**WHAT IS CLAIMED IS:**

1. An antibody that binds to human mutant calreticulin (CALR), wherein:

the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1, a VH CDR2, and a VH CDR3, wherein:

the VH CDR1 comprises the amino acid sequence $X_1X_2X_3X_4X_5$, wherein $X_1$ is S, E, or D; wherein $X_2$ is Y, L, or S; wherein $X_3$ is A, S, or F; wherein $X_4$ is I or M; and wherein $X_5$ is S, Q, or H;

the VH CDR2 comprises the amino acid sequence $X_6X_7X_8PX_9X_{10}X_{11}X_{12}X_{13}X_{14}YAX_{15}X_{16}X_{17}X_{18}G$ (SEQ ID NO:97), wherein $X_6$ is L or G; wherein $X_7$ is V, F, or I; wherein $X_8$ is D or I; wherein $X_9$ is E, D, or I; wherein $X_{10}$ is D, G, F, A, S, or E; wherein $X_{11}$ is G or A; wherein $X_{12}$ is E or T; wherein $X_{13}$ is T or A; wherein $X_{14}$ is I, M, or N; wherein $X_{15}$ is E or Q; wherein $X_{16}$ is K or R; wherein $X_{17}$ is F or L; and wherein $X_{18}$ is R or Q;

the VH CDR3 comprises the amino acid sequence $X_{19}X_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}X_{31}X_{32}X_{33}X_{34}X_{35}X_{36}X_{37}X_{38}$ (SEQ ID NO:98), wherein $X_{19}$ is P, E, or absent; wherein $X_{20}$ is G, E, or absent; wherein $X_{21}$ is G, W, S, or absent; wherein $X_{22}$ is I, D, S, P, or absent; wherein $X_{23}$ is S, L, I, T, G, or absent; wherein $X_{24}$ is P, T, Q, I, D, R, or absent; wherein $X_{25}$ is G, D, or absent; wherein $X_{26}$ is E, Y, P, L, D, or S; wherein $X_{27}$ is E, D, A, or G; wherein $X_{28}$ is S, F, A, E, Y, or W; wherein $X_{29}$ is Y or F; wherein $X_{30}$ is G, D, or W; wherein $X_{31}$ is P, Y, I, or H; wherein $X_{32}$ is Y or absent; wherein $X_{33}$ is Y or absent; wherein $X_{34}$ is Y or absent; wherein $X_{35}$ is G or absent; wherein $X_{36}$ is M or absent; wherein $X_{37}$ is D or absent; wherein $X_{38}$ is V or absent;

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence $X_{39}X_{40}X_{41}X_{42}X_{43}X_{44}X_{45}X_{46}X_{47}X_{48}X_{49}X_{50}X_{51}X_{52}X_{53}X_{54}$ (SEQ ID NO:99), wherein $X_{39}$ is T, A, or absent; wherein $X_{40}$ is G or absent; wherein $X_{41}$ is Q, G, V, T, or S; wherein $X_{42}$ is A, G, S, or N; wherein $X_{43}$ is S, N, D, T, or Y; wherein

$X_{44}$ is Q, Y, N, D, S, or K; wherein $X_{45}$ is D, I, F, V, S, or T; wherein $X_{46}$ is N or absent; wherein $X_{47}$ is I or absent; wherein $X_{48}$ is I, G, or R; wherein $X_{49}$ is S, G, A, D, I, R, or T; wherein $X_{50}$ is Y or absent; wherein $X_{51}$ is N, K, I, or E; wherein $X_{52}$ is Y, S, N, D, H, F, R, or G; wherein $X_{53}$ is L or V; and wherein $X_{54}$ is N, H, S, D, or F;

the VL CDR2 comprises the amino acid sequence $X_{55}X_{56}X_{57}X_{58}X_{59}X_{60}X_{61}$, wherein $X_{55}$ is T, D, E, Q, or R; wherein $X_{56}$ is A, D, V, or N; wherein $X_{57}$ is S, G, N, or R; wherein $X_{58}$ is I, N, D, or K; wherein $X_{59}$ is L, R, or W; wherein $X_{60}$ is E or P; and wherein $X_{61}$ is S, T, or L;

the VL CDR3 comprises the amino acid sequence $X_{62}X_{63}X_{64}X_{65}X_{66}X_{67}X_{68}X_{69}X_{70}X_{71}X_{72}$, wherein $X_{62}$ is Q, S, C, or G; wherein $X_{63}$ is Q, V, S, T, or A; wherein $X_{64}$ is Q, L, W, or Y; wherein $X_{65}$ is Q, N, D, I, T, A, or G; wherein $X_{66}$ is S, P, G, N, or A; wherein $X_{67}$ is N, Y, I, S, N, L, or D; wherein $X_{68}$ is E, P, S, I, N, H, L, or T; wherein $X_{69}$ is D, T, S, or absent; wherein $X_{70}$ is P, H, L, R, F, A, Q, or absent; wherein $X_{71}$ is W, L, V, Y, S, A, or E; and wherein $X_{72}$ is T, V, or I.

2. The antibody of claim 1, wherein:

(a) the VH CDR1 comprises the amino acid sequence of any one of SEQ ID NOs:1-6;

the VH CDR2 comprises the amino acid sequence of any one of SEQ ID NOs:7-17 and 92-95;

the VH CDR3 comprises the amino acid sequence of any one of SEQ ID NOs:18-25;

the VL CDR1 comprises the amino acid sequence of any one of SEQ ID NOs:26-52 or 118;

the VL CDR2 comprises the amino acid sequence of any one of SEQ ID NOs:53-68; and

the VL CDR3 comprises the amino acid sequence of any one of SEQ ID NOs:69-91;

(b) the VH CDR1, the VH CDR2, and the VH CDR3 each correspond to the VH CDRs set forth in Tables 1-2 for a single clone selected from the group consisting of clones 1-53 and 55-215, and wherein the VL CDR1, the VL CDR2, and the VL CDR3 each correspond to the VL CDRs set forth in Tables 1-2 for a single clone selected from the group consisting of clones 1-53 and 55-215;

or

(c) the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:26; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:53; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:69;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:27; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:70;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:8; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3

comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:29; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:72;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:29; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:73;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:56; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:31; the VL CDR2 comprises the amino

acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:57; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:9; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:32; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:33; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:73;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:34; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:56; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:27; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:35; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:36; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:72;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:58; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:37; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:38; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3

comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:32; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:39; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:40; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:10; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:41; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino

acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:70;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:40; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:74;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:75;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:118; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:59; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:76;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:77;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:42; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:59; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:76;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:78;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:12; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:77;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:43; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:59; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:79;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:2; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3

comprises the amino acid sequence of SEQ ID NO:19; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:60; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:79;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:13; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:20; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:44; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:61; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:80;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:20; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:45; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:61; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:80;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:4; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:14; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:21; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:46; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:62; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:81;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:5; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:14; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:21; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:46; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:62; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:81;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:5; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:14; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:21; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:46; the VL CDR2 comprises the amino

acid sequence of SEQ ID NO:63; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:81;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:47; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:64; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:82;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:48; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:64; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:83;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:49; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:65; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:84;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:48; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:64; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:85;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:50; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:65; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:84;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:66; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:86;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:47; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:64; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:84;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:118; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:66; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:87;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:3; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:15; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:22; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:50; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:64; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:88;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:5; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:11; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:23; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:44; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:61; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:89;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:5; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:16; the VH CDR3

comprises the amino acid sequence of SEQ ID NO:24; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:51; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:67; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:90;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:92; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:93; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:94; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:95; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:92; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino

acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:93; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:94; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:95; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:28; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:92; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:27; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:93; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:27; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:94; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:27; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:95; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:27; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:92; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:36; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:72;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:93; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:36; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:72;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:94; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:36; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:72;

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:1; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:95; the VH CDR3

comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:36; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:54; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:72;

or

the VH CDR1 comprises the amino acid sequence of SEQ ID NO:329; the VH CDR2 comprises the amino acid sequence of SEQ ID NO:7; the VH CDR3 comprises the amino acid sequence of SEQ ID NO:18; the VL CDR1 comprises the amino acid sequence of SEQ ID NO:30; the VL CDR2 comprises the amino acid sequence of SEQ ID NO:55; and the VL CDR3 comprises the amino acid sequence of SEQ ID NO:71.

3. The antibody of claim 1 or claim 2, wherein:

the VH is at least 80% identical to the amino acid sequence of any one of SEQ ID NOs:165-181 and 183-208; and

the VL is at least 80% identical to the amino acid sequence of any one of SEQ ID NOs:264-304 and 306-318.

4. The antibody of claim 1, wherein:

(a) the VH comprises the amino acid sequence of any one of SEQ ID NOs:165-181 and 183-208; and

the VL comprises the amino acid sequence of any one of SEQ ID NOs:264-304 and 306-318;

or

(b) the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:264;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:265;

the VH comprises the amino acid sequence of SEQ ID NO:166 and the VL comprises the amino acid sequence of SEQ ID NO:266;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:266;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:267;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:269;

the VH comprises the amino acid sequence of SEQ ID NO:167 and the VL comprises the amino acid sequence of SEQ ID NO:270;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:271;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:272;

the VH comprises the amino acid sequence of SEQ ID NO:168 and the VL comprises the amino acid sequence of SEQ ID NO:273;

the VH comprises the amino acid sequence of SEQ ID NO:169 and the VL comprises the amino acid sequence of SEQ ID NO:274;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:275;

the VH comprises the amino acid sequence of SEQ ID NO:171 and the VL comprises the amino acid sequence of SEQ ID NO:276;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:278;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:280;

the VH comprises the amino acid sequence of SEQ ID NO:172 and the VL comprises the amino acid sequence of SEQ ID NO:281;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:282;

the VH comprises the amino acid sequence of SEQ ID NO:173 and the VL comprises the amino acid sequence of SEQ ID NO:283;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:284;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:285;

the VH comprises the amino acid sequence of SEQ ID NO:174 and the VL comprises the amino acid sequence of SEQ ID NO:286;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:287;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:288;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:289;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:290;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:291;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:292;

the VH comprises the amino acid sequence of SEQ ID NO:175 and the VL comprises the amino acid sequence of SEQ ID NO:293;

the VH comprises the amino acid sequence of SEQ ID NO:175 and the VL comprises the amino acid sequence of SEQ ID NO:294;

the VH comprises the amino acid sequence of SEQ ID NO:175 and the VL comprises the amino acid sequence of SEQ ID NO:295;

the VH comprises the amino acid sequence of SEQ ID NO:175 and the VL comprises the amino acid sequence of SEQ ID NO:296;

the VH comprises the amino acid sequence of SEQ ID NO:176 and the VL comprises the amino acid sequence of SEQ ID NO:294;

the VH comprises the amino acid sequence of SEQ ID NO:175 and the VL comprises the amino acid sequence of SEQ ID NO:297;

the VH comprises the amino acid sequence of SEQ ID NO:175 and the VL comprises the amino acid sequence of SEQ ID NO:298;

the VH comprises the amino acid sequence of SEQ ID NO:177 and the VL comprises the amino acid sequence of SEQ ID NO:299;

the VH comprises the amino acid sequence of SEQ ID NO:178 and the VL comprises the amino acid sequence of SEQ ID NO:300;

the VH comprises the amino acid sequence of SEQ ID NO:179 and the VL comprises the amino acid sequence of SEQ ID NO:301;

the VH comprises the amino acid sequence of SEQ ID NO:180 and the VL comprises the amino acid sequence of SEQ ID NO:301;

the VH comprises the amino acid sequence of SEQ ID NO:180 and the VL comprises the amino acid sequence of SEQ ID NO:302;

the VH comprises the amino acid sequence of SEQ ID NO:181 and the VL comprises the amino acid sequence of SEQ ID NO:303;

the VH comprises the amino acid sequence of SEQ ID NO:182 and the VL comprises the amino acid sequence of SEQ ID NO:304;

the VH comprises the amino acid sequence of SEQ ID NO:183 and the VL comprises the amino acid sequence of SEQ ID NO:306;

the VH comprises the amino acid sequence of SEQ ID NO:182 and the VL comprises the amino acid sequence of SEQ ID NO:307;

the VH comprises the amino acid sequence of SEQ ID NO:182 and the VL comprises the amino acid sequence of SEQ ID NO:308;

the VH comprises the amino acid sequence of SEQ ID NO:182 and the VL comprises the amino acid sequence of SEQ ID NO:309;

the VH comprises the amino acid sequence of SEQ ID NO:184 and the VL comprises the amino acid sequence of SEQ ID NO:310;

the VH comprises the amino acid sequence of SEQ ID NO:182 and the VL comprises the amino acid sequence of SEQ ID NO:311;

the VH comprises the amino acid sequence of SEQ ID NO:185 and the VL comprises the amino acid sequence of SEQ ID NO:312;

the VH comprises the amino acid sequence of SEQ ID NO:186 and the VL comprises the amino acid sequence of SEQ ID NO:313;

the VH comprises the amino acid sequence of SEQ ID NO:187 and the VL comprises the amino acid sequence of SEQ ID NO:314;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:268;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:315;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:316;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:277;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:317;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:188 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:189 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:192 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:193 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:194 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:197 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:198 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:199 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:200 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:201 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:279;

the VH comprises the amino acid sequence of SEQ ID NO:170 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:202 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:203 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:204 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:205 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:206 and the VL comprises the amino acid sequence of SEQ ID NO:318;

the VH comprises the amino acid sequence of SEQ ID NO:207 and the VL comprises the amino acid sequence of SEQ ID NO:318;

or

the VH comprises the amino acid sequence of SEQ ID NO:208 and the VL comprises the amino acid sequence of SEQ ID NO:318,

preferably wherein

(i) the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:268;

(ii) the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:277;

(iii) the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:279;

(iv) the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:315;

(v) the VH comprises the amino acid sequence of SEQ ID NO:190 and the VL comprises the amino acid sequence of SEQ ID NO:315;

(vi) the VH comprises the amino acid sequence of SEQ ID NO:196 and the VL comprises the amino acid sequence of SEQ ID NO:315;

(vii) the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:277;

(viii) the VH comprises the amino acid sequence of SEQ ID NO:165 and the VL comprises the amino acid sequence of SEQ ID NO:317;

(ix) the VH comprises the amino acid sequence of SEQ ID NO:191 and the VL comprises the amino acid sequence of SEQ ID NO:318; or

(x) the VH comprises the amino acid sequence of SEQ ID NO:195 and the VL comprises the amino acid sequence of SEQ ID NO:318.

5. The antibody of claim 1, wherein the antibody comprises:

(a) a heavy chain comprising the amino acid sequence of any one of SEQ ID NOs:119-135 and 137-164; and

a light chain comprising the amino acid sequence of any one of SEQ ID NOs:209-249 and 251-263,

optionally wherein:

(i) the heavy chain comprises the amino acid sequence of SEQ ID NO:119 and the light chain comprises the amino acid sequence of SEQ ID NO:213;

(ii) the heavy chain comprises the amino acid sequence of SEQ ID NO:119 and the light chain comprises the amino acid sequence of SEQ ID NO:222;

(iii) the heavy chain comprises the amino acid sequence of SEQ ID NO:119 and the light chain comprises the amino acid sequence of SEQ ID NO:224;

(iv) the heavy chain comprises the amino acid sequence of SEQ ID NO:142 and the light chain comprises the amino acid sequence of SEQ ID NO:213;

(v) the heavy chain comprises the amino acid sequence of SEQ ID NO:142 and the light chain comprises the amino acid sequence of SEQ ID NO:260;

(vi) the heavy chain comprises the amino acid sequence of SEQ ID NO:145 and the light chain comprises the amino acid sequence of SEQ ID NO:260;

(vii) the heavy chain comprises the amino acid sequence of SEQ ID NO:151 and the light chain comprises the amino acid sequence of SEQ ID NO:260;

(viii) the heavy chain comprises the amino acid sequence of SEQ ID NO:146 and the light chain comprises the amino acid sequence of SEQ ID NO:222;

(ix) the heavy chain comprises the amino acid sequence of SEQ ID NO:142 and the light chain comprises the amino acid sequence of SEQ ID NO:262;

(x) the heavy chain comprises the amino acid sequence of SEQ ID NO:146 and the light chain comprises the amino acid sequence of SEQ ID NO:263; or

(xi) the heavy chain comprises the amino acid sequence of SEQ ID NO:150 and the light chain comprises the amino acid sequence of SEQ ID NO:263;

or

(b) a heavy chain and a light chain each corresponding to the heavy chain and the light chain set forth in Tables 4-5 for a single clone selected from the group consisting of clones 1-53 and 55-215.

6. An antibody that binds to human mutant calreticulin (CALR), wherein:

(a) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence ELSMQ (SEQ ID NO:1), optionally wherein the VH CDR1 comprises the amino acid sequence GYTLTELSMQ (SEQ ID NO:329);

the VH CDR2 comprises the amino acid sequence GFDPDDX$_{101}$ETMYAEX$_{102}$X$_{103}$QG (SEQ ID NO:102); wherein X$_{101}$ is D or G; wherein X$_{102}$ is K or R; and wherein X$_{103}$ is F or L;

the VH CDR3 is SPGYDFFDY (SEQ ID NO:18);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence GGX$_{104}$X$_{105}$X$_{106}$GX$_{107}$X$_{108}$X$_{109}$VX$_{110}$ (SEQ ID NO:103), wherein X$_{104}$ is N, D, or S; wherein X$_{105}$ is Y, N, or D; wherein X$_{106}$ is I or T; wherein X$_{107}$ is S, D, I, R, or T; wherein X$_{108}$ is K, E, or I; wherein X$_{109}$ is S, I, R, G, N, or A; and wherein X$_{110}$ is H, F, or N;

the VL CDR2 comprises the amino acid sequence DDX$_{111}$DRPX$_{112}$ (SEQ ID NO:104), wherein X$_{111}$ is G, S, or R; and wherein X$_{112}$ is S or L; and

the VL CDR3 comprises the amino acid sequence QVWDX$_{113}$X$_{114}$X$_{115}$DX$_{116}$X$_{117}$X$_{118}$ (SEQ ID NO:105), wherein X$_{113}$ is S or A; wherein X$_{114}$ is I or S; wherein X$_{115}$ is S, I, or N; wherein X$_{116}$ is H, L, or Q; wherein X$_{117}$ is V or L; and wherein X$_{118}$ is V or I;

(b) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence ELSMQ (SEQ ID NO:1), optionally wherein the VH CDR1 comprises the amino acid sequence GYTLTELSMQ (SEQ ID NO:329);

the VH CDR2 comprises the amino acid sequence GFDPDDX$_{101}$ETMYAEX$_{102}$X$_{103}$QG (SEQ ID NO:102); wherein X$_{101}$ is D or G; wherein X$_{102}$ is K or R; and wherein X$_{103}$ is F or L;

the VH CDR3 is SPGYDFFDY (SEQ ID NO:18);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence TGTSSDVGGYNYVS (SEQ ID NO:30);

the VL CDR2 comprises the amino acid sequence $X_{119}VSX_{120}RPS$ (SEQ ID NO:106); wherein $X_{119}$ is E or D; and wherein $X_{120}$ is N or K; and

the VL CDR3 comprises the amino acid sequence QVWDSSNDLLI (SEQ ID NO:71);

(c) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence DYFIH (SEQ ID NO:2);

the VH CDR2 comprises the amino acid sequence $LVDPEDGETIYAEX_{121}FQG$ (SEQ ID NO:107), wherein $X_{121}$ is K or R;

the VH CDR3 comprises the amino acid sequence PGGILTDPDAFDI (SEQ ID NO:19);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence $X_{122}GTX_{123}SDVGGYNX_{124}VS$ (SEQ ID NO:108), wherein $X_{122}$ is T or A; wherein $X_{123}$ is S or G; and wherein $X_{124}$ is Y or H;

the VL CDR2 comprises the amino acid sequence $X_{125}VX_{126}X_{127}RPS$ (SEQ ID NO:109), wherein $X_{125}$ is D or E; wherein $X_{126}$ is N or S; and wherein $X_{127}$ is K or N; and

the VL CDR3 comprises the amino acid sequence $SSYX_{128}X_{129}SSTX_{130}X_{131}V$ (SEQ ID NO:110), wherein $X_{128}$ is I or T; wherein $X_{129}$ is P or S; wherein $X_{130}$ is R, P, F, or absent; and wherein $X_{131}$ is W or Y;

(d) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence SYAIS (SEQ ID NO:3);

the VH CDR2 comprises the amino acid sequence $LVDPEDGETIYAEKFX_{132}G$ (SEQ ID NO:111), wherein $X_{132}$ is R or Q;

the VH CDR3 comprises the amino acid sequence EESYGP (SEQ ID NO:20);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence QASQDISNYL$X_{133}$ (SEQ ID NO:112), $X_{133}$ is N or D;

the VL CDR2 comprises the amino acid sequence DASNLET (SEQ ID NO:61); and

the VL CDR3 comprises the amino acid sequence QQLNSYPLT (SEQ ID NO:80);

(e) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence E$X_{134}$SMH (SEQ ID NO:113), wherein $X_{134}$ is S or L;

the VH CDR2 comprises the amino acid sequence LVDPEDGETIYAQKFQG (SEQ ID NO:14);

the VH CDR3 comprises the amino acid sequence EEWSGDGDDAFDI (SEQ ID NO:21);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence SGSSSNIGSYSVS (SEQ ID NO:46);

the VL CDR2 comprises the amino acid sequence D$X_{135}$NKRPS (SEQ ID NO:114), wherein $X_{135}$ is N or D; and

the VL CDR3 comprises the amino acid sequence GTWDSSLSAWV (SEQ ID NO:81);

(f) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence SYAIS (SEQ ID NO:3);

the VH CDR2 comprises the amino acid sequence GIIPIFGTANYAQKFQG (SEQ ID NO:15);

the VH CDR3 comprises the amino acid sequence SPLRGSGWYWHYYYGMDV (SEQ ID NO:22);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence GGN$X_{136}$I$X_{137}$$X_{138}$K$X_{139}$VH (SEQ ID NO:115), wherein $X_{136}$ is N or K; wherein $X_{137}$ is R or G; wherein $X_{138}$ is A, S, R, or T; and wherein $X_{139}$ is H or S;

the VL CDR2 comprises the amino acid sequence $X_{140}$D$X_{141}$$X_{142}$RPS (SEQ ID NO:116), wherein $X_{140}$ is Q or R; wherein $X_{141}$ is S or R; and wherein $X_{142}$ is N or K; and

the VL CDR3 comprises the amino acid sequence Q$X_{143}$W$X_{144}$S$X_{145}$T$X_{146}$V (SEQ ID NO:117), wherein $X_{143}$ is A or V; wherein $X_{144}$ is D or G; wherein $X_{145}$ is S or N; and wherein $X_{146}$ is V, A, or E;

or

(g) the antibody comprises a heavy chain variable region (VH) comprising a VH CDR1; a VH CDR2; and a VH CDR3; wherein:

the VH CDR1 comprises the amino acid sequence TSGMGVG (SEQ ID NO:6);

the VH CDR2 comprises the amino acid sequence HIWWDDDKYYNPYLKN (SEQ ID NO:17);

the VH CDR3 comprises the amino acid sequence SAYGSTYGY (SEQ ID NO:25);

wherein the antibody comprises a light chain variable region (VL) comprising a VL CDR1, a VL CDR2, and a VL CDR3, wherein:

the VL CDR1 comprises the amino acid sequence KASQSVDYDGDSFMN (SEQ ID NO:52);

the VL CDR2 comprises the amino acid sequence TASILES (SEQ ID NO:68); and

the VL CDR3 comprises the amino acid sequence QQSNEDPWT (SEQ ID NO:91),

optionally wherein the VH is at least 80% identical to the amino acid sequence of SEQ ID NO:182; and the VL is at least 80% identical to the amino acid sequence of SEQ ID NO:305,

optionally wherein the VH comprises the amino acid sequence of SEQ ID NO:182; and the VL comprises the amino acid sequence of SEQ ID NO:305,

optionally wherein the heavy chain comprises the amino acid sequence of SEQ ID NO:136; and the light chain comprises the amino acid sequence of SEQ ID NO:250.

7. An antibody that binds to human mutant calreticulin (CALR), wherein the antibody:

inhibits one or more signaling pathways downstream of thrombopoietin receptor (MPL) in a cell expressing human mutant CALR;

inhibits oncogenic cell proliferation in a cell expressing human mutant CALR;

inhibits dimerization of MPL in a cell expressing human mutant CALR; and/or

inhibits binding of MPL to human mutant CALR,

optionally wherein the antibody:

(a)(i) inhibits one or more signaling pathways downstream of MPL in both a first cell expressing human Type 1 mutant CALR and in a second cell expressing human Type 2 mutant CALR;

inhibits oncogenic cell proliferation in both a first cell expressing human Type 1 mutant CALR and in a second cell expressing human Type 2 mutant CALR; and/or

inhibits dimerization of MPL in both a first cell expressing human Type 1 mutant CALR and in a second cell expressing human Type 2 mutant CALR; and/or

(ii) wherein the one or more signaling pathways downstream of MPL are selected from the group consisting of Janus tyrosine kinase (JAK) and signal transducers and activators of transcription (STAT) signaling, mitogen-activated protein kinase (MEK) and extracellular signal-regulated kinase (ERK) signaling, serine/threonine kinase (AKT) signaling, and mammalian target of rapamycin (mTOR) signaling;

(b) binds to human mutant CALR with a greater affinity than human mutant CALR binds to MPL;

or

(c) binds to human mutant CALR with an $IC_{50}$ of between about 0.1 and 1 nM.

8. An antibody that binds to human mutant calreticulin (CALR), wherein the antibody has modulated Fc effector function, optionally wherein the modulated Fc effector function is increased Fc effector function or reduced Fc effector function.

9. The antibody of claim 8, wherein

(a) the antibody has reduced Fc effector function;

(b) the Fc effector function is antibody-dependent cell-mediated cytotoxicity (ADCC), complement dependent cytotoxicity (CDC), or antibody dependent cellular phagocytosis (ADCP);

and/or

(c) the antibody having reduced Fc effector function has increased binding affinity to human mutant CALR as compared to an antibody without reduced Fc effector function, optionally wherein the Fc effector function is ADCC.

10. An antibody that binds to human mutant calreticulin (CALR), wherein

(a) the antibody binds to human mutant CALR at an epitope within DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328), optionally wherein:

(i) the antibody binds within amino acids 8-20 of DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328), optionally wherein the antibody binds to:

one or more of the amino acid residues R8, M10, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328); or

all of the amino acid residues R8, M10, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328);

(ii) the antibody binds within amino acids 1-20 of DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328), optionally wherein the antibody binds to:

one or more of D1, R5, R8, M9, M10, R11, T12, M14, R15, M16, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328); or

all of D1, R5, R8, M9, M10, R11, T12, M14, R15, M16, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328);

(iii) the antibody binds within amino acids 7-21 of DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328), optionally wherein the antibody binds to:

one or more of the amino acid residues R7, R11, R17, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328); or

all of the amino acid residues R7, R11, R17, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328);

(iv) the antibody binds within amino acids 6-21 of DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328), optionally wherein the antibody binds to:

one or more of the amino acid residues T6, R7, M10, R11, M14, R17, R18, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328); or

all of the amino acid residues T6, R7, M10, R11, M14, R17, R18, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328);

(b) the antibody binds two non-identical epitopes within DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328); or

(c) the antibody binds to human mutant CALR at a first epitope within DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328) and at a second epitope within of DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328), wherein the first epitope and the second epitope are non-identical, optionally wherein the antibody binds to:

(i) the first epitope at one or more of the amino acid residues R8, M10, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328) and the antibody binds to the second epitope at one or more of the amino acid residues R7, R11, R17, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328);

(ii) the first epitope at all of the amino acid residues R8, M10, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328) and the antibody binds to the second epitope at all of the amino acid residues R7, R11, R17, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328);

(iii) to the first epitope at one or more of the amino acid residues D1, R5, R8, M9, M10, R11, T12, M14, R15, M16, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328) and the

antibody binds to the second epitope at one or more of the amino acid residues T6, R7, M10, R11, M14, R17, R18, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328); or

(iv) to the first epitope at all of the amino acid residues D1, R5, R8, M9, M10, R11, T12, M14, R15, M16, M19, and R20 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328) and the antibody binds to the second epitope at all of the amino acid residues T6, R7, M10, R11, M14, R17, R18, R20, and R21 in DEEQRTRRMMRTKMRMRRMRR (SEQ ID NO:328).

11. An antibody that binds to human mutant CALR, wherein the antibody

(a) competes for binding to human mutant CALR with an antibody that has a heavy chain comprising the amino acid sequence of SEQ ID NO:327 and a light chain comprising the amino acid sequence of SEQ ID NO:213; or

(b) inhibits or reduces binding of human mutant CALR to thrombopoietin receptor (MPL).

12. The antibody of any one of claims 1 to 11, wherein

A)

the human mutant CALR is

(a) human Type 1 mutant CALR comprising the amino acid sequence of SEQ ID NO:320; or

(b) human Type 2 mutant CALR comprising the amino acid sequence of SEQ ID NO:321;

B)

the antibody is

(a) (i) a human or humanized antibody;

(ii) a full-length antibody; and/or

(iii) an IgG1, IgG2, IgG3 or IgG4 antibody, preferably an IgG1 antibody; or

(b) a bispecific antibody, a biparatopic antibody, a single chain antibody (scFv), an Fab fragment, an $F(ab')_2$ fragment, an Fab' fragment, an Fsc fragment, an Fv fragment, an scFv, an $sc(Fv)_2$, or a diabody, optionally wherein

(i) the antibody is a biparatopic antibody comprising two heavy chain-light chain pairs or one heavy chain-light chain pair; or

(ii) the biparatopic antibody is a full-length antibody;

optionally wherein the biparatopic antibody comprises one heavy chain-light chain pair;

and/or

C)

the antibody is conjugated to a toxic substance, optionally wherein the antibody is conjugated to a radioisotope or a cytotoxic agent.

13. A nucleic acid or a set of nucleic acids, which collectively encodes the antibody of any one of claims 1-12.

14. An expression vector or a set of expression vectors comprising the nucleic acid or the set of nucleic acids of claim 13 operably linked to a promoter.

15. An isolated cell comprising the nucleic acid or the set of nucleic acids of claim 13 or the expression vector or the set of expression vectors of claim 14.

16. A method of making the antibody of any one of claims 1-12, comprising culturing the cell of claim 15 and isolating the antibody.

17. A pharmaceutical composition comprising the antibody of any one of claims 1-12, the nucleic acid or the set of nucleic acids of claim 13, the expression vector or the set of expression vectors of claim 14, or the isolated cell of claim 15, and a pharmaceutically acceptable carrier.

18. The antibody of any one of claims 1-12 or the pharmaceutical composition of claim 17 for use in the treatment of a myeloproliferative neoplasm in a human subject, optionally wherein the myeloproliferative neoplasm is selected from the group consisting of chronic myelogenous leukemia, polycythemia vera, primary myelofibrosis, essential thrombocythemia, chronic neutrophilic leukemia, acute myelogenus leukemia, chronic eosinophilic leukemia, chronic myelomonocytic leukemia, myeloproliferative neoplasm and myelodysplastic syndrome, including myelodysplastic syndrome with refractory anaemia with ring sideroblasts, myelodysplastic syndrome with refractory anemia, and myelodysplastic syndrome with refractory anemia with excess blasts.

19. The antibody or the pharmaceutical composition of claim 18, wherein an additional therapy selected from the group consisting of a Janus tyrosine kinase (JAK) inhibitor, a phosphoinositide 3-kinase (PI3K) inhibitor, a standard of care therapy, or a combination thereof, is to be administered to the human subject, optionally wherein

(a) the JAK inhibitor is ruxolitinib and itaticinib;

(b) the PI3K inhibitor is parsaclisib; or

(c) the standard of care therapy is selected from the group consisting of IFN-alpha, hydroxyurea, thalidomide, lenalidomide, an androgen, an erythropoietin-stimulating agent, a chemotherapeutic agent, or a combination thereof.

20. The antibody or the pharmaceutical composition of claim 19, wherein the antibody of any one of claims 1-12 or the pharmaceutical composition of claim 17 is to be administered to the human subject in combination with the JAK inhibitor to produce a synergistic effect, optionally wherein the JAK inhibitor is ruxolitinib.

21. Use of the antibody of any one of claims 1-12 or the pharmaceutical composition of claim 17 in the manufacture of a medicament for the treatment of a myeloproliferative neoplasm in a human subject, optionally wherein the myeloproliferative neoplasm is selected from the group consisting of chronic myelogenous leukemia, polycythemia vera, primary myelofibrosis, essential thrombocythemia, chronic neutrophilic leukemia, acute myelogenus leukemia, chronic eosinophilic leukemia, chronic myelomonocytic leukemia, myeloproliferative neoplasm and myelodysplastic syndrome, including myelodysplastic syndrome with refractory anaemia with ring sideroblasts, myelodysplastic syndrome with refractory anemia, and myelodysplastic syndrome with refractory anemia with excess blasts.

22. The use of claim 21, wherein an additional therapy selected from the group consisting of a Janus tyrosine kinase (JAK) inhibitor, a phosphoinositide 3-kinase (PI3K) inhibitor, a standard of care therapy, or a combination thereof, is to be administered to the human subject, optionally wherein

(a) the JAK inhibitor is ruxolitinib and itaticinib;

(b) the PI3K inhibitor is parsaclisib; or

(c) the standard of care therapy is selected from the group consisting of IFN-alpha, hydroxyurea, thalidomide, lenalidomide, an androgen, an erythropoietin-stimulating agent, a chemotherapeutic agent, or a combination thereof.

23. The use of claim 22, wherein the antibody of any one of claims 1-12 or the pharmaceutical composition of claim 17 is to be administered to the human subject in combination with the JAK inhibitor to produce a synergistic effect, optionally wherein the JAK inhibitor is ruxolitinib.

24. A kit comprising the antibody of any one of claims 1-12, the nucleic acid or the set of nucleic acids of claim 14, the expression vector or the set of expression vectors of claim 15, or the isolated cell of claim 16, and instructions for the kit to be used in the treatment of a myeloproliferative neoplasm in a human subject in need thereof, optionally with instructions for the kit to be used in combination with an additional therapy.

25. An *in vitro* method of

> detecting a CALR exon 9 mutation in a biological sample obtained from a human subject who has or is suspected of having a myeloproliferative neoplasm;

the method comprising contacting the sample with the antibody of any one of claims 1-12 such that the antibody binds to a mutCALR protein if the mutCALR protein is present in the biological sample.