a heavy chain variable region CDR3 of SEQ ID NO: 5; a light chain variable region CDR1 of SEQ ID NO: 13; a light chain variable region CDR2 of SEQ ID NO: 14; and a light chain variable region CDR3 of SEQ ID NO: 15.

30. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 of SEQ ID NO: 23; a heavy chain variable region CDR2 of SEQ ID NO: 24; a heavy chain variable region CDR3 of SEQ ID NO: 25; a light chain variable region CDR1 of SEQ ID NO: 33; a light chain variable region CDR2 of SEQ ID NO: 34; and a light chain variable region CDR3 of SEQ ID NO: 35.

31. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 of SEQ ID NO: 6; a heavy chain variable region CDR2 of SEQ ID NO: 7; a heavy chain variable region CDR3 of SEQ ID NO: 8; a light chain variable region CDR1 of SEQ ID NO: 16; a light chain variable region CDR2 of SEQ ID NO: 17; and a light chain variable region CDR3 of SEQ ID NO: 18.

32. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment comprises a heavy chain variable region CDR1 of SEQ ID NO: 26; a heavy chain variable region CDR2 of SEQ ID NO: 27; a heavy chain variable region CDR3 of SEQ ID NO: 28; a light chain variable region CDR1 of SEQ ID NO: 36; a light chain variable region CDR2 of SEQ ID NO: 37; and a light chain variable region CDR3 of SEQ ID NO: 38.

33. A pharmaceutical composition comprising an antibody or fragment thereof of one of the above claims and a pharmaceutically acceptable carrier.

34. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment binds to the same epitope as an isolated antibody or fragment according to any previous claim.

35. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment competes for binding to a human FXI and/or FXIa protein with an isolated antibody or fragment according to any previous claim.

36. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment is selected from the group consisting of NOV1090 and NOV1401.

37. A method of treating a thromboembolic disorder comprising administering to a subject afflicted with a thromboembolic disorder an effective amount of a pharmaceutical composition comprising an antibody or fragment according to any previous claim.

38. The method of claim 37, wherein the subject is afflicted with one or more of ischemic stroke associated with atrial fibrillation and deep vein thrombosis.

39. The method of claim 37, wherein the subject is afflicted with ischemic stroke associated with atrial fibrillation.

40. A method of treating a thromboembolic disorder comprising administering to a subject afflicted with a thromboembolic disorder an effective amount of a pharmaceutical composition comprising an antibody or fragment according to any previous claim in combination with statin therapies.

41. A medicament comprising an antibody according to any previous claim.

42. A nucleic acid coding for one or more of the antibodies according to any previous claim.

43. A vector comprising the nucleic acid according to claim 42.

44. A host cell comprising the vector of claim 43.

45. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment leads upon binding to the active FXI (FXIa) catalytic domain to FXIa changing its conformation to an inactive conformation, in which the N-terminal 4 residues, loops 145, 188 and 220 are shifted and/or disordered compared to the active conformation.

46. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment upon binding to FXI prevents the FXI catalytic domain from assuming an active

conformation, in which loops 145, 188 and 220 are ordered as in the structure of the FXIa catalytic domain.

47. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment upon binding to FXI prevents the FXI catalytic domain from assuming an active conformation, in which the N-terminal 4 residues, loops 145, 188 and 220 are ordered as in the structure of the FXIa catalytic domain.

48. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment upon binding to FXI prevents the FXI catalytic domain from assuming an active conformation by inducing conformational changes in the zymogen structure, further leading to an inhibited FXI conformation closely related to that observed when binding to FXIa.

49. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment, upon binding to FXI and/or FXIa and forming an antibody: antigen complex with the catalytic domain of FXI and/or FXIa, causes a shift and/or disorientation of loops 145, 188 and 220 when compared with the uncomplexed structure of the catalytic domain of active Factor XI (FXIa).

50. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment, upon binding to FXI and/or FXIa and forming an antibody: antigen complex with the catalytic domain of FXI and/or FXIa, causes a shift and/or disorientation of the N-terminal 4 residues, loops 145, 188 and 220 when compared with the uncomplexed structure of the catalytic domain of active Factor XI (FXIa).

51. The isolated antibody or fragment of Claim 1, wherein the antibody or fragment binds to active FXI (FXIa) and causes the FXI (FXIa) catalytic domain to change its conformation to an inactive conformation, in which loops 145, 188 and 220 are shifted and/or disoriented compared to the active conformation.