CLAIMS

What is claimed is:

1. An antibody that specifically binds AAV2.7m8 capsid, wherein the antibody comprises a first light chain complementary determining region (CDR-L1) of SEQ ID NO: 5, a second light chain complementary determining region (CDR-L2) of SEQ ID NO: 6, a third light chain complementary determining region (CDR-L3) of SEQ ID NO: 7, a first heavy chain complementary determining region (CDR-H1) of SEQ ID NO: 13, a second heavy chain complementary determining region (CDR-H2) of SEQ ID NO: 14, and a third heavy chain complementary determining region (CDR-H3) of SEQ ID NO: 15.

2. The antibody of claim 1, wherein the antibody comprises a light chain variable domain (VL) amino acid sequence having at least 90% identity to a sequence selected from SEQ ID NO: 4; and/or a heavy chain variable domain (VH) amino acid sequence having at least 90% identity to a sequence selected from SEQ ID NO: 12.

3. The antibody of claim 1, wherein the antibody comprises: a light chain (LC) amino acid sequence having at least 90% identity to a sequence selected from SEQ ID NO:20; and/or a heavy chain (HC) amino acid sequence having at least 90% identity to a sequence selected from SEQ ID NO: 21.

4. The antibody of claim 1, wherein the antibody is: (i) a monoclonal antibody; (ii) a chimeric antibody; (iii) a humanized antibody; (iv) a full length antibody of class IgG, optionally, wherein the class IgG antibody has an isotype selected from IgG1, IgG2, IgG3, and IgG4; (v) an antibody fragment, optionally selected from the group consisting of F(ab')2, Fab', Fab, Fv, single domain antibody (VHH), and scFv; (vi) the antibody is a multi-specific antibody, optionally a bispecific antibody; and/or (vii) the antibody is a synthetic antibody, wherein the HVRs are grafted onto a scaffold or framework other than an immunoglobulin scaffold or framework; optionally, a scaffold selected from an alternative protein scaffold and an artificial polymer scaffold.

5. The antibody of claim 1, wherein the antibody is an immunoconjugate, optionally, wherein the immunoconjugate comprises a detectable label.

6. The antibody of claim 5, wherein the immunoconjugate comprises a detectable label selected from a radiolabel, a fluorescent label, and an indirect labeling moiety.

7. The antibody of claim 1, wherein the antibody is characterized by one or more of the following properties:
   (a) binds to AAV2.7m8 capsid with a binding affinity of 1 x 10^{-8} M or less, 1 x 10^{-9} M or less, 1 x 10^{-10} M or less, or 1 x 10^{-11} M or less; optionally, wherein the binding affinity is measured by equilibrium dissociation constant (K_D) to a AAV2.7m8 capsid polypeptide of SEQ ID NO: 2; and
   (b) binds to AAV2.7m8 capsid with a binding affinity that is increased by at least 2-fold, at least 3-fold, at least 5-fold, or at least 10-fold, relative to the binding affinity to AAV2 capsid; optionally, wherein the relative binding affinities are measured by equilibrium dissociation constant (K_D) to the AAV2.7m8 capsid polypeptide of SEQ ID NO: 2 and the AAV2 capsid polypeptide of SEQ ID NO: 1.

8. An antibody that specifically binds to the same epitope of AAV2.7m8 capsid as the antibody of claim 1; optionally, wherein the epitope comprises the amino acid sequence LALGETTRPA (SEQ ID NO: 22) located at positions 588-597 of SEQ ID NO: 2.

9. An antibody that competes with an antibody of claim 1 for binding to an epitope of AAV2.7m8 capsid and has a binding affinity of 1 x 10^{-9} M or less, 1 x 10^{-10} M or less, or 1 x 10^{-11} M or less; optionally, wherein the binding affinity is measured by equilibrium dissociation constant (K_D) to a AAV2.7m8 capsid polypeptide of SEQ ID NO: 2.

10. The antibody of claim 9, wherein the epitope comprises the amino acid sequence LALGETTRPA (SEQ ID NO: 22) located at positions 588-597 of SEQ ID NO: 2.

11. An isolated polynucleotide or vector encoding the antibody of claim 1.

12. An isolated host cell comprising the oligonucleotide or vector of claim 11.

13. A method of producing an antibody comprising culturing the host cell of claim 12 so that an antibody is produced.

14. A kit comprising: assay reagents; and an antibody of claim 1.

15. The kit of claim 14, wherein the assay reagents comprise: (a) an AAV2.7m8 vector that encodes a luciferase gene; (b) a luciferase substrate; and/or (c) cells from a transduction-permissive cell line; optionally, wherein the cells are from a 293T cell line.

16. A method for detecting neutralizing antibody activity against AAV2.7m8 in a human serum sample, the method comprising:

(a) providing: (i) a human serum sample; (ii) an assay solution comprising cells; (iii) a vector solution comprising an AAV2.7m8 vector that encodes a luciferase gene; (iv) a luciferase substrate solution; and (v) an AAV2.7m8 antibody solution comprising the antibody of claim 1;

(b) combining an aliquot of the human serum sample, the assay solution, the vector solution, and the luciferase substrate solution to form a sample solution;

(c) combining an aliquot of the AAV2.7m8 antibody solution, the assay solution, the vector solution, and the luciferase substrate solution to form a positive control solution; and

(d) detecting luminescence signals from the sample solution and the positive control solution; whereby, the relative luminescence signal levels indicate presence and/or amount of neutralizing antibody activity in the human serum sample.

17. The method of claim 16, wherein step (c) comprises combining at least 2, 3, 4, 5, 6, 7, 8, 9, or more different aliquots with different dilutions of the AAV2.7m8 antibody solution to form at least 2, 3, 4, 5, 6, 7, 8, 9, or more positive control solutions having different concentrations of the AAV2.7m8 antibody for use in preparing a response curve.

18. The method of claims 16, wherein the method further comprises steps of combining an aliquot of the assay solution, and the luciferase substrate solution to form a negative control solution; and detecting luminescence signals from the negative control solution.

19. The method of claim 16, wherein the cells pre-exposed to an AAV2.7m8 vector that encodes a luciferase gene are from a transduction-permissive cell line; optionally, wherein the cell line is 293T.

20. A method for detecting an AAV2.7m8 capsid protein, the method comprising:
contacting the protein with an antibody of claim 1 and detecting the antibody bound to the protein.

21. The method of claim 20, wherein the AAV2.7m8 capsid protein is immobilized.

22. The method of claim 20, wherein the AAV2.7m8 capsid protein is in solution.

23. The method of claim 20, wherein the antibody comprises a detectable label.

24. The method of claim 23, wherein the detectable label selected from a radiolabel, a fluorescent label, and an indirect labeling moiety.