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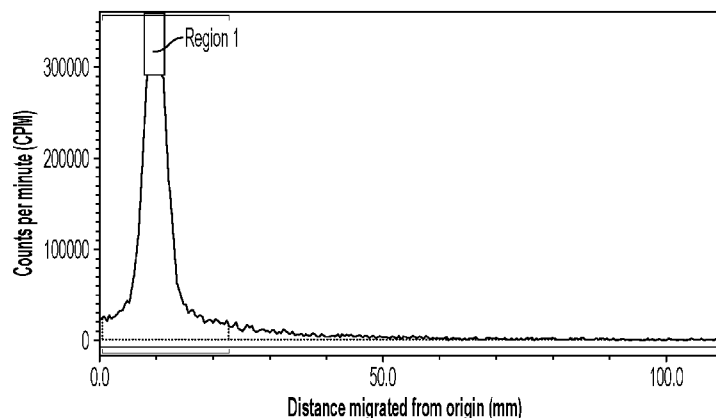
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(54) Title: TROPHOBLAST GLYCOPROTEIN ANTIBODY COMPOSITIONS AND METHODS OF USE



Sample	% labelled with Zr-89
Zr89-VHH1-Fc	99.7
Zr89-VHH3-Fc	99.6
Zr89-VHH7-Fc	99.9
Zr89-VHH10-Fc	99.6

FIG. 1

(57) Abstract: The disclosure related to antibodies that bind to 5T4 and conjugates comprising the antibodies. The disclosure also relates to methods of using the antibodies and/or antibody-conjugates and compositions comprising the antibodies and/or antibody-drug conjugates.



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TROPHOBLAST GLYCOPROTEIN ANTIBODY COMPOSITIONS AND METHODS OF USE

RELATED APPLICATIONS

5 This application claims the benefit under 35 U.S.C. § 119(e) of U.S. provisional application number 63/518,504, filed August 9, 2023, and provisional application number 63/563,740, filed March 11, 2024, each of which is incorporated by reference herein in its entirety.

BACKGROUND

10 Trophoblast glycoprotein, also known as 5T4, is a transmembrane protein that is expressed on the surface of a variety of cancer cells but is absent or expressed at very low levels on normal tissues. As such, 5T4 has been identified as an attractive target for cancer therapy. Antibodies that specifically bind to 5T4 have the potential to be used for the treatment of cancer,
15 either alone or in combination with other therapeutic agents.

SUMMARY

The present disclosure, in some aspects, relates to monoclonal antibodies that bind to 5T4 with high affinity and specificity, and methods of using these antibodies for the diagnosis
20 and treatment of cancer. The antibodies of the present disclosure are useful for targeting and killing cancer cells that express 5T4, and can be used to deliver therapeutic agents, such as radionuclides, directly to cancer cells, while sparing normal tissues.

Some aspects of the disclosure relate to an antibody comprising: a complementary determining region 1 (CDR1) comprising the amino acid sequence of any one of SEQ ID NOs:
25 351-700; a complementary determining region 2 (CDR2) comprising the amino acid sequence of any one of SEQ ID NOs: 701-1050; and/or a complementary determining region 3 (CDR3) comprising the amino acid sequence of any one of SEQ ID NOs: 1051-1400, wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of any one of
30 SEQ ID NOs: 1-350, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of any one of SEQ ID NOs: 1-350.

Some aspects relate to an antibody comprising: a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 593; a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 943; and/or a

complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1293. In some embodiments, this antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 243, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 243.

Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 421;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 771; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1121,

wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 71, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 71.

Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 658;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 1008; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1358,

wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 308, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 308.

Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 632;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 982; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1332,

wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 282, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 282.

Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 483;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 833; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1183,

wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 133, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 133.

5 Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 445;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 795; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1145,

wherein the antibody binds to 5T4.

10 In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 95, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 95.

Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 408;
- 15 a CDR2 comprising the amino acid sequence of SEQ ID NO: 758; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1108,

wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 58, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 58.

Some aspects relate to an antibody comprising:

- a CDR1 comprising the amino acid sequence of SEQ ID NO: 381;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 731; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1081,

25 wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 31, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 31.

Some aspects relate to an antibody comprising:

- 30 a CDR1 comprising the amino acid sequence of SEQ ID NO: 623;
- a CDR2 comprising the amino acid sequence of SEQ ID NO: 973; and/or
- a CDR3 comprising the amino acid sequence of SEQ ID NO: 1323,

wherein the antibody binds to 5T4.

In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 273, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 273.

5 In some embodiments, the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 10^{-9} M to 10^{-11} M.

In some embodiments, the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 1 nM to 0.01 nM.

In some embodiments, the antibody selectively binds to human 5T4 relative to a non-human 5T4.

10 In some embodiments, the antibody binds to human 5T4, mouse 5T4, cynomolgus monkey 5T4, or any combination thereof.

In some embodiments, the antibody is a single chain antibody.

In some embodiments, the single chain antibody is a heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody.

15 In some embodiments, the antibody is a humanized antibody.

In some embodiments, the antibody is a chimeric antibody.

Other aspects of the disclosure relate to a cell comprising the antibody of any one of the preceding paragraphs. In some embodiments, the cell is a cancer cell.

20 Yet other aspects of the disclosure relate to conjugate comprising the antibody of any one of the preceding paragraphs.

In some embodiments, the conjugate further comprises a radionuclide.

In some embodiments,

Still other aspects of the disclosure relate to pharmaceutical composition comprising the antibody of any one of the preceding paragraphs and a pharmaceutically acceptable excipient.

25 Some aspects relate to a method comprising administering to a subject the antibody of any one of preceding paragraphs, the conjugate of any one of the preceding paragraphs, the antibody-drug conjugate of any one of preceding paragraphs, or the pharmaceutical composition of any one of preceding paragraphs.

30 Other aspects relate to a nucleic acid or set of nucleic acids encoding the antibody of any one of preceding paragraphs.

Yet other aspects relate to a vector or set of vectors comprising one or more nucleic acid encoding the antibody of any one of preceding paragraphs.

Further aspects relate to a method of producing the antibody of any one of preceding paragraphs, the method comprising culturing the cell of any one of preceding paragraphs in cell culture and obtaining the antibody from the cell or cell culture.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1: RadioTLC scan of 5t4 VHH1-Fc labelled with Zr-89

Figure 2: *In vivo* PET imaging of H1975 tumors post 120h IV administration of Zr89 - VHH1-Fc (5t4 VHH binder) and Zr89-VHH10-Fc (negative control) in mice.

Figures 3A-3B: (Figure 3A) Image based quantification of the accumulation of Zr89-VHH Fc's in H1975 tumors after 120h IV administration in mice. (Figure 3B) Summary of the calculated pI's (isoelectric point) and Biacore kinetic data of the VHH monomer clones binding to 5t4 at pH 5.5 and 7.4.

Figure 4: Relative tumor:organ uptake ratios of Zr89-VHH Fc based on the PET imaging data and % of injected dose after 120h IV injection. The dotted line represents the "non-specific uptake" levels based on the biodistribution of the non-targeting Zr89-VHH10-Fc molecule.

DETAILED DESCRIPTION

The present disclosure relates to antibodies (e.g., VHH antibodies) that specifically bind to 5T4, also known as trophoblast glycoprotein. 5T4 is a transmembrane protein that is highly expressed on the surface of a variety of cancer cells, but is absent or expressed at very low levels on normal tissues. This makes it an attractive target for cancer therapy. Antibodies that bind to 5T4 have the potential to be used for the diagnosis and treatment of cancer, either alone or in combination with other therapeutic agents, such as radionuclides. In some embodiments, the present disclosure relates to monoclonal antibodies (e.g., VHH antibodies) that bind to 5T4 with high affinity and specificity, and methods of using these antibodies for the diagnosis and treatment of cancer. The antibodies of the present disclosure are useful, for example, for targeting and killing cancer cells that express 5T4, and can be used in some embodiments to deliver therapeutic agents directly to cancer cells, while sparing normal tissues.

In some embodiments, the antibodies are VHH antibodies, also known as nanobodies. VHH antibodies are a unique type of antibody that have gained popularity in recent years due to their small size and high stability. VHH antibodies are derived from the variable region of the heavy chain-only antibodies found in the camelid family and have a molecular weight of only about 15 kDa. This small size allows them to access and bind to epitopes that are inaccessible to

larger antibodies and also makes them more stable in harsh environments such as the gastrointestinal tract or extreme temperatures. VHH antibodies have shown promise as therapeutics for a wide range of diseases, including cancer, autoimmune disorders, and infectious diseases. Due to their unique properties, VHH antibodies have the potential to overcome some of the limitations of traditional antibodies and may offer new opportunities for the development of therapeutics.

In some embodiments, the antibodies of the present disclosure are conjugated to a therapeutic agent, such as a radionuclide. Radionuclides are unstable atomic nuclei that emit radiation in the form of alpha, beta, or gamma particles in order to become more stable. These particles can be harnessed for a variety of purposes, including medical imaging, cancer treatment, and industrial applications. For example, alpha emitters are highly effective at killing cancer cells because they release high-energy particles that can only travel a short distance, while beta emitters are useful for imaging and therapy because they can penetrate deeper into tissue. Radionuclides used in therapeutics, for example, are often attached to targeting molecules, such as antibodies, peptides, or small molecules, in order to deliver the radiation directly to a specific cell or tissue. This targeted approach minimizes damage to healthy cells and tissues, while maximizing the radiation dose to the target. Radionuclides have been used in a range of diagnostic and therapeutic applications, including PET imaging, SPECT imaging, radioimmunotherapy, and targeted radionuclide therapy.

Antibodies Binding to 5T4

The present disclosure provides antibodies that bind to 5T4 (i.e., trophoblast glycoprotein) and are capable of targeting cells having 5T4 on their surface (e.g., cancer cells expressing 5T4). An antibody that binds to 5T4 may be referred to as an anti-5T4 antibody.

An antibody (interchangeably used in plural form) is an immunoglobulin molecule capable of specific binding to a target, such as a carbohydrate, polynucleotide, lipid, polypeptide, etc., through at least one antigen recognition site, located in the variable region of the immunoglobulin molecule. As used herein, the term “antibody” encompasses not only intact (i.e., full-length) polyclonal or monoclonal antibodies, but also antigen-binding fragments thereof (such as Fab, Fab', F(ab')₂, Fv), mutants thereof, fusion proteins comprising an antibody portion, humanized antibodies, chimeric antibodies, diabodies, nanobodies, linear antibodies, single chain antibodies (e.g., heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody), multispecific antibodies (e.g., bispecific antibodies) and any

other modified configuration of the immunoglobulin molecule that comprises an antigen recognition site of the required specificity, including glycosylation variants of antibodies, amino acid sequence variants of antibodies, and covalently modified antibodies. An antibody includes an antibody of any class, such as IgD, IgE, IgG, IgA, or IgM (or sub-class thereof), and the antibody need not be of any particular class. Depending on the antibody amino acid sequence of the constant domain of its heavy chains, immunoglobulins can be assigned to different classes. There are five major classes of immunoglobulins: IgA, IgD, IgE, IgG, and IgM, and several of these may be further divided into subclasses (isotypes), *e.g.*, IgG1, IgG2, IgG3, IgG4, IgA1 and IgA2. The heavy-chain constant domains that correspond to the different classes of immunoglobulins are called alpha, delta, epsilon, gamma, and mu, respectively. The subunit structures and three-dimensional configurations of different classes of immunoglobulins are well known.

A typical antibody molecule comprises a heavy chain variable region (V_H) and a light chain variable region (V_L), which are usually involved in antigen binding. The V_H and V_L regions can be further subdivided into regions of hypervariability, also known as “complementarity determining regions” (“CDR”), interspersed with regions that are more conserved, which are known as “framework regions” (“FR”). Each V_H and V_L is typically composed of three CDRs and four FRs, arranged from amino-terminus to carboxy-terminus in the following order: FR1, CDR1, FR2, CDR2, FR3, CDR3, FR4. The extent of the framework region and CDRs can be precisely identified using methodology known in the art, for example, by the Kabat definition, the Chothia definition, the AbM definition, and/or the contact definition, all of which are well known in the art. See, *e.g.*, Kabat, E.A., *et al.* (1991) *Sequences of Proteins of Immunological Interest, Fifth Edition*, U.S. Department of Health and Human Services, NIH Publication No. 91-3242, Chothia *et al.*, (1989) *Nature* 342:877; Chothia, C. *et al.* (1987) *J. Mol. Biol.* 196:901-917, Al-lazikani *et al* (1997) *J. Molec. Biol.* 273:927-948; and Almagro, J. *Mol. Recognit.* 17:132-143 (2004). See also hgmp.mrc.ac.uk and bioinf.org.uk/abs.

In some embodiments, the anti-5T4 antibodies as described herein can bind and inhibit the activity of 5T4 by at least 50% (*e.g.*, 60%, 70%, 80%, 90%, 95% or greater). The apparent inhibition constant (K_i^{app} or $K_{i,app}$), which provides a measure of inhibitor potency, is related to the concentration of inhibitor required to reduce enzyme activity and is not dependent on enzyme concentrations. The inhibitory activity of an anti-5T4 antibody described herein can be determined by routine methods known in the art.

The antibodies described herein can be murine, rat, human, camelid (including from camels, alpacas, and llamas), or any other origin (including chimeric or humanized antibodies). Such antibodies are non-naturally occurring, *i.e.*, would not be produced in an animal without human act (*e.g.*, immunizing such an animal with a desired antigen or fragment thereof).

5 Any of the antibodies described herein can be either monoclonal or polyclonal. A “monoclonal antibody” refers to a homogenous antibody population and a “polyclonal antibody” refers to a heterogeneous antibody population. These two terms do not limit the source of an antibody or the manner in which it is made.

10 In one example, an antibody used in the methods described herein is a humanized antibody. Humanized antibodies refer to forms of non-human (*e.g.*, murine) antibodies that are specific chimeric immunoglobulins, immunoglobulin chains, or antigen-binding fragments thereof that contain minimal sequence derived from non-human immunoglobulin. In some embodiments, humanized antibodies are human immunoglobulins (recipient antibody) in which residues from a complementary determining region (CDR) of the recipient are replaced by
15 residues from a CDR of a non-human species (donor antibody) such as mouse, rat, or rabbit having the desired specificity, affinity, and capacity. In some instances, Fv framework region (FR) residues of the human immunoglobulin are replaced by corresponding non-human residues. Furthermore, the humanized antibody may comprise residues that are found neither in the recipient antibody nor in the imported CDR or framework sequences but are included to further
20 refine and optimize antibody performance. In general, the humanized antibody will comprise substantially all of at least one, and typically two, variable domains, in which all or substantially all of the CDR regions correspond to those of a non-human immunoglobulin and all or substantially all of the FR regions are those of a human immunoglobulin consensus sequence. The humanized antibody optimally also will comprise at least a portion of an immunoglobulin
25 constant region or domain (Fc), typically that of a human immunoglobulin. Antibodies may have Fc regions modified as described in WO 99/58572.

30 In some embodiments, humanized antibodies are a heavy-chain variable domain (VHH) antibodies in which camelid-specific amino acids in the framework region(s) have been replaced with corresponding human-specific amino acids. A humanized VHH antibody has been changed such that immunogenicity upon administration of the VHH in human patients is minor or nonexistent. Humanizing a VHH antibody may comprise a step of replacing one or more of the *Camelidae* amino acids by their human counterpart as found in the human consensus sequence, without that VHH losing its typical character (*e.g.*, the humanization does not significantly affect

the antigen binding capacity of the resulting VHH). In some embodiments, humanization of single domain antibodies (*e.g.*, VHH antibodies) requires the introduction and mutagenesis of a limited number of amino acids in a single VHH chain. This is in contrast to humanization of scFv, Fab, (Fab)₂ and IgG, which requires the introduction of amino acid changes in two chains, the light and the heavy chain and the preservation of the assembly of both chains.

Other forms of humanized antibodies have one or more CDRs (one, two, three, four, five, and/or six), which are altered with respect to the original antibody, which are also termed one or more CDRs “derived from” one or more CDRs from the original antibody. Humanized antibodies may also involve affinity maturation.

In another example, an antibody described herein can be a chimeric antibody, which can include a heavy constant region and a light constant region from a human antibody. Chimeric antibodies refer to antibodies having a variable region or part of variable region from a first species and a constant region from a second species. Typically, in these chimeric antibodies, the variable region of both light and heavy chains mimics the variable regions of antibodies derived from one species of mammals (*e.g.*, a non-human mammal such as mouse, rabbit, and rat), while the constant portions are homologous to the sequences in antibodies derived from another mammal such as human. In some embodiments, amino acid modifications can be made in the variable region and/or the constant region.

In some embodiments, the anti-5T4 antibodies described herein specifically bind to the corresponding target antigen or an epitope thereof. A molecule is said to exhibit “specific binding” if it reacts more frequently, more rapidly, with greater duration and/or with greater affinity with a particular target antigen than it does with alternative targets. An antibody “specifically binds” to a target antigen or epitope if it binds with greater affinity, avidity, more readily, and/or with greater duration than it binds to other substances. An antibody that specifically (or preferentially) binds to 5T4 or an antigenic epitope therein is an antibody that binds this target antigen with greater affinity, avidity, more readily, and/or with greater duration than it binds to other antigens or other epitopes in the same antigen. It is also understood with this definition that, for example, an antibody that specifically binds to a first target antigen may or may not specifically or preferentially bind to a second target antigen. As such, “specific binding” or “preferential binding” does not necessarily require (although it can include) exclusive binding. In some examples, an antibody that “specifically binds” to a target antigen or an epitope thereof may not bind to other antigens or other epitopes in the same antigen. In some embodiments, the anti-5T4 antibodies described herein specifically binds human 5T4. In some

examples, its binding activity to a non-human 5T4 antigen is not detectable in a conventional assay or is very low such that it would have no significant biological significance as known to those skilled in the art. In other examples, the anti-5T4 antibodies described herein may cross-react with 5T4 from different species, for example, between human 5T4 and a non-human 5T4 (e.g., 5T4 from an experimental animal such as a non-human primate, mouse, or rat).

In some embodiments, an anti-5T4 antibody may specifically bind to any extracellular epitope of 5T4 or an epitope that becomes exposed to an antibody. In some embodiments, an anti-5T4 antibody binds to an amino acid segment of a human or non-human primate 5T4. In some embodiments, an anti-5T4 antibody specifically binds to its target with a binding affinity (K_D) of about 0.01 nM to about 1 nM. In some embodiments, an anti-5T4 antibody specifically binds to its target with a K_D of about 0.001 nM to about 10 nM. In some embodiments, an anti-5T4 antibody specifically binds to its target with a K_D of about 10^{-6} M, 10^{-7} M, 10^{-8} M, 10^{-9} M, 10^{-10} M, 10^{-11} M, 10^{-12} M, 10^{-13} M. In some embodiments, an anti-5T4 antibody specifically binds to its target with a K_D of about 10^{-9} M to 10^{-11} M.

An example human 5T4 amino acid sequence, corresponding to NCBI sequence NP_001159864.1 (Trophoblast Glycoprotein Precursor, *Homo sapiens*) is as follows:

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MPGGCSRGA AGDGRLRLAR LALVLLGWVS SSSPTSSASS FSSSAPFLAS
AVSAQPPLPD QCPALCECSE AARTVKCVNR NLTEVPTDLP AYVRNLFLLTG
NQLAVLPAGA FARRPPLAEL AALNLSGSRL DEVRAGAFEH LPSLRQLDLS
HNPLADLSPF AFSGSNASVS APSPLVELIL NHIVPPEDER QNRSFEGMVV
AALLAGRALQ GLRRLELASN HFLYLPRDVL AQLPSLRHLD LSNNSLVSLT
YVSFRNLTHL ESLHLEDNAL KVLHNGTLAE LQGLPHIRVF LDNNPWV CDC
HMADMVTWLK ETEVVQ GKDR LTCAYPEKMR NRVLLELNSA DLDCDPILPP
SLQTSYVFLG IVLALIGAIF LLVLYLNRKG IKKWMHNIRD ACRDHMEGYH
YRYEINADPR LTNLSSNSDV (SEQ ID NO: 1401).

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In some embodiments, an anti-5T4 antibody as described herein has a suitable binding affinity for the target antigen (e.g., human 5T4) or antigenic epitopes thereof. As used herein, “binding affinity” refers to the apparent association constant (K_A). The K_A is the reciprocal of the dissociation constant (K_D). An increased binding affinity corresponds to a decreased K_D .

Higher affinity binding of an antibody for a first antigen relative to a second antigen can be indicated by a higher K_A (or a smaller numerical value K_D) for binding the first antigen than the K_A (or numerical value K_D) for binding the second antigen. In such cases, an antibody has specificity for the first antigen (e.g., a first protein in a first conformation or mimic thereof)

relative to the second antigen (*e.g.*, the same first protein in a second conformation or mimic thereof; or a second protein). In some embodiments, the anti-5T4 antibodies described herein have a higher binding affinity (a higher K_A or smaller K_D) to human 5T4 as compared to the binding affinity to 5T4 of a different species. Differences in binding affinity (*e.g.*, for specificity
5 or other comparisons) can be at least 1.5, 2, 3, 4, 5, 10, 15, 20, 37.5, 50, 70, 80, 91, 100, 500, 1000, 10,000 or 10^5 fold. In some embodiments, any of the anti-5T4 antibodies may be further affinity matured to increase the binding affinity of the antibody to the target antigen or antigenic epitope thereof.

Binding affinity (or binding specificity) can be determined by a variety of methods
10 including equilibrium dialysis, equilibrium binding, gel filtration, ELISA, surface plasmon resonance, or spectroscopy (*e.g.*, using a fluorescence assay). Exemplary conditions for evaluating binding affinity are in HBS-P buffer (10 mM HEPES pH7.4, 150 mM NaCl, 0.005% (v/v) Surfactant P20). These techniques can be used to measure the concentration of bound binding protein as a function of target protein concentration. The concentration of bound binding
15 protein ([Bound]) is generally related to the concentration of free target protein ([Free]) by the following equation:

$$[\text{Bound}] = [\text{Free}] / (K_D + [\text{Free}])$$

It is not always necessary to make an exact determination of K_A , though, since sometimes it is sufficient to obtain a quantitative measurement of affinity, *e.g.*, determined using
20 a method such as ELISA or FACS analysis, is proportional to K_A , and thus can be used for comparisons, such as determining whether a higher affinity is, *e.g.*, 2-fold higher, to obtain a qualitative measurement of affinity, or to obtain an inference of affinity, *e.g.*, by activity in a functional assay, *e.g.*, an in vitro or in vivo assay.

In some embodiments, the anti-5T4 antibodies described herein bind to the same epitope
25 in a 5T4 antigen (*e.g.*, human 5T4) as a reference antibody known in the art. In some embodiments, the reference antibody is PF-06281192 (huA1mAb). An antibody that binds the same epitope as a reference antibody described herein may bind to the same epitope or a substantially overlapping epitope (*e.g.*, containing less than 3 non-overlapping amino acid residue, less than 2 non-overlapping amino acid residues, or only 1 non-overlapping amino acid
30 residue) as the reference antibody. Whether two antibodies compete against each other from binding to the cognate antigen can be determined by a competition assay, which is well known in the art. Such antibodies can be identified as known to those skilled in the art, *e.g.*, those

having substantially similar structural features (*e.g.*, complementary determining regions), and/or those identified by assays known in the art. For example, competition assays can be performed using one of the reference antibodies to determine whether a candidate antibody binds to the same epitope as the reference antibody or competes against its binding to the 5T4 antigen.

5 The anti-5T4 antibodies described herein may comprise a complementary determining region 1 (CDR1), a complementary determining region 2 (CDR2), and a complementary determining region 3 (CDR3).

 In some embodiments, an anti-5T4 antibody is a single-chain antibody (*e.g.*, heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody). In some
10 embodiments, an anti-5T4 antibody is a heavy-chain variable domain (VHH) antibody.

 In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1051. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1052. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1053. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
15 1054. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1055. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1056. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1057. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1058. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
20 1059. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1060. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1061. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1062. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1063. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
25 1064. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1065. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1066. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1067. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1068. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
30 1069. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1070. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1071. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:
1072. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:

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NO: 434, the amino acid sequence of SEQ ID NO: 784, and/or the amino acid sequence of SEQ
ID NO: 1134. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 435, the amino acid sequence of SEQ ID NO: 785, and/or the amino acid sequence of SEQ
ID NO: 1135. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
5 NO: 436, the amino acid sequence of SEQ ID NO: 786, and/or the amino acid sequence of SEQ
ID NO: 1136. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 437, the amino acid sequence of SEQ ID NO: 787, and/or the amino acid sequence of SEQ
ID NO: 1137. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 438, the amino acid sequence of SEQ ID NO: 788, and/or the amino acid sequence of SEQ
10 ID NO: 1138. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 439, the amino acid sequence of SEQ ID NO: 789, and/or the amino acid sequence of SEQ
ID NO: 1139. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 440, the amino acid sequence of SEQ ID NO: 790, and/or the amino acid sequence of SEQ
ID NO: 1140. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
15 NO: 441, the amino acid sequence of SEQ ID NO: 791, and/or the amino acid sequence of SEQ
ID NO: 1141. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 442, the amino acid sequence of SEQ ID NO: 792, and/or the amino acid sequence of SEQ
ID NO: 1142. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 443, the amino acid sequence of SEQ ID NO: 793, and/or the amino acid sequence of SEQ
20 ID NO: 1143. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 444, the amino acid sequence of SEQ ID NO: 794, and/or the amino acid sequence of SEQ
ID NO: 1144. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 445, the amino acid sequence of SEQ ID NO: 795, and/or the amino acid sequence of SEQ
ID NO: 1145. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
25 NO: 446, the amino acid sequence of SEQ ID NO: 796, and/or the amino acid sequence of SEQ
ID NO: 1146. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 447, the amino acid sequence of SEQ ID NO: 797, and/or the amino acid sequence of SEQ
ID NO: 1147. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 448, the amino acid sequence of SEQ ID NO: 798, and/or the amino acid sequence of SEQ
30 ID NO: 1148. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 449, the amino acid sequence of SEQ ID NO: 799, and/or the amino acid sequence of SEQ
ID NO: 1149. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID
NO: 450, the amino acid sequence of SEQ ID NO: 800, and/or the amino acid sequence of SEQ

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ID NO: 1348. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 649, the amino acid sequence of SEQ ID NO: 999, and/or the amino acid sequence of SEQ ID NO: 1349. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 650, the amino acid sequence of SEQ ID NO: 1000, and/or the amino acid sequence of SEQ ID NO: 1350. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 651, the amino acid sequence of SEQ ID NO: 1001, and/or the amino acid sequence of SEQ ID NO: 1351. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 652, the amino acid sequence of SEQ ID NO: 1002, and/or the amino acid sequence of SEQ ID NO: 1352. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 653, the amino acid sequence of SEQ ID NO: 1003, and/or the amino acid sequence of SEQ ID NO: 1353. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 654, the amino acid sequence of SEQ ID NO: 1004, and/or the amino acid sequence of SEQ ID NO: 1354. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 655, the amino acid sequence of SEQ ID NO: 1005, and/or the amino acid sequence of SEQ ID NO: 1355. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 656, the amino acid sequence of SEQ ID NO: 1006, and/or the amino acid sequence of SEQ ID NO: 1356. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 657, the amino acid sequence of SEQ ID NO: 1007, and/or the amino acid sequence of SEQ ID NO: 1357. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 658, the amino acid sequence of SEQ ID NO: 1008, and/or the amino acid sequence of SEQ ID NO: 1358. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 659, the amino acid sequence of SEQ ID NO: 1009, and/or the amino acid sequence of SEQ ID NO: 1359. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 660, the amino acid sequence of SEQ ID NO: 1010, and/or the amino acid sequence of SEQ ID NO: 1360. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 661, the amino acid sequence of SEQ ID NO: 1011, and/or the amino acid sequence of SEQ ID NO: 1361. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 662, the amino acid sequence of SEQ ID NO: 1012, and/or the amino acid sequence of SEQ ID NO: 1362. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 663, the amino acid sequence of SEQ ID NO: 1013, and/or the amino acid sequence of SEQ ID NO: 1363. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 664, the amino acid sequence of SEQ ID NO: 1014, and/or the amino acid sequence of SEQ ID NO: 1364. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID

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NO: 698, the amino acid sequence of SEQ ID NO: 1048, and/or the amino acid sequence of SEQ ID NO: 1398. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 699, the amino acid sequence of SEQ ID NO: 1049, and/or the amino acid sequence of SEQ ID NO: 1399. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 700, the amino acid sequence of SEQ ID NO: 1050, and/or the amino acid sequence of SEQ ID NO: 1400.

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embodiments, an antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO:

29. In some embodiments, an antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

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at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 44. In some embodiments, an antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 45. In some embodiments, an antibody comprises an amino acid

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98% identity to the amino acid sequence of SEQ ID NO: 349. In some embodiments, an antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 350.

In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO:

- 5 1. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 2. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 3. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 4. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 5. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 6. In some
- 10 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 7. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 8. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 9. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 10. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 11. In some
- 15 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 12. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 13. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 14. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 15. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 16. In some
- 20 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 17. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 18. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 19. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 20. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 21. In some
- 25 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 22. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 23. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 24. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 25. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 26. In some
- 30 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 27. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 28. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 29. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 30. In some

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embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 328. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 329. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 330. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 331. In some
5 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 332. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 333. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 334. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 335. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 336. In some
10 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 337. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 338. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 339. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 340. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 341. In some
15 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 342. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 343. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 344. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 345. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 346. In some
20 embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 347. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 348. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 349. In some embodiments, an antibody comprises the amino acid sequence of SEQ ID NO: 350.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
25 SEQ ID NO: 351; a CDR2 comprising the amino acid sequence of SEQ ID NO: 701; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1051, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
SEQ ID NO: 1. In some embodiments, the antibody comprises the amino acid sequence of SEQ
30 ID NO: 1.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
SEQ ID NO: 352; a CDR2 comprising the amino acid sequence of SEQ ID NO: 702; and/or a
CDR3 comprising the amino acid sequence of SEQ ID NO: 1052, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 2. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 2.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 353; a CDR2 comprising the amino acid sequence of SEQ ID NO: 703; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1053, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 3. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 3.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 354; a CDR2 comprising the amino acid sequence of SEQ ID NO: 704; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1054, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 4. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 4.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 355; a CDR2 comprising the amino acid sequence of SEQ ID NO: 705; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1055, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 5. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 5.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 356; a CDR2 comprising the amino acid sequence of SEQ ID NO: 706; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1056, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 6. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 6.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 357; a CDR2 comprising the amino acid sequence of SEQ ID NO: 707; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1057, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 7. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 7.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 358; a CDR2 comprising the amino acid sequence of SEQ ID NO: 708; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1058, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 8. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 8.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 359; a CDR2 comprising the amino acid sequence of SEQ ID NO: 709; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1059, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 9. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 9.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 360; a CDR2 comprising the amino acid sequence of SEQ ID NO: 710; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1060, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 10. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 10.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 361; a CDR2 comprising the amino acid sequence of SEQ ID NO: 711; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1061, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 11. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 11.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 362; a CDR2 comprising the amino acid sequence of SEQ ID NO: 712; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1062, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 12. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 12.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 363; a CDR2 comprising the amino acid sequence of SEQ ID NO: 713; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1063, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 13. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 13.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 364; a CDR2 comprising the amino acid sequence of SEQ ID NO: 714; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1064, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 14. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 14.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 365; a CDR2 comprising the amino acid sequence of SEQ ID NO: 715; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1065, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 15. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 15.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 366; a CDR2 comprising the amino acid sequence of SEQ ID NO: 716; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1066, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 16. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 16.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 367; a CDR2 comprising the amino acid sequence of SEQ ID NO: 717; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1067, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 17. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 17.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 368; a CDR2 comprising the amino acid sequence of SEQ ID NO: 718; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1068, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 18. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 18.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 369; a CDR2 comprising the amino acid sequence of SEQ ID NO: 719; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1069, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 19. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 19.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 370; a CDR2 comprising the amino acid sequence of SEQ ID NO: 720; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1070, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 20. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 20.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 371; a CDR2 comprising the amino acid sequence of SEQ ID NO: 721; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1071, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 21. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 21.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 372; a CDR2 comprising the amino acid sequence of SEQ ID NO: 722; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1072, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 22. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 22.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 373; a CDR2 comprising the amino acid sequence of SEQ ID NO: 723; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1073, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 23. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 23.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 374; a CDR2 comprising the amino acid sequence of SEQ ID NO: 724; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1074, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 24. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 24.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 375; a CDR2 comprising the amino acid sequence of SEQ ID NO: 725; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1075, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 25. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 25.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 376; a CDR2 comprising the amino acid sequence of SEQ ID NO: 726; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1076, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 26. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 26.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 377; a CDR2 comprising the amino acid sequence of SEQ ID NO: 727; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1077, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 27. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 27.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 378; a CDR2 comprising the amino acid sequence of SEQ ID NO: 728; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1078, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 28. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 28.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 379; a CDR2 comprising the amino acid sequence of SEQ ID NO: 729; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1079, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 29. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 29.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 380; a CDR2 comprising the amino acid sequence of SEQ ID NO: 730; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1080, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 30. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 30.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 381; a CDR2 comprising the amino acid sequence of SEQ ID NO: 731; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1081, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 31. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 31.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 382; a CDR2 comprising the amino acid sequence of SEQ ID NO: 732; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1082, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 32. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 32.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 383; a CDR2 comprising the amino acid sequence of SEQ ID NO: 733; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1083, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 33. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 33.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 384; a CDR2 comprising the amino acid sequence of SEQ ID NO: 734; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1084, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 34. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 34.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 385; a CDR2 comprising the amino acid sequence of SEQ ID NO: 735; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1085, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 35. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 35.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 386; a CDR2 comprising the amino acid sequence of SEQ ID NO: 736; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1086, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 36. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 36.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 387; a CDR2 comprising the amino acid sequence of SEQ ID NO: 737; and/or a
15 CDR3 comprising the amino acid sequence of SEQ ID NO: 1087, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 37. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 37.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 388; a CDR2 comprising the amino acid sequence of SEQ ID NO: 738; and/or a
25 CDR3 comprising the amino acid sequence of SEQ ID NO: 1088, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 38. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 38.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 389; a CDR2 comprising the amino acid sequence of SEQ ID NO: 739; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1089, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 39. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 39.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 390; a CDR2 comprising the amino acid sequence of SEQ ID NO: 740; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1090, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 40. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 40.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 391; a CDR2 comprising the amino acid sequence of SEQ ID NO: 741; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1091, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 41. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 41.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 392; a CDR2 comprising the amino acid sequence of SEQ ID NO: 742; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1092, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 42. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 42.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 393; a CDR2 comprising the amino acid sequence of SEQ ID NO: 743; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1093, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 43. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 43.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 394; a CDR2 comprising the amino acid sequence of SEQ ID NO: 744; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1094, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 44. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 44.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 395; a CDR2 comprising the amino acid sequence of SEQ ID NO: 745; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1095, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 45. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 45.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 396; a CDR2 comprising the amino acid sequence of SEQ ID NO: 746; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1096, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 46. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 46.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 397; a CDR2 comprising the amino acid sequence of SEQ ID NO: 747; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1097, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 47. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 47.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 398; a CDR2 comprising the amino acid sequence of SEQ ID NO: 748; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1098, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 48. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 48.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 399; a CDR2 comprising the amino acid sequence of SEQ ID NO: 749; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1099, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 49. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 49.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 400; a CDR2 comprising the amino acid sequence of SEQ ID NO: 750; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1100, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 50. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 50.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 401; a CDR2 comprising the amino acid sequence of SEQ ID NO: 751; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1101, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 51. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 51.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 402; a CDR2 comprising the amino acid sequence of SEQ ID NO: 752; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1102, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 52. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 52.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 403; a CDR2 comprising the amino acid sequence of SEQ ID NO: 753; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1103, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 53. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 53.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 404; a CDR2 comprising the amino acid sequence of SEQ ID NO: 754; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1104, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 54. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 54.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 405; a CDR2 comprising the amino acid sequence of SEQ ID NO: 755; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1105, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 55. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 55.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 406; a CDR2 comprising the amino acid sequence of SEQ ID NO: 756; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1106, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 56. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 56.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 407; a CDR2 comprising the amino acid sequence of SEQ ID NO: 757; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1107, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 57. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 57.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 408; a CDR2 comprising the amino acid sequence of SEQ ID NO: 758; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1108, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 58. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 58.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 409; a CDR2 comprising the amino acid sequence of SEQ ID NO: 759; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1109, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 59. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 59.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 410; a CDR2 comprising the amino acid sequence of SEQ ID NO: 760; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1110, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 60. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 60.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 411; a CDR2 comprising the amino acid sequence of SEQ ID NO: 761; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1111, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 61. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 61.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 412; a CDR2 comprising the amino acid sequence of SEQ ID NO: 762; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1112, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 62. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 62.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 413; a CDR2 comprising the amino acid sequence of SEQ ID NO: 763; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1113, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 63. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 63.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 414; a CDR2 comprising the amino acid sequence of SEQ ID NO: 764; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1114, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 64. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 64.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 415; a CDR2 comprising the amino acid sequence of SEQ ID NO: 765; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1115, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 65. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 65.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 416; a CDR2 comprising the amino acid sequence of SEQ ID NO: 766; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1116, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 66. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 66.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 417; a CDR2 comprising the amino acid sequence of SEQ ID NO: 767; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1117, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 67. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 67.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 418; a CDR2 comprising the amino acid sequence of SEQ ID NO: 768; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1118, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 68. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 68.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 419; a CDR2 comprising the amino acid sequence of SEQ ID NO: 769; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1119, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 69. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 69.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 420; a CDR2 comprising the amino acid sequence of SEQ ID NO: 770; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1120, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 70. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 70.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 421; a CDR2 comprising the amino acid sequence of SEQ ID NO: 771; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1121, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 71. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 71.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 422; a CDR2 comprising the amino acid sequence of SEQ ID NO: 772; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1122, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 72. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 72.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 423; a CDR2 comprising the amino acid sequence of SEQ ID NO: 773; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1123, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 73. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 73.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 424; a CDR2 comprising the amino acid sequence of SEQ ID NO: 774; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1124, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 74. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 74.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 425; a CDR2 comprising the amino acid sequence of SEQ ID NO: 775; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1125, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 75. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 75.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 426; a CDR2 comprising the amino acid sequence of SEQ ID NO: 776; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1126, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 76. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 76.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 427; a CDR2 comprising the amino acid sequence of SEQ ID NO: 777; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1127, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 77. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 77.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 428; a CDR2 comprising the amino acid sequence of SEQ ID NO: 778; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1128, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 78. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 78.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 429; a CDR2 comprising the amino acid sequence of SEQ ID NO: 779; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1129, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 79. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 79.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 430; a CDR2 comprising the amino acid sequence of SEQ ID NO: 780; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1130, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 80. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 80.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 431; a CDR2 comprising the amino acid sequence of SEQ ID NO: 781; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1131, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 81. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 81.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 432; a CDR2 comprising the amino acid sequence of SEQ ID NO: 782; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1132, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 82. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 82.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 433; a CDR2 comprising the amino acid sequence of SEQ ID NO: 783; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1133, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 83. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 83.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 434; a CDR2 comprising the amino acid sequence of SEQ ID NO: 784; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1134, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 84. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 84.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 435; a CDR2 comprising the amino acid sequence of SEQ ID NO: 785; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1135, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 85. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 85.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 436; a CDR2 comprising the amino acid sequence of SEQ ID NO: 786; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1136, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 86. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 86.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 437; a CDR2 comprising the amino acid sequence of SEQ ID NO: 787; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1137, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 87. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 87.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 438; a CDR2 comprising the amino acid sequence of SEQ ID NO: 788; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1138, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 88. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 88.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 439; a CDR2 comprising the amino acid sequence of SEQ ID NO: 789; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1139, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 89. In some embodiments, the antibody comprises the amino acid sequence of SEQ
25 ID NO: 89.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 440; a CDR2 comprising the amino acid sequence of SEQ ID NO: 790; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1140, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 90. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 90.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 441; a CDR2 comprising the amino acid sequence of SEQ ID NO: 791; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1141, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 91. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 91.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 442; a CDR2 comprising the amino acid sequence of SEQ ID NO: 792; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1142, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 92. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 92.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 443; a CDR2 comprising the amino acid sequence of SEQ ID NO: 793; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1143, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 93. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 93.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 444; a CDR2 comprising the amino acid sequence of SEQ ID NO: 794; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1144, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 94. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 94.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 445; a CDR2 comprising the amino acid sequence of SEQ ID NO: 795; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1145, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 95. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 95.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 446; a CDR2 comprising the amino acid sequence of SEQ ID NO: 796; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1146, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 96. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 96.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 447; a CDR2 comprising the amino acid sequence of SEQ ID NO: 797; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1147, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 97. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 97.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 448; a CDR2 comprising the amino acid sequence of SEQ ID NO: 798; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1148, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 98. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 98.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 449; a CDR2 comprising the amino acid sequence of SEQ ID NO: 799; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1149, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 99. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 99.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 450; a CDR2 comprising the amino acid sequence of SEQ ID NO: 800; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1150, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 100. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 100.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 451; a CDR2 comprising the amino acid sequence of SEQ ID NO: 801; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1151, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 101. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 101.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 452; a CDR2 comprising the amino acid sequence of SEQ ID NO: 802; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1152, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 102. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 102.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 453; a CDR2 comprising the amino acid sequence of SEQ ID NO: 803; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1153, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 103. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 103.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 454; a CDR2 comprising the amino acid sequence of SEQ ID NO: 804; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1154, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 104. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 104.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 455; a CDR2 comprising the amino acid sequence of SEQ ID NO: 805; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1155, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 105. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 105.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 456; a CDR2 comprising the amino acid sequence of SEQ ID NO: 806; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1156, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 106. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 106.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 457; a CDR2 comprising the amino acid sequence of SEQ ID NO: 807; and/or a
15 CDR3 comprising the amino acid sequence of SEQ ID NO: 1157, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 107. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 107.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 458; a CDR2 comprising the amino acid sequence of SEQ ID NO: 808; and/or a
25 CDR3 comprising the amino acid sequence of SEQ ID NO: 1158, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 108. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 108.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 459; a CDR2 comprising the amino acid sequence of SEQ ID NO: 809; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1159, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 109. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 109.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 460; a CDR2 comprising the amino acid sequence of SEQ ID NO: 810; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1160, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 110. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 110.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 461; a CDR2 comprising the amino acid sequence of SEQ ID NO: 811; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1161, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 111. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 111.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 462; a CDR2 comprising the amino acid sequence of SEQ ID NO: 812; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1162, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 112. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 112.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 463; a CDR2 comprising the amino acid sequence of SEQ ID NO: 813; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1163, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 113. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 113.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 464; a CDR2 comprising the amino acid sequence of SEQ ID NO: 814; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1164, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 114. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 114.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 465; a CDR2 comprising the amino acid sequence of SEQ ID NO: 815; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1165, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 115. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 115.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 466; a CDR2 comprising the amino acid sequence of SEQ ID NO: 816; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1166, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 116. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 116.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 467; a CDR2 comprising the amino acid sequence of SEQ ID NO: 817; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1167, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 117. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 117.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 468; a CDR2 comprising the amino acid sequence of SEQ ID NO: 818; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1168, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 118. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 118.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 469; a CDR2 comprising the amino acid sequence of SEQ ID NO: 819; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1169, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 119. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 119.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 470; a CDR2 comprising the amino acid sequence of SEQ ID NO: 820; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1170, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 120. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 120.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 471; a CDR2 comprising the amino acid sequence of SEQ ID NO: 821; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1171, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 121. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 121.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 472; a CDR2 comprising the amino acid sequence of SEQ ID NO: 822; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1172, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 122. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 122.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 473; a CDR2 comprising the amino acid sequence of SEQ ID NO: 823; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1173, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 123. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 123.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 474; a CDR2 comprising the amino acid sequence of SEQ ID NO: 824; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1174, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 124. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 124.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 475; a CDR2 comprising the amino acid sequence of SEQ ID NO: 825; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1175, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 125. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 125.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 476; a CDR2 comprising the amino acid sequence of SEQ ID NO: 826; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1176, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 126. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 126.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 477; a CDR2 comprising the amino acid sequence of SEQ ID NO: 827; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1177, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 127. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 127.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 478; a CDR2 comprising the amino acid sequence of SEQ ID NO: 828; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1178, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 128. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 128.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 479; a CDR2 comprising the amino acid sequence of SEQ ID NO: 829; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1179, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 129. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 129.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 480; a CDR2 comprising the amino acid sequence of SEQ ID NO: 830; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1180, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 130. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 130.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 481; a CDR2 comprising the amino acid sequence of SEQ ID NO: 831; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1181, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 131. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 131.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 482; a CDR2 comprising the amino acid sequence of SEQ ID NO: 832; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1182, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 132. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 132.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 483; a CDR2 comprising the amino acid sequence of SEQ ID NO: 833; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1183, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 133. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 133.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 484; a CDR2 comprising the amino acid sequence of SEQ ID NO: 834; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1184, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 134. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 134.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 485; a CDR2 comprising the amino acid sequence of SEQ ID NO: 835; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1185, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 135. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 135.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 486; a CDR2 comprising the amino acid sequence of SEQ ID NO: 836; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1186, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 136. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 136.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 487; a CDR2 comprising the amino acid sequence of SEQ ID NO: 837; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1187, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 137. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 137.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 488; a CDR2 comprising the amino acid sequence of SEQ ID NO: 838; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1188, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 138. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 138.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 489; a CDR2 comprising the amino acid sequence of SEQ ID NO: 839; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1189, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 139. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 139.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 490; a CDR2 comprising the amino acid sequence of SEQ ID NO: 840; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1190, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 140. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 140.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 491; a CDR2 comprising the amino acid sequence of SEQ ID NO: 841; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1191, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 141. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 141.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 492; a CDR2 comprising the amino acid sequence of SEQ ID NO: 842; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1192, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 142. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 142.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 493; a CDR2 comprising the amino acid sequence of SEQ ID NO: 843; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1193, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 143. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 143.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 494; a CDR2 comprising the amino acid sequence of SEQ ID NO: 844; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1194, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 144. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 144.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 495; a CDR2 comprising the amino acid sequence of SEQ ID NO: 845; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1195, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 145. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 145.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 496; a CDR2 comprising the amino acid sequence of SEQ ID NO: 846; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1196, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 146. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 146.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 497; a CDR2 comprising the amino acid sequence of SEQ ID NO: 847; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1197, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 147. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 147.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 498; a CDR2 comprising the amino acid sequence of SEQ ID NO: 848; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1198, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 148. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 148.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 499; a CDR2 comprising the amino acid sequence of SEQ ID NO: 849; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1199, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 149. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 149.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 500; a CDR2 comprising the amino acid sequence of SEQ ID NO: 850; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1200, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 150. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 150.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 501; a CDR2 comprising the amino acid sequence of SEQ ID NO: 851; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1201, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 151. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 151.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 502; a CDR2 comprising the amino acid sequence of SEQ ID NO: 852; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1202, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 152. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 152.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 503; a CDR2 comprising the amino acid sequence of SEQ ID NO: 853; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1203, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 153. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 153.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 504; a CDR2 comprising the amino acid sequence of SEQ ID NO: 854; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1204, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 154. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 154.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 505; a CDR2 comprising the amino acid sequence of SEQ ID NO: 855; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1205, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 155. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 155.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 506; a CDR2 comprising the amino acid sequence of SEQ ID NO: 856; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1206, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 156. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 156.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 507; a CDR2 comprising the amino acid sequence of SEQ ID NO: 857; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1207, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 157. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 157.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 508; a CDR2 comprising the amino acid sequence of SEQ ID NO: 858; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1208, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 158. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 158.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 509; a CDR2 comprising the amino acid sequence of SEQ ID NO: 859; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1209, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 159. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 159.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 510; a CDR2 comprising the amino acid sequence of SEQ ID NO: 860; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1210, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 160. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 160.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 511; a CDR2 comprising the amino acid sequence of SEQ ID NO: 861; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1211, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 161. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 161.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 512; a CDR2 comprising the amino acid sequence of SEQ ID NO: 862; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1212, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 162. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 162.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 513; a CDR2 comprising the amino acid sequence of SEQ ID NO: 863; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1213, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 163. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 163.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 514; a CDR2 comprising the amino acid sequence of SEQ ID NO: 864; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1214, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 164. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 164.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 515; a CDR2 comprising the amino acid sequence of SEQ ID NO: 865; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1215, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 165. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 165.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 516; a CDR2 comprising the amino acid sequence of SEQ ID NO: 866; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1216, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 166. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 166.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 517; a CDR2 comprising the amino acid sequence of SEQ ID NO: 867; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1217, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 167. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 167.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 518; a CDR2 comprising the amino acid sequence of SEQ ID NO: 868; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1218, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 168. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 168.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 519; a CDR2 comprising the amino acid sequence of SEQ ID NO: 869; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1219, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 169. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 169.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 520; a CDR2 comprising the amino acid sequence of SEQ ID NO: 870; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1220, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 170. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 170.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 521; a CDR2 comprising the amino acid sequence of SEQ ID NO: 871; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1221, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 171. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 171.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 522; a CDR2 comprising the amino acid sequence of SEQ ID NO: 872; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1222, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 172. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 172.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 523; a CDR2 comprising the amino acid sequence of SEQ ID NO: 873; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1223, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 173. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 173.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 524; a CDR2 comprising the amino acid sequence of SEQ ID NO: 874; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1224, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 174. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 174.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 525; a CDR2 comprising the amino acid sequence of SEQ ID NO: 875; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1225, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 175. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 175.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 526; a CDR2 comprising the amino acid sequence of SEQ ID NO: 876; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1226, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 176. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 176.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 527; a CDR2 comprising the amino acid sequence of SEQ ID NO: 877; and/or a
15 CDR3 comprising the amino acid sequence of SEQ ID NO: 1227, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 177. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 177.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 528; a CDR2 comprising the amino acid sequence of SEQ ID NO: 878; and/or a
25 CDR3 comprising the amino acid sequence of SEQ ID NO: 1228, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 178. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 178.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 529; a CDR2 comprising the amino acid sequence of SEQ ID NO: 879; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1229, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 179. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 179.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 530; a CDR2 comprising the amino acid sequence of SEQ ID NO: 880; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1230, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 180. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 180.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 531; a CDR2 comprising the amino acid sequence of SEQ ID NO: 881; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1231, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 181. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 181.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 532; a CDR2 comprising the amino acid sequence of SEQ ID NO: 882; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1232, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 182. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 182.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 533; a CDR2 comprising the amino acid sequence of SEQ ID NO: 883; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1233, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 183. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 183.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 534; a CDR2 comprising the amino acid sequence of SEQ ID NO: 884; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1234, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 184. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 184.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 535; a CDR2 comprising the amino acid sequence of SEQ ID NO: 885; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1235, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 185. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 185.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 536; a CDR2 comprising the amino acid sequence of SEQ ID NO: 886; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1236, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 186. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 186.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 537; a CDR2 comprising the amino acid sequence of SEQ ID NO: 887; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1237, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 187. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 187.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 538; a CDR2 comprising the amino acid sequence of SEQ ID NO: 888; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1238, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 188. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 188.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 539; a CDR2 comprising the amino acid sequence of SEQ ID NO: 889; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1239, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 189. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 189.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 540; a CDR2 comprising the amino acid sequence of SEQ ID NO: 890; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1240, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 190. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 190.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 541; a CDR2 comprising the amino acid sequence of SEQ ID NO: 891; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1241, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 191. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 191.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 542; a CDR2 comprising the amino acid sequence of SEQ ID NO: 892; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1242, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 192. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 192.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 543; a CDR2 comprising the amino acid sequence of SEQ ID NO: 893; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1243, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 193. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 193.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 544; a CDR2 comprising the amino acid sequence of SEQ ID NO: 894; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1244, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 194. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 194.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 545; a CDR2 comprising the amino acid sequence of SEQ ID NO: 895; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1245, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 195. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 195.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 546; a CDR2 comprising the amino acid sequence of SEQ ID NO: 896; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1246, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 196. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 196.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 547; a CDR2 comprising the amino acid sequence of SEQ ID NO: 897; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1247, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 197. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 197.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 548; a CDR2 comprising the amino acid sequence of SEQ ID NO: 898; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1248, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 198. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 198.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 549; a CDR2 comprising the amino acid sequence of SEQ ID NO: 899; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1249, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 199. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 199.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 550; a CDR2 comprising the amino acid sequence of SEQ ID NO: 900; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1250, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 200. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 200.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 551; a CDR2 comprising the amino acid sequence of SEQ ID NO: 901; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1251, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 201. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 201.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 552; a CDR2 comprising the amino acid sequence of SEQ ID NO: 902; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1252, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 202. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 202.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 553; a CDR2 comprising the amino acid sequence of SEQ ID NO: 903; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1253, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 203. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 203.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 554; a CDR2 comprising the amino acid sequence of SEQ ID NO: 904; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1254, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 204. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 204.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 555; a CDR2 comprising the amino acid sequence of SEQ ID NO: 905; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1255, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 205. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 205.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 556; a CDR2 comprising the amino acid sequence of SEQ ID NO: 906; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1256, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 206. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 206.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 557; a CDR2 comprising the amino acid sequence of SEQ ID NO: 907; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1257, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 207. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 207.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 558; a CDR2 comprising the amino acid sequence of SEQ ID NO: 908; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1258, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 208. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 208.

10 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 559; a CDR2 comprising the amino acid sequence of SEQ ID NO: 909; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1259, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of 15 SEQ ID NO: 209. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 209.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 560; a CDR2 comprising the amino acid sequence of SEQ ID NO: 910; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1260, wherein the antibody binds to 20 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 210. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 210.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of 25 SEQ ID NO: 561; a CDR2 comprising the amino acid sequence of SEQ ID NO: 911; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1261, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 211. In some embodiments, the antibody comprises the amino acid sequence of 30 SEQ ID NO: 211.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 562; a CDR2 comprising the amino acid sequence of SEQ ID NO: 912; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1262, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 212. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 212.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 563; a CDR2 comprising the amino acid sequence of SEQ ID NO: 913; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1263, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 213. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 213.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 564; a CDR2 comprising the amino acid sequence of SEQ ID NO: 914; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1264, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 214. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 214.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 565; a CDR2 comprising the amino acid sequence of SEQ ID NO: 915; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1265, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 215. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 215.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 566; a CDR2 comprising the amino acid sequence of SEQ ID NO: 916; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1266, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 216. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 216.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 567; a CDR2 comprising the amino acid sequence of SEQ ID NO: 917; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1267, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 217. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 217.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 568; a CDR2 comprising the amino acid sequence of SEQ ID NO: 918; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1268, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 218. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 218.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 569; a CDR2 comprising the amino acid sequence of SEQ ID NO: 919; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1269, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 219. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 219.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 570; a CDR2 comprising the amino acid sequence of SEQ ID NO: 920; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1270, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 220. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 220.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 571; a CDR2 comprising the amino acid sequence of SEQ ID NO: 921; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1271, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 221. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 221.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 572; a CDR2 comprising the amino acid sequence of SEQ ID NO: 922; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1272, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 222. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 222.

10 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 573; a CDR2 comprising the amino acid sequence of SEQ ID NO: 923; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1273, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of 15 SEQ ID NO: 223. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 223.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 574; a CDR2 comprising the amino acid sequence of SEQ ID NO: 924; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1274, wherein the antibody binds to 20 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 224. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 224.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of 25 SEQ ID NO: 575; a CDR2 comprising the amino acid sequence of SEQ ID NO: 925; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1275, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 225. In some embodiments, the antibody comprises the amino acid sequence of 30 SEQ ID NO: 225.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 576; a CDR2 comprising the amino acid sequence of SEQ ID NO: 926; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1276, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 226. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 226.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 577; a CDR2 comprising the amino acid sequence of SEQ ID NO: 927; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1277, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 227. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 227.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 578; a CDR2 comprising the amino acid sequence of SEQ ID NO: 928; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1278, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 228. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 228.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 579; a CDR2 comprising the amino acid sequence of SEQ ID NO: 929; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1279, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 229. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 229.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 580; a CDR2 comprising the amino acid sequence of SEQ ID NO: 930; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1280, wherein the antibody binds to
30 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 230. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 230.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 581; a CDR2 comprising the amino acid sequence of SEQ ID NO: 931; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1281, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 231. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 231.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 582; a CDR2 comprising the amino acid sequence of SEQ ID NO: 932; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1282, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 232. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 232.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 583; a CDR2 comprising the amino acid sequence of SEQ ID NO: 933; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1283, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 233. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 233.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 584; a CDR2 comprising the amino acid sequence of SEQ ID NO: 934; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1284, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 234. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 234.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 585; a CDR2 comprising the amino acid sequence of SEQ ID NO: 935; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1285, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 235. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 235.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 586; a CDR2 comprising the amino acid sequence of SEQ ID NO: 936; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1286, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 236. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 236.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 587; a CDR2 comprising the amino acid sequence of SEQ ID NO: 937; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1287, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 237. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 237.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 588; a CDR2 comprising the amino acid sequence of SEQ ID NO: 938; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1288, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 238. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 238.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 589; a CDR2 comprising the amino acid sequence of SEQ ID NO: 939; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1289, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 239. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 239.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 590; a CDR2 comprising the amino acid sequence of SEQ ID NO: 940; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1290, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 240. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 240.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 591; a CDR2 comprising the amino acid sequence of SEQ ID NO: 941; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1291, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 241. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 241.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 592; a CDR2 comprising the amino acid sequence of SEQ ID NO: 942; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1292, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 242. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 242.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 593; a CDR2 comprising the amino acid sequence of SEQ ID NO: 943; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1293, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 243. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 243.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 594; a CDR2 comprising the amino acid sequence of SEQ ID NO: 944; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1294, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 244. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 244.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 595; a CDR2 comprising the amino acid sequence of SEQ ID NO: 945; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1295, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 245. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 245.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 596; a CDR2 comprising the amino acid sequence of SEQ ID NO: 946; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1296, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 246. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 246.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 597; a CDR2 comprising the amino acid sequence of SEQ ID NO: 947; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1297, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 247. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 247.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 598; a CDR2 comprising the amino acid sequence of SEQ ID NO: 948; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1298, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 248. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 248.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 599; a CDR2 comprising the amino acid sequence of SEQ ID NO: 949; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1299, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 249. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 249.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 600; a CDR2 comprising the amino acid sequence of SEQ ID NO: 950; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1300, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 250. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 250.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 601; a CDR2 comprising the amino acid sequence of SEQ ID NO: 951; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1301, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 251. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 251.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 602; a CDR2 comprising the amino acid sequence of SEQ ID NO: 952; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1302, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 252. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 252.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 603; a CDR2 comprising the amino acid sequence of SEQ ID NO: 953; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1303, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 253. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 253.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 604; a CDR2 comprising the amino acid sequence of SEQ ID NO: 954; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1304, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 254. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 254.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 605; a CDR2 comprising the amino acid sequence of SEQ ID NO: 955; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1305, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 255. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 255.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 606; a CDR2 comprising the amino acid sequence of SEQ ID NO: 956; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1306, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 256. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 256.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 607; a CDR2 comprising the amino acid sequence of SEQ ID NO: 957; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1307, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 257. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 257.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 608; a CDR2 comprising the amino acid sequence of SEQ ID NO: 958; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1308, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 258. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 258.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 609; a CDR2 comprising the amino acid sequence of SEQ ID NO: 959; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1309, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 259. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 259.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 610; a CDR2 comprising the amino acid sequence of SEQ ID NO: 960; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1310, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 260. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 260.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 611; a CDR2 comprising the amino acid sequence of SEQ ID NO: 961; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1311, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 261. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 261.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 612; a CDR2 comprising the amino acid sequence of SEQ ID NO: 962; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1312, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 262. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 262.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 613; a CDR2 comprising the amino acid sequence of SEQ ID NO: 963; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1313, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 263. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 263.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 614; a CDR2 comprising the amino acid sequence of SEQ ID NO: 964; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1314, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 264. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 264.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 615; a CDR2 comprising the amino acid sequence of SEQ ID NO: 965; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1315, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 265. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 265.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 616; a CDR2 comprising the amino acid sequence of SEQ ID NO: 966; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1316, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 266. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 266.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 617; a CDR2 comprising the amino acid sequence of SEQ ID NO: 967; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1317, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 267. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 267.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 618; a CDR2 comprising the amino acid sequence of SEQ ID NO: 968; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1318, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 268. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 268.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 619; a CDR2 comprising the amino acid sequence of SEQ ID NO: 969; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1319, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 269. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 269.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 620; a CDR2 comprising the amino acid sequence of SEQ ID NO: 970; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1320, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 270. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 270.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 621; a CDR2 comprising the amino acid sequence of SEQ ID NO: 971; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1321, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 271. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 271.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 622; a CDR2 comprising the amino acid sequence of SEQ ID NO: 972; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1322, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 272. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 272.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 623; a CDR2 comprising the amino acid sequence of SEQ ID NO: 973; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1323, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 273. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 273.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 624; a CDR2 comprising the amino acid sequence of SEQ ID NO: 974; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1324, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 274. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 274.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 625; a CDR2 comprising the amino acid sequence of SEQ ID NO: 975; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1325, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 275. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 275.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 626; a CDR2 comprising the amino acid sequence of SEQ ID NO: 976; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1326, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 276. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 276.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 627; a CDR2 comprising the amino acid sequence of SEQ ID NO: 977; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1327, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 277. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 277.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 628; a CDR2 comprising the amino acid sequence of SEQ ID NO: 978; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1328, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 278. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 278.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 629; a CDR2 comprising the amino acid sequence of SEQ ID NO: 979; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1329, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 279. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 279.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 630; a CDR2 comprising the amino acid sequence of SEQ ID NO: 980; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1330, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 280. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 280.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 631; a CDR2 comprising the amino acid sequence of SEQ ID NO: 981; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1331, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 281. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 281.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 632; a CDR2 comprising the amino acid sequence of SEQ ID NO: 982; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1332, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 282. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 282.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 633; a CDR2 comprising the amino acid sequence of SEQ ID NO: 983; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1333, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 283. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 283.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 634; a CDR2 comprising the amino acid sequence of SEQ ID NO: 984; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1334, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 284. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 284.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 635; a CDR2 comprising the amino acid sequence of SEQ ID NO: 985; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1335, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 285. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 285.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 636; a CDR2 comprising the amino acid sequence of SEQ ID NO: 986; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1336, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 286. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 286.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 637; a CDR2 comprising the amino acid sequence of SEQ ID NO: 987; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1337, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 287. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 287.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 638; a CDR2 comprising the amino acid sequence of SEQ ID NO: 988; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1338, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 288. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 288.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 639; a CDR2 comprising the amino acid sequence of SEQ ID NO: 989; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1339, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
20 SEQ ID NO: 289. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 289.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 640; a CDR2 comprising the amino acid sequence of SEQ ID NO: 990; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1340, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 290. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 290.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 641; a CDR2 comprising the amino acid sequence of SEQ ID NO: 991; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1341, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 291. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 291.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 642; a CDR2 comprising the amino acid sequence of SEQ ID NO: 992; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1342, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 292. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 292.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 643; a CDR2 comprising the amino acid sequence of SEQ ID NO: 993; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1343, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 293. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 293.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 644; a CDR2 comprising the amino acid sequence of SEQ ID NO: 994; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1344, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 294. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 294.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 645; a CDR2 comprising the amino acid sequence of SEQ ID NO: 995; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1345, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 295. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 295.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 646; a CDR2 comprising the amino acid sequence of SEQ ID NO: 996; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1346, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 296. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 296.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 647; a CDR2 comprising the amino acid sequence of SEQ ID NO: 997; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1347, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 297. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 297.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 648; a CDR2 comprising the amino acid sequence of SEQ ID NO: 998; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1348, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 298. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 298.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 649; a CDR2 comprising the amino acid sequence of SEQ ID NO: 999; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1349, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 299. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 299.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 650; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1000; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1350, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 300. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 300.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 651; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1001; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1351, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 301. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 301.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 652; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1002; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1352, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 302. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 302.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 653; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1003; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1353, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 303. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 303.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 654; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1004; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1354, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 304. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 304.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 655; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1005; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1355, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 305. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 305.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 656; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1006; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1356, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 306. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 306.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 657; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1007; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1357, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 307. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 307.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 658; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1008; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1358, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 308. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 308.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 659; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1009; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1359, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 309. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 309.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 660; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1010; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1360, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 310. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 310.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 661; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1011; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1361, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 311. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 311.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 662; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1012; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1362, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 312. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 312.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 663; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1013; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1363, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 313. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 313.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 664; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1014; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1364, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 314. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 314.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 665; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1015; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1365, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 315. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 315.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 666; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1016; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1366, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 316. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 316.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 667; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1017; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1367, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 317. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 317.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 668; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1018; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1368, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 318. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 318.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 669; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1019; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1369, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 319. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 319.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 670; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1020; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1370, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 320. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 320.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 671; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1021; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1371, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 321. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 321.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 672; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1022; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1372, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 322. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 322.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 673; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1023; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1373, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 323. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 323.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 674; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1024; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1374, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 324. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 324.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 675; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1025; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1375, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 325. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 325.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 676; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1026; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1376, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 326. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 326.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 677; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1027; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1377, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 327. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 327.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 678; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1028; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1378, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 328. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 328.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 679; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1029; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1379, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 329. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 329.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 680; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1030; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1380, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 330. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 330.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 681; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1031; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1381, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 331. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 331.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 682; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1032; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1382, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 332. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 332.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 683; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1033; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1383, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 333. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 333.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 684; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1034; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1384, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 334. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 334.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 685; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1035; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1385, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 335. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 335.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 686; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1036; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1386, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 336. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 336.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 687; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1037; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1387, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 337. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 337.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 688; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1038; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1388, wherein the antibody binds to

5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 338. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 338.

5 In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 689; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1039; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1389, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of
10 SEQ ID NO: 339. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 339.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 690; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1040; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1390, wherein the antibody binds to
15 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 340. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 340.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
20 SEQ ID NO: 691; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1041; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1391, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 341. In some embodiments, the antibody comprises the amino acid sequence of
25 SEQ ID NO: 341.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 692; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1042; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1392, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
30 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 342. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 342.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 693; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1043; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1393, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
5 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 343. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 343.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 694; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1044; and/or a
10 CDR3 comprising the amino acid sequence of SEQ ID NO: 1394, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 344. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 344.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 695; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1045; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1395, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%,
15 at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 345. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 345.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 696; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1046; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1396, wherein the antibody binds to
25 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 346. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 346.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of
30 SEQ ID NO: 697; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1047; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1397, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of

SEQ ID NO: 347. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 347.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 698; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1048; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1398, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 348. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 348.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 699; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1049; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1399, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 349. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 349.

In some aspects, an antibody comprises: a CDR1 comprising the amino acid sequence of SEQ ID NO: 700; a CDR2 comprising the amino acid sequence of SEQ ID NO: 1050; and/or a CDR3 comprising the amino acid sequence of SEQ ID NO: 1400, wherein the antibody binds to 5T4. In some embodiments, the antibody comprises an amino acid sequence having at least 80%, at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 350. In some embodiments, the antibody comprises the amino acid sequence of SEQ ID NO: 350.

Table 1. Exemplary Anti-5T4 antibody sequences

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP01F08	EVQLVESGGGLAQAGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNMSLKPEDTGVIYCAASRDW STKSSAYDYGQGTQVTSS	1	VYTIG	351	AIRLRGTAT WYADSVKG	701	SRDWSTKSS AYDY	1051
FJ2237MP01B11	EVQLVESGGGLAQAGGSLRLSCAASGRTSEVYTM GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAKNTMYLMNMSLKPEDTAVIYCAASRDW STKSSAYDYGQGTQVTSS	2	VYTMG	352	AIRLRGTAT WYADSVKG	702	SRDWSTKSS AYDY	1052
FJ2237MP01F11	EVQLVESGGGLAQAGGSLRLSCSASGRAFDKTM AWFRQAPGKEREFVAAIRLHGTATWYDTSVKGRF TVSRDTAKMSVYLQMDSLKPEDTAVIYCAASRDW SAFSSAYEYWGQGTQVTSS	3	MKTMA	353	AIRLHGTAT WYDTSVKG	703	GRDWSAFSS AYEY	1053

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP01E02	EVQLVESGGGLAQAGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFEVAAVRLRGATATWYADSVKGRF TISRDTAKITVYQLQMNSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	4	IYTMA	354	AVRLRGATAT WYADSVKG	704	GRDWSAFSS AYEY	1054
FJ2237MP03A02	EVQLVESGGGLMQAGGSLRLSCTAPGRTISNYAM GWFRQAPGKEREFEVAGISRGTSTLTGDSVKGRF TISRDNAKNTVYQLQMNDLKPEDTAVYYCAATSTS ASRRYGVFQSESESYWGQGTQVTVSS	5	NYAMG	355	GISRSGTST LTGDSVKG	705	TSTSASRRY GVFQSESEY SY	1055
FJ2237MP01D02	EVQLVESGGGLVQAGDSLRLSCAASGLTFDIKTM AWFRQAPGKEREFEVAAALRLRGATATWYADSVKGRF TISRDTPNPTVYQLQMNSLKPEDTAVYYCAAGRGW SAFSSAYEYWGQGTQVTVSS	6	IKTMA	356	ALRLRGATAT WYADSVKG	706	GRGWSAFSS AYEY	1056
FJ2237MP01A07	EVQLVESGGGLVQAGDSLRLSCAASGLTFDIKTM AWFRQAPGKEREFEVAAALRLRGATATWYADSVKGRF TISRDTPNPTVYQLQMNSLKPEDTAVYYCAAGRGW SAFSSAYEYWGQGTQVTVSS	7	IKTMA	357	ALRLRGATAT WYADSVKG	707	GRGWSAFSS AYEY	1057
FJ2237MP03G11	EVQLVESGGGLVQAGDSLRLSCQASGRTFSRDAL GWFRQAPGKEREFEVAAHIGWDGGSTFYADSVKGRF TISRDNAKNTVYQLQMNSLKPEDTAVYYCAAGSKA VVRPTGFDYWQGTQVTVSS	8	RDALG	358	HIGWDGGST YYADSVKG	708	GSKAVVRPT GFDY	1058
FJ2237MP02G02	EVQLVESGGGLVQAGDSLRLSCTASGGTFSTRAM GWFRQPPGKEREFEVGHIGWNGGSTFYADSVKGRF TISRDNAKNTVYQLQMNSLKPEDTAVYYCAAGSKP VVRPEDFHYWGQGTQVTVSS	9	TRAMG	359	HIGWNGGST FYADSVKG	709	GSKPVVRPE DFHY	1059
FJ2237MP04H03	EVQLVESGGGLVQAGESLRLSCAASGGTYGYAMG WFRQAPGKEREFEVGTITRSGTYYADSVKGRFTII SGDNAENTVYQLMNGLLPEDTAVYYCAARSVSYS RRYTAYSEMNDYTFWGQGTQVTVSS	10	GYAMG	360	TITRSGTYY YADSVKG	710	RSVSYSTRY TAYSEMNDY TF	1060
FJ2237MP04E09	EVQLVESGGGLVQAGESLRLSCAASGGTYGYAMG WFRQAPGKEREFEVGTITRSGTYYADSVKGRFTII SGDNAENTVYQLMNGLLPEDTAVYYCAARSVSYS RRYTAYSEMNDYTFWGQGTQVTVSS	11	GYAMG	361	TITRSGTYY YADSVKG	711	RSVSYSTRY TAYSEMNDY TF	1061
FJ2237MP04A08	EVQLVESGGGLVQAGGSLRLSCAASESLFRFNDA SWYRQGPQKQREWVARITSDSTGYAEAVKARST ISRDTTKNTVYQLMNGLLKPEDTAVYYCNTVPFRS WGQGTQVTVSS	12	FNDAS	362	RITSDDSTG YAEAVKA	712	VPFRS	1062
FJ2237MP06E06	EVQLVESGGGLVQAGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREFEVSCSSSSDGYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	13	FYDMG	363	CSSSSDGYSD SVKGRF	713	VELRCADVP EDDNYPF	1063
FJ2237MP01B08	EVQLVESGGGLVQAGGSLRLSCAASGGAVSDYDV AWFRQAPGKEREFEVAAIRWTEYYADSVKGRFTIA RDNAKNTVYQLQMNSLRPEDTAVYYCAAGYCTRNE CKHLSLYHYWGQGTQVTVSS	14	DYDVA	364	AIRWTEYYA DSVKG	714	GYCTRNECK HLSLYHY	1064
FJ2237MP02G10	EVQLVESGGGLVQAGGSLRLSCAASGGAVSDYDV GWFRQAPGKEREFEVAAIRWTEYYADSVKGRFTIA RDNAKNAVYLMHNSLKPEDTAVYYCAAGYCSRND CKQLSRYHYWGQGTQVTVSS	15	DYDVG	365	AIRWTEYYA DSVKG	715	GYCSRNDCK QLSRYHY	1065
FJ2237MP02D09	EVQLVESGGGLVQAGGSLRLSCAASGGAVSDYDV GWFRQAPGKEREFEVAAIRWTEYYADSVKGRFTIA RDNAKNTVYQLQMNSLKPEDTAVYYCAAGYCTRNE CKHLSLYHYWGQGTQVTVSS	16	DYDVG	366	AIRWTEYYA DSVKG	716	GYCTRNECK HLSLYHY	1066
FJ2237MP03E10	EVQLVESGGGLVQAGGSLRLSCAASGGTFSTRAM GWFRQAPGKEREFEVGHIGWNGGSTFYADSVKGRF TISRDNAKNAVYLMNSLKPEDTAVYYCAAGSKP IVRPEDFNYWGQGTQVTVSS	17	TRAMG	367	HIGWNGGST YYADSVKG	717	GSKPIVRPE DFNY	1067
FJ2237MP03C07	EVQLVESGGGLVQAGGSLRLSCAASGGTFSTRAM GWFRQPPGKEREFEVGHIGWNGGSTFYADSVKGRF TISRDNAKNTVYQLQMNSLKPEDTAVYYCAAGSKP VVRPEDFHYWGQGTQVTVSS	18	TRAMG	368	HIGWNGGST FYADSVKG	718	GSKPVVRPE DFHY	1068
FJ2237MP03D11	EVQLVESGGGLVQAGGSLRLSCAASGGTFSTRAM GWFRQPPGKEREFEVGHIGWNGGSTFYADSVKGRF TISRDNAKNTVYQLQMNSLKPEDTAVYYCAAGSKP VVRPEDFHYWGQGTQVTVSS	19	TRAMG	369	HIGWNGGST FYADSVKG	719	GSKPVVRPE DFHY	1069
FJ2237MP04A07	EVQLVESGGGLVQAGGSLRLSCAASGNIFSSNMV DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDD WGPGTRVTVSS	20	SNVMD	370	AMSTEGDTN YADSVKG	720	RGYDD	1070
FJ2237MP04G07	EVQLVESGGGLVQAGGSLRLSCAASGNIFSSNMV DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDD	21	SNVMD	371	AMSTEGDTN YADSVKG	721	RGYDD	1071

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	WGPGRVTVSS							
FJ2237MP04G08	EVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	22	SNVMD	372	AMSTEGDTNYADSVKG	722	RGYDD	1072
FJ2237MP04C09	EVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	23	SNVMD	373	AMSTEGDTNYADSVKG	723	RGYDD	1073
FJ2237MP04D08	EVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRVRGYDDWGPGRVTVSS	24	SNVMD	374	AMSTEGDTNYADSVKG	724	RGYDD	1074
FJ2237MP04H09	EVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRVRGYDDWGPGRVTVSS	25	SNVMD	375	AMSTEGDTNYADSVKG	725	RGYDD	1075
FJ2237MP01C05	EVQLVESGGGLVQAGGSLRLSCAASGRTFDIYTMWFRQAPGKEREFFVAAILRLGTATWYADSVKGRFTISRDTAKITVYLMNSLKPEDTAVYYCAAGRDWSAFSSAYEYWGQGTQVTVSS	26	IYTMA	376	AVRLRGATWYADSVKG	726	GRDWSAFSSAYEY	1076
FJ2237MP01G10	EVQLVESGGGLVQAGGSLRLSCAASGRTFDVYTMWFRQAPGKEREFFVAAILRLGTATWYADSVKGRFTISRDTAKSTVNLMNSLKPEDTAVYYCAAGREWSAFSSAYEYWGQGTQVTVSS	27	VYTMA	377	AIRLRGTATWYADSVKG	727	GREWSAFSSAYEY	1077
FJ2237MP03D02	EVQLVESGGGLVQAGGSLRLSCAASGRTFDVYTMWFRQAPGKEREFFVAAILRLGTATWYADSVKGRFTISRDTAKSTVNLMNSLKPEDTAVYYCAAGREWSAFSSAYEYWGQGTQVTVSS	28	VYTMA	378	AIRLRGTATWYADSVKG	728	GREWSAFSSAYEY	1078
FJ2237MP01B02	EVQLVESGGGLVQAGGSLRLSCAASGRTFNSYTMWFRQAPGKDEREFVAALRWSTATWYADSVKGRFTISKDTAKITVYLMNSLKPEDTAVYYCAAGRDWSFSSAYEYWGQGTQVTVSS	29	SYTMA	379	ALRWSTATWYADSVKG	729	GRDWSSFSSAYEY	1079
FJ2237MP05H05	EVQLVESGGGLVQAGGSLRLSCAASGRTFSSYPVWFRQAPGKDEREFVARIISYSGVNTNYADSVKGRFTISRDNAMMAWLMNSLKPEDMAVYYCAADGPPYGRTYEFSGQGTIEYWGQGTQVTVSS	30	SYPVA	380	RISYSGVNTNYADSVKG	730	DGPPYGRTYEFSGQGTIEY	1080
FJ2237MP04G09	EVQLVESGGGLVQAGGSLRLSCAASGSIFGIDVIDWFRQAPGKQREWAGITNDGVTGYADSVKDRFTISRDNAKNTVYLMNGLKPEDTAVYYCKVRYDDWGQGTQVTVSS	31	IDVID	381	GITNDGVTGYADSVKD	731	RAYDD	1081
FJ2237MP01C01	EVQLVESGGGLVQAGGSLRLSCAASGSTFSNTLDWYRQAPGKQREWVAITDDGATNYAGSVKGRFTISRDIKNTVYLMNSLKPEDTAVYYCKERGGDYWGQGTQVTVSS	32	FNTLD	382	VITDDGATNYAGSVKG	732	RGGDY	1082
FJ2237MP04D06	EVQLVESGGGLVQAGGSLRLSCAPSGGIFSGDRAWYRQAPGKQRELVDITGGGSTMYADSVKGRFFISRDFAKNTVALQMNLKPEDTARYYYCYNLRGTTSWGQGTQVTVPS	33	GDRAG	383	DITGGGSTMYADSVKG	733	LRRGTT	1083
FJ2237MP01D03	EVQLVESGGGLVQAGGSLRLSCSASGRAFDKTMWFRQAPGKEREFFVAAILRLHGTATWYDTSVKGRFTVSRDTAKMSVYLMQDSLKPEDTAVYYCAAGRDWSAFSSAYEYWGQGTQVTVSS	34	MKTMA	384	AIRLHGTATWYDTSVKG	734	GRDWSAFSSAYEY	1084
FJ2237MP01F05	EVQLVESGGGLVQAGGSLRLSCSASGRAFDKTMWFRQAPGKEREFFVAAILRLHGTATWYDTSVKGRFTVSRDTAKMSVYLMQDSLKPEDTAVYYCAAGRDWSAFSSAYEYWGQGTQVTVSS	35	MKTMA	385	AIRLHGTATWYDTSVKG	735	GRDWSAFSSAYEY	1085
FJ2237MP01A04	EVQLVESGGGLVQAGGSLRLSCSASGRTFDSRTMWFRQAPGKEREFFIAALRLSGPATWYADSVKGRFTISRDTAKNTVYLMNSLRPEDTAVYYCAAGREWSAFSSAYEYWGQGTQVTVSS	36	SRTMA	386	ALRLSGPATWYADSVKG	736	GREWSAFSSAYEY	1086
FJ2237MP01E09	EVQLVESGGGLVQAGGSLRLSCSASGRTFDSRTMWFRQAPGKEREFFIAALRLSGPATWYADSVKGRFTISRDTAKNTVYLMNSLRPEDTAVYYCAAGREWSAFSSAYEYWGQGTQVTVSS	37	SRTMA	387	ALRLSGPATWYADSVKG	737	GREWSAFSSAYEY	1087
FJ2237MP01H11	EVQLVESGGGLVQAGGSLRLSCSASGRTFDSRTMWFRQAPGKEREFFIAALRLSGPATWYADSVKGRFTISRDTGKITVYLMNSLKPEDTAVYYCAAGRDWSASSAYEYWGQGTQVTVSS	38	SRTMA	388	ALRLSGPATWYADSVKG	738	GRDWSASSAYEY	1088

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP04D02	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	39	NYAMA	389	CIGVSGATF YADSVKG	739	GECYSDYDI YPTGY	1089
FJ2237MP04H05	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	40	NYAMA	390	CIGVSGATF YADSVKG	740	GECYSDYDI YPTGY	1090
FJ2237MP04F11	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	41	NYAMA	391	CIGVSGATF YADSVKG	741	GECYSDYDI YPTGY	1091
FJ2237MP06D03	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	42	NYAMA	392	CIGVSGATF YADSVKG	742	GECYSDYDI YPTGY	1092
FJ2237MP06G03	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	43	NYAMA	393	CIGVSGATF YADSVKG	743	GECYSDYDI YPTGY	1093
FJ2237MP06C04	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	44	NYAMA	394	CIGVSGATF YADSVKG	744	GECYSDYDI YPTGY	1094
FJ2237MP06H05	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	45	NYAMA	395	CIGVSGATF YADSVKG	745	GECYSDYDI YPTGY	1095
FJ2237MP06F07	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	46	NYAMA	396	CIGVSGATF YADSVKG	746	GECYSDYDI YPTGY	1096
FJ2237MP06A08	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	47	NYAMA	397	CIGVSGATF YADSVKG	747	GECYSDYDI YPTGY	1097
FJ2237MP06B08	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	48	NYAMA	398	CIGVSGATF YADSVKG	748	GECYSDYDI YPTGY	1098
FJ2237MP06E08	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	49	NYAMA	399	CIGVSGATF YADSVKG	749	GECYSDYDI YPTGY	1099
FJ2237MP06H09	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	50	NYAMA	400	CIGVSGATF YADSVKG	750	GECYSDYDI YPTGY	1100
FJ2237MP06A11	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	51	NYAMA	401	CIGVSGATF YADSVKG	751	GECYSDYDI YPTGY	1101
FJ2237MP06H11	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	52	NYAMA	402	CIGVSGATF YADSVKG	752	GECYSDYDI YPTGY	1102
FJ2237MP06B12	EVQLVESGGGLVQPGGSLKLSASGFPSPDNYAM AWFRQAPGKEREGLVSCIGVSGATFYADSVKGRFT ISRDNAKKMVYLQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	53	NYAMA	403	CIGVSGATF YADSVKG	753	GECYSDYDI YPTGY	1103
FJ2237MP05D09	EVQLVESGGGLVQPGGSLRLSCAASESLFRFNDA SWYRQGPGRQREWARITSDSTGYAEAVKARFT ISRDTTKNTVYLQMNGLKPEDTAVYYCNTVPFRS WGQGTQVTVSS	54	FNDAS	404	RITSDDSTG YAEAVKA	754	VPFRS	1104
FJ2237MP06A01	EVQLVESGGGLVQPGGSLRLSCAASGFPNMNYAM AWFRQAPGKEREGLVSCISSSGSTYYADSVKGRFT ISRDNAKKMVYLQNLNLSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	55	NYAMA	405	CISSSGSTY YADSVKG	755	GECYSDYDI YPTDY	1105
FJ2237MP06C01	EVQLVESGGGLVQPGGSLRLSCAASGFPNMNYAM AWFRQAPGKEREGLVSCISSSGSTYYADSVKGRFT ISRDNAKKMVYLQNLNLSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	56	NYAMA	406	CISSSGSTY YADSVKG	756	GECYSDYDI YPTDY	1106

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	CYSDYDIYPTDYWGQGAQVTVSS							
FJ2237MP06H03	EVQLVESGGGLVQPGGSLRLSCAASGFPMNNYAM AWFRQAPGKEREGRGVSCISSSGSTYYADSVKGRFTISRDNAKMVLQLNSLPEDTAVYYCAIGE CYSDYDIYPTDYWGQGAQVTVSS	57	NYAMA	407	CISSSGSTY YADSVKG	757	GECYSDYDI YPTDY	1107
FJ2237MP04F07	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	58	FYDMG	408	CSSSDGST YYSDSVKG	758	VELRCADVP EDDNYPF	1108
FJ2237MP06E02	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	59	FYDMG	409	CSSSDGST YYSDSVKG	759	VELRCADVP EDDNYPF	1109
FJ2237MP06A04	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	60	FYDMG	410	CSSSDGST YYSDSVKG	760	VELRCADVP EDDNYPF	1110
FJ2237MP06F04	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	61	FYDMG	411	CSSSDGST YYSDSVKG	761	VELRCADVP EDDNYPF	1111
FJ2237MP06G04	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	62	FYDMG	412	CSSSDGST YYSDSVKG	762	VELRCADVP EDDNYPF	1112
FJ2237MP06H04	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	63	FYDMG	413	CSSSDGST YYSDSVKG	763	VELRCADVP EDDNYPF	1113
FJ2237MP06F06	EVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGRVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	64	FYDMG	414	CSSSDGST YYSDSVKG	764	VELRCADVP EDDNYPF	1114
FJ2237MP04G04	EVQLVESGGGLVQPGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLPEDTGYYCRIRGYDD WGPGRVTVSS	65	SNVMD	415	AMSTEGDTN YADSVKG	765	RGYDD	1115
FJ2237MP01B12	EVQLVESGGGLVQPGGSLRLSCAASGRTFDMYTM GWFRQAPGKEREFVAAIRLGTATWYADSVKGRFTISRDTAKITVYLQMNLSLPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	66	MYTMG	416	AIRLRGTAT WYADSVKG	766	GREWSTQSS AYDY	1116
FJ2237MP03E03	EVQLVESGGGLVQPGGSLRLSCAASGRTFDMYTM GWFRQAPGKEREFVAAIRLGTATWYADSVKGRFTISRDTAKITVYLQMNLSLPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	67	MYTMG	417	AIRLRGTAT WYADSVKG	767	GREWSTQSS AYDY	1117
FJ2237MP01F03	EVQLVESGGGLVQPGGSLRLSCAASGRTFDSRTM AWFRQAPGKEREFVAAIRLSGPATWYADSVKGRFTISRDTAKITVYLQMNLSLPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	68	SRTMA	418	AIRLSGPAT WYADSVKG	768	GRDWSAFSS AYEY	1118
FJ2237MP01H04	EVQLVESGGGLVQPGGSLRLSCAASGRTFVSHTM AWFRQAPGKEREFVAAIRLSGTATWYADSVKGRFTISRDTAKITARDTAKITVYLQMNLSLPEDTAVY YCAAGRDWSAFSSAYEYWGQGTQVTVSS	69	SHTMA	419	AIRLSGTAT WYADSVKG	769	GRDWSAFSS AYEY	1119
FJ2237MP03D01	EVQLVESGGGLVQPGGSLRLSCAASGRTFVSHTM AWFRQAPGKEREFVAAIRLSGTATWYADSVKGRFTISRDTAKITARDTAKITVYLQMNLSLPEDTAVY YCAAGRDWSAFSSAYEYWGQGTQVTVSS	70	SHTMA	420	AIRLSGTAT WYADSVKG	770	GRDWSAFSS AYEY	1120
FJ2237MP03B05	EVQLVESGGGLVQPGGSLRLSCAASGSGFSIRVM DWYRQAPGKQREWVAGIASDGTGLLDAVKGRFTIFRDNAKNTVYLHMTSLKPEDTAVYYCNLRGSDY RGQGTQVTVSS	71	LRVMD	421	GIASDGTG LLDAVKG	771	RGSDY	1121
FJ2237MP01C09	EVQLVESGGGLVQPGGSLRLSCAASGSGSSIRVM DWYRQAPGKQREWVAGIASDGTGLLDAVKGRFTIFRDNAKNTVYLHMTSLKPEDTAVYYCNLRGSDY RGQGTQVTVSS	72	LRVMD	422	GIASDGTG LLDAVKG	772	RGSDY	1122
FJ2237MP01F07	EVQLVESGGGLVQPGGSLRLSCAASGSTFSFNTL DWYRQAPGKQREWVAVITDDGATNYAGSVKGRFTISRDIKNTVYLQMNLSLPEDTAVYYCKERGGDY WGQGTQVTVSS	73	FNTLD	423	VITDDGATN YAGSVKG	773	RGGDY	1123

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP01E06	EVQLVESGGGLVQPGGSLRLSCAASGSTFSNTMDWYRQAPGKQREWVAITDGGATNYAGSVKGRFTISGDIKNTVYLMNSLKPEDTAVYYCKERGGDYWGQGTQVTVSS	74	FNTMD	424	VITDGGATNYAGSVKVG	774	RGGDY	1124
FJ2237MP01A09	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	75	RGVMD	425	AITEGGDTGYADSVKVG	775	RPPNRNY	1125
FJ2237MP02E02	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	76	RGVMD	426	AITEGGDTGYADSVKVG	776	RPPNRNY	1126
FJ2237MP02C04	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	77	RGVMD	427	AITEGGDTGYADSVKVG	777	RPPNRNY	1127
FJ2237MP02E09	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	78	RGVMD	428	AITEGGDTGYADSVKVG	778	RPPNRNY	1128
FJ2237MP02B12	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	79	RGVMD	429	AITEGGDTGYADSVKVG	779	RPPNRNY	1129
FJ2237MP03F07	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	80	RGVMD	430	AITEGGDTGYADSVKVG	780	RPPNRNY	1130
FJ2237MP03A09	EVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAAITEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRNYWGQGTQVTVSS	81	RGVMD	431	AITEGGDTGYADSVKVG	781	RPPNRNY	1131
FJ2237MP01C04	EVQLVESGGGLVQPGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFVAAVRLRGATWYADSVKGRFTISRDTAKITVYLMNSLKAEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	82	IYTMA	432	AVRLRGATWYADSVKVG	782	GRDWSAFSSAYEY	1132
FJ2237MP01A06	EVQLVESGGGLVQPGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFVAAVRLRGATWYADSVKGRFTISRDTAKITVYLMNSLKAEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	83	IYTMA	433	AVRLRGATWYADSVKVG	783	GRDWSAFSSAYEY	1133
FJ2237MP01H07	EVQLVESGGGLVQPGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFVAAVRLRGATWYADSVKGRFTISRDTAKITVYLMNSLKAEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	84	IYTMA	434	AVRLRGATWYADSVKVG	784	GRDWSAFSSAYEY	1134
FJ2237MP01G08	EVQLVESGGGLVQPGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFVAAVRLRGATWYADSVKGRFTISRDTAKITVYLMNSLKAEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	85	IYTMA	435	AVRLRGATWYADSVKVG	785	GRDWSAFSSAYEY	1135
FJ2237MP03E01	EVQLVESGGGLVQPGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFVAAVRLRGATWYADSVKGRFTISRDTAKITVYLMNSLKAEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	86	IYTMA	436	AVRLRGATWYADSVKVG	786	GRDWSAFSSAYEY	1136
FJ2237MP01B10	EVQLVESGGGLVQPGGSLRLSCSASGRTFDSRTM AWFRQAPGKEREFVAAVRLRSGPATWYADSVKGRFTISRDTAKITVYLMNSLKPEDTAVYYCAAGRDW SAFASAYEYWGQGTQVTVSS	87	SRTMA	437	ALRLSGPATWYADSVKVG	787	GRDWSAFASAYEY	1137
FJ2237MP06B05	EVQLVESGGGLVQPGGSLRLSCTASGFPDSYAM AWFRQAPGNEPEGREGVSCISTSGSTYYADSVKGRFTTSRDNAKSMVYLQNLKPEDTAVYYCAIGE CYSDYDIYPTGYWGQGAQVTVSS	88	SYAMA	438	CISTSGSTYYADSVKVG	788	GECYSDYDIYPTGY	1138
FJ2237MP03F03	EVQLVESGGGLVQPGGSLRLSCVVSIGELNHMGWYRQAPGKQREMVATITAAGTTNYADSVKGRFTISRGSSENTLYLMNSLKPEDTAVYYCNINIFTS DWPPKYLDLWGQGTIVTVSS	89	LNHMG	439	TITAAGTTNYADSVKVG	789	NIFTSDWPPKYLDL	1139
FJ2237MP03C01	EVQLVESGGGLVQPGGSLRLSCVVSIGELNHMGWYRQAPGKQREMVATITAAGTTNYADSVKGRFTISRGSSENTLYLMNSLKPEDTAVYYCNINIFTS DWPPKYLDLWGQGTIVTVSS	90	LNHMG	440	TITAAGTTNYADSVKVG	790	NIFTSDWPPKYLDL	1140
FJ2237MP04G02	EVQLVESGGGSVQAGDSRLSCAASERTWNTNSMGWFRQAPGKEREFVAAITWSEGSTYYHDSVKGRFTISADNAKNTVNLQMNLSLKPEDTAVYYCAARRGV	91	TNSMG	441	AITWSEGSTYYHDSVKVG	791	RRGVYSPNRYRNY	1141

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	YSPNPRYYNYWAQGSQVTVSS							
FJ2237MP01D05	EVQLVESGGGVVQPGGSLRLSCAASGRTFDVYTM AWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAKSTVYLNQMNLSLKLEDTAVYYCAAGREW SAFSSAYEYWGQGTQVTVSS	92	VYTMA	442	AIRLRGTAT WYADSVKG	792	GREWSAFSS AYEY	1142
FJ2237MP01B09	QLQLVESGGDLVQPGGSLRLSCVASGSTSDISTM AWFRQAPGKEREFVAAIRLSGPATWYADSVKGRF TISRDTAPITVYLNQMNLSRPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	93	ISTMA	443	ALRLSGPAT WYADSVKG	793	GRDWSAFSS AYEY	1143
FJ2237MP01F10	QLQLVESGGGLAQAGGSLRLSCAASGRTFDIYTL GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAKSTVYLNQMNLSLKLEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	94	IYTLG	444	AIRLRGTAT WYADSVKG	794	GREWSTQSS AYDY	1144
FJ2237MP04E03	QLQLVESGGGLVQAGESLRLSCAASGGTYGYAMG WFRQAPGKEREFVGTITRS GTTYADSVKGRFTI SGDNAENTVYLNQMNLLPEDTAVYYCAARSVSYS RRYTAYSEMNDYTFWGQGTQVTVSS	95	GYAMG	445	TITRS GTTY YADSVKG	795	RSVSYSTRY TAYSEMNDY TF	1145
FJ2237MP04A06	QLQLVESGGGLVQAGGPLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	96	SNVMD	446	AMSTEGDTN YADSVKG	796	RGYDD	1146
FJ2237MP04E01	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	97	SNVMD	447	AMSTEGDTN YADSVKG	797	RGYDD	1147
FJ2237MP04G01	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	98	SNVMD	448	AMSTEGDTN YADSVKG	798	RGYDD	1148
FJ2237MP04C05	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	99	SNVMD	449	AMSTEGDTN YADSVKG	799	RGYDD	1149
FJ2237MP04C06	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	100	SNVMD	450	AMSTEGDTN YADSVKG	800	RGYDD	1150
FJ2237MP04F06	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	101	SNVMD	451	AMSTEGDTN YADSVKG	801	RGYDD	1151
FJ2237MP04B10	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	102	SNVMD	452	AMSTEGDTN YADSVKG	802	RGYDD	1152
FJ2237MP04B11	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	103	SNVMD	453	AMSTEGDTN YADSVKG	803	RGYDD	1153
FJ2237MP04D09	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ISRDNQNTVDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	104	SNVMD	454	AMSTEGDTN YADSVKG	804	RGYDD	1154
FJ2237MP04G11	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ISRDNQNTVDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	105	SNVMD	455	AMSTEGDTN YADSVKG	805	RGYDD	1155
FJ2237MP04D11	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	106	SNVMD	456	AMSTEGDTN YADSVRG	806	RGYDD	1156
FJ2237MP06B01	QLQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	107	SNVMD	457	AMSTEGDTN YADSVKG	807	RGYDD	1157
FJ2237MP01G05	QLQLVESGGGLVQAGGSLRLSCAASGSTFSFNTL DWYRQAPGKQREWVAVITDDGATNYAGSVKGRFT ISRDIKNTVYLNQMNLSLKPEDTAVYYCKERGGDY WGQGTQVTVSS	108	FNTLD	458	VITDDGATN YAGSVKG	808	RGGDY	1158

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP01D10	QLQLVESGGGLVQAGGSLRLSCAASGSTFSFNTLDWYRQAPGKQREWVAITDDGATNAGSVKGRFTISRDI AKNTVYLQMNSLKPEDTAVYYCKERGGDYWGQGTQVTVSS	109	FNTLD	459	VITDDGATN YAGSVKG	809	RGGDY	1159
FJ2237MP03A01	QLQLVESGGGLVQAGGSLRLSCAASGSTFSIYDMGWFRQAPGKQREL VAGISNGGSKTYADSVKGRFTISRDNANTVYLQMNSLKPEDTAVYYCNAASNSGSGSRASRYNYWGQGTQVTVSS	110	IYDMG	460	GISNGGSKTYADSVKGYADSVKG	810	ASNSGSGSR ASRYNY	1160
FJ2237MP03D12	QLQLVESGGGLVQAGGSLRLSCAASGSTFSIYDMGWFRQAPGKQREL VAGISNGGSKTYADSVKGRFTISRDNANTVLSLQMNSLKPEDTAVYYCNAASNSGSGSRASRYNYWGQGTQVTVSS	111	IYDMG	461	GMSNGGSKTYADSVKGYADSVKG	811	ASNSGSGSR ASRYNY	1161
FJ2237MP04B08	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	112	NYAMA	462	CIGVSGATFYADSVKGYADSVKG	812	GECYSDYDI YPTGY	1162
FJ2237MP06E01	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	113	NYAMA	463	CIGVSGATFYADSVKGYADSVKG	813	GECYSDYDI YPTGY	1163
FJ2237MP06G02	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	114	NYAMA	464	CIGVSGATFYADSVKGYADSVKG	814	GECYSDYDI YPTGY	1164
FJ2237MP06A03	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	115	NYAMA	465	CIGVSGATFYADSVKGYADSVKG	815	GECYSDYDI YPTGY	1165
FJ2237MP06F03	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	116	NYAMA	466	CIGVSGATFYADSVKGYADSVKG	816	GECYSDYDI YPTGY	1166
FJ2237MP06A05	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	117	NYAMA	467	CIGVSGATFYADSVKGYADSVKG	817	GECYSDYDI YPTGY	1167
FJ2237MP06C07	QLQLVESGGGLVQPGGSLKLSASGFPSPDNYAMAWFRQAPGKEREGVSCIGVSGATFYADSVKGRFTISRDNAKKMVY LQMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	118	NYAMA	468	CIGVSGATFYADSVKGYADSVKG	818	GECYSDYDI YPTGY	1168
FJ2237MP04H01	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTHYSDSVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYPFWGQGTQVTVSS	119	FYDMG	469	CSSSDGSTHYSDSVKGYADSVKG	819	VELRCADVP EDDNYPF	1169
FJ2237MP06C03	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTYYSDPVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYPFWGQGTQVTVSS	120	FYDMG	470	CSSSDGSTYYSDPVKGYADSVKG	820	VELRCADVP EDDNYPF	1170
FJ2237MP06B02	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDDYPFWGQGTQVTVSS	121	FYDMG	471	CSSSDGSTYYSDSVKGYADSVKG	821	VELRCADVP EDDDYPF	1171
FJ2237MP06G01	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYPFWGQGTQVTVSS	122	FYDMG	472	CSSSDGSTYYSDSVKGYADSVKG	822	VELRCADVP EDDNYPF	1172
FJ2237MP06H02	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYPFWGQGTQVTVSS	123	FYDMG	473	CSSSDGSTYYSDSVKGYADSVKG	823	VELRCADVP EDDNYPF	1173
FJ2237MP06C05	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYPFWGQGTQVTVSS	124	FYDMG	474	CSSSDGSTYYSDSVKGYADSVKG	824	VELRCADVP EDDNYPF	1174
FJ2237MP06E05	QLQLVESGGGLVQPGGSLRLSCAASGFS LQFYDMGWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRFTISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYPFWGQGTQVTVSS	125	FYDMG	475	CSSSDGSTYYSDSVKGYADSVKG	825	VELRCADVP EDDNYPF	1175
FJ2237MP06E12	QLQLVESGGGLVQPGGSLRLSCAASGFTFGSYDMSWVRQAPGKGP EWSEINSAGEPTYADSVKGRFTISRDNAKSMLY LQMNSLKPEDTGVYHCATAADE	126	SYDMS	476	EINSAGEPTYADSVKGYADSVKG	826	AADENAEF	1176

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	NAEFPSQGTILVTSS							
FJ2237MP04F03	QLQLVESGGGLVQPGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	127	SNVMD	477	AMSTEGDTNYADSVKG	827	RGYDD	1177
FJ2237MP04B02	QLQLVESGGGLVQPGGSLRLSCAASGSIFEGDRTGWYRQVPKGQRELVDITADGTTTTYDSVKGRFFASRDFAKNTVYLMNLSLKPEDTAVYYCYNLRRGTTSWGQGTQVTVSS	128	GDRTG	478	DTTADGTTTTYDSVKG	828	LRRGTTS	1178
FJ2237MP03D04	QLQLVESGGGLVQPGGSLRLSCAASGSTFSIYEMSWYRQAPGKQRELVAGISNNGSTKYADSVKGRFTISRDNAKNTVYLMNLSLKPEDTAVYYCNAASNSGSGSRASRYNYWGQGTQVTVSS	129	IYEMS	479	GISNNGSTKYADSVKG	829	ASNSGSGSRASRYNY	1179
FJ2237MP01D12	QLQLVESGGGLVQPGGSLRLSCAASGSTLSFNTLDWYRQAPGKQREWVAVITDDGATNYAGSVKGRFTISRDIKNTVYLMNLSLKPEDTAVYYCKERGGDYWGQGTQVTVSS	130	FNTLD	480	VITDDGATNYAGSVKG	830	RGGDY	1180
FJ2237MP02H04	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGMMDWYRQAPGKQREWVAATEGGDTGYADSVKGRFTISRDNASTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	131	RGMMD	481	AITEGGDTGYADSVKG	831	RPPNRY	1181
FJ2237MP02E10	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGMMDWYRQAPGKQREWVAATEGGDTGYADSVKGRFTISRDNASTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	132	RGMMD	482	AITEGGDTGYADSVKG	832	RPPNRY	1182
FJ2237MP03D08	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSK	133	RGVMD	483	AITEGGDTGYADSVKG	833	RPPNRY	1183
FJ2237MP01C06	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	134	RGVMD	484	AITEGGDTGYADSVKG	834	RPPNRY	1184
FJ2237MP01E07	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	135	RGVMD	485	AITEGGDTGYADSVKG	835	RPPNRY	1185
FJ2237MP02E06	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	136	RGVMD	486	AITEGGDTGYADSVKG	836	RPPNRY	1186
FJ2237MP02D08	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	137	RGVMD	487	AITEGGDTGYADSVKG	837	RPPNRY	1187
FJ2237MP02E08	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	138	RGVMD	488	AITEGGDTGYADSVKG	838	RPPNRY	1188
FJ2237MP02G09	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	139	RGVMD	489	AITEGGDTGYADSVKG	839	RPPNRY	1189
FJ2237MP02C12	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	140	RGVMD	490	AITEGGDTGYADSVKG	840	RPPNRY	1190
FJ2237MP02E12	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	141	RGVMD	491	AITEGGDTGYADSVKG	841	RPPNRY	1191
FJ2237MP03D09	QLQLVESGGGLVQPGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	142	RGVMD	492	AITEGGDTGYADSVKG	842	RPPNRY	1192
FJ2237MP02C10	QLQLVESGGGLVQPGGSLRLSCATSGVDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	143	RGVMD	493	AITEGGDTGYADSVKG	843	RPPNRY	1193

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP02B06	QLQLVESGGGLVQPGGSLRLSCTTSGIDFSRGVM DWYRQPPGKQREWVAATEGGDTGYADSVKGRFT ISADNARSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	144	RGVMD	494	AITEGGDTG YADSVKG	844	RPPNRNY	1194
FJ2237MP02H01	QLQLVESGGGLVQTGGSLRLSCATSGIDFSRGMM DWYRQAPGKQREWVAATEGGDTGYADSVKGRFT ISRDNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	145	RGMD	495	AITEGGDTG YADSVKG	845	RPPNRNY	1195
FJ2237MP06F01	QSQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREFGVSCSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	146	FYDMG	496	CSSSDGST YYSDSVKG	846	VELRCADVP EDDNYPF	1196
FJ2237MP04E10	QVQLQESGGDLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	147	SNVMD	497	AMSTEGDTN YADSVKG	847	RGYDD	1197
FJ2237MP01F06	QVQLQESGGGLAQAGGSLRLSCAASGRTSEVYTM GWFRQAPGKEREFGVAIRLRGTATYADSVKGRF TISRDTAKNTMYLNMNSLKPEDTAVYYCAASRDW STKSSAYDYWGQGTQVTVSS	148	VYTMG	498	AIRLRGTAT WYADSVKG	848	SRDWSTKSS AYDY	1198
FJ2237MP01E12	QVQLQESGGGLAQAGGSLRLSCAASGRTSEVYTM GWFRQAPGKEREFGVAIRLRGTATYADSVKGRF TISRDTAKNTMYLNMNSLKPEDTAVYYCAASRDW STKSSAYDYWGQGTQVTVSS	149	VYTMG	499	AIRLRGTAT WYADSVKG	849	SRDWSTKSS AYDY	1199
FJ2237MP01G02	QVQLQESGGGLAQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAATEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	150	RGVMD	500	AITEGGDTG YADSVKG	850	RPPNRNY	1200
FJ2237MP01C12	QVQLQESGGGLVEPGGSLRLSCAASGFAFGNYDM TWVRQAPGKGPWEVSAINTRGSTYYADSVKGRFT ISRDNAKNTLYLQMNLSLKPEDTAVYYCATDPYKD YINGQPTAYDYWGQGTQVTVSS	151	NYDMT	501	AINTRGSTY YADSVKG	851	DPYKDYING QPTAYDY	1201
FJ2237MP03A06	QVQLQESGGGLVEPGGSLRLSCAASGFAFGNYDM TWVRQAPGKGPWEVSAINTRGSTYYADSVKGRFT ISRDNAKNTLYLQMNLSLKPEDTAVYYCATDPYKD YINGQPTAYDYWGQGTQVTVSS	152	NYDMT	502	AINTRGSTY YADSVKG	852	DPYKDYING QPTAYDY	1202
FJ2237MP04C07	QVQLQESGGGLVQAGGPLRLSCAASGSILEGDR GWYRQVPGKQRELVDATTAGTTTTYDSVKGRFF ASRDFAKNTVYLMNGLKPEDAAVYYCYNLRRT TSWGQGTQVTVSS	153	GDRTG	503	DTTADGTTT YTDSVKG	853	LRRGTTS	1203
FJ2237MP03B04	QVQLQESGGGLVQAGGSLRLSCAASGHTFDIKTL AWFRQTPGTEREFVAAIRLWGATRYADSVKGRF TISRDSAKNTVYLMNLSLKPEDTAVYYCAAGRWD SAFSSAYDHWGQGTQVTVSS	154	IKTLA	504	AIRLWGAT RYADSVKG	854	GRDWSAFSS AYDH	1204
FJ2237MP01G03	QVQLQESGGGLVQAGGSLRLSCAASGLTFDSKTM AWFRQAPGKEREFGVAIRLHGATRYADSVKGRF TISRDTAKDTVSLHLSSLKPEDTAVYYCAAGREW TTQSSAYDYWGQGTQVTVSS	155	SKTMA	505	AIRLHGAT WYADSVKG	855	GREWTTQSS AYDY	1205
FJ2237MP04H11	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADPVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	156	SNVMD	506	AMSTEGDTN YADPVKG	856	RGYDD	1206
FJ2237MP04H02	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYHCRIRGYDD WPGGTQVTISS	157	SNVMD	507	AMSTEGDTN YADSVKG	857	RGYDD	1207
FJ2237MP04C02	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	158	SNVMD	508	AMSTEGDTN YADSVKG	858	RGYDD	1208
FJ2237MP04B04	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	159	SNVMD	509	AMSTEGDTN YADSVKG	859	RGYDD	1209
FJ2237MP04G06	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WPGGTRVTVSS	160	SNVMD	510	AMSTEGDTN YADSVKG	860	RGYDD	1210
FJ2237MP04H07	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD	161	SNVMD	511	AMSTEGDTN YADSVKG	861	RGYDD	1211

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	WGPGRVTVSS							
FJ2237MP04H08	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	162	SNVMD	512	AMSTEGDTNYADSVKGY	862	RGYDD	1212
FJ2237MP04H10	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	163	SNVMD	513	AMSTEGDTNYADSVKGY	863	RGYDD	1213
FJ2237MP04A03	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	164	SNVMD	514	AMSTEGDTNYADSVKGY	864	RGYDD	1214
FJ2237MP04A04	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	165	SNVMD	515	AMSTEGDTNYADSVKGY	865	RGYDD	1215
FJ2237MP04E04	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	166	SNVMD	516	AMSTEGDTNYADSVKGY	866	RGYDD	1216
FJ2237MP04E06	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	167	SNVMD	517	AMSTEGDTNYADSVKGY	867	RGYDD	1217
FJ2237MP06A02	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	168	SNVMD	518	AMSTEGDTNYADSVKGY	868	RGYDD	1218
FJ2237MP04C03	QVQLQESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCRVIRGYDDWGPGRVTVSS	169	SNVMD	519	AMSTEGDTNYADSVKGY	869	RGYDD	1219
FJ2237MP01G01	QVQLQESGGGLVQAGGSLRLSCAASGRTFSSYTI GWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCAASRDWSTKSSAYDYWGQGTQVTVSS	170	SYTIG	520	AIRLRGTATWYADSVKGY	870	SRDWSTKSSAYDY	1220
FJ2237MP01F12	QVQLQESGGGLVQAGGSLRLSCAASGRTFSSYTI GWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTGVYYCAASRDWSTKSSAYDYWGQGTQVTVSS	171	SYTIG	521	AIRLRGTATWYADSVKGY	871	SRDWSTKSSAYDY	1221
FJ2237MP03C02	QVQLQESGGGLVQAGGSLRLSCAASGTSFNTLDWYRQAPGKQREWVAITDDGATNYAGSVKGRFTISRDIKNTVYLQMNSLKPEDTAVYYCKERGGDYWGQGTQVTVSS	172	FNTLD	522	VITDDGATNYAGSVKGY	872	RGGDY	1222
FJ2237MP03F05	QVQLQESGGGLVQAGGSLRLSCAASGSTSSINAMGWYRQAPGKQRELVAAIRSGDSTNYADSVKGRFTISRDDAKNTVHLQMNSLKPEDTAVYYCAASGHTYSGSYNGAYNYWGQGTQVTVSS	173	INAMG	523	AIRSGDSTNYADSVKGY	873	QSHTYSGSYNGAYNY	1223
FJ2237MP02D03	QVQLQESGGGLVQAGGSLRLSCATSGIDFSRGVMDWYRQPPGKQREWVAATEGGDTGYADSVKGRFTISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNRYWGQGTQVTVSS	174	RGVMD	524	AITEGGDTGYADSVKGY	874	RPPNRY	1224
FJ2237MP01H08	QVQLQESGGGLVQAGGSLRLSCASGRTFDIYTM AWFRQAPGKEREFEVAAVRLRGATWYADSVKGRFTISRDNAQNTVDLQMNSLKPEDTAVYYCAAGRDWAFSSAYEYWGQGTQVTVSS	175	IYTMA	525	AVRLRGATWYADSVKGY	875	GRDWSAFSSAYEY	1225
FJ2237MP04F10	QVQLQESGGGLVQPGGSLRLSCASGFPDNYAMAWFRQAPGKEREFEVSCIGVSGATFYADSVKGRFTISRDNAAKMYLQMNSLKPEDTAVYYCAIGECYSYDYIYPTGYWGRGTQVTVSS	176	NYAMA	526	CIGVSGATFYADSVKGY	876	GECYSYDYIYPTGY	1226
FJ2237MP03F02	QVQLQESGGGLVQPGGSLRLSCASGFNFGNYDMSWYRQAPGKEREFEVSSINSGGSTFYADSVKGRFTISRDNAAKNTLYLQMNSLKPEDTAVYYCAPDPERDRIPHRDYWGQGTQVTVSS	177	NYDMS	527	SINSGGSTFYADSVKGY	877	DPERDRIPHRDY	1227
FJ2237MP04F08	QVQLQESGGGLVQPGGSLRLSCASGFSQFYDMGWFRQAPGKEREFEVSCSSSDGSTFYADSVKGRFTISRDNAAKNTAYLHMNSLKPEDTAVYYCAPVELRCADVPEDDNYFFWGQGTQVTVSS	178	FYDMG	528	CSSSDGSTFYADSVKGY	878	VELRCADVPEDDNYFF	1228

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FJ2237MP06D06	QVQLQESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSSDGSYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	180	FYDMG	530	CSSSSDGS YYSDSVKG	880	VELRCADVP EDDNYPF	1230
FJ2237MP06B03	QVQLQESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSSDGSYYSDSVKGRF TISRDNVKNNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	181	FYDMG	531	CSSSSDGS YYSDSVKG	881	VELRCADVP EDDNYPF	1231
FJ2237MP04F05	QVQLQESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSSDGSYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYPFWGQGTQVTVSS	182	FYDMG	532	CSSSSDGS YYSDSVKG	882	VELRCADVP EDDNYPF	1232
FJ2237MP01H10	QVQLQESGGGLVQPGGSLRLSCAASGRTFDIYTL GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDIKSTVYLQMNLSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	183	IYTLG	533	AIRLRGTAT WYADSVKG	883	GREWSTQSS AYDY	1233
FJ2237MP01B05	QVQLQESGGGLVQPGGSLRLSCAASGRTFNSYTM AWFRQAPGKDERFVAAALRWSGTATWYADSVKGRF TISRDTAKTTVYLQMNLSLKPEDTAVYYCAAGRDW SSFSSAYEYWQGTQVTVSS	184	SYTMA	534	ALRWSGTAT WYADSVKG	884	GRDWSSFSS AYEY	1234
FJ2237MP01H02	QVQLQESGGGLVQPGGSLRLSCAASGRTSEVYTM GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAKNTMYLNMNSLKPEDTAVYYCAASRDW STKSSAYDYWGQGTQVTVSS	185	VYTMG	535	AIRLRGTAT WYADSVKG	885	SRDWSTKSS AYDY	1235
FJ2237MP03D06	QVQLQESGGGLVQPGGSLRLSCAASGRTSEVYTM GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAKNTMYLNMNSLKPEDTAVYYCAASRDW STKSSAYDYWGQGTQVTVSS	186	VYTMG	536	AIRLRGTAT WYADSVKG	886	SRDWSTKSS AYDY	1236
FJ2237MP02A03	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGMM DWYRQAPGKQREWVAAITEGGDTGYADSVKGRFT ISRDNASTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	187	RGMD	537	AITEGGDTG YADSVKG	887	RPPNRNY	1237
FJ2237MP02B04	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGMM DWYRQAPGKQREWVAAITEGGDTGYADSVKGRFT ISRDNASTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	188	RGMD	538	AITEGGDTG YADSVKG	888	RPPNRNY	1238
FJ2237MP02H05	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGMM DWYRQAPGKQREWVAAITEGGDTGYADSVKGRFT ISRDNASTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	189	RGMD	539	AITEGGDTG YADSVKG	889	RPPNRNY	1239
FJ2237MP02C09	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGMM DWYRQAPGKQREWVAAITEGGDTGYADSVKGRST ISRDNASTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	190	RGMD	540	AITEGGDTG YADSVKG	890	RPPNRNY	1240
FJ2237MP02G03	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAESTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	191	RGVMD	541	AITEGGDTG YADSVKG	891	RPPNRNY	1241
FJ2237MP01B04	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	192	RGVMD	542	AITEGGDTG YADSVKG	892	RPPNRNY	1242
FJ2237MP02C01	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	193	RGVMD	543	AITEGGDTG YADSVKG	893	RPPNRNY	1243
FJ2237MP02D01	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	194	RGVMD	544	AITEGGDTG YADSVKG	894	RPPNRNY	1244
FJ2237MP02E01	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	195	RGVMD	545	AITEGGDTG YADSVKG	895	RPPNRNY	1245
FJ2237MP02A02	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTRLRPEDTAVYYCNSRPPNR	196	RGVMD	546	AITEGGDTG YADSVKG	896	RPPNRNY	1246

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	NYWGQGTQVTVSS							
FJ2237MP02F02	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	197	RGVMD	547	AITEGGDTG YADSVKG	897	RPPNRNY	1247
FJ2237MP02B03	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	198	RGVMD	548	AITEGGDTG YADSVKG	898	RPPNRNY	1248
FJ2237MP02E03	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	199	RGVMD	549	AITEGGDTG YADSVKG	899	RPPNRNY	1249
FJ2237MP02A04	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	200	RGVMD	550	AITEGGDTG YADSVKG	900	RPPNRNY	1250
FJ2237MP02E04	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	201	RGVMD	551	AITEGGDTG YADSVKG	901	RPPNRNY	1251
FJ2237MP02F04	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	202	RGVMD	552	AITEGGDTG YADSVKG	902	RPPNRNY	1252
FJ2237MP02B05	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	203	RGVMD	553	AITEGGDTG YADSVKG	903	RPPNRNY	1253
FJ2237MP02C05	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	204	RGVMD	554	AITEGGDTG YADSVKG	904	RPPNRNY	1254
FJ2237MP02E05	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	205	RGVMD	555	AITEGGDTG YADSVKG	905	RPPNRNY	1255
FJ2237MP02G05	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	206	RGVMD	556	AITEGGDTG YADSVKG	906	RPPNRNY	1256
FJ2237MP02C06	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	207	RGVMD	557	AITEGGDTG YADSVKG	907	RPPNRNY	1257
FJ2237MP02D06	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	208	RGVMD	558	AITEGGDTG YADSVKG	908	RPPNRNY	1258
FJ2237MP02F06	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	209	RGVMD	559	AITEGGDTG YADSVKG	909	RPPNRNY	1259
FJ2237MP02A07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	210	RGVMD	560	AITEGGDTG YADSVKG	910	RPPNRNY	1260
FJ2237MP02B07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	211	RGVMD	561	AITEGGDTG YADSVKG	911	RPPNRNY	1261
FJ2237MP02D07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	212	RGVMD	562	AITEGGDTG YADSVKG	912	RPPNRNY	1262
FJ2237MP02E07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAIIEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	213	RGVMD	563	AITEGGDTG YADSVKG	913	RPPNRNY	1263

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP02H07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	214	RGVMD	564	AITEGGDTG YADSVKG	914	RPPNRNY	1264
FJ2237MP02A08	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	215	RGVMD	565	AITEGGDTG YADSVKG	915	RPPNRNY	1265
FJ2237MP02C08	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	216	RGVMD	566	AITEGGDTG YADSVKG	916	RPPNRNY	1266
FJ2237MP02H08	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	217	RGVMD	567	AITEGGDTG YADSVKG	917	RPPNRNY	1267
FJ2237MP02B09	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	218	RGVMD	568	AITEGGDTG YADSVKG	918	RPPNRNY	1268
FJ2237MP02F09	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	219	RGVMD	569	AITEGGDTG YADSVKG	919	RPPNRNY	1269
FJ2237MP02H09	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	220	RGVMD	570	AITEGGDTG YADSVKG	920	RPPNRNY	1270
FJ2237MP02A10	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	221	RGVMD	571	AITEGGDTG YADSVKG	921	RPPNRNY	1271
FJ2237MP02H10	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	222	RGVMD	572	AITEGGDTG YADSVKG	922	RPPNRNY	1272
FJ2237MP02A11	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	223	RGVMD	573	AITEGGDTG YADSVKG	923	RPPNRNY	1273
FJ2237MP02G11	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	224	RGVMD	574	AITEGGDTG YADSVKG	924	RPPNRNY	1274
FJ2237MP02H11	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	225	RGVMD	575	AITEGGDTG YADSVKG	925	RPPNRNY	1275
FJ2237MP02A12	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	226	RGVMD	576	AITEGGDTG YADSVKG	926	RPPNRNY	1276
FJ2237MP02D12	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	227	RGVMD	577	AITEGGDTG YADSVKG	927	RPPNRNY	1277
FJ2237MP03H02	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	228	RGVMD	578	AITEGGDTG YADSVKG	928	RPPNRNY	1278
FJ2237MP03A07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	229	RGVMD	579	AITEGGDTG YADSVKG	929	RPPNRNY	1279
FJ2237MP03G07	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	230	RGVMD	580	AITEGGDTG YADSVKG	930	RPPNRNY	1280
FJ2237MP03B08	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLQMNTLRPEDTAVYYCNSRPPNR	231	RGVMD	581	AITEGGDTG YADSVKG	931	RPPNRNY	1281

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	NYWGQGTQVTVSS							
FJ2237MP03C09	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAATEGGDTGYADSVKGRFT ISADNAKSTVYLMNLTLPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	232	RGVMD	582	AITEGGDTG YADSVKG	932	RPPNRNY	1282
FJ2237MP03A12	QVQLQESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAATEGGDTGYADSVKGRFT ISADNAKSTVYLMNLTLPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	233	RGVMD	583	AITEGGDTG YADSVKG	933	RPPNRNY	1283
FJ2237MP01D09	QVQLQESGGGLVQPGGSLRLSCVASGVSIGITM AWFRQAPGKEREFFVAAIRVRGTATWYAGSVKGRF TISRDTTAEISVFLFEMNSLKPEDTAVYYCAAGRD WSTFSSAYEHWGQGTQVTVSS	234	ITTMA	584	AIRVRGTAT WYAGSVKG	934	GRDWSTFSS AYEH	1284
FJ2237MP01E04	QVQLVESGGGLAQAGGSLRLSCASGRTFDSRTM AWFRQAPGKEREFFVAALRLSGPATWYADSVKGRF TISRDTTAEISVFLFEMNSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGIQVTVSS	235	SRTMA	585	ALRLSGPAT WYADSVKG	935	GRDWSAFSS AYEY	1285
FJ2237MP01A02	QVQLVESGGGLAQAGGSLRLSCAASGRTFDIYTL GWFRQAPGKEREFFVAAILRGTATWYADSVKGRF TISRDIKSTVYLMNLSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	236	IYTLG	586	AIRLRGTAT WYADSVKG	936	GREWSTQSS AYDY	1286
FJ2237MP01F02	QVQLVESGGGLAQAGGSLRLSCAASGRTFDIYTL GWFRQAPGKEREFFVAAILRGTATWYADSVKGRF TISRDIKSTVYLMNLSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	237	IYTLG	587	AIRLRGTAT WYADSVKG	937	GREWSTQSS AYDY	1287
FJ2237MP01F04	QVQLVESGGGLAQAGGSLRLSCAASGRTFDIYTL GWFRQAPGKEREFFVAAILRGTATWYADSVKGRF TISRDIKSTVYLMNLSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	238	IYTLG	588	AIRLRGTAT WYADSVKG	938	GREWSTQSS AYDY	1288
FJ2237MP01E08	QVQLVESGGGLAQAGGSLRLSCAASGRTFDIYTL GWFRQAPGKEREFFVAAILRGTATWYADSVKGRF TISRDIKSTVYLMNLSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	239	IYTLG	589	AIRLRGTAT WYADSVKG	939	GREWSTQSS AYDY	1289
FJ2237MP01H01	QVQLVESGGGLAQAGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFFVAAVRLRGTATWYADSVKGRF TISRDTAKITVYLMNLSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	240	IYTMA	590	AVRLRGTAT WYADSVKG	940	GRDWSAFSS AYEY	1290
FJ2237MP01H03	QVQLVESGGGLAQAGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFFVAAVRLRGTATWYADSVKGRF TISRDTAKITVYLMNLSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVIVSS	241	IYTMA	591	AVRLRGTAT WYADSVKG	941	GRDWSAFSS AYEY	1291
FJ2237MP03G02	QVQLVESGGGLAQAGGSLRLSCSASGRTFDIYTM AWFRQAPGKEREFFVAAVRLRGTATWYADSVKGRF TISRDTAKITVYLMNLSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	242	IYTMA	592	AVRLRGTAT WYADSVKG	942	GRDWSAFSS AYEY	1292
FJ2237MP01H09	QVQLVESGGGLAQAGGSLRLSCSASGRTFDSRTV AWFRQAPGKEREFFVAALRLSGPATWYADSVKGRF TISRDNAKNTIYLMNLSLKPEDTAVYYCAAGREW SALSSAYEYWGAGTQVTVSS	243	SRTVA	593	ALRLSGPAT WYADSVKG	943	GREWSALSS AYEY	1293
FJ2237MP01E10	QVQLVESGGGLAQAGGSLRLSCSASGRTFDSRTV AWFRQAPGKEREFFVAALRLSGPATWYADSVKGRF TISRDNAKNTIYLMNLSLKPEDTAVYYCAAGREW SALSSAYEYWGAGTQVTVSS	244	SRTVA	594	ALRLSGPAT WYADSVKG	944	GREWSALSS AYEY	1294
FJ2237MP03C04	QVQLVESGGGLVEPGGSLRLSCAASGFAFGNYDM TWVRQAPGKGFPEWVSAINSRGSTYYADSVKGRFT ISRDNAKNTIYLMNLSLKPEDTAVYYCATDPYRD YIYGQPTHYDYWGQGTQVTVSS	245	NYDMT	595	AINSRGSTY YADSVKG	945	DPYRDYIYG QPTHYDY	1295
FJ2237MP03E05	QVQLVESGGGLVEPGGSLRLSCAASGFAFGNYDM TWVRQAPGKGFPEWVSAINSRGSTYYADSVKGRFT ISRDNAKNTIYLMNLSLKPEDTAVYYCATDPYRD YIYGQPTHYDYWGQGTQVTVSS	246	NYDMT	596	AINSRGSTY YADSVKG	946	DPYRDYIYG QPTHYDY	1296
FJ2237MP02A06	QVQLVESGGGLVQAGDSLRLSCAASGGTFSTRAM GWFRQAPGKEREFFVGHIGWNGGSTFYADSVKGRF TISRDNAKNTVYLMNLSLKPEDTAVYYCAAGSKP VVRPEDFHYWGQGTQVTVSS	247	TRAMG	597	HIGWNGGST FYADSVKG	947	GSKPVVRPE DFHY	1297
FJ2237MP04F01	QVQLVESGGGLVQAGDSLRLSCAASGRTFSTYTM GWFRQAPGKERESVAAISKSGRTAQYADSVKGRF TMSRDNAKNTVYLMNLSLKPEDTAVYYCAADSSD WVSGRAYDYEYWGQGAQVTVSS	248	TYTMG	598	AISKSGRTA QYADSVKG	948	DSSDWVSGR AYDYEY	1298

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP06D01	QVQLVESGGGLVQAGESLRLSCAASGGTYGYAMG WFRQAPGKEREFVGTITRSGETTYADSVKGRFTI SGDNAENTVYLQMNGLLPEDTAVYYCAARSVSYS RRYTAYSEMNDYTFWGQGTQVTVSS	249	GYAMG	599	TITRSGETTY YADSVKG	949	RSVYSRRY TAYSEMNDY TF	1299
FJ2237MP04E11	QVQLVESGGGLVQAGESLRLSCAASGGTYGYAMG WFRQAPGKEREFVGTITRSGETTYADSVKGRFTI SGDNAENTVYLQMNGLLPEDTAVYYCAARSVSYS RRYTAYSEMNDYTFWGQGTQVTVSS	250	GYAMG	600	TITRSGETTY YADSVKG	950	RSVYSRRY TAYSEMNDY TF	1300
FJ2237MP01E03	QVQLVESGGGLVQAGGSLRLSCSASGRTFDSRTM AWFRQAPGKEREFVAAALRLSGPATWYADSVGRF TISRDTAQNVTYVLQMNLSRPEDTAVYYCAAGRWD SAFSSAYEYWGQGTQVTVSS	251	SRTMA	601	ALRLSGPAT WYADSVRG	951	GRDWSAFSS AYEY	1301
FJ2237MP01D04	QVQLVESGGGLVQAGGSLRLSCSASGRTFDSRTM AWFRQAPGKEREFVAAALRLSGPATWYADSVGRF TISRDTAQNVTYVLQMNLSRPEDTAVYYCAAGRWD SAFSSAYEYWGQGTQVTVSS	252	SRTMA	602	ALRLSGPAT WYADSVRG	952	GRDWSAFSS AYEY	1302
FJ2237MP01A10	QVQLVESGGGLVQAGGSLRLSCSASGRTFNSRTM AWFRQAPGKEREFVAAALRLSGPATWYADSVGRS TISRDTGKNTVYLQMNLSKPEDTGVYYCAAGREW SASSAYEYWGQGTQVTVSS	253	SRTMA	603	ALRLSGPAT WYADSVKG	953	GREWSASSS AYEY	1303
FJ2237MP03C08	QVQLVESGGGLVQAGGSLRLSCAASGGTFSTRAM GWFRQPPGKEREFVGHIGWNGGSTFYADSVKGRF TISRDNAKNTVYLQMDSLKPEDTAVYHCAAGSKP VVRVEDFNWQGTQVTVSA	254	TRAMG	604	HIGWNGGST FYADSVKG	954	GSKPVVRVE DFNY	1304
FJ2237MP01A05	QVQLVESGGGLVQAGGSLRLSCAASGLTFDIKTM AWFRQAPGKEREFVAAALRLSGTATWYADSVKGRF TISRDTAKMVLQMNLSKPEDTAVYYCAAGRGWS AFSSAYEYWGQGTQVTVSP	255	IKTMA	605	ALRLSGTAT WYADSVKG	955	GRGWSAFSS AYEY	1305
FJ2237MP03A03	QVQLVESGGGLVQAGGSLRLSCAASGLTFDIKTM AWFRQAPGKEREFVAAALRLSGTATWYADSVKGRF TISRDTAKMVLQMNLSKPEDTAVYYCAAGRGWS AFSSAYEYWGQGTQVTVSP	256	IKTMA	606	ALRLSGTAT WYADSVKG	956	GRGWSAFSS AYEY	1306
FJ2237MP04E05	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	257	SNVMD	607	AMSTEGDTN YADSVKG	957	RGYDD	1307
FJ2237MP04B01	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	258	SNVMD	608	AMSTEGDTN YADSVKG	958	RGYDD	1308
FJ2237MP04A02	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	259	SNVMD	609	AMSTEGDTN YADSVKG	959	RGYDD	1309
FJ2237MP04E02	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	260	SNVMD	610	AMSTEGDTN YADSVKG	960	RGYDD	1310
FJ2237MP04F04	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	261	SNVMD	611	AMSTEGDTN YADSVKG	961	RGYDD	1311
FJ2237MP04B05	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	262	SNVMD	612	AMSTEGDTN YADSVKG	962	RGYDD	1312
FJ2237MP04D05	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	263	SNVMD	613	AMSTEGDTN YADSVKG	963	RGYDD	1313
FJ2237MP04E08	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	264	SNVMD	614	AMSTEGDTN YADSVKG	964	RGYDD	1314
FJ2237MP04F09	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD WGPGRVTVSS	265	SNVMD	615	AMSTEGDTN YADSVKG	965	RGYDD	1315
FJ2237MP04G10	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVM DWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSKPEDTGVYYCRIRGYDD	266	SNVMD	616	AMSTEGDTN YADSVKG	966	RGYDD	1316

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	WGPGRVTVSS							
FJ2237MP04D12	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	267	SNVMD	617	AMSTEGDTNYADSVKG	967	RGYDD	1317
FJ2237MP04F12	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	268	SNVMD	618	AMSTEGDTNYADSVKG	968	RGYDD	1318
FJ2237MP04F02	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTASRDNAQNTGDLQMNSLKPEDTGVYYCRIRGYDDWGQGTQATVSS	269	SNVMD	619	AMSTEGDTNYADSVKG	969	RGYDD	1319
FJ2237MP04D01	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNQNTVDLQMSSSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	270	SNVMD	620	AMSTEGDTNYADSVKG	970	RGYDD	1320
FJ2237MP04B03	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNQNTVDLQMSSSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	271	SNVMD	621	AMSTEGDTNYADSVKG	971	RGYDD	1321
FJ2237MP04B09	QVQLVESGGGLVQAGGSLRLSCAASGNIFSSNVMDWYRQAPGKQREWVAAMSTEGDTNYADSVKGRFTISRDNQNTVDLQMSSSLKPEDTGVYYCRIRGYDDWGPGRVTVSS	272	SNVMD	622	AMSTEGDTNYADSVKG	972	RGYDD	1322
FJ2237MP06E10	QVQLVESGGGLVQAGGSLRLSCAASGRIDRISDMSWYRQGPGRQDLVATITADGRSAYPDSVKGRFTISRDNAKNTVILQMNSLRPEDTAVYYCNAEPAIMGWNRPPLDYWGQGTQVTVSS	273	ISDMS	623	TITADGRSAYPDSVKG	973	AEPAIMGWNRPPLDY	1323
FJ2237MP03D07	QVQLVESGGGLVQAGGSLRLSCAASGRPFSTYAMGWFRQAPGKEREFEVVIHIGGIGDSTYYADSVKGRFTASRDNAKNTVYILQMNSLKPEDTAVYYCAAGSKPVVRPDFNYWGQGTQVTVAS	274	TYAMG	624	HIGGIGDSTYYADSVKG	974	GSKPVVRPRDFNY	1324
FJ2237MP01C10	QVQLVESGGGLVQAGGSLRLSCAASGRDSSYTMGWFRQAPGKEREFEVAAISWSTYYADPVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAAGLPRSRYLHLADEYFYWGQGTQVTVSS	275	SYTMG	625	AISWSTYYADPVKKG	975	GLPRSRYLHLADEYFY	1325
FJ2237MP01E01	QVQLVESGGGLVQAGGSLRLSCAASGRFTDIYTLGWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDIKSTVYILQMNSLKPEDTAVYYCAAGREWSTQSSAYDYWGQGTQVTVSS	276	IYTLG	626	AIRLRGTATWYADSVKG	976	GREWSTQSSAYDY	1326
FJ2237MP01A11	QVQLVESGGGLVQAGGSLRLSCAASGRFTDIYTLGWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDIKSTVYILQMNSLKPEDTAVYYCAAGREWSTQSSAYDYWGQGTQVTVSS	277	IYTLG	627	AIRLRGTATWYADSVKG	977	GREWSTQSSAYDY	1327
FJ2237MP03G01	QVQLVESGGGLVQAGGSLRLSCAASGRFTDIYTLGWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDIKSTVYILQMNSLKPEDTAVYYCAAGREWSTQSSAYDYWGQGTQVTVSS	278	IYTLG	628	AIRLRGTATWYADSVKG	978	GREWSTQSSAYDY	1328
FJ2237MP01A12	QVQLVESGGGLVQAGGSLRLSCAASGRFTDYMVTMGWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDTAKITVYILQMNSLKPEDTAVYYCAAGREWSTQSSAYDYWGQGTQVTVSS	279	MYTMG	629	AIRLRGTATWYADSVKG	979	GREWSTQSSAYDY	1329
FJ2237MP01D06	QVQLVESGGGLVQAGGSLRLSCAASGRFTDVYTMWFRQAPGKEREFEVAAIRLRGTATWYADSVKGRFTISRDTAKSTVNLMNSLKLKEDTAVYYCAAGREWSAFSSAYEYWGQGTQVTVSS	280	VYTMA	630	AIRLRGTATWYADSVKG	980	GREWSAFSSAYEY	1330
FJ2237MP05C08	QVQLVESGGGLVQAGGSLRLSCAASGRTFSSYPVWFRQAPGKEREFEVARI SYTGVNTNYADSVKGRFTISRDNAKNMAWLQMNSLKPEDMAVYYCAADGPPYGRTYQYSGQGTYEYWGQGTQVTVSS	281	SYPVA	631	RISYTGVTNYADSVKG	981	DGPPYGRTYQYSGQGTYEY	1331
FJ2237MP03C12	QVQLVESGGGLVQAGGSLRLSCAASGRTFSTSAMWFRQAPGKEREFEVAHIGWNGDSTFYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAVYYCAAGSKPVVRPDFVYWGQGTQVTVSS	282	TSAMG	632	HIGWNGDSTFYADSVKG	982	GSKPVVRPRDFVY	1332
FJ2237MP03B12	QVQLVESGGGLVQAGGSLRLSCAASGRTFSTYAMWFRQAPGKEREFEVAHIGWNGASTFYADSVKGRFTISRDNAKNTVYILQMNSLKPEDTAAVYYCAAGSKPVVRPDFVYWGQGTQVTVSS	283	TYAMG	633	HIGWNGASTFYADSVKG	983	GSKPVVRPRDFVY	1333

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP04D07	QVQLVESGGGLVQAGGSLRLSCAASGRTSSTYNM GWFRQAPGKEREFFVASISKSGRTTQYADSVKGRF TMSRDGAKNTVYLMNSLKPEDTAVYYCAAGSSD WLSGRPDEYEWGQGAQVTVSS	284	TYNMG	634	SISKSGRTT QYADSVKG	984	GSSDWLSGR PDEYEW	1334
FJ2237MP04C11	QVQLVESGGGLVQAGGSLRLSCAASGRTSSTYNM GWFRQAPGKEREFFVASISKSGRTTQYADSVKGRF TMSRDGAKNTVYLMNSLKPEDTAVYYCAAGSSD WLSGRPDEYEWGQGAQVTVSS	285	TYNMG	635	SISKSGRTT QYADSVKG	985	GSSDWLSGR PDEYEW	1335
FJ2237MP06D02	QVQLVESGGGLVQAGGSLRLSCAASGSIFEGDRT DWYRQAPGKQRELVADMTGGGNTNYADSVKGRFT SSRDFAKNTVYLMNDLKPEDTAVYYCYNLRRTG TSWGQGTQVTVSS	286	GDRTG	636	DMTGGGNTN YADSVKG	986	LRRGTTS	1336
FJ2237MP01C08	QVQLVESGGGLVQAGGSLRLSCAASGSTSFNTL DWYRQAPGKQREFFVAVITDGGATNYADSVKGRFT ISRDIKNTVYLMNSLKPEDTAVYYCKERGGDY WGQGTQVTVSS	287	FNTLD	637	VITDDGATN YAGSVKG	987	RGGDY	1337
FJ2237MP01C03	QVQLVESGGGLVQAGGSLRLSCAASGSTSSFNTM DWYRQAPGKQREFFVAVITDGGATNYADSVKGRFT ISGDIKNTVYLMNSLKPEDTAVYYCKERGGDY WGQGTQVTVSS	288	FNTMD	638	VITDGGATN YAGSVKG	988	RGGDY	1338
FJ2237MP01C07	QVQLVESGGGLVQAGGSLRLSCAASGSTSSFNTM DWYRQAPGKQREFFVAVITDGGATNYADSVKGRFT ISGDIKNTVYLMNSLKPEDTAVYYCKERGGDY WGQGTQVTVSS	289	FNTMD	639	VITDGGATN YAGSVKG	989	RGGDY	1339
FJ2237MP02G01	QVQLVESGGGLVQAGGSLRLSCAPSGRTDSSYTM GWFRQAPGKEREFFVTAIDWNTYYTDVNGRFTIS RDNAKNTVYLMNSLKPEDTAVYYCVAGLPRRRY MQAADEYAYWGQGTQVTVSS	290	SYTMG	640	AIDWNTYYT DVVNG	990	GLPRRRYMQ AADEYAY	1340
FJ2237MP03E08	QVQLVESGGGLVQAGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREFFVAAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	291	RGVMD	641	AITEGGDTG YADSVKG	991	RPPNRNY	1341
FJ2237MP01A03	QVQLVESGGGLVQAGGSLRLSCTASGRTFDIYTL GWFRQAPGKEREFFVAAIRLRGTATWYADSVKGRF TISRDIKNTVYLMNSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	292	IYTLG	642	AIRLRGTAT WYADSVKG	992	GREWSTQSS AYDY	1342
FJ2237MP01H05	QVQLVESGGGLVQAGGSLRLSCTASGRTFDIYTL GWFRQAPGKEREFFVAAIRLRGTATWYADSVKGRF TISRDIKNTVYLMNSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	293	IYTLG	643	AIRLRGTAT WYADSVKG	993	GREWSTQSS AYDY	1343
FJ2237MP01F09	QVQLVESGGGLVQAGGSLRLSCTASGRTFDIYTL GWFRQAPGKEREFFVAAIRLRGTATWYADSVKGRF TISRDIKNTVYLMNSLKPEDTAVYYCAAGREW STQSSAYDYWGQGTQVTVSS	294	IYTLG	644	AIRLRGTAT WYADSVKG	994	GREWSTQSS AYDY	1344
FJ2237MP03C10	QVQLVESGGGLVQAGGSLTLSCVASGRSISNYAM GWFRQTPGKEREFFVAHIGWNGDSTFYADSVKGRF TISRDNKNTVYLMHSLKPEDTAVYYCAAGSKP IVRPEGFNYWGQGTQVTVSS	295	NYAMG	645	HIGWNGDST FYADSVKG	995	GSKPIVRPE GFNY	1345
FJ2237MP06E03	QVQLVESGGGLVQPGGSLKLSCSASGFPSPDNAM AWFRQAPGKEREFFVSCIGVSGATFYADPVKGRFT ISRDNKNTVYLMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVAS	296	NYAMA	646	CIGVSGATF YADPVKG	996	GECYSYDI YPTGY	1346
FJ2237MP06G10	QVQLVESGGGLVQPGGSLKLSCSASGFPSPDNAM AWFRQAPGKEREFFVSCIGVSGATFYADSVKGRFT ISRDNKNTVYLMNSLKPEDTAVYYCAIGECYS DYDIYPTGYWGQGTQVTVSS	297	NYAMA	647	CIGVSGATF YADSVKG	997	GECYSYDI YPTGY	1347
FJ2237MP04C10	QVQLVESGGGLVQPGGSLRLSCAAGNIFSSNVM DWYRQAPGKQREFFVAAAMSTEGDTNYADSVKGRFT ASRDNAQNTGDLQMNLSLKPEDTGVYYCRIRGYDD WGPGRTRTVSS	298	SNVMD	648	AMSTEGDTN YADSVKG	998	RGYDD	1348
FJ2237MP05H09	QVQLVESGGGLVQPGGSLRLSCAASESLFRFND SWYRQGPQKQREFFVAVITSDSTGYAEAVKARFT ISRDTTKNTVYLMNGLKPEDTAVYYCNTVPFRS WGQGTQVTVSS	299	FNDAS	649	RITSDSTG YAEAVKA	999	VPFRS	1349
FJ2237MP03F01	QVQLVESGGGLVQPGGSLRLSCAASGFNFGNYDM SWVRQAPGKGPPEWVSSINSGGSTYYADSVKGRFT ISRDNKNTLYLMNSLKPEDTAVYYCAPDPEGD RIPHRDYWGQGTQVMVSS	300	NYDMS	650	SINSGGSTY YADSVKG	1000	DPEGDRIPH RDY	1350
FJ2237MP01D11	QVQLVESGGGLVQPGGSLRLSCAASGFNFGNYDM SWVRQAPGKGPPEWVSSINSGRGSTYYADSVKGRF TISRDNKNTLYLMNSLKPEDTAAAYCAVDPEG	301	NYDMS	651	SINSGRGST YYADSVKG	1001	DPEGDRIPH YDY	1351

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	DRIPHIDYWGQGTQVTVSS							
FJ2237MP06G06	QVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCNSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFFWGQGTQVTVSS	302	FYDMG	652	CNSSSDGST YYSDSVKG	1002	VELRCADVP EDDNYPF	1352
FJ2237MP06B04	QVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFFWGQGTQVTVSS	303	FYDMG	653	CSSSDGST YYSDSVKG	1003	VELRCADVP EDDNYPF	1353
FJ2237MP06D04	QVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFFWGQGTQVTVSS	304	FYDMG	654	CSSSDGST YYSDSVKG	1004	VELRCADVP EDDNYPF	1354
FJ2237MP06F05	QVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFFWGQGTQVTVSS	305	FYDMG	655	CSSSDGST YYSDSVKG	1005	VELRCADVP EDDNYPF	1355
FJ2237MP06G05	QVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFFWGQGTQVTVSS	306	FYDMG	656	CSSSDGST YYSDSVKG	1006	VELRCADVP EDDNYPF	1356
FJ2237MP06C06	QVQLVESGGGLVQPGGSLRLSCAASGFSLQFYDM GWFRQAPGKEREGVSCSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFFWGQGTQVTVSS	307	FYDMG	657	CSSSDGST YYSDSVKG	1007	VELRCADVP EDDNYPF	1357
FJ2237MP03C06	QVQLVESGGGLVQPGGSLRLSCAASGHTFDIKTL AWFRQTPGTEREFVAAIRLWGTATRYADSVKGRF TISRDSAKNTVYLMNSLKPEDTAVYYCAAGRDW SAFSSAYDHWGQGTQVTVSS	308	IKTLA	658	AIRLWGTAT RYADSVKG	1008	GRDWSAFSS AYDH	1358
FJ2237MP01E05	QVQLVESGGGLVQPGGSLRLSCAASGHTFDVKTL GWFRQTPGTEREFVAAIRLWGTATRYADSVKGRF TISRDSAKNTVYLMNKLKPEDTAVYYCAAGRDW SAFSSAYDYWGQGTQVTVSS	309	VKTLG	659	AIRLWGTAT RYADSVKG	1009	GRDWSAFSS AYDY	1359
FJ2237MP01E11	QVQLVESGGGLVQPGGSLRLSCAASGHTFDVKTL GWFRQTPGTEREFVAAIRLWGTATRYADSVKGRF TISRDSAKNTVYLMNKLKPEDTAVYYCAAGRDW SAFSSAYDYWGQGTQVTVSS	310	VKTLG	660	AIRLWGTAT RYADSVKG	1010	GRDWSAFSS AYDY	1360
FJ2237MP01C02	QVQLVESGGGLVQPGGSLRLSCAASGRTFDVYTM AWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAKSTVNLQMNLSLKEDTAVYYCAAGREW SAFSSAYEYWGQGTQVTVSS	311	VYTMA	661	AIRLRGTAT WYADSVKG	1011	GREWSAFSS AYEY	1361
FJ2237MP01A01	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	312	VYTIG	662	AIRLRGTAT WYADSVKG	1012	SRDWSTKSS AYDY	1362
FJ2237MP01D01	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	313	VYTIG	663	AIRLRGTAT WYADSVKG	1013	SRDWSTKSS AYDY	1363
FJ2237MP01B03	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	314	VYTIG	664	AIRLRGTAT WYADSVKG	1014	SRDWSTKSS AYDY	1364
FJ2237MP01B07	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	315	VYTIG	665	AIRLRGTAT WYADSVKG	1015	SRDWSTKSS AYDY	1365
FJ2237MP01D08	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	316	VYTIG	666	AIRLRGTAT WYADSVKG	1016	SRDWSTKSS AYDY	1366
FJ2237MP01C11	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	317	VYTIG	667	AIRLRGTAT WYADSVKG	1017	SRDWSTKSS AYDY	1367
FJ2237MP03D03	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREFVAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNSLKPEDTGVIYCAASRDW STKSSAYDYWGQGTQVTVSS	318	VYTIG	668	AIRLRGTAT WYADSVKG	1018	SRDWSTKSS AYDY	1368

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
FJ2237MP03A05	QVQLVESGGGLVQPGGSLRLSCAASGRTFEVYTI GWFRQAPGKEREVFAAIRLRGTATWYADSVKGRF TISRDTAENTVYLMNLSKPEDTGVYYCAASRDW STKSSAYDYWGQGTQVTVSS	319	VYTIG	669	AIRLRGTAT WYADSVKG	1019	SRDWSTKSS AYDY	1369
FJ2237MP01D07	QVQLVESGGGLVQPGGSLRLSCAASGSMFSDDVV DWYRQPPGKQREWVAITSSGHDAGYADSVKGRF TISRDNAKNTVYLMNLSKPEDTAVYYCSDRKGL WRGQGTQVTVSS	320	DDVVD	670	GITSSGHDA GYADSVKG	1020	RKGLW	1370
FJ2237MP02B10	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADDAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	321	RGVMD	671	AITEGGDTG YADSVKG	1021	RPPNRNY	1371
FJ2237MP02H02	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDAAVYYCNSRPPNR NYWGQGTQVTVSS	322	RGVMD	672	AITEGGDTG YADSVKG	1022	RPPNRNY	1372
FJ2237MP03E07	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDAAVYYCNSRPPNR NYWGQGTQVTVSS	323	RGVMD	673	AITEGGDTG YADSVKG	1023	RPPNRNY	1373
FJ2237MP02A01	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	324	RGVMD	674	AITEGGDTG YADSVKG	1024	RPPNRNY	1374
FJ2237MP02B01	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	325	RGVMD	675	AITEGGDTG YADSVKG	1025	RPPNRNY	1375
FJ2237MP02F01	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	326	RGVMD	676	AITEGGDTG YADSVKG	1026	RPPNRNY	1376
FJ2237MP02D02	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	327	RGVMD	677	AITEGGDTG YADSVKG	1027	RPPNRNY	1377
FJ2237MP02C03	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	328	RGVMD	678	AITEGGDTG YADSVKG	1028	RPPNRNY	1378
FJ2237MP02H03	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	329	RGVMD	679	AITEGGDTG YADSVKG	1029	RPPNRNY	1379
FJ2237MP02D04	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	330	RGVMD	680	AITEGGDTG YADSVKG	1030	RPPNRNY	1380
FJ2237MP02G04	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	331	RGVMD	681	AITEGGDTG YADSVKG	1031	RPPNRNY	1381
FJ2237MP02A05	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	332	RGVMD	682	AITEGGDTG YADSVKG	1032	RPPNRNY	1382
FJ2237MP02G06	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	333	RGVMD	683	AITEGGDTG YADSVKG	1033	RPPNRNY	1383
FJ2237MP02C07	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	334	RGVMD	684	AITEGGDTG YADSVKG	1034	RPPNRNY	1384
FJ2237MP02E11	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	335	RGVMD	685	AITEGGDTG YADSVKG	1035	RPPNRNY	1385
FJ2237MP02F12	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAITEGGDTGYADSVKGRFT ISADNAKSTVYLMNTLRPEDTAVYYCNSRPPNR	336	RGVMD	686	AITEGGDTG YADSVKG	1036	RPPNRNY	1386

Clone ID	VHH	SEQ ID NO:	CDR1	SEQ ID NO:	CDR2	SEQ ID NO:	CDR3	SEQ ID NO:
	NYWGQGTQVTVSS							
FJ2237MP03H08	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAATEGGDTGYADSVKGRFT ISADNAKSTVYLQMNLTLPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	337	RGVMD	687	AITEGGDTG YADSVKG	1037	RPPNRY	1387
FJ2237MP03G09	QVQLVESGGGLVQPGGSLRLSCATSGIDFSRGVM DWYRQPPGKQREWVAATEGGDTGYADSVKGRFT ISADNAKSTVYLQMNLTLPEDTAVYYCNSRPPNR NYWGQGTQVTVSS	338	RGVMD	688	AITEGGDTG YADSVKG	1038	RPPNRY	1388
FJ2237MP01B06	QVQLVESGGGLVQPGGSLRLSCASGRAFDKTM AWFRQAPGKEREFAAIRLHGTATWYTSVKGRF TISRDTAKNSTVYLQMDSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	339	MKTMA	689	AIRLHGTAT WYTSVKG	1039	GRDWSAFSS AYEY	1389
FJ2237MP01G04	QVQLVESGGGLVQPGGSLRLSCASGRAFDKTM AWFRQAPGKEREFAAIRLHGTATWYTSVKGRF TISRDTAKNSTVYLEMNSLKPEDTGVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	340	TKTMA	690	ALRLHGTAT WYTSVKG	1040	GRDWSAFSS AYEY	1390
FJ2237MP01G07	QVQLVESGGGLVQPGGSLRLSCASGRAFDKTM AWFRQAPGKEREFAAIRLHGTATWYTSVKGRF TISRDTAKNSTVYLEMNSLKPEDTGVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	341	TKTMA	691	ALRLHGTAT WYTSVKG	1041	GRDWSAFSS AYEY	1391
FJ2237MP03H01	QVQLVESGGGLVQPGGSLRLSCASGRAFDKTM AWFRQAPGKEREFAAIRLHGTATWYTSVKGRF TISRDTAKNSTVYLEMNSLKPEDTGVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	342	TKTMA	692	ALRLHGTAT WYTSVKG	1042	GRDWSAFSS AYEY	1392
FJ2237MP01F01	QVQLVESGGGLVQPGGSLRLSCASGRTFDIYTM AWFRQAPGKEREFAAVRLRGATWYADSVKGRF TISRDTAKITVYLQMNLSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	343	IYTMA	693	AVRLRGAT WYADSVKG	1043	GRDWSAFSS AYEY	1393
FJ2237MP01G06	QVQLVESGGGLVQPGGSLRLSCASGRTFDIYTM AWFRQAPGKEREFAAVRLRGATWYADSVKGRF TISRDTAKITVYLQMNLSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	344	IYTMA	694	AVRLRGAT WYADSVKG	1044	GRDWSAFSS AYEY	1394
FJ2237MP01A08	QVQLVESGGGLVQPGGSLRLSCASGRTFDIYTM AWFRQAPGKEREFAAVRLRGATWYADSVKGRF TISRDTAKITVYLQMNLSLKPEDTAVYYCAAGRDW SAFSSAYEYWGQGTQVTVSS	345	IYTMA	695	AVRLRGAT WYADSVKG	1045	GRDWSAFSS AYEY	1395
FJ2237MP03B03	QVQLVESGGGLVQPGGSLRLSCVSVSGSIGELNHM GWYRQAPGKQREMVATITTTGTNYADSVKGRFT ISRGSSENTLYLQMNLSLKPEDTAVYYCNIFFTS DWPPKYLDLWGQGTQVTVSS	346	LNHMG	696	TITTTGTN YADSVKG	1046	NFFTSWPP KYLDL	1396
FJ2237MP06H01	QVQLVESGGGLVQPGGSLRLSCAASGFSLDQYDM GWFRQAPGKEREVSCSSSSDGSTYYSDSVKGRF TISRDNAKNTAYLHMNSLKPEDTAVYYCAPVELR CADVPEDDNYFWGQGTQVTVSS	347	FYDMG	697	CSSSSDGST YYSDSVKG	1047	VELRCADVP EDDNYPF	1397
FJ2237MP03A11	QVQLVESGGGLVQTGGSLRLSCEASGAFSTGAT GWFRQAPGKEREFAHIGWGGDTYYAESAKGRF TISRDNAKNTVYLQMNLSLKPEDTAVYYCAAGSKP IVRIEFGDSWGQGTQVTVSS	348	TGATG	698	HIGWGGDT YYAESAKG	1048	GSKPIVRIE GFDS	1398
FJ2237MP02B02	QVQLVESGGGLVQPGGSLRLSCTASGTFSTYAM GWFRQAPGKEREFAHIGWNGASTFYADSVKGRF TISRDNAKNTVYLQMNLSLKPEDTAVYYCAAGSKP VVRPRDFVYWQGTQVTVSS	349	TYAMG	699	HIGWNGAST FYADSVKG	1049	GSKPVVRPR DFVY	1399
FJ2237MP01B01	QVQLVESGGGVVQPGGSLRLSCAASGHTFDVKTL GWFRQTPGTEREFVAAIRLWGTATRYADSVKGRF TISRDSAKNTVYLQMNLSLKPEDTAVYYCAAGRDW SAFSSAYDYWGQGTQVTVSS	350	VKTLG	700	AIRLWGTAT RYADSVKG	1050	GRDWSAFSS AYDY	1400

Also within the scope of the present disclosure are functional variants of any of the reference anti-5T4 antibodies as disclosed herein. A functional variant can comprise up to 5 (e.g., 4, 3, 2, or 1) amino acid residue variations in one or more of the heavy chain and light chain CDR regions of the reference antibody and binds the same epitope of the 5T4 antigen with substantially similar affinity (e.g., having a K_D value in the same order). In some instances, each

of the heavy chain and/or light chain CDR in a functional variant contain no more than 2 amino acid residue variations as relative to the counterpart CDR in the reference antibody. In some examples, each of the heavy chain and/or light chain CDR in a functional variant contain no more than 1 amino acid residue variations as relative to the counterpart CDR in the reference antibody.

In one example, the amino acid residue variations are conservative amino acid residue substitutions. As used herein, a “conservative amino acid substitution” refers to an amino acid substitution that does not alter the relative charge or size characteristics of the protein in which the amino acid substitution is made. Variants can be prepared according to methods for altering polypeptide sequence known to one of ordinary skill in the art. Conservative substitutions of amino acids include substitutions made amongst amino acids within the following groups: (a) M, I, L, V; (b) F, Y, W; (c) K, R, H; (d) A, G; (e) S, T; (f) Q, N; and (g) E, D.

In some embodiments, an anti-5T4 antibody comprises heavy chain CDRs that, collectively, are at least 80% (*e.g.*, 85%, 90%, 95%, or 98%) identical to the heavy chain CDRs of a reference antibody, and/or light chain CDRs that, collectively, are at least 80% (*e.g.*, 85%, 90%, 95%, or 98%) identical to the light chain CDRs of the reference antibody. In some embodiments, an anti-5T4 antibody comprises a heavy chain variable region (V_H) that is at least 80% (*e.g.*, 85%, 90%, 95%, or 98%) identical to the heavy chain variable region of any of the reference antibody and/or a light chain variable region (V_L) that is at least 80% (*e.g.*, 85%, 90%, 95%, or 98%) identical to the light chain variable region of the reference antibody.

The “percent identity” of two amino acid sequences is determined using the algorithm of Karlin and Altschul Proc. Natl. Acad. Sci. USA 87:2264-68, 1990, modified as in Karlin and Altschul Proc. Natl. Acad. Sci. USA 90:5873-77, 1993. Such an algorithm is incorporated into the NBLAST and XBLAST programs (version 2.0) of Altschul, et al. J. Mol. Biol. 215:403-10, 1990. BLAST protein searches can be performed with the XBLAST program, score=50, wordlength=3 to obtain amino acid sequences homologous to the protein molecules of interest. Where gaps exist between two sequences, Gapped BLAST can be utilized as described in Altschul et al., Nucleic Acids Res. 25(17):3389-3402, 1997. When utilizing BLAST and Gapped BLAST programs, the default parameters of the respective programs (*e.g.*, XBLAST and NBLAST) can be used.

Methods for Producing Anti-5T4 Antibodies

There are several methods of producing anti-5T4 antibodies, each with its advantages and disadvantages. The choice of method depends on the specific application and desired characteristics of the antibody. In some embodiments, hybridoma technology is used, which involves fusing a specific antibody-producing B-cell with a myeloma cell to produce hybridoma cells. These hybridoma cells can then be cloned and grown in culture to produce large quantities of monoclonal antibodies (mAbs). In other embodiments, phage display technology is used, which involves displaying antibody fragments on the surface of bacteriophages, which are then selected for their binding affinity to a specific antigen. The selected phages are then grown in bacteria to produce large quantities of the specific antibody. In yet other embodiments, recombinant DNA technology is used, which involves cloning antibody genes into expression vectors and expressing the antibodies in bacteria, yeast, or mammalian cells. The recombinant antibodies can then be purified and characterized. In still other embodiments, Transgenic Animals are used, which involves introducing human antibody genes into animals, such as mice, to produce humanized antibodies. The transgenic animals can then be immunized with the desired antigen to produce high-affinity antibodies.

In some embodiments, the anti-5T4 is a VHH antibody, also known as a single-domain antibody or a nanobody, which is a small antigen-binding fragment derived from heavy-chain-only antibodies found in the immune systems of camelids. In some embodiments, a method for producing an anti-5T4 antibody comprises the following steps:

Step 1: Immunization of Camelids: Camelids, such as llamas, alpacas, and camels, are immunized with a desired 5T4 antigen to generate an immune response. The antigen may be a protein, peptide, or hapten that is conjugated to a carrier protein to enhance its immunogenicity. The immunization may be repeated at intervals to boost the immune response.

Step 2: Isolation of Peripheral Blood Mononuclear Cells (PBMCs): Peripheral blood is collected from the immunized camelids, and PBMCs are isolated using standard techniques such as density gradient centrifugation. PBMCs are a heterogeneous population of immune cells, including lymphocytes and monocytes, that can produce antibodies.

Step 3: Generation of VHH Libraries: RNA is extracted from the PBMCs, and cDNA is synthesized using reverse transcription. The variable domains of the heavy-chain-only antibodies are amplified using PCR with primers specific to the VHH sequences. The amplified VHH fragments are then cloned into a phage display vector to generate a VHH library.

Step 4: Selection of VHH Antibodies: The VHH library is screened for binding to the antigen of interest using phage display. Phage particles displaying VHH antibodies that bind to the antigen are isolated and propagated for further analysis.

Step 5: Production and Purification of VHH Antibodies: Selected VHH antibodies are produced by recombinant expression in bacterial or mammalian cells. The VHH antibody may be fused to a tag such as His6 for purification using affinity chromatography. The purified VHH antibody is then characterized for binding specificity, affinity, and stability.

The above-described method enables the production of VHH antibodies with high specificity and affinity for 5T4.

Anti-5T4 Antibody-Drug Conjugates

Also provided are antibody-drug conjugates (ADCs) for drug delivery comprising (a) an anti-5T4 antibody; and (b) a drug, which is directly or indirectly bound to the antibody.

Antibody-drug conjugates are a type of targeted cancer therapy that combines an antibody specific to a tumor antigen with a drug (e.g., a toxic drug). The antibody selectively binds to the tumor cell, delivering the drug directly to the cancer cells, while sparing healthy cells. Non-limiting examples of drugs include therapeutic agents, such as cytotoxins, radioisotopes, immunomodulatory agents, anti-angiogenic agents, anti-proliferative agents, pro-apoptotic agents, chemotherapeutic agents, and therapeutic nucleic acids. Diagnostic agents are also contemplated herein. A radioisotope, for example, may be used as a therapeutic agent or as a diagnostic/imaging agent when bound to an antibody.

In some embodiments, an ADC comprises an anti-5T4 antibody (e.g., VHH) and a radionuclide, also known as a radioactive isotope or radioisotope. There are many types of radionuclides, both naturally occurring and man-made, that can emit various types of ionizing radiation. Non-limiting examples of the different types of radionuclides include alpha-emitters, beta-emitters, gamma-emitters, neutron-emitters, and positron-emitters. In some embodiments, the radionuclide comprises scandium (Sc), cobalt (Co), copper (Cu), gallium (Ga), zirconium (Zr), yttrium (Y), niobium (Nb), technetium (Tc), indium (In), samarium (Sm), gadolinium (Gd), terbium (Tb), erbium (Er), dysprosium (Dy), holmium (Ho), ytterbium (Yb), lutetium (Lu), rhenium (Re), bismuth (Bi), actinium (Ac), iodine (I), cerium (Ce), platinum (Pt), radium (Ra), thorium (Th), fluorine (F), carbon (C), nitrogen (N), oxygen (O), californium (Cf), plutonium (Pu), americium (Am), curium (Cm), astatine (At), phosphorous (P), or strontium (Sr). In some embodiments the radionuclide comprises Sc-44, Sc-47, Co-55, Cu-62, Cu-64, Cu-67, Ga-66, Ga-

67, Ga-68, Zr-89, Y-86, Y-90, Nb-90, Tc-99m, In-111, Sm-135, Gd-159, Tb-147, Tb-149, Tb-150, Tb-151, Tb-154, Tb-160, Tb-161, Er-165, Dy-166, Ho-166, Yb-175, PO_3H_2 Lu-177, Re-186, Re-168, Bi-213, Ac-225, Pt-195m, I-125, I-123, Ce-136, Ce-138, Ce-140, Ce-142, Ra-223, Th-227, F-18, C-11, N-13, O-15, Cf-252, Pu-238, Am-241, Cm-244, At-211, P-32, or Sr-90.

5 In some embodiments, an antibody of the disclosure is conjugated to an alpha emitter. Alpha emitters are a type of radionuclide that release alpha particles during decay. Examples of alpha emitters include Actinium-225, Bismuth-213, Radium-223, and Thorium-227. These radionuclides have high linear energy transfer, meaning that they deposit a large amount of energy over a short distance. This property makes them highly effective at killing cancer cells
10 that are close to the source of radiation, while minimizing damage to surrounding healthy tissue. Alpha emitters are used in a type of targeted radionuclide therapy called alpha therapy, which has shown promise in the treatment of various types of cancer.

In some embodiments, an antibody of the disclosure is conjugated to a beta emitter. Beta emitters are a type of radionuclide that release beta particles during decay. Examples of beta
15 emitters include Iodine-131, Lutetium-177, Samarium-153, and Yttrium-90. Terbium is another example of a beta-emitter, including four short-lived radioisotopes Terbium-149, Terbium-152, Terbium-155, and Terbium-161. Beta emitters are widely used in nuclear medicine, particularly in radioimmunotherapy and targeted radionuclide therapy. In radioimmunotherapy, for example, a beta-emitting radionuclide may be attached to an antibody that targets a specific antigen on
20 cancer cells. When the antibody binds to the cancer cell, the beta-emitting radionuclide delivers a therapeutic dose of radiation to the cancer cell. Beta emitters may also be used in brachytherapy, where a radioactive source is implanted directly into or near a tumor to deliver a high dose of radiation to the cancer cells while sparing surrounding healthy tissue.

In some embodiments, an antibody of the disclosure is conjugated to a gamma emitter.
25 Gamma emitters are a type of radionuclide that release gamma radiation during decay. Examples of gamma emitters include Fluorine-18, Gallium-68, Technetium-99m, and Indium-111. Gamma emitters are widely used in medical imaging, particularly in single photon emission computed tomography (SPECT) imaging. SPECT imaging is a non-invasive way to visualize the distribution of gamma-emitting radionuclides in the body. Gamma emitters are also used in
30 radiation therapy, where they can be targeted to specific areas of the body to deliver a therapeutic dose of radiation to cancer cells.

In some embodiments, an antibody of the disclosure is conjugated to a positron emitter. Positron emitters are a type of radionuclide that release positrons during decay. Examples of

positron emitters include Carbon-11, Nitrogen-13, Oxygen-15, and Fluorine-18. These radionuclides are used in a type of medical imaging called positron emission tomography (PET). PET imaging is a non-invasive way to visualize the activity of cells in the body by tracking the distribution of the positron-emitting radionuclide. PET imaging has a wide range of applications, including cancer diagnosis and staging, monitoring response to therapy, and neuroscience research.

In some embodiments, an antibody of the disclosure is conjugated to a neutron emitter. Neutron emitters are a type of radionuclide that release neutrons during decay. Examples of neutron emitters include Californium-252, Plutonium-238, Americium-241, and Curium-244.

These radionuclides are used in a variety of industrial applications, such as oil well logging, neutron radiography, and materials testing. They are also used in the production of radioisotopes for medical and research purposes. Neutron emitters are highly effective at inducing fission in other materials, making them useful for power generation in nuclear reactors.

The most common radioisotopes used in ADCs are alpha and beta particle emitters, which can deliver high-energy radiation to targeted cancer cells. One commonly used radioisotope in ADCs is iodine-131 (I-131), which emits beta particles and has been used in the treatment of lymphoma and leukemia. Another commonly used radioisotope is yttrium-90 (Y-90), which emits beta particles and has been used in the treatment of non-Hodgkin's lymphoma. Actinium-225 (Ac-225) is a promising alpha particle emitter that has been used in preclinical studies for the treatment of prostate cancer and leukemia. Other radioisotopes that may be used for use in ADCs include lutetium-177 (Lu-177), bismuth-213 (Bi-213), astatine-211 (At-211), phosphorous-32 (P-32), strontium-90 (Sr-90), and yttrium-90 (Y-90). The choice of radioisotope for a specific ADC depends on factors such as the target antigen, the tumor type, and the desired therapeutic effect.

In some embodiments, an ADC comprises an anti-5T4 antibody (e.g., VHH) and a cytotoxic agent. In some embodiments, the drug used in an ADC is a potent cytotoxic agent that can kill cancer cells. The specific type of drug used in an ADC can vary depending on the target cancer and the specific mechanism of action. Non-limiting examples of drugs that can be used in ADCs include auristatins, calicheamicins, maytansinoids, pyrrolobenzodiazepines, and duocarmycins.

The disclosed anti-5T4 ADCs may include a linker for binding the antibody to the drug. Representative linkers include 4-(4'acetylphenoxy)butanoic acid (AcBut), 3-acetylphenyl acidic

acid (AcPac), and 4-mercapto-4-methyl-pentanoic acid (Amide). The antibody/drug conjugates may also include polyethylene glycol or other agents to enhance drug incorporation.

Methods for conjugating drugs to antibodies are known in the art and have been described in various publications. For example, chemical modification can be made in the antibodies either through lysine side chain amines or through cysteine sulfhydryl groups activated by reducing interchain disulfide bonds for the conjugation reaction to occur. Reactive cysteine residues engineered at specific sites of antibodies for specific drug conjugation with defined stoichiometry have also been described. Conjugation using an acyl donor glutamine-containing tag and/or an endogenous glutamine made reactive by polypeptide engineering in the presence of transglutaminase and an amine, for example, a cytotoxic agent modified with a reactive amine may be used.

In some embodiments, a chelating agent is used to conjugate the antibody to the radionuclide. In some embodiments, the chelating agent is a bifunctional chelating agent. Bifunctional chelating agents include, but are not limited to, DOTA, TCMC, DOTATATE, DOTATOC, DOTANOC, DTPA, 1B4M-DTPA, CHX-A''-DTPA, NOTA, NODAGA, NODASA, NETA, TETA, CB-TE2A, H₂dedpa, H₂octapa, H₂CHXdedpa, H₂CHXoctapa, HYNIC, EDDA/HYNIC-TOC, a Sar bicyclic chelator, T3, 4BCPP, N(NOEt)₂ isomers, HBED-CC, PCTA-NCS, MANOTA, THP, DFO, DFO*, or DFOcyclo*.

Pharmaceutical Compositions

The anti-5T4 antibodies, the encoding nucleic acids or nucleic acid sets, vectors comprising such, or host cells comprising the vectors, as described herein, as well as the ADCs comprising the anti-5T4 antibodies can be mixed with a pharmaceutically acceptable carrier (excipient) to form a pharmaceutical composition for use in treating a target disease.

“Acceptable” means that the carrier must be compatible with the active ingredient of the composition (and preferably, capable of stabilizing the active ingredient) and not deleterious to the subject to be treated. Pharmaceutically acceptable excipients (carriers) including buffers, which are well known in the art. See, *e.g.*, Remington: The Science and Practice of Pharmacy 20th Ed. (2000) Lippincott Williams and Wilkins, Ed. K. E. Hoover.

The pharmaceutical compositions to be used in the present methods can comprise pharmaceutically acceptable carriers, excipients, or stabilizers in the form of lyophilized formulations or aqueous solutions. (Remington: The Science and Practice of Pharmacy 20th Ed. (2000) Lippincott Williams and Wilkins, Ed. K. E. Hoover). Acceptable carriers, excipients, or

stabilizers are nontoxic to recipients at the dosages and concentrations used, and may comprise buffers such as phosphate, citrate, and other organic acids; antioxidants including ascorbic acid and methionine; preservatives (such as octadecyldimethylbenzyl ammonium chloride; hexamethonium chloride; benzalkonium chloride, benzethonium chloride; phenol, butyl or benzyl alcohol; alkyl parabens such as methyl or propyl paraben; catechol; resorcinol; cyclohexanol; 3-pentanol; and m-cresol); low molecular weight (less than about 10 residues) polypeptides; proteins, such as serum albumin, gelatin, or immunoglobulins; hydrophilic polymers such as polyvinylpyrrolidone; amino acids such as glycine, glutamine, asparagine, histidine, arginine, or lysine; monosaccharides, disaccharides, and other carbohydrates including glucose, mannose, or dextrans; chelating agents such as EDTA; sugars such as sucrose, mannitol, trehalose or sorbitol; salt-forming counter-ions such as sodium; metal complexes (*e.g.* Zn-protein complexes); and/or non-ionic surfactants such as TWEENTM, PLURONICSTM or polyethylene glycol (PEG).

In some embodiments, the pharmaceutical composition described herein comprises a nanoparticle (see, *e.g.*, Lu et al., “A Review on Polymer and Lipid-Based Nanocarriers and Its Application to Nano-Pharmaceutical and Food-Based Systems.” *Front Nutr.* 2021;8:783831). A nanoparticle is any particle that is smaller than 100 nm in size. In some embodiments, the nanoparticle is a lipid-based nanocarrier, such as a liposome or a lipid nanoparticle (LNP). A liposome comprises one or more lipid bilayers, ranging from 20-2500 nm in size, that encloses an aqueous core in which compounds can be held. A LNP comprises a phospholipid outer layer, ranging from 50-200 nm in size, encapsulating an interior core which can be aqueous or non-aqueous. It is within this interior core that a compound can be carried. In some embodiments, the nanoparticle is a polymer nanoparticle, such as a nanosphere or a nanocapsule. A polymer nanoparticle is a particle comprised of polymers between 1-1000 nm in size that can be loaded with compounds (*e.g.*, biomolecules, drugs, polynucleotides, peptides, etc.); the compounds can be entrapped within or surface-adsorbed onto the polymeric core of the particle. A nanosphere is distinguished by a continuous polymeric network in which a drug can be retained inside or adsorbed onto the surface. A nanocapsule is distinguished by an oily core in which a compound is usually dissolved, surrounded by a polymeric shell which controls the release profile of the compound from the core. In some embodiments, the nanoparticle is a DNA nanoparticle. A DNA nanoparticle can comprise a variety of nanoparticle formulations (*e.g.*, lipid, polymer, inorganic, etc.) tethered to a DNA molecule. In some embodiments, the nanoparticle is an inorganic nanoparticle, such as a magnetic nanoparticle or a metal (*e.g.*, gold or silver)

nanoparticle (see, *e.g.*, Wang et al., “Recent Advances on Inorganic Nanoparticle-Based Cancer Therapeutic Agents.” *Int J Environ Res Public Health*. 2016;13(12):1182).

In some embodiments, the pharmaceutical composition described herein comprises an emulsion. An emulsion is given its ordinary meaning as used in the art, *i.e.*, a liquid dispersion.

5 In some embodiments, the emulsion is a microemulsion, *i.e.*, an emulsion having a dispersant on the order of microns. In some embodiments, the emulsion is a nanoemulsion, *i.e.*, an emulsion having a dispersant on the order of nanometers.

In some examples, the pharmaceutical composition described herein comprises liposomes containing the antibodies (or the encoding nucleic acids, or the conjugates), which can
10 be prepared by methods known in the art, such as described in Epstein, et al., Proc. Natl. Acad. Sci. USA 82:3688 (1985); Hwang, et al., Proc. Natl. Acad. Sci. USA 77:4030 (1980); and U.S. Pat. Nos. 4,485,045 and 4,544,545. Liposomes with enhanced circulation time are disclosed in U.S. Pat. No. 5,013,556. Particularly useful liposomes can be generated by the reverse phase evaporation method with a lipid composition comprising phosphatidylcholine, cholesterol and
15 PEG-derivatized phosphatidylethanolamine (PEG-PE). Liposomes are extruded through filters of defined pore size to yield liposomes with the desired diameter.

The antibodies, the encoding nucleic acid(s), or the conjugates may also be entrapped in microcapsules prepared, for example, by coacervation techniques or by interfacial polymerization, for example, hydroxymethylcellulose or gelatin-microcapsules and poly-
20 (methylmethacrylate) microcapsules, respectively, in colloidal drug delivery systems (for example, liposomes, albumin microspheres, microemulsions, nano-particles and nanocapsules) or in macroemulsions. Such techniques are known in the art, see, *e.g.*, Remington, The Science and Practice of Pharmacy 20th Ed. Mack Publishing (2000).

In other examples, the pharmaceutical composition described herein can be formulated in
25 sustained-release format. Suitable examples of sustained-release preparations include semipermeable matrices of solid hydrophobic polymers containing an antibody, which matrices are in the form of shaped articles, *e.g.* films, or microcapsules. Examples of sustained-release matrices include polyesters, hydrogels (for example, poly(2-hydroxyethyl-methacrylate), or poly(v nylalcohol)), polylactides (U.S. Pat. No. 3,773,919), copolymers of L-glutamic acid and 7
30 ethyl-L-glutamate, non-degradable ethylene-vinyl acetate, degradable lactic acid-glycolic acid copolymers such as the LUPRON DEPOTTM (injectable microspheres composed of lactic acid-glycolic acid copolymer and leuprolide acetate), sucrose acetate isobutyrate, and poly-D-(-)-3-hydroxybutyric acid.

The pharmaceutical compositions to be used for *in vivo* administration must be sterile. This is readily accomplished by, for example, filtration through sterile filtration membranes. Therapeutic antibody compositions are generally placed into a container having a sterile access port, for example, an intravenous solution bag or vial having a stopper pierceable by a hypodermic injection needle.

The pharmaceutical compositions described herein can be in unit dosage forms such as tablets, pills, capsules, powders, granules, solutions or suspensions, or suppositories, for oral, parenteral or rectal administration, or administration by inhalation or insufflation.

For preparing solid compositions such as tablets, the principal active ingredient can be mixed with a pharmaceutical carrier, *e.g.*, conventional tableting ingredients such as corn starch, lactose, sucrose, sorbitol, talc, stearic acid, magnesium stearate, dicalcium phosphate or gums, and other pharmaceutical diluents, *e.g.*, water, to form a solid preformulation composition containing a homogeneous mixture of a compound of the present invention, or a non-toxic pharmaceutically acceptable salt thereof. When referring to these preformulation compositions as homogeneous, it is meant that the active ingredient is dispersed evenly throughout the composition so that the composition may be readily subdivided into equally effective unit dosage forms such as tablets, pills and capsules. The tablets or pills of the novel composition can be coated or otherwise compounded to provide a dosage form affording the advantage of prolonged action. For example, the tablet or pill can comprise an inner dosage and an outer dosage component, the latter being in the form of an envelope over the former. The two components can be separated by an enteric layer that serves to resist disintegration in the stomach and permits the inner component to pass intact into the duodenum or to be delayed in release. A variety of materials can be used for such enteric layers or coatings, such materials including a number of polymeric acids and mixtures of polymeric acids with such materials as shellac, cetyl alcohol and cellulose acetate.

Suitable surface-active agents include, in particular, non-ionic agents, such as polyoxyethylenesorbitans (*e.g.*, TweenTM 20, 40, 60, 80 or 85) and other sorbitans (*e.g.*, SpanTM 20, 40, 60, 80 or 85). Compositions with a surface-active agent will conveniently comprise between 0.05 and 5% surface-active agent, and can be between 0.1 and 2.5%. It will be appreciated that other ingredients may be added, for example mannitol or other pharmaceutically acceptable vehicles, if necessary.

Suitable emulsions may be prepared using commercially available fat emulsions, such as IntralipidTM, LiposynTM, InfonutrolTM, LipofundinTM and LipiphysanTM. The active ingredient

may be either dissolved in a pre-mixed emulsion composition or alternatively it may be dissolved in an oil (*e.g.*, soybean oil, safflower oil, cottonseed oil, sesame oil, corn oil or almond oil) and an emulsion formed upon mixing with a phospholipid (*e.g.*, egg phospholipids, soybean phospholipids or soybean lecithin) and water. It will be appreciated that other ingredients may be added, for example glycerol or glucose, to adjust the tonicity of the emulsion. Suitable emulsions will typically contain up to 20% oil, for example, between 5 and 20%.

The emulsion compositions can be those prepared by mixing an antibody with IntralipidTM or the components thereof (soybean oil, egg phospholipids, glycerol and water).

Pharmaceutical compositions for inhalation or insufflation include solutions and suspensions in pharmaceutically acceptable, aqueous or organic solvents, or mixtures thereof, and powders. The liquid or solid compositions may contain suitable pharmaceutically acceptable excipients as set out above. In some embodiments, the compositions are administered by the oral or nasal respiratory route for local or systemic effect.

Compositions in preferably sterile pharmaceutically acceptable solvents may be nebulised by use of gases. Nebulised solutions may be breathed directly from the nebulising device or the nebulising device may be attached to a face mask, tent or intermittent positive pressure breathing machine. Solution, suspension or powder compositions may be administered, preferably orally or nasally, from devices which deliver the formulation in an appropriate manner.

Methods of Use

Some aspects of the disclosure provide methods of administering an anti-5T4 antibody, an ADC, or a pharmaceutical composition as described herein to a subject.

In some embodiments, an anti-5T4 antibody, ADC or pharmaceutical composition as described herein is use in the treatment of human solid tumors and hematological malignancies, for example, human solid tumors. In some embodiments, the human solid tumors are selected from the group consisting of breast cancer, gastric cancer, colorectal cancer, ovarian cancer, lung cancer (*e.g.*, non-small cell lung cancer (NSCLC) and small-cell lung cancer (SCLC)), and (malignant pleural) mesothelioma. In some embodiments, an anti-5T4 antibody, ADC or pharmaceutical composition as described herein is use in the treatment of leukemia, for example, selected from the group consisting of acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML).

The present disclosure further relates to the use of a sequentially or simultaneously administered combination of an anti-5T4 antibody, an anti-5T4 ADC or a pharmaceutical composition as described hereinabove with a therapeutic antibody, a chemotherapeutic agent, and/or an ADC against a cancer-related target other than the 5T4 antigen for the treatment of human solid tumors and hematological malignancies as described hereinabove.

To practice the methods disclosed herein, an effective amount of the anti-5T4 antibody, an anti-5T4 ADC or a pharmaceutical composition described herein can be administered to a subject (*e.g.*, a human) in need of the treatment via a suitable route, such as intravenous administration, *e.g.*, as a bolus or by continuous infusion over a period of time, by intramuscular, intraperitoneal, intracerebrospinal, subcutaneous, intra-articular, intrasynovial, intrathecal, oral, inhalation or topical routes. Commercially available nebulizers for liquid formulations, including jet nebulizers and ultrasonic nebulizers are useful for administration. Liquid formulations can be directly nebulized and lyophilized powder can be nebulized after reconstitution. Alternatively, the antibodies as described herein can be aerosolized using a fluorocarbon formulation and a metered dose inhaler, or inhaled as a lyophilized and milled powder.

The subject to be treated by the methods described herein can be a mammal, more preferably a human. Mammals include, but are not limited to, farm animals, sport animals, pets, primates, horses, dogs, cats, mice and rats. A human subject who needs the treatment may be a human patient having, at risk for, or suspected of having a target disease/disorder associated with 5T4⁺ disease cells. In some embodiments, the 5T4⁺ disease cells are diseased cancer cells. A subject having a target disease or disorder can be identified by routine medical examination, *e.g.*, laboratory tests, organ functional tests, CT scans, or ultrasounds. A subject suspected of having any of such target disease/disorder might show one or more symptoms of the disease/disorder. A subject at risk for the disease/disorder can be a subject having one or more of the risk factors for that disease/disorder.

As used herein, “an effective amount” refers to the amount of each active agent required to confer therapeutic effect on the subject, either alone or in combination with one or more other active agents. In some embodiments, the therapeutic effect is reduced 5T4 activity or the activity of 5T4⁺ cells. Determination of whether an amount of an anti-5T4 antibody, an anti-5T4 ADC or a pharmaceutical composition achieved the therapeutic effect would be evident to one of skill in the art. Effective amounts vary, as recognized by those skilled in the art, depending on the particular condition being treated, the severity of the condition, the individual patient parameters including age, physical condition, size, gender and weight, the duration of the treatment, the

nature of concurrent therapy (if any), the specific route of administration and like factors within the knowledge and expertise of the health practitioner. These factors are well known to those of ordinary skill in the art and can be addressed with no more than routine experimentation. It is generally preferred that a maximum dose of the individual components or combinations thereof
5 be used, that is, the highest safe dose according to sound medical judgment.

Empirical considerations, such as the half-life, generally will contribute to the determination of the dosage. For example, antibodies that are compatible with the human immune system, such as humanized antibodies or fully human antibodies, may be used to prolong half-life of the antibody and to prevent the antibody being attacked by the host's immune
10 system. Frequency of administration may be determined and adjusted over the course of therapy, and is generally, but not necessarily, based on treatment and/or suppression and/or amelioration and/or delay of a target disease/disorder. Alternatively, sustained continuous release formulations of an antibody may be appropriate. Various formulations and devices for achieving sustained release are known in the art.

15 In one example, dosages for an antibody as described herein may be determined empirically in individuals who have been given one or more administration(s) of the antibody. Individuals are given incremental dosages of the antagonist. To assess efficacy of the antagonist, an indicator of the disease/disorder can be followed.

For the purpose of the present disclosure, the appropriate dosage of an antibody or ADC
20 as described herein will depend on the specific antibody, antibodies, and/or non-antibody peptide (or compositions thereof) employed, the type and severity of the disease/disorder, whether the antibody is administered for preventive or therapeutic purposes, previous therapy, the patient's clinical history and response to the antagonist, and the discretion of the attending physician. Typically, the clinician will administer an antibody, until a dosage is reached that
25 achieves the desired result. In some embodiments, the desired result is a decrease in thrombosis. Methods of determining whether a dosage resulted in the desired result would be evident to one of skill in the art. Administration of one or more antibodies can be continuous or intermittent, depending, for example, upon the recipient's physiological condition, whether the purpose of the administration is therapeutic or prophylactic, and other factors known to skilled practitioners.
30 The administration of an antibody may be essentially continuous over a preselected period of time or may be in a series of spaced dose, *e.g.*, either before, during, or after developing a target disease or disorder.

As used herein, the term “treating” refers to the application or administration of a composition including one or more active agents to a subject, who has a target disease or disorder, a symptom of the disease/disorder, or a predisposition toward the disease/disorder, with the purpose to cure, heal, alleviate, relieve, alter, remedy, ameliorate, improve, or affect the disorder, the symptom of the disease, or the predisposition toward the disease or disorder.

Alleviating a target disease/disorder includes delaying the development or progression of the disease, or reducing disease severity. Alleviating the disease does not necessarily require curative results. As used therein, “delaying” the development of a target disease or disorder means to defer, hinder, slow, retard, stabilize, and/or postpone progression of the disease. This delay can be of varying lengths of time, depending on the history of the disease and/or individuals being treated. A method that “delays” or alleviates the development of a disease, or delays the onset of the disease, is a method that reduces probability of developing one or more symptoms of the disease in a given time frame and/or reduces extent of the symptoms in a given time frame, when compared to not using the method. Such comparisons are typically based on clinical studies, using a number of subjects sufficient to give a statistically significant result.

“Development” or “progression” of a disease means initial manifestations and/or ensuing progression of the disease. Development of the disease can be detectable and assessed using standard clinical techniques as well known in the art. However, development also refers to progression that may be undetectable. For purpose of this disclosure, development or progression refers to the biological course of the symptoms. “Development” includes occurrence, recurrence, and onset. As used herein “onset” or “occurrence” of a target disease or disorder includes initial onset and/or recurrence.

In some embodiments, an anti-5T4 antibody, an anti-5T4 ADC or a pharmaceutical composition described herein is administered to a subject in need of the treatment at an amount sufficient to inhibit the activity of one or both of the target antigen by at least 20% (*e.g.*, 30%, 40%, 50%, 60%, 70%, 80%, 90% or greater) *in vivo*. In some embodiments, an anti-5T4 antibody, an anti-5T4 ADC or a pharmaceutical composition is administered in an amount effective in reducing the activity level of a target antigens by at least 20% (*e.g.*, 30%, 40%, 50%, 60%, 70%, 80%, 90% or greater).

Conventional methods, known to those of ordinary skill in the art of medicine, can be used to administer an anti-5T4 antibody, an anti-5T4 ADC or a pharmaceutical composition to the subject, depending upon the type of disease to be treated or the site of the disease. The anti-5T4 antibody, anti-5T4 ADC or pharmaceutical composition can also be administered via other

conventional routes, *e.g.*, administered orally, parenterally, by inhalation spray, topically, rectally, nasally, buccally, vaginally or via an implanted reservoir. The term “parenteral” as used herein includes subcutaneous, intracutaneous, intravenous, intramuscular, intraarticular, intraarterial, intrasynovial, intrasternal, intrathecal, intralesional, and intracranial injection or infusion techniques. In addition, it can be administered to the subject via injectable depot routes of administration such as using 1-, 3-, or 6-month depot injectable or biodegradable materials and methods. In some embodiments, the anti-5T4 antibody, anti-5T4 ADC or pharmaceutical composition is administered intraocularly or intravitreally.

Injectable compositions may contain various carriers such as vegetable oils, dimethylacetamide, dimethylformamide, ethyl lactate, ethyl carbonate, isopropyl myristate, ethanol, and polyols (glycerol, propylene glycol, liquid polyethylene glycol, and the like). For intravenous injection, water soluble antibodies can be administered by the drip method, whereby a pharmaceutical formulation containing an antibody and a physiologically acceptable excipient is infused. Physiologically acceptable excipients may include, for example, 5% dextrose, 0.9% saline, Ringer’s solution or other suitable excipients. Intramuscular preparations, *e.g.*, a sterile formulation of a suitable soluble salt form of an antibody, can be dissolved and administered in a pharmaceutical excipient such as Water-for-Injection, 0.9% saline, or 5% glucose solution.

In some embodiments, the anti-5T4 antibody, anti-5T4 ADC or pharmaceutical composition is administered via site-specific or targeted local delivery techniques. Examples of site-specific or targeted local delivery techniques include various implantable depot sources of an antibody or local delivery catheters, such as infusion catheters, an indwelling catheter, or a needle catheter, synthetic grafts, adventitial wraps, shunts and stents or other implantable devices, site specific carriers, direct injection, or direct application.

Kits for Use

The present disclosure also provides kits for use in inhibiting and/or eliminating 5T4⁺ disease cells and thus alleviating diseases/disorders associated with such disease cells. Such kits can include one or more containers comprising an anti-5T4 antibody, a conjugate, or pharmaceutical composition *e.g.*, any of those described herein.

In some embodiments, the kit can comprise instructions for use in accordance with any of the methods described herein. The included instructions can comprise a description of administration of an ADC comprising the anti-5T4 antibody or the anti-5T4 antibody itself to treat, delay the onset, or alleviate a target disease as those described herein. The kit may further

comprise a description of selecting an individual suitable for treatment based on identifying whether that individual has the target disease. In still other embodiments, the instructions comprise a description of administering an antibody or an ADC to an individual at risk of the target disease.

5 The instructions relating to the use of an anti-5T4 antibody generally include information as to dosage, dosing schedule, and route of administration for the intended treatment. The containers may be unit doses, bulk packages (*e.g.*, multi-dose packages) or sub-unit doses. Instructions supplied in the kits of the invention are typically written instructions on a label or package insert (*e.g.*, a paper sheet included in the kit), but machine-readable instructions (*e.g.*,
10 instructions carried on a magnetic or optical storage disk) are also acceptable.

The label or package insert indicates that the composition is used for treating, delaying the onset and/or alleviating a disease or disorder associated with 5T4⁺ cells. Instructions may be provided for practicing any of the methods described herein.

The kits of this invention are in suitable packaging. Suitable packaging includes, but is
15 not limited to, vials, bottles, jars, flexible packaging (*e.g.*, sealed Mylar or plastic bags), and the like. Also contemplated are packages for use in combination with a specific device, such as an inhaler, nasal administration device (*e.g.*, an atomizer) or an infusion device such as a minipump. A kit may have a sterile access port (for example the container may be an intravenous solution bag or a vial having a stopper pierceable by a hypodermic injection needle).
20 The container may also have a sterile access port (for example the container may be an intravenous solution bag or a vial having a stopper pierceable by a hypodermic injection needle). At least one active agent in the composition is an anti-5T4 antibody as those described herein.

Kits may optionally provide additional components such as buffers and interpretive information. Normally, the kit comprises a container and a label or package insert(s) on or
25 associated with the container. In some embodiments, the invention provides articles of manufacture comprising contents of the kits described above.

Also provided herein are kits for use in detecting 5T4⁺ cells in a sample. Such a kit may comprise any one of the anti-5T4 antibodies described herein. In some instances, an anti-5T4 antibody can be conjugated with a detectable label or a diagnostic agent as those described
30 herein. As used herein, “conjugated” or “attached” means two entities are associated, preferably with sufficient affinity that the therapeutic/diagnostic benefit of the association between the two entities is realized. The association between the two entities can be either direct or via a linker, such as a polymer linker. Conjugated or attached can include covalent or noncovalent bonding as

well as other forms of association, such as entrapment, *e.g.*, of one entity on or within the other, or of either or both entities on or within a third entity, such as a micelle.

Alternatively or in addition, the kit may comprise a secondary antibody capable of binding to an anti-5T4 antibody. The kit may further comprise instructions for using an anti-5T4 antibody for detecting 5T4⁺.

The present disclosure further provides embodiments encompassed by the following numbered paragraphs:

1. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of any one of SEQ ID NOs: 351-700;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of any one of SEQ ID NOs: 701-1050; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of any one of SEQ ID NOs: 1051-1400,

wherein the antibody binds to 5T4.

2. The antibody of paragraph 1, wherein the antibody comprises the amino acid sequence of any one of SEQ ID NOs: 1-350, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of any one of SEQ ID NOs: 1-350.

3. The antibody of any one of the preceding paragraphs, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 10^{-9} M to 10^{-11} M.

4. The antibody of any one of the preceding paragraphs, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 1 nM to 0.01 nM.

5. The antibody of any one of the preceding paragraphs, wherein the antibody selectively binds to human 5T4 relative to a non-human 5T4.

6. The antibody of any one of the preceding paragraphs, wherein the antibody binds to human 5T4, mouse 5T4, cynomolgus monkey 5T4, or any combination thereof.

7. The antibody of any one of the preceding paragraphs, wherein the antibody is a single chain antibody.

8. The antibody of paragraph 7, wherein the single chain antibody is a heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody.

9. The antibody of any one of the preceding paragraphs, wherein the antibody is a humanized antibody.
10. The antibody of any one of the preceding paragraphs, wherein the antibody is a chimeric antibody.
- 5 11. A cell comprising the antibody of any one of the preceding paragraphs, optionally wherein the cell is a cancer cell.
12. A conjugate comprising the antibody of any one of the preceding paragraphs.
13. The conjugate of paragraph 12 further comprising a radionuclide.
14. A pharmaceutical composition comprising the antibody of any one of paragraphs 1-13, or
10 the conjugate of paragraph 12 or 1613 and a pharmaceutically acceptable excipient.
15. A method comprising administering to a subject the antibody of any one of paragraphs 1-13, the conjugate of paragraph 12 or 13, or the pharmaceutical composition of paragraph 20.
16. A nucleic acid or set of nucleic acids encoding the antibody of any one of paragraphs 1-13.
- 15 17. A vector or set of vectors comprising one or more nucleic acid encoding the antibody of any one of paragraphs 1-10.
18. A method of producing the antibody of any one of paragraphs 1-10, the method comprising culturing the cell of paragraph 11 in cell culture and obtaining the antibody from the cell or cell culture.
- 20 19. An antibody comprising:
a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 593;
a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 943; and/or
25 a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1293,
wherein the antibody binds to 5T4.
20. The antibody of paragraph 19, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 243, or an amino acid sequence having at least 85%, at least 90%, at least 95%,
30 or at least 98% identity to the amino acid sequence of SEQ ID NO: 243.
21. An antibody comprising:
a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 421;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 771; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1121,

5 wherein the antibody binds to 5T4.

22. The antibody of paragraph 21, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 71, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 71.

23. An antibody comprising:

10 a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 658;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 1008; and/or

15 a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1358,

wherein the antibody binds to 5T4.

24. The antibody of paragraph 23, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 308, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 308.

20 25. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 632;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 982; and/or

25 a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1332,

wherein the antibody binds to 5T4.

26. The antibody of paragraph 25, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 282, or an amino acid sequence having at least 85%, at least 90%, at least 95%,
30 or at least 98% identity to the amino acid sequence of SEQ ID NO: 282.

27. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 483;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 833; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1183,

5 wherein the antibody binds to 5T4.

28. The antibody of paragraph 27, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 133, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 133.

29. An antibody comprising:

10 a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 445;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 795; and/or

15 a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1145,

wherein the antibody binds to 5T4.

30. The antibody of paragraph 29, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 95, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 95.

20 31. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 408;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 758; and/or

25 a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1108,

wherein the antibody binds to 5T4.

32. The antibody of paragraph 31, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 58, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or
30 at least 98% identity to the amino acid sequence of SEQ ID NO: 58.

33. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 381;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 731; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1081,

5 wherein the antibody binds to 5T4.

34. The antibody of paragraph 33, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 31, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 31.

35. An antibody comprising:

10 a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 623;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 973; and/or

15 a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1323,

wherein the antibody binds to 5T4.

36. The antibody of paragraph 35, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 273, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 273.

20

37. The antibody of any one of paragraphs 19-36, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 10^{-9} M to 10^{-11} M.

38. The antibody of any one of paragraphs 19-37, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 1 nM to 0.01 nM.

25 39. The antibody of any one of paragraphs 19-38, wherein the antibody selectively binds to human 5T4 relative to a non-human 5T4.

40. The antibody of any one of paragraphs 19-39, wherein the antibody binds to human 5T4, mouse 5T4, cynomolgus monkey 5T4, or any combination thereof.

41. The antibody of any one of paragraphs 19-40, wherein the antibody is a single chain
30 antibody.

42. The antibody of paragraph 41, wherein the single chain antibody is a heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody.

43. The antibody of any one of paragraphs 19-42, wherein the antibody is a humanized antibody.

44. The antibody of any one of paragraphs 19-43, wherein the antibody is a chimeric antibody.

5 45. A cell comprising the antibody of any one of the preceding paragraphs, optionally wherein the cell is a cancer cell.

46. A conjugate comprising the antibody of any one of paragraphs 19-44.

47. The conjugate of paragraph 46 further comprising a radionuclide.

10

EXAMPLES

Example 1: Generation of anti-5T4 VHH Antibodies

Generation of anti-5T4 single domain antibodies

To generate single domain (VHH) antibodies binding to human, cynomolgus monkey, and mouse 5T4, two llamas were immunized with 5t4 proteins according to the schedule shown
15 in Table 2.

Table 2: Protein and cell immunization schedule to generate VHH's that bind human (hu), cynomolgus (cy) and mouse (mo) 5T4. Note: SC (subcutaneous), IFA (incomplete Freund's adjuvant, na (not applicable)).

	Llama 399a	Llama 399b			
Immunization day	Immunogen cocktail per animal		Route of immunogen administration	Adjuvant (adjuvant : immunogen)	Tissue collection
0	Hu5T4 protein	Hu5T4 protein	SC	IFA (1:1)	Collect 20ml of blood for pre-immune serum
7	Hu5T4 protein	Hu5T4 protein	SC	IFA (1:1)	
14	Hu5T4 protein	Hu5T4 protein	SC	IFA (1:1)	
21	Hu5T4 protein	Hu5T4 protein	SC	IFA (1:1)	
28	Hu5T4 protein	Hu5T4 protein	SC	IFA (1:1)	
35	Hu/mo 5T4 expressing cells	Hu/mo 5T4 expressing cells	SC	No adjuvant	
49	Hu/mo 5T4 expressing cells	Hu/mo 5T4 expressing cells	SC	No adjuvant	

	Llama 399a	Llama 399b			
Immunization day	Immunogen cocktail per animal		Route of immunogen administration	Adjuvant (adjuvant : immunogen)	Tissue collection
53	N/A	N/A	N/A	N/A	Collection of immune blood to be used for serum titers screening and RNA preparation

Two llamas (399a and 399b) were immunized on day 0, day 7, day 14, day 21 and day 28 with human 5T4 antigen. The llamas were subsequently boosted at day 35 and day 49 with cells expressing hu5T4 and mouse 5T4 (mo5T4). CHO-K1 and 293FF cells expressing human and mouse antigens were generated by transient transfection of cells with plasmid vectors encoding the DNA sequences of either human (hu), cynomolgus monkey (cy) or mouse (mo) 5T4 using Lipofectamine following the manufactures instructions. Cells that had been transformed were analyzed using species specific antibodies that recognized 5T4. The primary detection antibodies were used (Thermo Fischer Scientific, Cat. Nr. MA5-24229 for hu and cy 5T4 and Abcam, Cat. Nr. ab254168 for mo 5T4). The antibodies were diluted three-fold from 10 to 0.12µg/ml in 5 steps using 0.5 % FBS/0.5 mM EDTA/1xPBS. Detection of the primary antibody was achieved using a goat anti-mouse IgG-APC (Invitrogen, Cat. Nr. A-865) at 2 µg/ml. Analysis was performed in the iQUE3 screener equipment, expression of the targets was detected on RL-1/BL-1 fluorescence detector channels. Cell population was gated, and single cells were selected. Once expression of antigens on the cell surface was confirmed by flow cytometry, they were then used to boost the immune response for 5T4 in the llamas.

Serum titers of the VHH-Fc's generated in the llamas were determined using human, cynomolgus, and mouse 5T4. Pre- and post-immunization sera was tested against human, cynomolgus, and mouse proteins, as well as cells expressing those proteins. Cells not expressing 5T4 were used as a negative control. 96-well microtiter plated were coated with hu, mo5T4 (Acro Bio., Cat. Nr. TPG-H52E5, TPG-M52H3) at 5 µg/ml in 1x PBS. cy5T4 (AcroBio., Cat. Nr. TPG-C52H3) was coated at 10 µg/ml in 1x PBS overnight at 4 °C. The plate was then blocked using 4 % skimmed milk (Marvel, Cat. Nr. 928964) in 1x PBS. Samples from pre- and post- immune sera were three-fold diluted starting at 1:100 down to 1:5904900 in 10-steps. The sera samples were transferred to the antigen coated plates and incubated for 1 hr at 4 °C to allow for binding. Following washing to remove any unbound VHH-Fc, antigen bound VHH-Fc was detected using mouse anti-llama IgG (FJB, FJ1203MAB01B09) at 1 µg/ml followed by the

addition of a secondary antibody donkey anti-mouse IgG HRP (JIR, Cat. Nr. 715-035-150) at 1:5000 dilution. TMB (eBioscience, Cat. Nr. 00-4201-56) was added followed by H₂SO₄ (Fisher Chemical, Cat. Nr. J/8430/15). To determine the level of binding the absorbance at 450nm was read using a microplate spectrophotometer.

5

Library Generation

To generate phage display libraries for further testing, purified RNA was obtained from each llama (399a and 399b). Four cDNA synthesis reactions were performed per animal, using primers annealing to the llama VH leader and cH2 regions, respectively. The 700 bp bands, which correspond to the amplified VHH genes, were gel extracted and purified using the NUCLEOSPIN® Gel and PCR clean-Up (Macherey-Nagel; Cat. Nr. 740609.250). The purified VHH genes were used to generate two phage display VHH libraries. VHH genes were cloned into the pDCL1 phagemid vector and transformed into *E.coli* ECC TG1 cells (Lucigen, Cat. Nr. 60502-2). The size of the VHH library was estimated by carrying out a ten fold serial dilution of the transformed cells with LB media (in duplicate) and transferring single 5µl volumes of each dilution onto an LB agar plate (2% glucose and 100µg/ml carbenicillin). Plates were incubated at 37 ° overnight until bacterial colonies had formed and the size of the library calculated at the dilution factor that gave single colonies (library size estimated to be $\sim 2 \times 10^8$ in size). Bacterial glycerol stocks of the two immune VHH phage display libraries were stored at -80 °C until required and were used to generate all the phage used in subsequent phage selections.

20

5T4 VHH phage selections

To select VHH clones capable of binding human, mouse, and cynomolgus 5T4 from the immunization libraries, a series of selection strategies were used with the phage display libraries. Phage selections were performed in solution using biotinylated antigens and Dynabeads™ MyOne™ Streptavidin T1 Magnetic Beads (Invitrogen, Cat. Nr. 65601) in 2% skimmed milk for capture of the VHH-phage. Following washing of the beads to remove non-specific and free VHH-phage particles, the bound VHH-phage were eluted using trypsin (1mg/ml) digestion.

30

Before the first round of selection, the libraries were pre-treated by incubating the phage for one hour at 75°C and for 15 minutes at room temperature.

Two main phage selection strategies were used to identify VHH binders that were cross reactive with human and cynomolgus 5T4 protein (strategy A) or cross reactive with human and mouse 5T4 protein (strategy B). Strategy A: rounds of phage selections were performed in the following order: 50 nM biotinylated hu5T4 (round I), 50, 5 or 0.5 nM biotinylated cy5T4 (round II), and 5×10^6 CHO-K1 cells expressing hu5T4 (round III). Strategy B was performed in the following order: 50 nM biotinylated hu5T4 (round I), 50 or 5 nM biotinylated mo5T4 (round II), and 5×10^6 CHO-K1 cells expressing hu5T4 (round III).

Enrichment values after each round of protein selections were calculated as the ratio between the number of phage eluted from the antigen condition compared to the number of phage eluted from the no antigen control conditions. Enrichment values after each round of cell selections was calculated as the ratio between the number of phage eluted from the antigen expressing cells compared to the number of phage eluted from the WT cell conditions. VHH clones identified through the selection process were then screened for binding to human, cynomolgus and mouse 5T4 by generating periplasmic extracts from *E. coli* for each of the clones.

Periplasmic extract preparation of 5T4 VHH's generated from the phage selections.

Master plates were generated containing *E. coli* cells producing clones from the two VHH immune libraries after two or three rounds of in-solution selection as described above. Periplasmic extracts (P.E.) were generated by inoculating relevant *E. coli* clones in 2xYT media and growing/expressing the specific VHHs for an additional 4hrs before harvesting by centrifugation. The cell pellets were resuspended in PBS and the sample repeatedly freeze-thawed causing total cell lysis and releasing the VHH protein from the periplasm and cytoplasm. Following cell lysis, the samples were clarified by centrifugation to remove any cellular debris, leaving only the soluble proteins. P.E. containing soluble VHH were produced in small-scale to be used for monoclonal screening by P.E. binding ELISA, as described below.

DNA sequencing of 5T4 binding VHH's

Clones of interest were selected for sequencing. Sequencing was performed by LGC Genomics. Sequences are shown in Table 1.

Example 2. *In vitro* Binding Studies

5 *Assessment of VHH binding to target 5T4 antigens.*

5T4 binding ELISA

P.E. produced as described above, containing the VHH of interest, were tested for binding to antigens of interest by ELISA. 96-well microtiter plates were coated with Neutravidin at 5 µg/ml in PBS followed by blocking using 1 % casein in PBS. Microtiter wells were then
 10 coated with the test protein of interest, either biotinylated human, mouse or cynomolgus 5T4 at a concentration of 5nM in 0.1% casein in PBS. P.E. samples were diluted 1:5 with 0.1% casein in PBS before being applied to the plate and allowed to bind to the 5T4 protein for 1hr before any unbound proteins were washed away using 0.05% Tween-20 in PBS. The detection of any VHH bound to the target antigen was detected using a mouse anti-c-MYC antibody (Roche, Cat. Nr.
 15 11667203001) at 1:1000 dilution, due to the presence of the c-MYC peptide sequence at the c-terminus of the expressed VHH. Amplification of the bound signal was carried out by using the donkey anti-mouse IgG-HRP (JIR, Cat. Nr. 715-035-150) at 1:5000 dilution. Quantification was carried out by adding TMB (Invitrogen, cat. nr. 00420156) and the colorimetric reaction terminated by the addition of H₂SO₄ (Fisher Chemical, Cat. Nr. J/8430/15). The quantification of
 20 binding was achieved by measuring the OD₄₅₀ using a spectrophotometer. A total of 194 hu5T4 binding clones were identified. 116 of those showed cross-reactivity with the cy5T4 protein and 3 clones also bound mo5T4. 75 clones bound specifically to hu5T4. Results are shown in **Table 3** below. (-) indicates absorbance at 450nm <0.15 (no binding), (+) indicates absorbance at 450nm between 0.15 and 0.5 (binding), and (++) indicates absorbance at 450 nm >
 25 0.5 (strong binding).

Table 3. Binding of VHH clones by ELISA

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP01H06	4.161	3.119	4.157	0.049
FJ2237MP01A01	++	++	-	0.048
FJ2237MP01B01	++	++	-	0.049
FJ2237MP01C01	++	-	-	0.048

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP01D01	++	++	—	0.052
FJ2237MP01E01	++	—	—	0.048
FJ2237MP01F01	++	—	—	0.048
FJ2237MP01G01	+	—	—	0.048
FJ2237MP01H01	++	—	—	0.050
FJ2237MP01A02	++	—	—	0.048
FJ2237MP01B02	++	—	—	0.049
FJ2237MP01C02	++	+	—	0.048
FJ2237MP01D02	++	+	—	0.048
FJ2237MP01E02	++	—	—	0.048
FJ2237MP01F02	++	+	—	0.048
FJ2237MP01G02	—	—	—	0.049
FJ2237MP01H02	++	++	—	0.049
FJ2237MP01A03	++	+	—	0.049
FJ2237MP01B03	++	++	—	0.049
FJ2237MP01C03	+	—	—	0.048
FJ2237MP01D03	++	++	—	0.048
FJ2237MP01E03	++	++	—	0.048
FJ2237MP01F03	++	+	—	0.048
FJ2237MP01G03	++	++	—	0.049
FJ2237MP01H03	++	—	—	0.050
FJ2237MP01A04	++	++	—	0.048
FJ2237MP01B04	—	—	—	0.048
FJ2237MP01C04	++	—	—	0.048
FJ2237MP01D04	++	++	—	0.051
FJ2237MP01E04	++	++	—	0.049
FJ2237MP01F04	++	+	—	0.049
FJ2237MP01G04	++	—	—	0.049
FJ2237MP01H04	++	—	—	0.049
FJ2237MP01A05	++	—	—	0.048
FJ2237MP01B05	++	—	—	0.048
FJ2237MP01C05	++	—	—	0.048
FJ2237MP01D05	++	—	—	0.048
FJ2237MP01E05	++	++	—	0.048
FJ2237MP01F05	++	++	—	0.048
FJ2237MP01G05	++	—	—	0.049
FJ2237MP01H05	++	+	—	0.049
FJ2237MP01A06	++	—	—	0.048
FJ2237MP01B06	++	++	—	0.048
FJ2237MP01C06	—	—	—	0.048
FJ2237MP01D06	++	+	—	0.049
FJ2237MP01E06	+	—	—	0.048
FJ2237MP01F06	++	++	—	0.048

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP01G06	++	-	-	0.050
FJ2237MP01A07	++	++	-	0.048
FJ2237MP01B07	++	++	-	0.050
FJ2237MP01C07	+	-	-	0.049
FJ2237MP01D07	-	-	-	0.048
FJ2237MP01E07	-	-	-	0.048
FJ2237MP01F07	++	-	-	0.048
FJ2237MP01G07	++	+	-	0.049
FJ2237MP01H07	++	-	-	0.050
FJ2237MP01A08	++	-	-	0.049
FJ2237MP01B08	++	-	-	0.049
FJ2237MP01C08	++	-	-	0.048
FJ2237MP01D08	++	++	-	0.048
FJ2237MP01E08	++	+	-	0.049
FJ2237MP01F08	++	++	-	0.049
FJ2237MP01G08	++	-	-	0.049
FJ2237MP01H08	++	-	-	0.050
FJ2237MP01A09	-	-	-	0.048
FJ2237MP01B09	-	-	-	0.049
FJ2237MP01C09	++	-	-	0.049
FJ2237MP01D09	++	-	-	0.049
FJ2237MP01E09	++	++	-	0.050
FJ2237MP01F09	++	+	-	0.049
FJ2237MP01G09	++	++	-	0.050
FJ2237MP01H09	++	++	-	0.050
FJ2237MP01A10	++	++	-	0.048
FJ2237MP01B10	++	++	-	0.048
FJ2237MP01C10	+	-	-	0.049
FJ2237MP01D10	+	-	-	0.048
FJ2237MP01E10	++	++	-	0.049
FJ2237MP01F10	++	-	-	0.049
FJ2237MP01G10	++	-	-	0.050
FJ2237MP01H10	++	-	-	0.050
FJ2237MP01A11	++	-	-	0.049
FJ2237MP01B11	++	++	-	0.049
FJ2237MP01C11	++	++	-	0.049
FJ2237MP01D11	++	++	-	0.048
FJ2237MP01E11	++	++	-	0.050
FJ2237MP01F11	++	++	-	0.049
FJ2237MP01H11	++	++	-	0.052
FJ2237MP01A12	++	-	-	0.048
FJ2237MP01B12	++	-	-	0.049
FJ2237MP01C12	++	+	-	0.049

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP01D12	++	-	-	0.048
FJ2237MP01E12	++	++	-	0.048
FJ2237MP01F12	+	-	-	0.052
FJ2237MP02A01	-	-	-	0.047
FJ2237MP02B01	-	-	-	0.048
FJ2237MP02C01	-	-	-	0.048
FJ2237MP02D01	-	-	-	0.052
FJ2237MP02E01	-	-	-	0.048
FJ2237MP02F01	-	-	-	0.048
FJ2237MP02G01	++	-	-	0.050
FJ2237MP02H01	-	-	-	0.049
FJ2237MP02A02	-	-	-	0.047
FJ2237MP02B02	++	-	-	0.048
FJ2237MP02C02	-	-	-	0.048
FJ2237MP02D02	-	-	-	0.047
FJ2237MP02E02	-	-	-	0.047
FJ2237MP02F02	-	-	-	0.048
FJ2237MP02G02	+	-	-	0.049
FJ2237MP02H02	-	-	-	0.048
FJ2237MP02A03	-	-	-	0.051
FJ2237MP02B03	-	-	-	0.048
FJ2237MP02C03	-	-	-	0.048
FJ2237MP02D03	-	-	-	0.048
FJ2237MP02E03	-	-	-	0.048
FJ2237MP02G03	-	-	-	0.050
FJ2237MP02H03	-	-	-	0.048
FJ2237MP02A04	-	-	-	0.049
FJ2237MP02B04	-	-	-	0.050
FJ2237MP02C04	-	-	-	0.048
FJ2237MP02D04	-	-	-	0.048
FJ2237MP02E04	-	-	-	0.048
FJ2237MP02F04	-	-	-	0.048
FJ2237MP02G04	-	-	-	0.050
FJ2237MP02H04	-	-	-	0.049
FJ2237MP02A05	-	-	-	0.049
FJ2237MP02B05	-	-	-	0.048
FJ2237MP02C05	-	-	-	0.049
FJ2237MP02E05	-	-	-	0.049
FJ2237MP02G05	-	-	-	0.048
FJ2237MP02H05	-	-	-	0.049
FJ2237MP02A06	++	-	-	0.048
FJ2237MP02B06	-	-	-	0.048
FJ2237MP02C06	-	-	-	0.048

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP02D06	-	-	-	0.050
FJ2237MP02E06	-	-	-	0.047
FJ2237MP02F06	-	-	-	0.048
FJ2237MP02G06	-	-	-	0.049
FJ2237MP02A07	-	-	-	0.048
FJ2237MP02B07	-	-	-	0.048
FJ2237MP02C07	-	-	-	0.048
FJ2237MP02D07	-	-	-	0.048
FJ2237MP02E07	-	-	-	0.048
FJ2237MP02H07	-	-	-	0.050
FJ2237MP02A08	-	-	-	0.048
FJ2237MP02C08	-	-	-	0.048
FJ2237MP02D08	-	-	-	0.048
FJ2237MP02E08	-	-	-	0.048
FJ2237MP02H08	-	-	-	0.048
FJ2237MP02A09	-	-	-	0.058
FJ2237MP02B09	-	-	-	0.048
FJ2237MP02C09	-	-	-	0.048
FJ2237MP02D09	++	-	-	0.048
FJ2237MP02E09	-	-	-	0.049
FJ2237MP02F09	-	-	-	0.048
FJ2237MP02G09	-	-	-	0.049
FJ2237MP02H09	-	-	-	0.050
FJ2237MP02A10	-	-	-	0.048
FJ2237MP02B10	-	-	-	0.049
FJ2237MP02C10	-	-	-	0.048
FJ2237MP02E10	-	-	-	0.047
FJ2237MP02G10	++	-	-	0.050
FJ2237MP02H10	-	-	-	0.048
FJ2237MP02A11	-	-	-	0.048
FJ2237MP02E11	-	-	-	0.051
FJ2237MP02G11	-	-	-	0.050
FJ2237MP02H11	-	-	-	0.049
FJ2237MP02A12	-	-	-	0.048
FJ2237MP02B12	-	-	-	0.049
FJ2237MP02C12	-	-	-	0.048
FJ2237MP02D12	-	-	-	0.053
FJ2237MP02E12	-	-	-	0.048
FJ2237MP02F12	-	-	-	0.048
FJ2237MP03A01	++	-	-	0.047
FJ2237MP03C01	++	-	-	0.048
FJ2237MP03D01	++	-	-	0.050
FJ2237MP03E01	++	-	-	0.048

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP03F01	++	++	—	0.048
FJ2237MP03G01	++	+	—	0.049
FJ2237MP03H01	++	—	—	0.049
FJ2237MP03A02	—	—	—	0.047
FJ2237MP03C02	++	+	—	0.048
FJ2237MP03D02	++	—	—	0.052
FJ2237MP03E02	++	—	—	0.048
FJ2237MP03F02	++	++	—	0.049
FJ2237MP03G02	++	—	—	0.049
FJ2237MP03H02	—	—	—	0.050
FJ2237MP03A03	++	—	—	0.047
FJ2237MP03B03	++	—	—	0.047
FJ2237MP03C03	++	—	—	0.048
FJ2237MP03D03	++	++	—	0.047
FJ2237MP03E03	++	—	—	0.048
FJ2237MP03F03	++	—	—	0.048
FJ2237MP03B04	++	++	—	0.048
FJ2237MP03C04	++	++	—	0.047
FJ2237MP03D04	++	—	—	0.048
FJ2237MP03A05	++	++	—	0.047
FJ2237MP03B05	++	+	—	0.048
FJ2237MP03E05	++	++	—	0.048
FJ2237MP03F05	++	—	—	0.048
FJ2237MP03A06	++	+	—	0.047
FJ2237MP03C06	++	++	—	0.048
FJ2237MP03D06	++	++	—	0.048
FJ2237MP03A07	—	—	—	0.047
FJ2237MP03C07	++	—	—	0.049
FJ2237MP03D07	++	—	—	0.047
FJ2237MP03E07	—	—	—	0.048
FJ2237MP03F07	—	—	—	0.048
FJ2237MP03G07	—	—	—	0.049
FJ2237MP03B08	—	—	—	0.047
FJ2237MP03C08	++	—	++	0.048
FJ2237MP03D08	—	—	—	0.048
FJ2237MP03E08	—	—	—	0.048
FJ2237MP03H08	—	—	—	0.050
FJ2237MP03A09	—	—	—	0.047
FJ2237MP03C09	—	—	—	0.048
FJ2237MP03D09	—	—	—	0.048
FJ2237MP03G09	—	—	—	0.050
FJ2237MP03C10	++	—	—	0.048
FJ2237MP03E10	+	—	—	0.048

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP03A11	+	-	-	0.047
FJ2237MP03D11	++	-	-	0.048
FJ2237MP03G11	++	-	-	0.050
FJ2237MP03A12	-	-	-	0.047
FJ2237MP03B12	++	-	++	0.049
FJ2237MP03C12	++	-	++	0.048
FJ2237MP03D12	++	-	-	0.048
FJ2237MP04B01	-	-	-	0.050
FJ2237MP04D01	-	-	-	0.055
FJ2237MP04E01	-	-	-	0.051
FJ2237MP04F01	-	-	-	0.051
FJ2237MP04G01	-	-	-	0.051
FJ2237MP04H01	++	++	-	0.052
FJ2237MP04A02	-	-	-	0.049
FJ2237MP04B02	-	-	-	0.050
FJ2237MP04C02	-	-	-	0.050
FJ2237MP04D02	++	++	-	0.049
FJ2237MP04E02	-	-	-	0.049
FJ2237MP04F02	-	-	-	0.050
FJ2237MP04G02	-	-	-	0.050
FJ2237MP04H02	-	-	-	0.050
FJ2237MP04A03	-	-	-	0.050
FJ2237MP04B03	-	-	-	0.049
FJ2237MP04C03	-	-	-	0.050
FJ2237MP04E03	++	+	-	0.049
FJ2237MP04F03	-	-	-	0.050
FJ2237MP04H03	++	-	-	0.051
FJ2237MP04A04	-	-	-	0.049
FJ2237MP04B04	-	-	-	0.050
FJ2237MP04E04	-	-	-	0.049
FJ2237MP04F04	-	-	-	0.050
FJ2237MP04G04	-	-	-	0.050
FJ2237MP04B05	-	-	-	0.050
FJ2237MP04C05	-	-	-	0.051
FJ2237MP04D05	-	-	-	0.049
FJ2237MP04E05	-	-	-	0.049
FJ2237MP04F05	++	++	-	0.050
FJ2237MP04H05	++	++	-	0.050
FJ2237MP04A06	-	-	-	0.049
FJ2237MP04C06	-	-	-	0.050
FJ2237MP04D06	-	-	-	0.049
FJ2237MP04E06	-	-	-	0.049
FJ2237MP04F06	-	-	-	0.049

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP04G06	-	-	-	0.052
FJ2237MP04A07	-	-	-	0.049
FJ2237MP04C07	-	-	-	0.049
FJ2237MP04D07	-	-	-	0.052
FJ2237MP04F07	++	++	-	0.050
FJ2237MP04G07	-	-	-	0.052
FJ2237MP04H07	-	-	-	0.050
FJ2237MP04A08	-	-	-	0.049
FJ2237MP04B08	++	+	-	0.050
FJ2237MP04D08	-	-	-	0.049
FJ2237MP04E08	-	-	-	0.049
FJ2237MP04F08	++	++	-	0.050
FJ2237MP04G08	-	-	-	0.050
FJ2237MP04H08	-	-	-	0.050
FJ2237MP04B09	-	-	-	0.051
FJ2237MP04C09	-	-	-	0.050
FJ2237MP04D09	-	-	-	0.050
FJ2237MP04E09	++	-	-	0.050
FJ2237MP04F09	-	-	-	0.049
FJ2237MP04G09	++	++	-	0.051
FJ2237MP04H09	-	-	-	0.051
FJ2237MP04B10	-	-	-	0.049
FJ2237MP04C10	-	-	-	0.050
FJ2237MP04E10	-	-	-	0.049
FJ2237MP04F10	++	++	-	0.051
FJ2237MP04G10	-	-	-	0.051
FJ2237MP04H10	-	-	-	0.051
FJ2237MP04B11	-	-	-	0.050
FJ2237MP04C11	++	++	-	0.050
FJ2237MP04D11	-	-	-	0.050
FJ2237MP04E11	++	-	-	0.049
FJ2237MP04F11	++	++	-	0.050
FJ2237MP04G11	-	-	-	0.050
FJ2237MP04H11	-	-	-	0.050
FJ2237MP04A12	-	-	-	0.053
FJ2237MP04D12	-	-	-	0.049
FJ2237MP04F12	-	-	-	0.050
FJ2237MP05H05	-	-	++	0.052
FJ2237MP05C08	++	-	-	0.052
FJ2237MP05D09	-	-	-	0.050
FJ2237MP05H09	-	-	-	0.051
FJ2237MP06A01	++	++	-	0.051
FJ2237MP06B01	-	-	-	0.052

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP06C01	++	++	–	0.052
FJ2237MP06D01	++	–	–	0.054
FJ2237MP06E01	++	++	–	0.051
FJ2237MP06F01	–	++	–	0.051
FJ2237MP06G01	++	++	–	0.055
FJ2237MP06H01	++	++	–	0.052
FJ2237MP06A02	–	–	–	0.051
FJ2237MP06B02	++	++	–	0.052
FJ2237MP06D02	–	–	–	0.051
FJ2237MP06E02	++	++	–	0.051
FJ2237MP06G02	++	++	–	0.052
FJ2237MP06H02	++	++	–	0.053
FJ2237MP06A03	++	+	–	0.051
FJ2237MP06B03	++	++	–	0.052
FJ2237MP06C03	++	++	–	0.052
FJ2237MP06D03	++	++	–	0.051
FJ2237MP06E03	++	++	–	0.051
FJ2237MP06F03	++	+	–	0.051
FJ2237MP06G03	++	++	–	0.051
FJ2237MP06H03	++	++	–	0.052
FJ2237MP06A04	++	++	–	0.052
FJ2237MP06B04	++	++	–	0.052
FJ2237MP06C04	++	++	–	0.052
FJ2237MP06D04	++	++	–	0.051
FJ2237MP06F04	++	++	–	0.051
FJ2237MP06G04	++	++	–	0.051
FJ2237MP06H04	++	++	–	0.051
FJ2237MP06A05	++	+	–	0.054
FJ2237MP06B05	++	++	–	0.052
FJ2237MP06C05	++	++	–	0.052
FJ2237MP06E05	++	++	–	0.050
FJ2237MP06F05	++	++	–	0.051
FJ2237MP06G05	++	++	–	0.051
FJ2237MP06H05	++	++	–	0.051
FJ2237MP06A06	++	++	–	0.053
FJ2237MP06C06	++	++	–	0.056
FJ2237MP06D06	++	++	–	0.053
FJ2237MP06E06	++	++	–	0.055
FJ2237MP06F06	++	++	–	0.051
FJ2237MP06G06	++	++	–	0.052
FJ2237MP06C07	++	+	–	0.051
FJ2237MP06F07	++	++	–	0.050
FJ2237MP06A08	++	++	–	0.051

Clone ID	Bio hu5T4 O.D. 450 nm	Bio cy5T4 O.D. 450 nm	Bio mo5T4 O.D. 450 nm	Neutravidin O.D. 450 nm
FJ2237MP06B08	++	++	–	0.050
FJ2237MP06E08	++	++	–	0.050
FJ2237MP06H09	++	++	–	0.052
FJ2237MP06E10	–	–	–	0.050
FJ2237MP06G10	++	++	–	0.052
FJ2237MP06A11	++	++	–	0.050
FJ2237MP06H11	++	++	–	0.051
FJ2237MP06B12	++	++	–	0.053
FJ2237MP06E12	–	–	–	0.049

Flow cytometry binding to CHO cells transiently expressing 5T4

P.E. samples were tested for binding to CHO-K1 expressing hu5T4, cy5T4, and mo5T4. CHO-K1 cells were transiently transfected with hu5T4, cy5T4, and mo5T4. Transiently transfected CHO-K1 and WT cells were aliquoted into a 96-well plate at 1.5×10^5 cells per well. P.E. of interest were diluted five-fold in 0.5 % FBS/0.5 mM EDTA/1xPBS, pre-incubated with 5000-fold diluted mouse anti-c-myc antibody (Roche, Cat. Nr. 11667203001) and added to the cells. Binding was detected by flow cytometry, using a goat anti-mouse IgG-APC antibody (Invitrogen, CAT. Nr. A-865) as the detection reagent (500-fold diluted). Analysis was performed using iQUE screener equipment; binding signal was detected in the RL-1 fluorescence detector channel.

A total of 305 clones were identified as binders to the CHO-K1 transiently transfected cells. 139 binders bound exclusively to one cell line (109 to CHO-K1 hu5T4; 27 to CHO-K1 cy5T4, and 3 to CHO-K1 mo5T4). 167 clones bound to two or three different cell lines (115 bound to cells expressing hu/cy5T4, 18 bound to cells expressing hu/mo5T4, 3 bound to cells expressing hu/cy/mo5T4, and 1 bound to cells expressing cy/mo5T4).

Results are shown in **Table 4** below:

Table 4. Binding of VHH clones to CHO-K1 cells by Flow Cytometry.

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP01H06	46.27	35330	51.65	32969	98.98	502266	0.59	2644
FJ2237MP01A01	+	14861	+	21768	–	3499	1.08	2575
FJ2237MP01B01	+	24434	+	45654	–	3402	0.67	2469
FJ2237MP01C0	+	56818	+	20479	–	3502	0.79	2442

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
1								
FJ2237MP01D0 1	+	17012	+	27721	–	3539	0.66	2472
FJ2237MP01E0 1	+	19421	+	13249	–	3556	0.66	2408
FJ2237MP01F0 1	+	40879	+	14026	–	3593	0.78	2456
FJ2237MP01G0 1	+	26061	–	7282	–	3516	0.79	2527
FJ2237MP01H0 1	+	36875	+	13865	–	3536	0.71	2475
FJ2237MP01A0 2	+	18517	+	13785	–	3585	0.86	2542
FJ2237MP01B0 2	+	25325	+	12266	–	3678	0.78	2477
FJ2237MP01C0 2	+	28945	+	25663	–	3724	0.59	2480
FJ2237MP01D0 2	+	22967	+	29670	–	3620	0.58	2483
FJ2237MP01E0 2	+	24071	–	7114	–	3624	0.63	2519
FJ2237MP01F0 2	+	24780	+	27949	–	3749	0.69	2497
FJ2237MP01G0 2	+	24489	–	5334	–	7915	0.61	2499
FJ2237MP01H0 2	+	17592	+	26297	–	3617	0.62	2502
FJ2237MP01A0 3	+	24000	+	24927	–	3627	0.63	2432
FJ2237MP01B0 3	+	15606	+	26034	–	3699	0.60	2481
FJ2237MP01C0 3	+	40995	–	10869	–	3780	0.54	2426
FJ2237MP01D0 3	+	24575	+	38362	–	3682	0.63	2494
FJ2237MP01E0 3	+	19026	+	26264	–	3793	0.56	2461
FJ2237MP01F0 3	+	21609	+	22086	–	3824	0.61	2478
FJ2237MP01G0 3	+	15522	+	24151	–	3763	0.57	2451
FJ2237MP01H0 3	+	23570	–	9086	–	3762	0.53	2461
FJ2237MP01A0 4	+	25630	+	49098	–	3543	0.76	2452
FJ2237MP01B0 4	+	28203	–	5630	–	10595	0.65	2456
FJ2237MP01C0 4	+	36830	–	11720	–	3776	0.59	2452
FJ2237MP01D0 4	+	19060	+	26654	–	3708	0.74	2462
FJ2237MP01E0 4	+	28496	+	44271	–	3837	0.77	2453
FJ2237MP01F0 4	+	23163	+	26601	–	3703	0.73	2449
FJ2237MP01G0 4	+	16592	–	8758	–	3784	0.66	2489
FJ2237MP01H0 4	+	22054	–	11383	–	3725	0.54	2460
FJ2237MP01A0 5	+	20232	+	12773	–	3740	0.90	2460
FJ2237MP01B0 5	+	24395	–	11322	–	3753	0.81	2481
FJ2237MP01C0 5	+	22455	–	6367	–	3897	0.79	2479
FJ2237MP01D0 5	+	20229	–	10206	–	3845	0.68	2519

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP01E05	+	17073	+	27108	-	4013	0.65	2442
FJ2237MP01F05	+	23356	+	42214	-	3893	0.60	2454
FJ2237MP01G05	+	38687	+	13122	-	3944	0.70	2456
FJ2237MP01H05	+	22582	+	28599	-	5598	0.49	2567
FJ2237MP01A06	+	46086	-	10910	-	3649	0.71	2450
FJ2237MP01B06	+	22997	+	42164	-	4040	0.93	2482
FJ2237MP01C06	+	33599	-	6633	+	13661	0.59	2480
FJ2237MP01D06	+	25822	+	25452	-	3952	0.92	2562
FJ2237MP01E06	+	40942	-	9831	-	4001	0.65	2476
FJ2237MP01F06	+	23167	+	47261	-	4122	0.73	2524
FJ2237MP01G06	+	34954	+	14926	-	4008	0.66	2492
FJ2237MP01A07	+	27737	+	28108	-	4023	1.02	2676
FJ2237MP01B07	+	15771	+	24476	-	3854	0.75	2645
FJ2237MP01C07	+	42383	-	9788	-	3922	0.76	2571
FJ2237MP01D07	+	16899	-	4495	-	4120	0.58	2560
FJ2237MP01E07	+	26679	-	4764	-	8683	0.67	2503
FJ2237MP01F07	+	40351	+	15253	-	4196	0.61	2512
FJ2237MP01G07	+	23970	+	16853	-	4131	0.80	2522
FJ2237MP01H07	+	34554	-	8455	-	4515	0.49	2410
FJ2237MP01A08	+	41695	+	18192	-	4056	0.67	2498
FJ2237MP01B08	+	35840	-	2947	-	3987	0.85	2563
FJ2237MP01C08	+	43491	+	13990	-	3942	0.92	2611
FJ2237MP01D08	+	15238	+	25642	-	4160	0.70	2613
FJ2237MP01E08	+	18948	+	28345	-	4205	0.76	2519
FJ2237MP01F08	+	23748	+	45731	-	4261	0.71	2511
FJ2237MP01G08	+	36373	+	13876	-	4129	0.65	2468
FJ2237MP01H08	+	22091	-	8552	-	4133	0.73	2555
FJ2237MP01A09	+	35595	-	7274	+	13315	0.97	2600
FJ2237MP01B09	+	15178	-	5932	-	4070	0.91	2541
FJ2237MP01C09	+	21017	+	20031	-	4038	0.74	2488
FJ2237MP01D09	+	34599	+	14505	-	4192	0.74	2455
FJ2237MP01E09	+	22960	+	56326	-	4030	0.69	2415
FJ2237MP01F09	+	22496	+	28736	-	4214	0.67	2404
FJ2237MP01G09	+	19394	+	43935	-	4169	0.50	2388

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP01H09	+	25116	+	48142	-	4126	0.44	2438
FJ2237MP01A10	+	15318	+	32225	-	4154	0.74	2405
FJ2237MP01B10	+	29701	+	48729	-	3979	0.80	2465
FJ2237MP01C10	+	29919	-	9270	-	3953	0.83	2482
FJ2237MP01D10	+	36945	+	14708	-	4047	0.74	2426
FJ2237MP01E10	+	16854	+	44563	-	4060	0.74	2400
FJ2237MP01F10	+	17924	+	15277	-	4161	0.66	2433
FJ2237MP01G10	+	17879	+	13448	-	4290	0.61	2384
FJ2237MP01H10	+	17330	+	15645	-	3935	0.83	2513
FJ2237MP01A11	+	18297	+	15869	-	4200	0.67	2413
FJ2237MP01B11	+	17970	+	23366	-	4364	0.69	2503
FJ2237MP01C11	+	16255	+	25635	-	4381	0.94	2481
FJ2237MP01D11	-	7455	-	7468	-	4329	0.54	2469
FJ2237MP01E11	+	14907	+	29092	-	4457	0.67	2443
FJ2237MP01F11	+	16667	+	24092	-	3925	0.47	2404
FJ2237MP01H11	+	29574	+	50189	-	4299	0.59	2429
FJ2237MP01A12	+	27904	+	24015	-	3875	0.62	2457
FJ2237MP01B12	+	35734	+	19424	-	3851	0.85	2538
FJ2237MP01C12	-	6309	-	3891	-	3879	0.61	2490
FJ2237MP01D12	+	32643	+	15227	-	3972	0.48	2503
FJ2237MP01E12	+	23988	+	50455	-	4426	0.71	2554
FJ2237MP01F12	+	19889	-	7818	-	4463	0.72	2453
FJ2237MP02A01	+	31296	-	7940	+	13680	0.29	2171
FJ2237MP02B01	+	39667	-	10483	+	17902	0.28	2157
FJ2237MP02C01	+	28331	-	7432	+	12394	0.46	2165
FJ2237MP02D01	+	26201	-	7548	-	11726	0.49	2186
FJ2237MP02E01	+	38291	-	10736	+	16412	0.42	2216
FJ2237MP02F01	+	40973	-	9544	+	17083	0.97	3017
FJ2237MP02G01	+	26944	-	3242	-	3390	0.57	2259
FJ2237MP02H01	+	18247	-	11455	+	24067	0.25	2172
FJ2237MP02A02	+	30055	-	7321	-	11580	0.68	2290
FJ2237MP02B02	-	6660	-	3285	-	3610	0.48	2175
FJ2237MP02C02	+	36422	-	11315	+	21124	0.27	2190
FJ2237MP02D02	+	28305	-	8184	+	14961	0.45	2184

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP02E0 2	+	37616	-	8492	+	13458	0.52	2190
FJ2237MP02F0 2	+	26269	-	5911	-	9253	0.64	2164
FJ2237MP02G0 2	-	4093	-	3378	-	3481	0.60	2253
FJ2237MP02H0 2	+	36833	-	9024	+	16777	0.50	2247
FJ2237MP02A0 3	+	12925	-	7245	+	14487	0.56	2214
FJ2237MP02B0 3	+	37864	-	9693	+	19096	0.94	3150
FJ2237MP02C0 3	+	26157	-	7131	+	14593	0.46	2138
FJ2237MP02D0 3	+	26281	-	6973	+	14001	1.11	2326
FJ2237MP02E0 3	+	27976	-	7011	-	11797	0.51	2244
FJ2237MP02G0 3	+	23936	-	5087	-	7382	0.69	2453
FJ2237MP02H0 3	+	40763	-	9600	+	17874	0.47	2157
FJ2237MP02A0 4	+	26196	-	5824	-	9789	0.67	2173
FJ2237MP02B0 4	+	13328	-	7377	+	14073	0.49	2171
FJ2237MP02C0 4	+	16753	-	4640	-	6813	0.72	2162
FJ2237MP02D0 4	+	37132	-	11284	+	19832	0.39	2262
FJ2237MP02E0 4	+	27714	-	7268	-	11682	0.65	2266
FJ2237MP02F0 4	+	27652	-	6994	-	11181	0.90	2371
FJ2237MP02G0 4	+	26313	-	5959	-	11780	0.81	2304
FJ2237MP02H0 4	+	14035	-	7044	+	15162	4.23	3361
FJ2237MP02A0 5	+	44297	-	9843	+	16024	0.22	2124
FJ2237MP02B0 5	+	29293	-	7209	-	11480	0.58	2209
FJ2237MP02C0 5	+	33440	-	10567	+	18158	0.48	2126
FJ2237MP02E0 5	+	25829	-	6572	-	10210	0.73	2257
FJ2237MP02G0 5	+	26488	-	5938	-	11214	0.84	2289
FJ2237MP02H0 5	+	12021	-	7786	+	14138	0.61	2298
FJ2237MP02A0 6	-	5692	-	3189	-	3700	0.23	2129
FJ2237MP02B0 6	+	35544	-	10553	+	19201	0.24	2132
FJ2237MP02C0 6	+	34666	-	11050	+	17301	0.45	2184
FJ2237MP02D0 6	+	32957	-	11510	+	15153	0.65	2207
FJ2237MP02E0 6	+	32470	-	11399	+	15295	0.60	2198
FJ2237MP02F0 6	+	34192	-	10077	+	14595	0.55	2203
FJ2237MP02G0 6	+	27826	-	7363	+	12874	0.44	2169
FJ2237MP02A0 7	+	29845	-	6962	-	11960	0.20	2111
FJ2237MP02B0 7	+	38800	-	10554	+	15617	0.40	2197

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP02C07	+	34060	-	11634	+	18814	0.39	2142
FJ2237MP02D07	+	34899	-	10807	+	17321	0.28	2135
FJ2237MP02E07	+	31667	-	10782	+	15395	0.49	2182
FJ2237MP02H07	+	34510	-	10810	+	16606	0.50	2420
FJ2237MP02A08	+	40751	-	10407	-	9044	0.21	2067
FJ2237MP02C08	+	24907	-	7255	-	10381	0.57	2163
FJ2237MP02D08	+	33483	-	10855	+	16287	0.48	2193
FJ2237MP02E08	+	32250	-	11989	+	17692	0.44	2178
FJ2237MP02H08	+	36711	-	11166	+	14878	0.45	2176
FJ2237MP02A09	+	14243	-	10113	+	14919	0.42	2135
FJ2237MP02B09	+	26652	-	7482	-	11490	0.50	2127
FJ2237MP02C09	-	11476	-	7621	+	13628	0.43	2182
FJ2237MP02D09	+	30475	-	3253	-	4180	0.56	2242
FJ2237MP02E09	+	22665	-	6309	-	9544	0.70	2216
FJ2237MP02F09	+	26158	-	6932	-	10196	0.63	2203
FJ2237MP02G09	+	24754	-	9066	-	11962	0.76	2200
FJ2237MP02H09	+	34159	+	12737	+	16009	0.37	2199
FJ2237MP02A10	+	29774	-	9841	+	12006	0.30	2121
FJ2237MP02B10	+	20909	-	5815	-	6637	0.47	2210
FJ2237MP02C10	+	22396	-	8316	+	13716	0.67	2220
FJ2237MP02E10	+	14467	+	12087	+	17992	0.41	2174
FJ2237MP02G10	+	16665	-	3365	-	4068	0.56	2208
FJ2237MP02H10	+	24644	-	7434	-	9726	0.45	2212
FJ2237MP02A11	+	23610	-	6314	-	8694	0.47	2125
FJ2237MP02E11	+	24617	-	7415	-	9893	0.49	2144
FJ2237MP02G11	+	25395	-	7872	-	10674	0.48	2140
FJ2237MP02H11	+	33544	-	11606	+	14293	0.26	2158
FJ2237MP02A12	+	22163	-	8024	-	9328	0.21	2069
FJ2237MP02B12	+	29551	-	11562	+	13582	0.12	2076
FJ2237MP02C12	+	29546	+	13170	+	14281	0.17	2098
FJ2237MP02D12	+	25942	-	9907	-	9358	0.32	2135
FJ2237MP02E12	+	31352	+	13776	+	13355	0.30	2145
FJ2237MP02F12	+	32878	+	12065	+	12112	0.23	2168
FJ2237MP03A01	+	22615	-	3080	-	3320	0.06	2397

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP03C01	-	9855	-	3384	-	3328	0.23	2468
FJ2237MP03D01	+	16095	-	7735	-	3631	0.40	2440
FJ2237MP03E01	+	39769	+	19652	-	3470	0.16	2481
FJ2237MP03F01	-	6697	-	9224	-	3388	0.39	2504
FJ2237MP03G01	+	21672	+	42687	-	3434	0.23	2465
FJ2237MP03H01	+	22447	+	29255	-	3372	0.12	2412
FJ2237MP03A02	+	15734	-	3286	-	3570	0.40	2442
FJ2237MP03C02	+	46848	+	31157	-	3517	0.07	2412
FJ2237MP03D02	+	18267	+	19873	-	3603	0.42	2515
FJ2237MP03E02	+	28977	+	54444	-	3912	0.19	2501
FJ2237MP03F02	-	10948	+	14313	-	3549	0.24	2500
FJ2237MP03G02	+	41650	+	24523	-	3538	0.18	2413
FJ2237MP03H02	+	27309	-	6760	-	9232	0.17	2468
FJ2237MP03A03	+	18315	+	19258	-	3581	0.39	2406
FJ2237MP03B03	-	9761	-	4108	-	3620	0.75	2567
FJ2237MP03C03	+	22216	+	14173	-	3562	0.08	2497
FJ2237MP03D03	+	14687	+	26010	-	3729	0.36	2458
FJ2237MP03E03	+	32044	+	30971	-	3559	0.20	2464
FJ2237MP03F03	-	9029	-	3677	-	3666	0.27	2483
FJ2237MP03B04	+	19092	+	39802	-	3842	0.21	2456
FJ2237MP03C04	-	8239	-	8658	-	3643	0.49	2559
FJ2237MP03D04	+	16809	-	3181	-	3702	0.04	2420
FJ2237MP03A05	+	15563	+	25093	-	3823	0.47	2468
FJ2237MP03B05	+	39254	+	46669	-	4111	0.06	2486
FJ2237MP03E05	-	10712	-	11297	-	3761	0.18	2359
FJ2237MP03F05	+	21597	-	5507	-	3758	0.17	2458
FJ2237MP03A06	+	14126	-	5029	-	3839	0.12	2411
FJ2237MP03C06	+	20791	+	36485	-	3721	0.33	2501
FJ2237MP03D06	+	22741	+	47257	-	3826	0.26	2455
FJ2237MP03A07	+	43264	-	7804	-	11536	0.29	2571
FJ2237MP03C07	-	7814	-	3613	-	3890	0.20	2551
FJ2237MP03D07	-	11513	-	3386	-	3876	0.16	2537
FJ2237MP03E07	+	32187	-	8422	+	12049	0.13	2532
FJ2237MP03F07	+	26081	-	5615	-	7891	0.33	2496

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP03G07	+	35420	-	8611	-	9970	0.18	2537
FJ2237MP03B08	+	29276	-	6589	-	9098	0.14	2426
FJ2237MP03C08	-	8554	-	1663	-	4598	0.12	2485
FJ2237MP03D08	+	39423	-	10189	+	14449	0.07	2534
FJ2237MP03E08	+	30973	-	7530	-	10809	0.08	2483
FJ2237MP03H08	+	36807	-	8934	-	10694	0.09	2521
FJ2237MP03A09	+	30069	-	5642	-	8110	0.09	2423
FJ2237MP03C09	+	40360	-	6818	+	13957	0.19	2488
FJ2237MP03D09	+	36021	-	10206	+	14866	0.15	2486
FJ2237MP03G09	+	37896	-	11827	+	14083	0.13	2484
FJ2237MP03C10	-	4673	-	3111	-	4199	0.10	2311
FJ2237MP03E10	-	3844	-	3283	-	4223	0.31	2378
FJ2237MP03A11	-	4505	-	3100	-	3909	0.16	2339
FJ2237MP03D11	-	5400	-	3162	-	4258	0.18	2356
FJ2237MP03G11	-	8574	-	3132	-	4073	0.31	2379
FJ2237MP03A12	+	30591	-	6541	-	7853	0.18	2329
FJ2237MP03B12	-	4901	-	3253	-	6850	0.12	2295
FJ2237MP03C12	-	11909	-	3392	-	9455	0.15	2430
FJ2237MP03D12	+	20306	-	3176	-	3902	0.16	2396
FJ2237MP04B01	+	27768	-	8103	-	3410	0.38	2227
FJ2237MP04D01	+	13246	-	4178	-	3353	0.38	2183
FJ2237MP04E01	+	29761	-	7846	-	3262	0.48	2179
FJ2237MP04F01	+	28656	+	28477	-	10453	0.50	2375
FJ2237MP04G01	+	29526	-	8287	-	3509	0.33	2159
FJ2237MP04H01	-	7651	-	11425	-	3416	0.49	2175
FJ2237MP04A02	+	27115	-	6509	-	3340	0.24	2213
FJ2237MP04B02	+	33060	+	40439	-	3421	0.30	2193
FJ2237MP04C02	+	24723	-	6232	-	3345	0.45	2150
FJ2237MP04D02	+	14368	+	18845	-	3614	0.52	2274
FJ2237MP04E02	+	29713	-	9173	-	3369	0.29	2176
FJ2237MP04F02	+	25861	-	6046	-	3425	0.64	2238
FJ2237MP04G02	+	24720	-	4840	-	3504	0.40	2170
FJ2237MP04H02	+	25811	-	6596	-	3511	0.37	2198
FJ2237MP04A03	+	34783	-	8547	-	3375	0.26	2190

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP04B03	+	14712	-	4238	-	3485	0.43	2230
FJ2237MP04C03	+	16481	-	4754	-	3534	0.29	2167
FJ2237MP04E03	+	18287	+	44587	-	3593	0.48	2204
FJ2237MP04F03	+	33295	-	10594	-	3460	0.34	2181
FJ2237MP04H03	+	24552	+	22313	-	3628	0.40	2241
FJ2237MP04A04	+	14273	-	4116	-	3414	0.44	2195
FJ2237MP04B04	+	27033	-	6630	-	3680	0.56	2331
FJ2237MP04E04	+	13853	-	4296	-	3711	0.44	2190
FJ2237MP04F04	+	25119	-	6628	-	3621	0.51	2228
FJ2237MP04G04	+	24145	-	7378	-	3717	0.49	2196
FJ2237MP04B05	+	31566	-	10029	-	3825	0.31	2193
FJ2237MP04C05	+	27982	-	6402	-	3877	0.44	2187
FJ2237MP04D05	+	25773	-	6876	-	3651	0.44	2201
FJ2237MP04E05	+	25995	-	7119	-	3802	0.49	2207
FJ2237MP04F05	-	9027	-	9930	-	3926	0.66	2240
FJ2237MP04H05	-	10396	+	12241	+	12032	0.59	2174
FJ2237MP04A06	+	37253	-	7020	-	3581	0.32	2204
FJ2237MP04C06	+	29731	-	8060	-	3766	0.41	2242
FJ2237MP04D06	+	24530	+	32414	-	3984	0.59	2268
FJ2237MP04E06	+	13724	-	4333	-	3794	0.44	2266
FJ2237MP04F06	+	28586	-	7558	-	3687	0.43	2257
FJ2237MP04G06	+	21885	-	6603	-	3689	0.52	2225
FJ2237MP04A07	+	26015	-	5666	-	4088	0.68	2272
FJ2237MP04C07	+	16594	+	16283	-	4153	0.93	2317
FJ2237MP04D07	-	10985	-	9542	-	4974	0.45	2325
FJ2237MP04F07	-	8810	-	10998	-	3808	0.57	2275
FJ2237MP04G07	+	24417	-	5544	-	4141	0.35	2247
FJ2237MP04H07	+	26936	-	7906	-	4048	0.76	2280
FJ2237MP04A08	+	17851	-	6742	-	8871	0.66	2230
FJ2237MP04B08	-	9165	-	8267	-	3796	0.66	2265
FJ2237MP04D08	+	19267	-	5255	-	4156	0.42	2181
FJ2237MP04E08	+	26573	-	6892	-	4279	0.64	2269
FJ2237MP04F08	-	8851	-	10795	-	4468	0.61	2321
FJ2237MP04G08	+	21332	-	6091	-	3906	0.42	2203

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP04H08	+	27700	-	8428	-	4229	0.48	2270
FJ2237MP04B09	+	15792	-	4377	-	4386	0.56	2211
FJ2237MP04C09	+	25476	-	6077	-	3997	0.64	2284
FJ2237MP04D09	+	18493	-	5617	-	4015	0.44	2199
FJ2237MP04E09	+	22030	+	27010	-	4005	0.77	2262
FJ2237MP04F09	+	25717	-	6921	-	4511	0.47	2269
FJ2237MP04G09	+	40229	+	78828	-	7034	0.70	2334
FJ2237MP04H09	+	13884	-	4370	-	4170	0.75	2262
FJ2237MP04B10	+	34874	-	10385	-	3816	0.22	2208
FJ2237MP04C10	+	25445	-	6713	-	3881	0.60	2225
FJ2237MP04E10	+	30797	-	9130	-	3805	0.38	2230
FJ2237MP04F10	-	11667	+	12999	-	4070	0.48	2216
FJ2237MP04G10	+	30714	-	8784	-	3836	0.11	2127
FJ2237MP04H10	+	25441	-	7602	-	4010	0.51	2328
FJ2237MP04B11	+	24269	-	7070	-	4288	0.48	2176
FJ2237MP04C11	-	11573	+	13738	-	4485	0.46	2233
FJ2237MP04D11	+	34373	-	10022	-	3842	0.37	2169
FJ2237MP04E11	+	17617	-	6936	-	4168	0.50	2180
FJ2237MP04F11	-	10689	+	13257	-	4137	0.73	2195
FJ2237MP04G11	+	15764	-	5255	-	3913	0.28	2158
FJ2237MP04H11	+	23241	-	6482	-	3849	0.32	2176
FJ2237MP04A12	+	24356	-	9932	-	3728	0.39	2170
FJ2237MP04D12	+	24684	-	6453	-	3607	0.38	2175
FJ2237MP04F12	+	18373	-	5290	-	3694	0.25	2132
FJ2237MP05H05	-	3902	-	3066	-	3455	0.38	2181
FJ2237MP05C08	-	10442	-	3083	-	3778	0.76	2314
FJ2237MP05D09	+	25827	-	8557	+	15835	0.46	2268
FJ2237MP05H09	+	29074	-	8685	+	15062	0.61	2281
FJ2237MP06A01	-	10676	+	15072	-	3464	0.89	2241
FJ2237MP06B01	+	24388	-	6739	-	3327	0.43	2235
FJ2237MP06C01	-	11706	+	14820	-	3423	0.63	2269
FJ2237MP06D01	+	20962	+	21388	-	3474	0.61	2276
FJ2237MP06E01	-	8035	-	7618	-	3421	0.43	2217
FJ2237MP06F01	-	3351	-	3696	-	3383	0.61	2177

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP06G01	-	5523	-	8257	-	3328	0.42	2186
FJ2237MP06H01	-	8312	-	9911	-	3388	0.62	2442
FJ2237MP06A02	+	13918	-	4789	-	3513	0.12	2188
FJ2237MP06B02	-	3973	-	6529	-	3458	0.29	2191
FJ2237MP06D02	+	13686	-	10608	-	3368	0.38	2221
FJ2237MP06E02	-	7113	-	7979	-	3559	0.38	2212
FJ2237MP06G02	-	7640	-	6400	-	3527	0.45	2211
FJ2237MP06H02	-	5340	-	7768	-	3508	0.30	2220
FJ2237MP06A03	-	6841	-	6311	-	3619	0.82	2261
FJ2237MP06B03	-	6494	-	7790	-	3621	0.39	2216
FJ2237MP06C03	-	4424	-	6176	-	3597	0.45	2241
FJ2237MP06D03	-	10427	-	10575	-	3691	0.38	2246
FJ2237MP06E03	+	12085	+	14006	-	3879	0.46	2234
FJ2237MP06F03	-	7279	-	6310	-	3613	0.31	2174
FJ2237MP06G03	-	8908	-	9195	-	3687	0.24	2206
FJ2237MP06H03	+	13376	+	14746	-	3681	0.43	2186
FJ2237MP06A04	-	8442	-	9593	-	3566	0.69	2280
FJ2237MP06B04	-	9440	-	11459	-	3575	0.37	2193
FJ2237MP06C04	-	10119	-	10721	-	3672	0.48	2214
FJ2237MP06D04	-	8880	-	10350	-	3701	0.69	2273
FJ2237MP06F04	-	8403	-	8806	-	3674	0.43	2247
FJ2237MP06G04	-	7078	-	7085	-	3712	0.38	2181
FJ2237MP06H04	-	9088	-	9657	-	3557	0.42	2198
FJ2237MP06A05	-	7765	-	6583	-	3623	0.60	2342
FJ2237MP06B05	-	10819	+	12022	-	3757	0.84	2326
FJ2237MP06C05	-	5369	-	6949	-	3747	0.34	2148
FJ2237MP06E05	-	5608	-	7774	-	3752	0.45	2240
FJ2237MP06F05	-	8563	-	8510	-	3776	0.69	2274
FJ2237MP06G05	-	8732	-	8646	-	3783	0.23	2181
FJ2237MP06H05	-	10779	-	8695	-	3854	0.51	2226
FJ2237MP06A06	-	8913	-	9960	-	3719	0.57	2245
FJ2237MP06C06	-	8465	-	8048	-	3886	0.55	2222
FJ2237MP06D06	-	7888	-	7955	-	3558	0.44	2244
FJ2237MP06E06	-	8758	-	8827	-	3875	0.65	2273

Clone ID	CHO-K1 hu5T4 cells % binding	CHO-K1 hu5T4 cells GeoMFI (RL1-H)	CHO-K1 cy5T4 cells % binding	CHO-K1 cy5T4 cells GeoMFI (RL1-H)	CHO-K1 mo5T4 cells % binding	CHO-K1 mo5T4 cells GeoMFI (RL1-H)	CHO-K1 WT cells % binding	CHO-K1 WT cells GeoMFI (RL1-H)
FJ2237MP06F06	–	8270	–	8647	–	3833	0.47	2241
FJ2237MP06G06	–	7528	–	7106	–	3843	0.45	2222
FJ2237MP06C07	–	6627	–	5602	–	3781	0.64	2281
FJ2237MP06F07	–	9820	–	10403	–	4046	0.58	2272
FJ2237MP06A08	–	9798	–	9253	–	4130	0.63	2307
FJ2237MP06B08	–	9939	–	10191	–	3612	1.12	2219
FJ2237MP06E08	+	12788	+	14996	–	3826	0.55	2208
FJ2237MP06H09	–	8528	–	8304	–	4507	0.60	2129
FJ2237MP06E10	–	7716	–	3047	+	14582	0.42	2122
FJ2237MP06G10	–	10781	–	9049	–	3711	0.29	2127
FJ2237MP06A11	–	9612	–	10496	–	3886	0.74	2178
FJ2237MP06H11	–	9300	–	8602	–	3721	0.34	2245
FJ2237MP06B12	–	11212	+	14782	–	3597	0.53	2207
FJ2237MP06E12	–	3900	–	10135	–	4783	0.58	2151

Example 3. Off-rate Binding Kinetics

SPR off-rate analysis of P.E. from 5T4 binding VHH's

The unique DNA sequenced VHH clones that were shown to bind to 5T4 by ELISA and flow cytometry, were further analyzed for their off-rate (k_d) binding kinetics to human, cynomolgus and mouse 5T4 by surface plasmon resonance (SPR) using a Biacore T200. This would allow the VHH clones to be ranked according to how slowly they dissociated from the 5T4 antigen, with slower off-rates usually correlating to lower (stronger) overall binding affinities (equilibrium dissociation constant, K_D) which can be more favorable characteristics for therapeutic drug development. To determine the off-rate of the VHH periplasmic extracts (P.E.), hu, cy and mo5T4 proteins were immobilized on a CM5 Series S chip (Cytiva; Cat. Nr. 29104988) via standard amine coupling methods as recommended by the manufacture to give a surface immobilized protein signal of approximately 1000 RU. P.E. samples were diluted 1:5 in 1x HBS-EP+, pH 7.4 (Cytiva) and injected for two minutes at 30 μ l/min. The off-rate signal was measured for 5 mins and after every cycle the RU levels were restored to initial baseline levels using a regeneration solution (Cytiva) to remove any VHH protein bound to the antigen on the chip surface. 5nM mouse anti-hu5T4 (Thermo Fischer Scientific, Cat. Nr. MA5-24229) and

mouse anti-mo5T4 (Abcam, Cat. Nr. ab254168) in 1xHBS-EP+, pH 7.4 were run at the at the beginning and end of experiment to confirm that the 5T4 antigen on the chip surface was still folded and had not been affected by the regeneration solution. The data were analyzed using the multi cycle kinetics evaluation method of the Biacore Evaluation Software. Dissociation constants (k_d) were calculated using the 1:1 dissociation model for the curves' fitting. Off-rate values for VHH clones with RU max values below 10, were not calculated and characterized as non-binders. The results are shown in Table 5.

Table 5. Results of surface plasmon resonance (SPR) analysis of 5T4-binding VHH clones (<1.00E-06 indicates k_d below the detection limit of the equipment. N/D indicates value not determined).

Clone ID	hu5T4 Rmax (RU)	hu5T4 k_d (s ⁻¹)	cy5T4 Rmax (RU)	cy5T4 k_d (s ⁻¹)	mo5T4 Rmax (RU)	mo5T4 k_d (s ⁻¹)
FJ2237MP01A01	224.80	9.15E-04	157.30	1.76E-03	1.90	N/D
FJ2237MP01B01	230.60	1.43E-04	170.60	3.14E-04	1.90	N/D
FJ2237MP01C01	104.40	1.92E-02	16.80	1.21E-01	2.00	N/D
FJ2237MP01E01	218.00	1.84E-03	80.40	1.73E-02	1.90	N/D
FJ2237MP01F01	193.80	5.29E-03	52.60	4.08E-02	2.10	N/D
FJ2237MP01G01	159.30	1.20E-02	40.00	3.46E-02	2.10	N/D
FJ2237MP01H01	190.20	5.37E-03	51.60	4.24E-02	2.30	N/D
FJ2237MP01A02	217.90	1.81E-03	87.30	1.78E-02	2.20	N/D
FJ2237MP01B02	184.50	3.48E-03	51.80	2.30E-02	2.00	N/D
FJ2237MP01C02	215.00	2.44E-03	73.30	1.96E-02	2.00	N/D
FJ2237MP01D02	222.30	9.65E-04	78.60	1.02E-02	2.10	N/D
FJ2237MP01E02	168.80	5.78E-03	37.10	4.30E-02	2.20	N/D
FJ2237MP01G02	24.90	7.81E-02	4.20	N/D	5.10	N/D
FJ2237MP01H02	221.70	1.21E-03	126.20	6.05E-03	2.30	N/D
FJ2237MP01A03	217.30	1.88E-03	79.80	1.83E-02	2.30	N/D
FJ2237MP01C03	94.50	3.34E-02	11.20	2.66E-01	2.40	N/D
FJ2237MP01D03	221.10	4.96E-04	88.80	4.48E-03	2.30	N/D
FJ2237MP01E03	200.60	1.97E-03	99.10	4.50E-03	2.30	N/D
FJ2237MP01F03	191.00	2.18E-03	79.00	6.34E-03	2.00	N/D
FJ2237MP01G03	210.70	1.90E-04	116.70	9.12E-04	2.40	N/D
FJ2237MP01A04	178.20	9.23E-04	73.20	2.81E-03	2.30	N/D
FJ2237MP01B04	31.90	7.98E-02	5.10	N/D	6.00	N/D
FJ2237MP01C04	143.00	6.46E-03	26.20	4.59E-02	2.20	N/D
FJ2237MP01E04	205.20	2.01E-03	80.60	7.43E-03	2.30	N/D
FJ2237MP01G04	216.80	1.09E-03	61.70	2.83E-02	2.40	N/D
FJ2237MP01H04	194.20	4.01E-04	29.70	2.46E-02	2.20	N/D
FJ2237MP01A05	216.90	9.55E-04	63.90	2.37E-02	2.30	N/D
FJ2237MP01B05	191.60	3.61E-03	59.30	2.52E-02	2.30	N/D

Clone ID	hu5T4 Rmax (RU)	hu5T4 kd (s ⁻¹)	cy5T4 Rmax (RU)	cy5T4 kd (s ⁻¹)	mo5T4 Rmax (RU)	mo5T4 kd (s ⁻¹)
FJ2237MP01C05	162.60	5.52E-03	32.40	4.61E-02	2.40	N/D
FJ2237MP01D05	181.10	2.45E-03	43.10	2.00E-02	2.30	N/D
FJ2237MP01E05	217.80	1.31E-04	156.40	3.02E-04	2.40	N/D
FJ2237MP01G05	116.30	2.88E-02	22.70	1.77E-01	2.60	N/D
FJ2237MP01B06	223.60	5.14E-04	137.20	4.58E-03	2.60	N/D
FJ2237MP01C06	45.80	8.02E-02	7.60	N/D	8.40	N/D
FJ2237MP01D06	211.00	2.47E-03	79.70	2.05E-02	2.40	N/D
FJ2237MP01E06	53.40	3.23E-02	7.10	N/D	2.60	N/D
FJ2237MP01F06	218.20	1.20E-03	124.30	6.34E-03	2.50	N/D
FJ2237MP01D07	14.40	1.43E-01	5.10	N/D	2.40	N/D
FJ2237MP01F07	102.00	1.94E-02	16.50	1.33E-01	2.50	N/D
FJ2237MP01B08	114.90	4.03E-03	1.40	N/D	2.50	N/D
FJ2237MP01C08	124.80	2.82E-02	25.50	1.76E-01	2.70	N/D
FJ2237MP01F08	174.80	8.96E-04	86.70	1.79E-03	2.60	N/D
FJ2237MP01H08	183.30	5.12E-03	51.30	4.24E-02	2.60	N/D
FJ2237MP01A09	19.90	8.54E-02	3.80	N/D	4.70	N/D
FJ2237MP01B09	36.40	4.86E-02	15.30	8.07E-02	2.40	N/D
FJ2237MP01C09	119.70	1.84E-03	36.90	2.19E-02	2.60	N/D
FJ2237MP01D09	118.80	1.86E-02	35.70	4.55E-02	2.80	N/D
FJ2237MP01H09	199.50	8.84E-04	82.80	3.20E-03	2.50	N/D
FJ2237MP01A10	212.10	5.89E-04	132.50	2.02E-03	2.70	N/D
FJ2237MP01B10	179.90	2.21E-03	69.50	6.20E-03	2.60	N/D
FJ2237MP01C10	139.90	2.57E-02	23.10	4.07E-01	2.70	N/D
FJ2237MP01F10	206.20	1.95E-03	73.90	2.10E-02	2.60	N/D
FJ2237MP01G10	192.50	2.54E-03	53.50	2.07E-02	2.50	N/D
FJ2237MP01H10	206.70	1.82E-03	82.90	1.82E-02	2.60	N/D
FJ2237MP01B11	210.60	1.35E-03	123.30	7.35E-03	2.90	N/D
FJ2237MP01D11	123.50	3.76E-03	100.90	6.65E-04	3.80	N/D
FJ2237MP01F11	205.80	5.26E-04	77.40	4.56E-03	2.50	N/D
FJ2237MP01H11	188.10	2.23E-03	77.30	6.48E-03	2.60	N/D
FJ2237MP01A12	193.80	4.34E-03	65.70	3.02E-02	2.70	N/D
FJ2237MP01B12	164.10	4.53E-03	38.40	2.99E-02	2.60	N/D
FJ2237MP01C12	97.30	1.90E-02	88.90	1.13E-02	2.90	N/D
FJ2237MP01D12	91.70	4.76E-02	16.60	2.65E-01	2.60	N/D
FJ2237MP02A01	54.00	7.84E-02	9.40	N/D	10.50	7.28E-01
FJ2237MP02G01	180.10	7.76E-04	1.80	N/D	2.60	N/D
FJ2237MP02H01	15.20	3.84E-01	6.70	N/D	10.20	7.24E-01
FJ2237MP02B02	106.60	3.55E-03	6.50	N/D	41.80	2.26E-02
FJ2237MP02G02	70.60	7.32E-03	2.80	N/D	19.90	3.78E-02
FJ2237MP02H02	16.80	7.05E-02	3.50	N/D	4.40	N/D
FJ2237MP02A03	8.50	N/D	4.80	N/D	6.50	N/D
FJ2237MP02D03	26.40	7.73E-02	5.20	N/D	5.50	N/D
FJ2237MP02G03	17.50	9.25E-02	3.60	N/D	4.50	N/D

Clone ID	hu5T4 Rmax (RU)	hu5T4 kd (s ⁻¹)	cy5T4 Rmax (RU)	cy5T4 kd (s ⁻¹)	mo5T4 Rmax (RU)	mo5T4 kd (s ⁻¹)
FJ2237MP02H04	14.50	3.85E-01	6.40	N/D	9.70	N/D
FJ2237MP02A06	137.90	7.07E-03	5.30	N/D	44.90	3.35E-02
FJ2237MP02B06	35.90	9.11E-02	6.10	N/D	8.10	N/D
FJ2237MP02C09	3.60	N/D	2.80	N/D	4.20	N/D
FJ2237MP02D09	129.00	3.59E-03	1.60	N/D	2.40	N/D
FJ2237MP02B10	20.20	1.08E-01	3.80	N/D	4.60	N/D
FJ2237MP02C10	26.90	9.71E-02	4.90	N/D	6.70	N/D
FJ2237MP02G10	150.00	7.37E-04	1.70	N/D	2.70	N/D
FJ2237MP03A01	45.40	5.59E-03	1.80	N/D	2.70	N/D
FJ2237MP03C01	11.10	1.48E-03	3.60	N/D	2.60	N/D
FJ2237MP03F01	140.40	2.23E-03	104.90	5.48E-04	5.00	N/D
FJ2237MP03A02	22.40	4.66E-02	2.10	N/D	2.50	N/D
FJ2237MP03C02	105.70	2.88E-02	18.30	1.94E-01	2.60	N/D
FJ2237MP03F02	142.20	2.57E-03	105.00	6.91E-04	4.90	N/D
FJ2237MP03G02	169.00	8.24E-03	39.40	4.99E-02	2.70	N/D
FJ2237MP03B03	31.90	1.52E-03	7.20	N/D	2.70	N/D
FJ2237MP03F03	14.10	1.58E-03	4.50	N/D	2.60	N/D
FJ2237MP03B04	210.10	1.09E-04	149.00	2.32E-04	2.60	N/D
FJ2237MP03C04	164.30	1.98E-03	115.70	1.11E-03	11.90	3.09E-01
FJ2237MP03D04	28.00	1.01E-02	2.10	N/D	2.50	N/D
FJ2237MP03B05	130.70	2.14E-03	43.40	2.00E-02	2.50	N/D
FJ2237MP03F05	16.20	4.84E-04	1.60	N/D	2.40	N/D
FJ2237MP03C06	210.50	1.00E-04	149.10	2.09E-04	2.20	N/D
FJ2237MP03C07	149.20	6.77E-03	6.30	N/D	53.70	3.42E-02
FJ2237MP03D07	179.90	4.29E-03	19.30	2.45E-01	58.10	6.77E-02
FJ2237MP03C08	184.60	1.52E-03	26.60	7.31E-02	119.40	4.28E-03
FJ2237MP03D08	76.70	7.76E-02	13.10	4.54E-01	14.40	5.44E-01
FJ2237MP03E08	61.60	8.01E-02	10.20	5.11E-01	11.50	6.94E-01
FJ2237MP03C10	141.40	1.17E-02	4.90	N/D	36.50	6.88E-02
FJ2237MP03E10	84.90	2.43E-02	3.70	N/D	39.90	4.25E-02
FJ2237MP03A11	26.10	1.00E-02	2.20	N/D	9.90	N/D
FJ2237MP03G11	165.00	2.09E-03	9.30	N/D	49.90	3.23E-02
FJ2237MP03B12	141.40	1.14E-02	7.30	N/D	128.50	3.33E-03
FJ2237MP03C12	189.40	1.92E-03	24.30	1.26E-01	154.80	1.91E-03
FJ2237MP03D12	87.80	3.50E-03	1.20	N/D	1.40	N/D
FJ2237MP04B01	34.10	1.22E-01	6.50	N/D	2.40	N/D
FJ2237MP04D01	13.40	5.43E-01	3.00	N/D	2.20	N/D
FJ2237MP04E01	58.70	1.09E-01	11.50	1.40E-04	2.40	N/D
FJ2237MP04F01	43.10	6.77E-02	39.80	5.47E-02	6.10	N/D
FJ2237MP04H01	122.50	4.21E-03	97.50	5.33E-04	2.40	N/D
FJ2237MP04B02	35.40	8.30E-02	36.50	4.78E-02	2.30	N/D
FJ2237MP04C02	38.80	1.21E-01	7.40	N/D	2.30	N/D
FJ2237MP04D02	129.90	8.67E-03	104.90	2.64E-03	20.90	7.37E-02

Clone ID	hu5T4 Rmax (RU)	hu5T4 kd (s ⁻¹)	cy5T4 Rmax (RU)	cy5T4 kd (s ⁻¹)	mo5T4 Rmax (RU)	mo5T4 kd (s ⁻¹)
FJ2237MP04F02	12.20	1.64E-01	3.00	N/D	2.30	N/D
FJ2237MP04G02	35.10	2.77E-01	3.10	N/D	2.50	N/D
FJ2237MP04H02	36.20	1.48E-01	7.00	N/D	2.50	N/D
FJ2237MP04A03	72.00	1.09E-01	15.90	4.19E-01	3.00	N/D
FJ2237MP04C03	18.60	3.21E-01	4.10	N/D	2.60	N/D
FJ2237MP04E03	141.80	4.05E-04	92.30	2.00E-02	2.70	N/D
FJ2237MP04F03	42.60	1.12E-01	7.90	N/D	2.50	N/D
FJ2237MP04H03	70.10	7.19E-04	40.90	3.29E-02	2.50	N/D
FJ2237MP04A04	16.70	4.74E-01	3.90	N/D	2.70	N/D
FJ2237MP04G04	26.50	1.30E-01	5.50	N/D	2.70	N/D
FJ2237MP04E05	47.40	1.26E-01	9.70	N/D	2.80	N/D
FJ2237MP04F05	65.70	4.78E-04	42.60	6.74E-05	2.70	N/D
FJ2237MP04A06	19.80	1.23E-01	4.50	N/D	2.80	N/D
FJ2237MP04D06	18.50	1.41E-01	21.70	7.82E-02	2.60	N/D
FJ2237MP04A07	22.40	1.32E-01	4.90	N/D	2.70	N/D
FJ2237MP04C07	3.40	N/D	4.60	N/D	2.70	N/D
FJ2237MP04D07	9.80	N/D	9.00	N/D	3.20	N/D
FJ2237MP04F07	106.10	2.87E-04	68.00	6.05E-05	2.80	N/D
FJ2237MP04A08	8.70	N/D	4.70	N/D	4.10	N/D
FJ2237MP04B08	137.70	3.19E-02	115.50	1.15E-02	22.00	2.75E-01
FJ2237MP04D08	15.80	3.58E-01	3.80	N/D	2.80	N/D
FJ2237MP04F08	117.90	5.15E-04	75.90	6.95E-05	3.00	N/D
FJ2237MP04D09	18.30	4.96E-01	4.10	N/D	2.60	N/D
FJ2237MP04G09	127.00	1.69E-04	69.80	1.87E-03	2.90	N/D
FJ2237MP04C10	43.80	1.15E-01	9.10	N/D	2.90	N/D
FJ2237MP04E10	46.50	1.23E-01	9.70	N/D	2.90	N/D
FJ2237MP04F10	169.50	1.16E-02	126.60	2.92E-03	43.60	8.12E-02
FJ2237MP04H10	70.10	1.17E-01	15.10	4.80E-01	3.00	N/D
FJ2237MP04D11	79.10	9.68E-02	17.30	3.90E-01	3.00	N/D
FJ2237MP04E11	12.20	4.76E-04	8.20	N/D	2.70	N/D
FJ2237MP04H11	43.20	1.16E-01	8.60	N/D	2.80	N/D
FJ2237MP05H05	3.30	N/D	1.80	N/D	2.90	N/D
FJ2237MP05C08	4.00	N/D	2.00	N/D	2.90	N/D
FJ2237MP05D09	33.70	1.13E-01	15.10	2.12E-01	8.90	N/D
FJ2237MP05H09	64.00	1.22E-01	30.40	2.14E-01	19.10	4.69E-01
FJ2237MP06A01	184.40	1.53E-03	126.30	8.66E-04	30.60	1.32E-01
FJ2237MP06B01	92.70	1.25E-01	22.60	4.86E-01	3.10	N/D
FJ2237MP06D01	176.10	7.73E-04	91.40	3.57E-02	2.80	N/D
FJ2237MP06F01	37.50	3.01E-02	68.80	2.79E-03	2.90	N/D
FJ2237MP06G01	119.90	5.31E-03	98.30	6.81E-04	2.80	N/D
FJ2237MP06H01	163.90	5.22E-04	106.50	8.46E-05	3.10	N/D
FJ2237MP06B02	97.80	1.38E-02	99.70	1.30E-03	2.90	N/D
FJ2237MP06D02	24.10	1.92E-01	26.40	1.09E-01	2.90	N/D

Clone ID	hu5T4 Rmax (RU)	hu5T4 kd (s ⁻¹)	cy5T4 Rmax (RU)	cy5T4 kd (s ⁻¹)	mo5T4 Rmax (RU)	mo5T4 kd (s ⁻¹)
FJ2237MP06B03	64.40	5.17E-04	41.90	7.29E-05	3.00	N/D
FJ2237MP06C03	21.70	4.40E-03	20.70	4.93E-04	2.90	N/D
FJ2237MP06E03	155.70	8.56E-03	118.10	2.67E-03	34.80	7.36E-02
FJ2237MP06B04	127.50	4.52E-04	81.40	6.68E-05	2.90	N/D
FJ2237MP06B05	116.20	3.53E-03	93.70	4.32E-04	9.50	N/D
FJ2237MP06E06	96.50	3.01E-04	62.00	6.13E-05	2.80	N/D
FJ2237MP06G06	88.70	4.66E-04	57.00	7.40E-05	2.80	N/D
FJ2237MP06E10	26.80	1.78E-01	2.30	N/D	61.40	1.01E-02
FJ2237MP06G10	154.40	9.89E-03	117.10	2.73E-03	33.90	7.42E-02
FJ2237MP06E12	1.20	N/D	2.30	N/D	3.10	N/D
Irrelevant P.E	1.3	N/D	1.9	N/D	2.7	N/D
Blank (no P.E.)	0.8	N/D	0.2	N/D	1.7	N/D
anti-hu/cy5T4	159.5	<1.00E-06	62.5	1.14E-04	0.9	N/D
anti-mo5T4	-0.4	N/D	-0.2	N/D	208.8	<1.00E-06

Assessment of VHH-Fc construct binding to target 5T4 antigens.

Nine VHH clones selected based on diversity of CDR3 amino acid sequence, differences in isoelectric points, and a range of off-rates and epitope binding properties were formatted as Fc fusions using a human IgG1 (hu IgG1) Fc with LALA and PG mutations. A VHH domain with CDRs having random amino acid sequences (and therefore no affinity for protein antigens) was used as a negative control. The physical properties of the VHH-Fc fusions are shown in Table 6 below.

Table 6. Physical properties of VHH-Fc fusions selected for further analysis

Antibody ID	VHH sequence	SEQ ID NO:	HC type	MW (kDa)	pI	ε	ε/MW
FJ2237VHHhu Fc01H09_huIgG1 LALAPG	QVQLVESGGGLAQAGGSLRLSCSA SGRTFDSRTVAWFRQAPGKEREV AALRLSGPATWYADSVKGRFTISR DNAKNTIYLMNSLKPEDTAVYYC AAGREWSALSSAYEYWGAGTQVTV SS	243	huFc Fusion IgG1 LALAPG	77.016	8.62	130400	1.69
FJ2237VHHhu Fc03B05_huIgG1 LALAPG	EVQLVESGGGLVQPGGSLRLSCAA SGSGFSLRVMDWYRQAPGKQREWV AGIASDGSTGLLDAVKGRFTIFRD NAKNTVYLHMTSLKPEDTAVYYCN LRGSDYRGQGTQVTVSS	71	huFc Fusion IgG1 LALAPG	75.096	8.45	105080	1.40
FJ2237VHHhu Fc03C06_huIgG1 LALAPG	QVQLVESGGGLVQPGGSLRLSCAA SGHTFDIKTLAWFRQTPGTEREFV AAIRLWGTATRYADSVKGRFTISR DSAKNTVYLMNSLKPEDTAVYYC AAGRDWSAFSSAYDHWGQGTQVTV SS	308	huFc Fusion IgG1 LALAPG	77.396	8.44	127840	1.65

Antibody ID	VHH sequence	SEQ ID NO:	HC type	MW (kDa)	pI	ϵ	ϵ /MW
FJ2237VHHhu Fc03C12_ huIgG1 LALAPG	QVQLVESGGGLVQAGGSLRLSCAA SGRTFTSTAMGWFRQAPGKEREV AHIGWNGDSTFYADSVKGRFTISR DNAKNTVYLQMNSLKPEDTAVYYC AAGSKPVRPRDFVYWGQGTQVTV SS	282	huFc Fusion IgG1 LALAPG	77.236	8.77	116460	1.51
FJ2237VHHhu Fc03D08_ huIgG1 LALAPG	QLQLVESGGGLVQPGGSLRLSCAT SGIDFSRGVMDWYRQPPGKQREWV AAITEGGDTGYADSVKGRFTISAD NAKSTVYLMNTLRLPEDTAVYYCN SRPPNRNYWGQGTQVTVSK	133	huFc Fusion IgG1 LALAPG	75.927	8.43	119020	1.57
FJ2237VHHhu Fc04E03_ huIgG1 LALAPG	QLQLVESGGGLVQAGESLRLSCAA SGGTGYAMGWFRQAPGKEREVFG TIIRSGTYYADSVKGRFTISGDN AENTVYLMNGLLPEDTAVYYCAA RSVSYSRRYTAYSEMNDYTFWGQG TQVTVSS	95	huFc Fusion IgG1 LALAPG	78.503	7.0	120440	1.53
FJ2237VHHhu Fc04F07_ huIgG1 LALAPG	EVQLVESGGGLVQPGGSLRLSCAA SGFSLQFYDMGWFRQAPGKEREV SCSSSDGSTYYSDSVKGRFTISR DNAKNTAYLHMNSLKPEDTAVYYC APVELRCADVPEDDNYFWGQGTQ VTVSS	58	huFc Fusion IgG1 LALAPG	77.932	6.18	110440	1.42
FJ2237VHHhu Fc04G09_ huIgG1 LALAPG	EVQLVESGGGLVQAGGSLRLSCAA SGSIFGIDVIDWFRQAPGKQREWV AGITNDGVTGYADSVKDRFTISR NAKNTVYLMNGLKPEDTAVYYCK VRAYDDWGQGTQVTVSS	31	huFc Fusion IgG1 LALAPG	75.22	6.68	116460	1.55
FJ2237VHHhu Fc06E10_ huIgG1 LALAPG	QVQLVESGGGLVQAGGSLRLSCAA SGRIDRISDMWYRQGPQKQDLV ATITADGRSAYPDSVKGRFTISR NAKNTVILQMNSLRLPEDTAVYYCN AAEPAIMGWNRPLDYWGQGTQVT VSS	273	huFc Fusion IgG1 LALAPG	77.442	8.44	116460	1.50
F2020VHHhu Fc05E05_huIg G1 LALAPG	N/A		huFc Fusion IgG1 LALAPG	77.749	8.73	135520	1.74

In Table 6, the following abbreviations are used as follows: “MW” indicates molecular weight in kilodaltons (kDa) (nonglycosylated); “pI” indicates the theoretical isoelectric point; “ ϵ ” indicates the molar attenuation coefficient, calculated as $\epsilon_{280\text{nm}} (\text{M}^{-1} \text{cm}^{-1}) = 5500 \times (\text{number of Tryptophan residues}) + (1490 \times (\text{number of Tyrosine residues}) + 125 \times (\text{number of disulphide bonds}))$; “ ϵ /MW” indicates the mass attenuation coefficient, shown in units of $(\text{mg/ml})^{-1} \text{cm}^{-1}$.

SPR analysis of VHH-Fc constructs

VHH-Fc constructs as described above were expressed using transient expression in CHO cells. The affinity of each of the constructs for human 5T4 was then tested by surface plasmon resonance (SPR) on a Biacore 8K+.

To determine the off-rate of the VHH-Fc fusions hu 5T4 proteins were immobilized on a CM5 Series S chip (Cytiva; Cat. Nr. BR100530) with a goat anti-human Fc specific antibody

- (JIR, Cat. Nr. 109-005-098) via standard amine coupling methods to give a surface immobilized protein signal of approximately 14000-15000 RU. Samples were diluted at two-fold dilutions from 50-3.125 nM in 1x HBS-EP+, pH 7.4 or 5.5 (Cytiva) and injected. The off-rate signal was measured for 10 mins. The data were analyzed using the single cycle kinetics evaluation method
- 5 of the Biacore Evaluation Software. Dissociation constants (kd) were calculated using the 1:1 dissociation model for the curves' fitting. The results are shown in Table 7.

Table 7. Characterization of anti-5T4 VHH-Fc fusions

Antibody	Analyte	Buffer	Rmax (RU)	Chi2 (RU²)	ka (1/Ms)	kd (1/s)	KD (nM)
FJ2237VHHhuFc01H09_huIgG1 LALAPG	Hu5T4	HBS-EP+ pH 7.4	48.6	0.07	1.98E+05	6.36E-04	3.22
		HBS-EP+ pH 5.5	225.7	3.58	6.86E+05	1.40E-03	2.03
FJ2237VHHhuFc03B05_huIgG1 LALAPG		HBS-EP+ pH 7.4	14.6	0.01	1.17E+05	1.67E-03	14.27
HBS-EP+ pH 5.5		151.0	2.42	5.08E+05	3.05E-03	6.00	
FJ2237VHHhuFc03C06_huIgG1 LALAPG		HBS-EP+ pH 7.4	79.7 ± 1.1	1.46	3.22E+05	3.87E-05	0.12
		HBS-EP+ pH 5.5	240.5 ± 8.7	56.82	9.91E+05	8.91E-05	0.09
FJ2237VHHhuFc03C12_huIgG1 LALAPG		HBS-EP+ pH 7.4	27.0	0.01	1.84E+05	1.93E-03	10.48
		HBS-EP+ pH 5.5	150.7	2.75	4.51E+05	1.97E-03	4.36
FJ2237VHHhuFc03D08_huIgG1 LALAPG		HBS-EP+ pH 7.4	N.D.	N.D.	N.D.	N.D.	N.D.
		HBS-EP+ pH 5.5	71.4	3.44	6.28E+06	1.15E-01	18.36
FJ2237VHHhuFc04E03_huIgG1 LALAPG		HBS-EP+ pH 7.4	15.6	0.03	1.15E+05	6.70E-04	5.81
		HBS-EP+ pH 5.5	38.1	0.68	1.23E+06	1.50E-02	12.21
FJ2237VHHhuFc04F07_huIgG1 LALAPG		HBS-EP+ pH 7.4	30.4	0.01	1.46E+05	3.21E-04	2.20
		HBS-EP+ pH 5.5	160.0	6.27	8.25E+05	1.24E-03	1.51
FJ2237VHHhuFc04G09_huIgG1 LALAPG		HBS-EP+ pH 7.4	14.3	0.01	9.12E+04	1.22E-04	1.34
		HBS-EP+ pH 5.5	117.7	1.57	3.70E+05	8.51E-04	2.30
FJ2237VHHhuFc06E10_huIgG1 LALAPG		HBS-EP+ pH 7.4	N.D.	N.D.	N.D.	N.D.	N.D.
		HBS-EP+ pH 5.5	24.1	1.70	3.40E+06	3.30E-02	9.72

Antibody	Analyte	Buffer	Rmax (RU)	Chi2 (RU²)	ka (1/Ms)	kd (1/s)	KD (nM)
F2020VHHhuFc05E05_huIgG1 LALAPG_first cycle		pH 5.5					
		HBS-EP+ pH 7.4	4.4 ± 0.3	N/A	N/A	N/A	N/A
		HBS-EP+ pH 5.5	18.5 ± 2.0	N/A	N/A	N/A	N/A
F2020VHHhuFc05E05_huIgG1 LALAPG_last cycle		HBS-EP+ pH 7.4	5.6 ± 1.0	N/A	N/A	N/A	N/A
		HBS-EP+ pH 5.5	23.4 ± 6.9	N/A	N/A	N/A	N/A

Example 4. In Vivo Imaging Studies

Characterization of Zr-89 labelled VHH-Fcs

The Zr-89 labelled VHH-Fcs were characterized using radioTLC to assess the purity and radiolabeling efficiency. Figure 1 is an example of the type of data generate by the radioTLC scan of the Zr-89 labelled VHH1-Fc.

The shape of the peak (Region 1) from the data indicates that nearly 100% of the activity remains at the origin (at 0mm) or the spotting point of the test protein on the TLC plate. This indicates the radioisotope is associated with the VHH1-Fc as any Zr-89 isotope that had dissociated would migrate away from the origin as it was carried by the solvent front down the TLC plate. The purity of all the VHH-Fc radiolabeled products was measured and the results are shown in Figure 1. The labelled molecules were then administered to the tumor bearing mice.

In vivo imaging study in H1975 tumor bearing mice by PET imaging

After IV injection of the Zr-89 labelled test articles into tumor bearing mice, each animal was PET imaged at 4, 24, 48 and 120 hrs. 120hrs was judged to give the best contrast between accumulation into the tumor vs background levels. Zr89-VHH1-Fc, Zr89-VHH3-Fc and Zr89-VHH7-Fc all showed significant accumulation into the tumor compared to the negative control Zr89-VHH10-Fc which does not bind the target 5t4. Figure 2 shows an example of the PET imaging obtained of Zr89-VHH1-Fc vs Zr89-VHH10-Fc at 120hrs after injection. Figure 2 (top panel) shows that as the Zr89-VHH10-Fc molecule does not recognize the antigen 5t4, it does not accumulate in the tumor when compared to Zr89-VHH1-Fc, which does bind 5t4 (Figure 2, bottom panel). This demonstrates that all the VHH's screened against 5t4 show a high level of selectivity and specificity for the target antigen. In both animals, Zr89 emissions can be seen from the knee joints and this is most likely due to the release of Zr89 from the chelator covalently attached to the VHH-Fc and subsequent uptake of the isotope into the joints. There

are also Zr89 emissions from the thoracic lymph nodes in both animals and this maybe due to the Fc region which is common to all the molecules.

Quantification of tumor uptake of Zr89-VHH Fc's in the H1975 in vivo model.

5 The PET scanned images were used to quantify the level of each Zr89-VHH Fc construct in the tumors at 120h post IV administration and the data is shown in Figure 3A. Zr89-VHH10-Fc shows the lowest tumor accumulation, which was expected as VHH10 was a negative control molecule where the CDRs have random peptide sequences and so does not bind 5t4 (data not shown). All 3 VHH's that were generated against 5t4 show an increased level of tumor
10 localization, with VHH1-Fc showing the greatest tumor accumulation. This suggests that the 3 VHH's have the ability to target and deliver a therapeutic isotope (e.g. Lu-177, Ac-225 etc) at levels that could be efficacious.

 The Biacore kinetic binding data of the VHH monomers to 5t4 are show in Figure 3B. The overall binding K_D 's to 5t4 of each clone are similar when measured at either pH 5.5 or 7.4.
15 Although the data in Figure 3B are for the monomer VHH's, there will be an increase in affinity via avidity effects, when the proteins are formatted as an Fc fusion with each molecule having 2 VHHs at the N-terminus. It would be expected that the VHH1-Fc and VHH7-Fc would have similar increases in affinity, with VHH3-Fc having the lowest overall K_D value (i.e. highest binding affinity for 5t4) of the 3 clones. A possible explanation of why Zr89-VHH1-Fc has the
20 highest tumor uptake of all the 5t4 targeting molecules, could be due to its lower affinity for the target and a higher k_d (off-rate) for 5t4. It has been shown that moderate affinity mAb clones to HER2 were associated with the highest tumor uptake, whereas high affinity clones bind to the perivascular space giving low tumor penetration (Rudnick, et al., Cancer Res, 2011, v71 (6) p2250). Zr89-VHH7-Fc has similar tumor penetration to Zr89-VHH3-Fc even though its affinity
25 would be similar to Zr89-VHH1-Fc. This could be due to the lower pI of VHH7 (6.18) compared to VHH1 (8.62) as shown in Figure 3B. It is know that the pI of mAbs can influence their PK (pharmacokinetics) *in vivo* and their tissue uptake. Antibodies that have been chemically or genetically modified to achieve higher, more basic, pI's exhibit a high propensity to bind to anionic sites of cell surfaces, resulting in increased tissue uptake and fast clearance from
30 circulation. Antibodies with lower, more acidic pI's have a lower rate of uptake into cells (as a result of repulsion from the negatively charged cell surface), leading to decreased tissue uptake and longer serum half-lives (Liu., 2018).

Biodistribution and quantification of tumor:organ exposure of Zr89-VHH Fc's in the H1975 in vivo model

The PET imaging data of the Zr89-VHH-Fcs at 120h was used to calculate the biodistribution into other important organs such as the kidneys and liver (Figure 4). Off-target radiation exposure to the kidneys and liver can be toxic and limit the dose that can be administered due to damage organ damage. Tumor: organ ratios give an indication of likely toxicities and the dose-limiting organs at risk and so indication of the therapeutic window and thus safety.

The % of the injected dose that accumulated in each organ relative the tumor was used to give the tumor:organ ratio. Zr89-VHH10-Fc was used to show what the “non-specific uptake” exposure would be as the molecule does not target 5t4 and so it's biodistribution will be driven mainly by the Fc portion of the molecule. Tumor:organ ratio's >1 mean that the Zr-89-VHH-Fc preferentially accumulates in the tumor relative to the organ. For example, for Zr89-VHH1-Fc there is ~4.5 greater uptake in the tumor relative to the kidneys and ~4 fold higher than the liver (Figure 4). The greater the value of the tumor:organ ratio, the greater the therapeutic window will be and the risk of toxicity driven by exposure to other organs such as kidney and liver will be lower. Being able to deliver high levels of the targeted radioisotope to the tumor without toxicity, will give greater tumor cell killing and so efficacy.

Methods

5t4 VHH Fc clones used for in vivo imaging studies.

The following clones were used:

VHH1-Fc = (FJ2237VHHhuFc01H09_huIgG1 LALAPG) (SEQ ID NO: 243)

VHH3-Fc= (FJ2237VHHhuFc03C06_huIgG1 LALAPG) (SEQ ID NO: 308)

VHH7-Fc= (FJ2237VHHhuFc04F07_huIgG1 LALAPG) (SEQ ID NO: 58)

VHH10-Fc= (FJ2237VHHhuFc05E05_huIgG1 LALAPG)

VHH numbering was taken from the QC Product Data Sheet provided by FairJourney. VHH1, VHH3 and VHH7 are all 5t4 binders, where as VHH10 has random peptides sequences in the CDRs and so does not bind 5t4 antigen. All molecules were expressed as human IgG1 Fc fusions from CHO and purified using conventional affinity chromatography and size-exclusion so that the purity was >98% and the levels of endotoxin were <0.2 EU/mg for all the *in vivo* work in mice.

Conjugation of 5t4 VHH-Fc's with p-SCN-Bn-Deferoxamine (DFO-NCS)

Protein samples were buffer exchanged into conjugation buffer using 7k MWCO Zebra columns (ThermoFisher), following the manufactures instructions. The conjugation buffer used
5 was 0.1 M NaHCO_3 pH 9.1, with 200uL of 1.5 mg/ml VHH-Fc as the starting material to be buffer exchanged.

1mg of p-SCN-Bn-Deferoxamine (DFO-NCS) (Macrocylics) was dissolved in DMSO to give a final concentration of 5mg/ml DFO-NCS. A 5:1 molar ratio of DFO-NCS to protein was used for conjugation. Approximately 1.5 mg of VHH-Fc protein in 200uL was used for conjugation and
10 the appropriate amount of DFO-NCS added and mixed immediately. The VHH-Fc/DFO-NCS solution was allowed to react at 37 °C for 60 mins, with gentle shaking. Following conjugation, the samples were purified to remove any unconjugated DFO-NCS by passing through 7k MWCO Zebra columns, following the manufactures instructions. Prior to applying the protein/DFO-NCS reaction mix, the Zebra column was equilibrated with 0.1 M NaHCO_3 pH
15 9.1, and the same buffer was used to elute the protein from the column.

Labelling of 5t4 VHH-Fc DFO-NCS modified protein with Zr-89

An equal volume of 1M HEPES buffer was added to the Zr-89 solution, after which 10 uL of 2M NaOH was added and mixed. 1mCi of Zr-89 solution was added to 0.1 mg of the 5t4
20 VHH-Fc DFO-NCS modified protein. The labelling reaction was allowed to proceed at 37 °C, for 60 min with shaking at 300 rpm. DTPA (Macrocylics) was used to remove any free Zr-89 and added to a final concentration of 5mM and incubated for an additional 5 mins before purifying the mixture using a 7k MWCO Zebra column. The Zr-89 labelled 5t4-VHH Fc proteins were then analyzed using radioTLC to assess the purity and radiolabeling efficiency.

In vivo imaging study in H1975 tumor bearing mice by PET imaging

The imaging study was carried out in female athymic nude mice (Charles River), with the groups as described in **Table 8**. 1×10^6 cells from the human cell line H1975 that express 5t4 on their surface, were implanted subcutaneously in the right axilla of the mice and allowed to
30 grow until $\sim 500 \text{ mm}^3$. Once the tumors had reached $\sim 500 \text{ mm}^3$, the Zr-89 labelled VHH-Fc molecules were dosed IV into individual animals and the mice PET imaged at 4, 24, 48, 120 hour timepoints using a Siemens microPET R4 scanner.

Table 8: Study design for the H1975 tumor imaging model using Zr-89 labelled 5t4 VHH-Fc fusion proteins.

Group	Model	Number of subjects	Test article	Activity dosed	Data collection (hrs)
1	Nude mice with H1975 right axilla tumor	3	Zr89-VHH1-Fc	~180uCi/80ug protein dosed IV per animal	4, 24, 48, 120
2	Nude mice with H1975 right axilla tumor	3	Zr89-VHH3-Fc		
3	Nude mice with H1975 right axilla tumor	3	Zr89-VHH7-Fc		
4	Nude mice with H1975 right axilla tumor	3	Zr89-VHH10-Fc (negative control)		

5

EQUIVALENTS

All references, patents and patent applications disclosed herein are incorporated by reference with respect to the subject matter for which each is cited, which in some cases may encompass the entirety of the document.

The indefinite articles “a” and “an,” as used herein in the specification and in the claims, unless clearly indicated to the contrary, should be understood to mean “at least one.”

It should also be understood that, unless clearly indicated to the contrary, in any methods claimed herein that include more than one step or act, the order of the steps or acts of the method is not necessarily limited to the order in which the steps or acts of the method are recited.

In the claims, as well as in the specification above, all transitional phrases such as “comprising,” “including,” “carrying,” “having,” “containing,” “involving,” “holding,” “composed of,” and the like are to be understood to be open-ended, *i.e.*, to mean including but not limited to. Only the transitional phrases “consisting of” and “consisting essentially of” shall be closed or semi-closed transitional phrases, respectively, as set forth in the United States Patent Office Manual of Patent Examining Procedures, Section 2111.03.

The terms “about” and “substantially” preceding a numerical value mean $\pm 10\%$ of the recited numerical value.

Where a range of values is provided, each value between and including the upper and lower ends of the range are specifically contemplated and described herein.

What is claimed is:

CLAIMS

1. An antibody comprising:
 - 5 a complementary determining region 1 (CDR1) comprising the amino acid sequence of any one of SEQ ID NOs: 351-700;
 - a complementary determining region 2 (CDR2) comprising the amino acid sequence of any one of SEQ ID NOs: 701-1050; and/or
 - 10 a complementary determining region 3 (CDR3) comprising the amino acid sequence of any one of SEQ ID NOs: 1051-1400,wherein the antibody binds to 5T4.
2. The antibody of claim 1, wherein the antibody comprises the amino acid sequence of any one of SEQ ID NOs: 1-350, or an amino acid sequence having at least 85%, at least 90%, at least
15 95%, or at least 98% identity to the amino acid sequence of any one of SEQ ID NOs: 1-350.
3. The antibody of any one of the preceding claims, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 10^{-9} M to 10^{-11} M.
- 20 4. The antibody of any one of the preceding claims, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 1 nM to 0.01 nM.
5. The antibody of any one of the preceding claims, wherein the antibody selectively binds to human 5T4 relative to a non-human 5T4.
25
6. The antibody of any one of the preceding claims, wherein the antibody binds to human 5T4, mouse 5T4, cynomolgus monkey 5T4, or any combination thereof.
7. The antibody of any one of the preceding claims, wherein the antibody is a single chain
30 antibody.

8. The antibody of claim 7, wherein the single chain antibody is a heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody.
9. The antibody of any one of the preceding claims, wherein the antibody is a humanized antibody.
10. The antibody of any one of the preceding claims, wherein the antibody is a chimeric antibody.
11. A cell comprising the antibody of any one of the preceding claims, optionally wherein the cell is a cancer cell.
12. A conjugate comprising the antibody of any one of the preceding claims.
13. The conjugate of claim 12 further comprising a radionuclide.
14. A pharmaceutical composition comprising the antibody of any one of claims 1-10, or the conjugate of claim 12 or 13, and a pharmaceutically acceptable excipient.
15. A method comprising administering to a subject the antibody of any one of claims 1-10, the conjugate of claim 12 or 13, or the pharmaceutical composition of claim 14.
16. A nucleic acid or set of nucleic acids encoding the antibody of any one of claims 1-10.
17. A vector or set of vectors comprising one or more nucleic acid encoding the antibody of any one of claims 1-10.
18. A method of producing the antibody of any one of claims 1-10, the method comprising culturing the cell of claim 14 in cell culture and obtaining the antibody from the cell or cell culture.

19. An antibody comprising:
a complementary determining region 1 (CDR1) comprising the amino acid sequence of
SEQ ID NO: 593;
a complementary determining region 2 (CDR2) comprising the amino acid sequence of
5 SEQ ID NO: 943; and/or
a complementary determining region 3 (CDR3) comprising the amino acid sequence of
SEQ ID NO: 1293,
wherein the antibody binds to 5T4.
- 10 20. The antibody of claim 19, wherein the antibody comprises the amino acid sequence of
SEQ ID NO: 243, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or
at least 98% identity to the amino acid sequence of SEQ ID NO: 243.
21. An antibody comprising:
15 a complementary determining region 1 (CDR1) comprising the amino acid sequence of
SEQ ID NO: 421;
a complementary determining region 2 (CDR2) comprising the amino acid sequence of
SEQ ID NO: 771; and/or
a complementary determining region 3 (CDR3) comprising the amino acid sequence of
20 SEQ ID NO: 1121,
wherein the antibody binds to 5T4.
22. The antibody of claim 21, wherein the antibody comprises the amino acid sequence of
SEQ ID NO: 71, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at
25 least 98% identity to the amino acid sequence of SEQ ID NO: 71.
23. An antibody comprising:
a complementary determining region 1 (CDR1) comprising the amino acid sequence of
SEQ ID NO: 658;
30 a complementary determining region 2 (CDR2) comprising the amino acid sequence of
SEQ ID NO: 1008; and/or
a complementary determining region 3 (CDR3) comprising the amino acid sequence of
SEQ ID NO: 1358,

wherein the antibody binds to 5T4.

24. The antibody of claim 23, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 308, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or
5 at least 98% identity to the amino acid sequence of SEQ ID NO: 308.

25. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of
SEQ ID NO: 632;

10 a complementary determining region 2 (CDR2) comprising the amino acid sequence of
SEQ ID NO: 982; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of
SEQ ID NO: 1332,

wherein the antibody binds to 5T4.

15

26. The antibody of claim 25, wherein the antibody comprises the amino acid sequence of
SEQ ID NO: 282, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or
at least 98% identity to the amino acid sequence of SEQ ID NO: 282.

20 27. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of
SEQ ID NO: 483;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of
SEQ ID NO: 833; and/or

25 a complementary determining region 3 (CDR3) comprising the amino acid sequence of
SEQ ID NO: 1183,

wherein the antibody binds to 5T4.

28. The antibody of claim 27, wherein the antibody comprises the amino acid sequence of
30 SEQ ID NO: 133, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or
at least 98% identity to the amino acid sequence of SEQ ID NO: 133.

29. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 445;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 795; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1145,

wherein the antibody binds to 5T4.

30. The antibody of claim 29, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 95, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 95.

31. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 408;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 758; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1108,

wherein the antibody binds to 5T4.

32. The antibody of claim 31, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 58, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 58.

33. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 381;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 731; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1081,

wherein the antibody binds to 5T4.

34. The antibody of claim 33, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 31, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 31.

35. An antibody comprising:

a complementary determining region 1 (CDR1) comprising the amino acid sequence of SEQ ID NO: 623;

a complementary determining region 2 (CDR2) comprising the amino acid sequence of SEQ ID NO: 973; and/or

a complementary determining region 3 (CDR3) comprising the amino acid sequence of SEQ ID NO: 1323,

wherein the antibody binds to 5T4.

36. The antibody of claim 35, wherein the antibody comprises the amino acid sequence of SEQ ID NO: 273, or an amino acid sequence having at least 85%, at least 90%, at least 95%, or at least 98% identity to the amino acid sequence of SEQ ID NO: 273.

37. The antibody of any one of claims 19-36, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 10^{-9} M to 10^{-11} M.

38. The antibody of any one of claims 19-37, wherein the equilibrium dissociation constant (K_D) of binding of the antibody to the 5T4 is in a range from 1 nM to 0.01 nM.

39. The antibody of any one of claims 19-38, wherein the antibody selectively binds to human 5T4 relative to a non-human 5T4.

40. The antibody of any one of claims 19-39, wherein the antibody binds to human 5T4, mouse 5T4, cynomolgus monkey 5T4, or any combination thereof.

41. The antibody of any one of claims 19-40, wherein the antibody is a single chain antibody.

42. The antibody of claim 41, wherein the single chain antibody is a heavy-chain variable domain (VHH) antibody or a single-chain variable fragment (scFv) antibody.

5 43. The antibody of any one of claims 19-42, wherein the antibody is a humanized antibody.

44. The antibody of any one of claims 19-43, wherein the antibody is a chimeric antibody.

45. A cell comprising the antibody of any one of the preceding claims, optionally wherein
10 the cell is a cancer cell.

46. A conjugate comprising the antibody of any one of claims 19-44.

47. The conjugate of claim 46 further comprising a radionuclide.
15

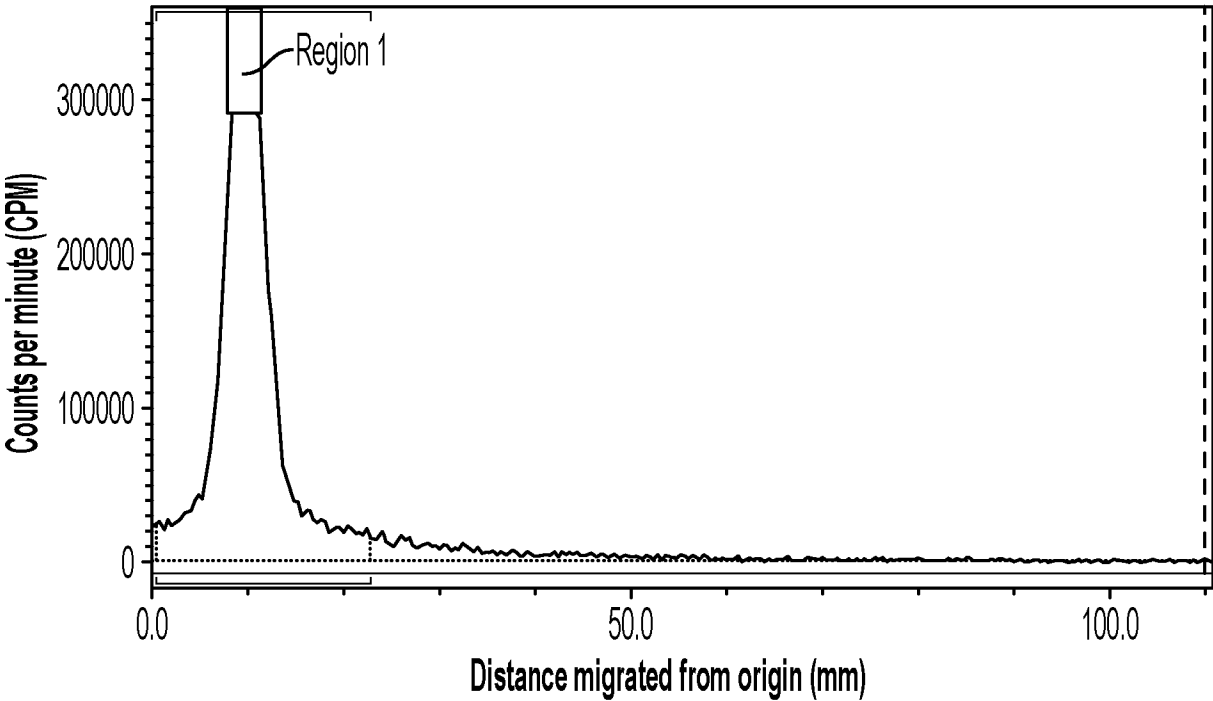
48. A pharmaceutical composition comprising the antibody of any one of claims 19-44, or the conjugate of claim 46 or 47, and a pharmaceutically acceptable excipient.

49. A method comprising administering to a subject the antibody of any one of claims 19-44,
20 the conjugate of claim 46 or 47, or the pharmaceutical composition of claim 48.

50. A nucleic acid or set of nucleic acids encoding the antibody of any one of claims 19-44.

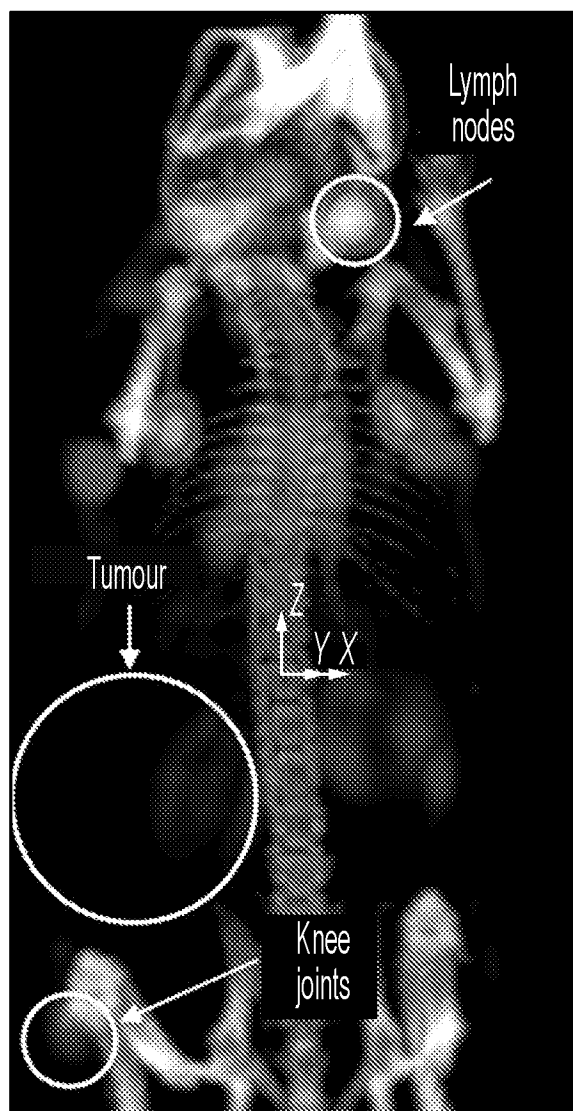
51. A vector or set of vectors comprising one or more nucleic acid encoding the antibody of
25 any one of claims 19-44.

52. A method of producing the antibody of any one of claims 19-44, the method comprising culturing the cell of claim 47 in cell culture and obtaining the antibody from the cell or cell culture.
30



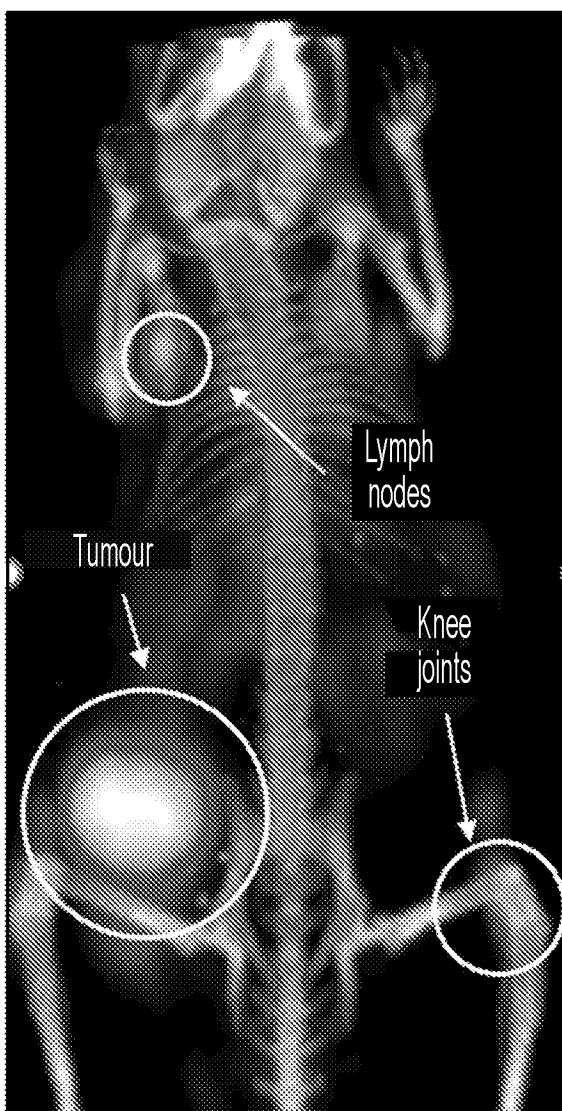
Sample	% labelled with Zr-89
Zr89-VHH1-Fc	99.7
Zr89-VHH3-Fc	99.6
Zr89-VHH7-Fc	99.9
Zr89-VHH10-Fc	99.6

FIG. 1



Zr89-VHH10-Fc

FIG. 2A



Zr89-VHH1-Fc

FIG. 2B

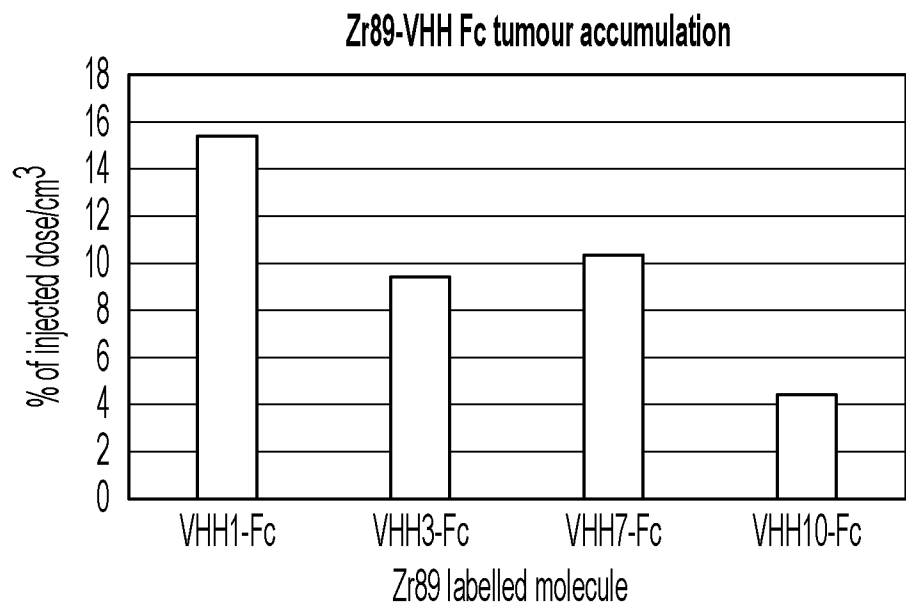
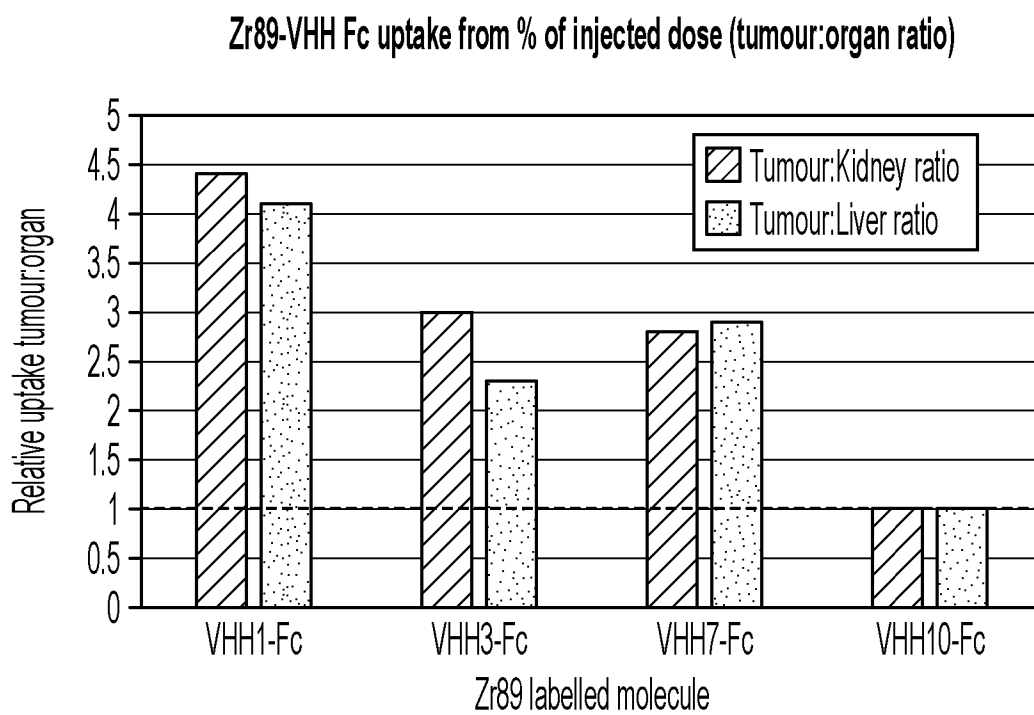


FIG. 3A

Molecule	k_a (1/Ms)	k_d (s ⁻¹)	K_D at pH 5.5 (nM)	k_a (1/Ms)	k_d (s ⁻¹)	K_D at pH 7.4 (nM)	pI
VHH1	6.86E+05	1.40E-03	2.03	1.98E+05	6.36E-04	3.22	8.62
VHH3	9.91E+05	8.91E-05	0.09	3.22E+05	3.87E-05	0.12	8.44
VHH7	8.25E+05	1.24E-03	1.51	1.46E+05	3.21E-04	2.20	6.18
VHH10	-	-	-	-	-	-	-

FIG. 3B

**FIG. 4**