

CLAIMS

1. An antibody or antigen binding fragment thereof, that binds complement component 5a receptor 1 (C5aR1) comprising a heavy chain variable region (VH) and light chain variable region (VL),
wherein the VH comprises three heavy chain complementarity determining regions (HCDRs), wherein the HCDR1, HCDR2 and HCDR3 comprise SEQ ID No: 6 (NYWMH), SEQ ID No: 7 (YLNPSGGYTKYAQKFQG), and SEQ ID No: 8 (SGGDNYGNPYFDR), respectively,
wherein the VL comprises three light chain complementarity determining regions (LCDRs), wherein the LCDR1, LCDR2 and LCDR3 comprise SEQ ID No: 9 (RASQSIVHSNGNTYLH), SEQ ID No:10 (KVSNRFS), and SEQ ID No:11 (AQYTLVPLT), respectively.
2. The antibody or antigen binding fragment of claim 1, wherein the antibody comprises an Fc domain selected from IgG1, IgG2, IgG3, and IgG4.
3. The antibody or antigen binding fragment of claim 1 or 2, wherein the antibody binds to C5aR1 and inhibits C5a mediated G α signaling.
4. The antibody or antigen binding fragment of any one of preceding claims, wherein the antibody binds to C5aR1 and inhibits calcium signaling.
5. The antibody or antigen binding fragment of any one of preceding claims, wherein the antibody binds to C5aR1 and inhibits CD11b expression.
6. The antibody or antigen binding fragment of any one of preceding claims, wherein the antibody binds to C5aR1 and inhibits neutropenia.
7. The antibody or antigen binding fragment of any one of preceding claims, wherein the antibody binds to C5aR1 and inhibits β -arrestin signaling.

8. The antibody or antigen binding fragment of any one of preceding claims, wherein the VH comprises SEQ ID NO: 14, and the VL comprises SEQ ID NO: 25.
9. The antibody or antigen binding fragment of claim 2, wherein the antibody comprises an Fc domain is IgG4.
10. The antibody or antigen binding fragment of claim 9, wherein the IgG4 comprises F234V, L235E, D265G, and S228P mutations.
11. The antibody or antigen binding fragment according to any one of claims 1-10 for use in treating an autoimmune disease in a subject in need of the treatment.
12. The antibody or antigen binding fragment for use according to claim 11, wherein the autoimmune disease is:
 - i) ANCA vasculitis;
 - ii) lupus;
 - iii) rheumatoid arthritis;
 - iv) a kidney disorder; or
 - v) stroke..