We Claim

1. A collection of synthetic antibodies or functional fragments thereof, wherein at least 50% of the antibodies or functional fragments comprise variable heavy chain and variable light chain pairs, wherein the framework regions of said variable heavy chain and variable light chain pairs consist of twenty five or more germline protein sequences selected from the variable heavy chain and variable light chain pairs having the sequences as defined in figures 25-36: VH1-18 (SEQ ID NO: 204)/VK1-39 (SEQ ID NO: 236); VH1-18 (SEQ ID NO: 204)/VK3-15 (SEQ ID NO: 238); VH1-18 (SEQ ID NO: 204)/VK3-20 (SEQ ID NO: 239); VH1-46 (SEQ ID NO: 205)/VK3-15 (SEQ ID NO: 238); VH1-46 (SEQ ID NO: 205)/VL1-51 (SEQ ID NO: 252); VH1-46 (SEQ ID NO: 205)/VL3-21 (SEQ ID NO: 257); VH1-69*01 (SEQ ID NO: 206)/VL1-51 (SEQ ID NO: 252); VH3-07 (SEQ ID NO: 207)/VK1-12 (SEQ ID NO: 233); VH3-07 (SEQ ID NO: 207)/VK1-16 (SEQ ID NO: 234); VH3-07 (SEQ ID NO: 207)/VK1-27 (SEQ ID NO: 235); VH3-07 (SEQ ID NO: 207)/VK1-39 (SEQ ID NO: 236); VH3-07 (SEQ ID NO: 207)/VK3-15 (SEQ ID NO: 238); VH3-07 (SEQ ID NO: 207)/VL1-47 (SEQ ID NO: 251); VH3-07 (SEQ ID NO: 207)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VK1-05 (SEQ ID NO: 230); VH3-11 (SEQ ID NO: 208)/VK1-39 (SEQ ID NO: 236); VH3-11 (SEQ ID NO: 208)/VK3-15 (SEQ ID NO: 238); VH3-11 (SEQ ID NO: 208)/VL1-40 (SEQ ID NO: 250); VH3-11 (SEQ ID NO: 208)/VL1-47 (SEQ ID NO: 251); VH3-11 (SEQ ID NO: 208)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VL2-23 (SEQ ID NO: 255); VH3-15 (SEQ ID NO: 209)/VK1-05 (SEQ ID NO: 230); VH3-15 (SEQ ID NO: 209)/VK1-06 (SEQ ID NO: 231); VH3-15 (SEQ ID NO: 209)/VK1-12 (SEQ ID NO: 233); VH3-15 (SEQ ID NO: 209)/VK1-16 (SEQ ID NO: 234); VH3-15 (SEQ ID NO: 209)/VK1-27 (SEQ ID NO: 235); VH3-15 (SEQ ID NO: 209)/VK3-11 (SEQ ID NO: 237); VH3-15 (SEQ ID NO: 209)/VL1-40 (SEQ ID NO: 250); VH3-15 (SEQ ID NO: 209)/VL1-47 (SEQ ID NO: 251); VH3-15 (SEQ ID NO: 209)/VL1-51 (SEQ ID NO: 252); VH3-15 (SEQ ID NO: 209)/VL2-14 (SEQ ID NO: 254); VH3-21 (SEQ ID NO: 210)/VK1-12 (SEQ ID NO: 233); VH3-21 (SEQ ID NO: 210)/VK1-27 (SEQ ID NO: 235); VH3-21 (SEQ ID NO: 210)/VL2-11 (SEQ ID NO: 253); VH3-23 (SEQ ID NO: 211)/VK1-39 (SEQ ID NO: 236); VH3-23 (SEQ ID NO: 211)/VK3-15 (SEQ ID NO: 238); VH3-23 (SEQ ID NO: 211)/VL2-23 (SEQ ID NO: 255); VH3-23 (SEQ ID NO: 211)/VL3-1 (SEQ ID NO: 256); VH3-30 (SEQ ID NO: 212)/VK3-20 (SEQ ID NO: 239); VH3-53 (SEQ ID NO: 213)/VK3-15 (SEQ ID NO: 238); VH3-53 (SEQ ID NO: 213)/VL2-11 (SEQ ID NO: 253); VH3-74 (SEQ ID NO: 214)/VK1-05 (SEQ ID NO: 230); VH3-74 (SEQ ID NO: 214)/VK1-06 (SEQ ID NO: 231); VH3-74 (SEQ ID NO: 214)/VK1-12 (SEQ ID NO: 233); VH3-74 (SEQ ID NO: 214)/VK1-27 (SEQ ID NO: 235); VH3-74 (SEQ ID NO: 214)/VK3-20 (SEQ ID NO: 239); VH3-74 (SEQ ID NO: 214)/VL1-51 (SEQ ID NO: 252); VH5-51 (SEQ ID NO: 215)/VK1-39 (SEQ ID NO: 236); VH5-51 (SEQ ID NO: 215)/VL1-40 (SEQ ID NO:

250); VH5-51 (SEQ ID NO: 215)/VL1-51 (SEQ ID NO: 252); VH6-1 (SEQ ID NO: 216)/VK1-09 (SEQ ID NO: 232); VH6-1 (SEQ ID NO: 216)/VK3-15 (SEQ ID NO: 238); VH6-1 (SEQ ID NO: 216)/VK3-20 (SEQ ID NO: 239) and VH6-1 (SEQ ID NO: 216)/VL1-51 (SEQ ID NO: 252).

2. A collection of synthetic antibodies or functional fragments thereof according to claim 1, wherein the framework regions of the variable heavy chain and variable light chain pairs consist of thirty or more germline protein sequences selected from the variable heavy chain and variable light chain pairs having the sequences as defined in figures 25-36: VH1-18 (SEQ ID NO: 204)/VK1-39 (SEQ ID NO: 236); VH1-18 (SEQ ID NO: 204)/VK3-15 (SEQ ID NO: 238); VH1-18 (SEQ ID NO: 204)/VK3-20 (SEQ ID NO: 239); VH1-46 (SEQ ID NO: 205)/VK3-15 (SEQ ID NO: 238); VH1-46 (SEQ ID NO: 205)/VL1-51 (SEQ ID NO: 252); VH1-46 (SEQ ID NO: 205)/VL3-21 (SEQ ID NO: 257); VH1-69*01 (SEQ ID NO: 206)/VL1-51 (SEQ ID NO: 252); VH3-07 (SEQ ID NO: 207)/VK1-12 (SEQ ID NO: 233); VH3-07 (SEQ ID NO: 207)/VK1-16 (SEQ ID NO: 234); VH3-07 (SEQ ID NO: 207)/VK1-27 (SEQ ID NO: 235); VH3-07 (SEQ ID NO: 207)/VK1-39 (SEQ ID NO: 236); VH3-07 (SEQ ID NO: 207)/VK3-15 (SEQ ID NO: 238); VH3-07 (SEQ ID NO: 207)/VL1-47 (SEQ ID NO: 251); VH3-07 (SEQ ID NO: 207)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VK1-05 (SEQ ID NO: 230); VH3-11 (SEQ ID NO: 208)/VK1-39 (SEQ ID NO: 236); VH3-11 (SEQ ID NO: 208)/VK3-15 (SEQ ID NO: 238); VH3-11 (SEQ ID NO: 208)/VL1-40 (SEQ ID NO: 250); VH3-11 (SEQ ID NO: 208)/VL1-47 (SEQ ID NO: 251); VH3-11 (SEQ ID NO: 208)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VL2-23 (SEQ ID NO: 255); VH3-15 (SEQ ID NO: 209)/VK1-05 (SEQ ID NO: 230); VH3-15 (SEQ ID NO: 209)/VK1-06 (SEQ ID NO: 231); VH3-15 (SEQ ID NO: 209)/VK1-12 (SEQ ID NO: 233); VH3-15 (SEQ ID NO: 209)/VK1-16 (SEQ ID NO: 234); VH3-15 (SEQ ID NO: 209)/VK1-27 (SEQ ID NO: 235); VH3-15 (SEQ ID NO: 209)/VK3-11 (SEQ ID NO: 237); VH3-15 (SEQ ID NO: 209)/VL1-40 (SEQ ID NO: 250); VH3-15 (SEQ ID NO: 209)/VL1-47 (SEQ ID NO: 251); VH3-15 (SEQ ID NO: 209)/VL1-51 (SEQ ID NO: 252); VH3-15 (SEQ ID NO: 209)/VL2-14 (SEQ ID NO: 254); VH3-21 (SEQ ID NO: 210)/VK1-12 (SEQ ID NO: 233); VH3-21 (SEQ ID NO: 210)/VK1-27 (SEQ ID NO: 235); VH3-21 (SEQ ID NO: 210)/VL2-11 (SEQ ID NO: 253); VH3-23 (SEQ ID NO: 211)/VK1-39 (SEQ ID NO: 236); VH3-23 (SEQ ID NO: 211)/VK3-15 (SEQ ID NO: 238); VH3-23 (SEQ ID NO: 211)/VL2-23 (SEQ ID NO: 255); VH3-23 (SEQ ID NO: 211)/VL3-1 (SEQ ID NO: 256); VH3-30 (SEQ ID NO: 212)/VK3-20 (SEQ ID NO: 239); VH3-53 (SEQ ID NO: 213)/VK3-15 (SEQ ID NO: 238); VH3-53 (SEQ ID NO: 213)/VL2-11 (SEQ ID NO: 253); VH3-74 (SEQ ID NO: 214)/VK1-05 (SEQ ID NO: 230); VH3-74 (SEQ ID NO: 214)/VK1-06 (SEQ ID NO: 231); VH3-74 (SEQ ID NO: 214)/VK1-12 (SEQ ID NO: 233); VH3-74 (SEQ ID NO: 214)/VK1-27 (SEQ ID NO: 235); VH3-74 (SEQ ID NO: 214)/VK3-20 (SEQ ID NO: 239); VH3-74 (SEQ ID NO: 214)/VL1-51 (SEQ ID NO: 252); VH5-51 (SEQ ID NO: 215)/VK1-39 (SEQ ID NO: 236); VH5-51 (SEQ ID NO: 215)/VL1-40 (SEQ ID NO: 250); VH5-51 (SEQ ID NO: 215)/VL1-51 (SEQ ID NO: 252); VH6-1 (SEQ ID NO: 216)/VK1-09 (SEQ ID NO: 232); VH6-1 (SEQ ID NO: 216)/VK3-15 (SEQ ID NO: 238); VH6-1 (SEQ ID NO: 216)/VK3-20 (SEQ ID NO: 239) and VH6-1 (SEQ ID NO: 216)/VL1-51 (SEQ ID NO: 252).

3. A collection according to any one of the preceding claims, wherein the framework regions of the variable heavy chain and variable light chain pairs consist of germline protein sequences of the variable heavy chain and variable light chain pairs having the sequences as defined in figures 25-36: VH1-18 (SEQ ID NO: 204)/VK3-20 (SEQ ID NO: 239); VH1-46 (SEQ ID NO:

205)/VK3-15 (SEQ ID NO: 238); VH1-46 (SEQ ID NO: 205)/VL1-51 (SEQ ID NO: 252); VH1-69*01 (SEQ ID NO: 206)/VL1-51 (SEQ ID NO: 252); VH3-07 (SEQ ID NO: 207)/VK1-12 (SEQ ID NO: 233); VH3-07 (SEQ ID NO: 207)/VK1-27 (SEQ ID NO: 235); VH3-07 (SEQ ID NO: 207)/VK3-15 (SEQ ID NO: 238); VH3-07 (SEQ ID NO: 207)/VL1-47 (SEQ ID NO: 251); VH3-07 (SEQ ID NO: 207)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VL1-40 (SEQ ID NO: 250); VH3-11 (SEQ ID NO: 208)/VL1-47 (SEQ ID NO: 251); VH3-11 (SEQ ID NO: 208)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VL2-23 (SEQ ID NO: 255); VH3-15 (SEQ ID NO: 209)/VK1-05 (SEQ ID NO: 230); VH3-15 (SEQ ID NO: 209)/VK1-06 (SEQ ID NO: 231); VH3-15 (SEQ ID NO: 209)/VK1-12 (SEQ ID NO: 233); VH3-15 (SEQ ID NO: 209)/VK1-27 (SEQ ID NO: 235); VH3-15 (SEQ ID NO: 209)/VK3-11 (SEQ ID NO: 237); VH3-15 (SEQ ID NO: 209)/VL1-51 (SEQ ID NO: 252); VH3-21 (SEQ ID NO: 210)/VK1-12 (SEQ ID NO: 233); VH3-23 (SEQ ID NO: 211)/VK1-39 (SEQ ID NO: 236); VH3-23 (SEQ ID NO: 211)/VK3-15 (SEQ ID NO: 238); VH3-23 (SEQ ID NO: 211)/VL2-23 (SEQ ID NO: 255); VH3-23 (SEQ ID NO: 211)/VL3-1 (SEQ ID NO: 256); VH3-53 (SEQ ID NO: 213)/VK3-15 (SEQ ID NO: 238); VH3-53 (SEQ ID NO: 213)/VL2-11 (SEQ ID NO: 253); VH3-74 (SEQ ID NO: 214)/VK1-05 (SEQ ID NO: 230); VH3-74 (SEQ ID NO: 214)/VK1-06 (SEQ ID NO: 231); VH3-74 (SEQ ID NO: 214)/VK1-12 (SEQ ID NO: 233); VH3-74 (SEQ ID NO: 214)/VK3-20 (SEQ ID NO: 239); VH5-51 (SEQ ID NO: 215)/VK1-39 (SEQ ID NO: 236); VH5-51 (SEQ ID NO: 215)/VL1-40 (SEQ ID NO: 250); VH5-51 (SEQ ID NO: 215)/VL1-51 (SEQ ID NO: 252); VH6-1 (SEQ ID NO: 216)/VK1-09 (SEQ ID NO: 232); VH6-1 (SEQ ID NO: 216)/VK3-20 (SEQ ID NO: 239) and VH6-1 (SEQ ID NO: 216)/VL1-51 (SEQ ID NO: 252).

4. A collection of synthetic antibodies or functional fragments thereof according to claim 3, wherein the framework regions of the variable heavy chain and variable light chain pairs consist of the germline protein sequences of the variable heavy chain and variable light chain pairs having the sequences as defined in figures 25-36: VH1-18 (SEQ ID NO: 204)/VK3-20 (SEQ ID NO: 239); VH1-46 (SEQ ID NO: 205)/VK3-15 (SEQ ID NO: 238); VH1-46 (SEQ ID NO: 205)/VL1-51 (SEQ ID NO: 252); VH1-69*01 (SEQ ID NO: 206)/VL1-51 (SEQ ID NO: 252); VH3-07 (SEQ ID NO: 207)/VK1-12 (SEQ ID NO: 233); VH3-07 (SEQ ID NO: 207)/VK1-27 (SEQ ID NO: 235); VH3 07 (SEQ ID NO: 207)/VK3-15 (SEQ ID NO: 238); VH3-07 (SEQ ID NO: 207)/VL1-47 (SEQ ID NO: 251); VH3-07 (SEQ ID NO: 207)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VL1-40 (SEQ ID NO: 250); VH3-11 (SEQ ID NO: 208)/VL1-47 (SEQ ID NO: 251); VH3-11 (SEQ ID NO: 208)/VL1-51 (SEQ ID NO: 252); VH3-11 (SEQ ID NO: 208)/VL2-23 (SEQ ID NO: 255); VH3-15 (SEQ ID NO: 209)/VK1-05 (SEQ ID NO: 230); VH3-15 (SEQ ID NO: 209)/VK1-06 (SEQ ID NO: 231); VH3-15 (SEQ ID NO: 209)/VK1-12 (SEQ ID NO: 233); VH3-15 (SEQ ID NO: 209)/VK1-27 (SEQ ID NO: 235); VH3-15 (SEQ ID NO: 209)/VK3-11 (SEQ ID NO: 237); VH3-15 (SEQ ID NO: 209)/VL1-51 (SEQ ID NO: 252); VH3-21 (SEQ ID NO: 210)/VK1-12 (SEQ ID NO: 233); VH3-23 (SEQ ID NO: 211)/VK3-15 (SEQ ID NO: 238); VH3-53 (SEQ ID NO: 213)/VK3-15 (SEQ ID NO: 238); VH3-53 (SEQ ID NO: 213)/VL2-11 (SEQ ID NO: 253); VH3-74 (SEQ ID NO: 214)/VK1-05 (SEQ ID NO: 230); VH3-74 (SEQ ID NO: 214)/VK1-06 (SEQ ID NO: 231); VH3-74 (SEQ ID NO: 214)/VK1-12 (SEQ ID NO: 233); VH3-74 (SEQ ID NO: 214)/VK3-20 (SEQ ID NO: 239); VH5-51 (SEQ ID NO: 215)/VK1-39 (SEQ ID NO: 236); VH5-51 (SEQ ID NO: 215)/VL1-40 (SEQ ID NO: 250); VH5-51 (SEQ ID NO: 215)/VL1-51 (SEQ ID NO: 252); VH6-1 (SEQ ID NO: 216)/VK1-09 (SEQ ID NO: 232); VH6-1 (SEQ ID NO: 216)/VK3-20 (SEQ ID NO: 239) and VH6-1 (SEQ ID NO: 216)/VL1-51 (SEQ ID NO: 252).

5. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise one or more complementarity determining regions consisting of germline protein sequences from the respective variable heavy chain and variable light chain pairs.

6. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise CDR1 regions consisting of germline protein sequences from the respective variable heavy chain and variable light chain pairs.

7. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise CDR2 regions consisting of germline protein sequences from the respective variable heavy chain and variable light chain pairs.

8. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise one or more complementarity determining regions comprising amino acid modifications that remove potential post translational modification sites.

9. The collection according to claim 8, wherein said antibodies or functional fragments thereof comprise one or more heavy chain complementarity determining regions comprising the complementary determining region sequences from the respective variable heavy chains depicted in figures 34-36.

10. The collection according to claim 9, wherein said antibodies or functional fragments thereof comprise HCDR1 regions from the respective HCDR1 region depicted in figure 34.

11. The collection according to claims 9 or 10, wherein said antibodies or functional fragments thereof comprise HCDR2 regions from the respective HCDR2 region depicted in figure 35.

12. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise a FR4 region selected from the group consisting of JH4, Jκ1, and Jλ2/3 the sequences thereof being defined in figure 40.

13. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise a diversified HCDR3 region.

14. The collection according to any one of the preceding claims, wherein said antibodies or functional fragments thereof comprise a diversified LCDR3 region.

15. The collection according to any one of the proceeding claims, wherein the collection comprises at least 1×10^4 antibodies or functional fragments thereof.

16. The collection according to any one of the proceeding claims, wherein said antibodies are selected from the groups consisting of human IgG1, IgG2, IgG3, IgG4, IgA, IgE, IgM and IgD.

17. The collection according to any one of the proceeding claims, wherein said functional fragments of said antibodies are selected from the group consisting of Fab, F(ab')2, Fab', Fv, and scFv.

18. A collection of nucleic acids encoding a collection of antibodies or functional fragments thereof according to any one of the preceding claims.

19. A vector comprising the collection of nucleic acids according to claim 18.

20. A recombinant host cell comprising the nucleic acids of claim 18 or the vector of claim 19.

21. A method of identifying an antibody or antibody fragment specific for an antigen, comprising: (a) contacting the antigen with a collection of antibodies or functional fragments thereof according to claim 1, and (b) selecting one or more antibodies or antibody fragments that bind to said antigen.