What is claimed is:

1. An antibody, or antigen binding fragment thereof, that specifically binds GDF-8, said antibody or fragment comprising:

an antibody variable heavy (VH) region comprising the first, second and third complementarity determining regions (CDR) from the VH region defined by the amino acid sequence of SEQ ID NO:44; and

an antibody variable light (VL) region comprising the first, second and third complementarity determining regions (CDR) from the VL region defined by the amino acid sequence of SEQ ID NO:46;

wherein said VH region comprises leucine at the amino acid position corresponding to residue number 111 of SEQ ID NO:44 (Kabat position 108).

2. The antibody or fragment of claim 1, wherein VH CDR1 comprises SEQ ID NO:10 or SEQ ID NO:20, VH CDR2 comprises SEQ ID NO:11 or SEQ ID NO:21, VH CDR3 comprises SEQ ID NO:12, VL CDR1 comprises SEQ ID NO:13, VL CDR2 comprises SEQ ID NO:14, and VL CDR3 comprises SEQ ID NO:15.

3. The antibody or fragment of claim 2, wherein up to three non-contact amino acid residues within each CDR are conservatively substituted.

4. The antibody or fragment of claim 1, wherein the fourth framework region (FR4) of said VH region comprises amino acids 106-116 of SEQ ID NO:44.

5. The antibody or fragment of claim 1, wherein said VL region comprises glycine at the amino acid position corresponding to residue number 100 of SEQ ID NO:46 (Kabat position 100).

6. The antibody or fragment of claim 1, wherein said VL region comprises glutamine at the amino acid position corresponding to residue number 100 of SEQ ID NO:46 (Kabat position 100).

7. The antibody or fragment of claim 5, wherein the fourth framework region of said VL region comprises amino acids 98-107 of SEQ ID NO:46.

8. The antibody or fragment of claim 6, wherein the fourth framework region of said VL region comprises amino acids 98-107 of SEQ ID NO:9.

9. The antibody or fragment of claim 1, wherein the VH region comprises the amino acid sequence of SEQ ID NO:44

10. The antibody or fragment of claim 9, wherein the VL region comprises the amino acid sequence of SEQ ID NO:46.

11. The antibody or fragment of claim 9, wherein the VL region comprises the amino acid sequence of SEQ ID NO:9.

12. The antibody or fragment of claim 1, further comprising an antibody constant heavy (CH) region derived from an antibody subtype selected from the group consisting of IgA, IgG, IgD, IgE, or IgM.

13. The antibody or fragment of claim 12, wherein said IgG subtype is further selected from the group consisting of IgG1, IgG2, IgG3 and IgG4.

14. The antibody or fragment of claim 13, wherein said IgG subtype is IgG1.

15. The antibody or fragment of claim 13, wherein said IgG subtype comprises at least one mutation that alters Fc domain function.

16. The antibody or fragment of claim 12, wherein the heavy chain of said antibody or fragment comprises the amino acid sequence of SEQ ID NO:57.

17. The antibody or fragment of claim 1, further comprising an antibody constant light (CL) region.

18. The antibody or fragment of claim 17, wherein said CL region is a kappa or lambda CL region.

19. The antibody or fragment of claim 17, wherein the light chain of said antibody or fragment comprises the amino acid sequence of SEQ ID NO:17.

20. The antibody or fragment of claim 9, wherein said VH region is encoded by the nucleic acid sequence of SEQ ID NO:43.

21. The antibody or fragment of claim 1, wherein said antibody or fragment binds GDF-8 with a Kd of at least 10^{-6} M, 10^{-7} M, 10^{-8} M, 10^{-9} M, 10^{-10} M, or 10^{-11} M.

22. The antibody or fragment of claim 1, wherein said antibody or fragment is selected from the group consisting of an Fab, an $F(ab')_2$, an scFv, an scFv-Fc, an scFv-CH, an scFab, an scFv-zipper, a diabody, a triabody, a tetrabody, a minibody, an Fv, and a bispecific antibody.

23. The antibody of claim 1, wherein the amount of said antibody produced by transfected cells is greater than the amount produced under similar conditions of an otherwise identical antibody in which the VH region comprises a methionine at Kabat position 108.

24. The antibody of claim 23, wherein the amount of said antibody produced by transfected cells exceeds the amount of said otherwise identical antibody produced under similar conditions by at least about an amount selected from the group consisting of least about 1.5 fold, 2 fold, 3 fold, 4 fold, 5 fold, 6 fold, 7 fold, 8 fold, 9 fold, 10 fold, 11 fold, 12 fold, 13 fold, 14 fold, 15 fold, 20 fold, and 30 fold.

25. An antibody, or antigen binding fragment thereof, that specifically binds GDF-8, said antibody or fragment comprising: a VH region at least 95% identical to the amino acid sequence of SEQ ID NO:44, and a VL region at least 95% identical to the amino acid sequence of SEQ ID NO:46, wherein said VH region comprises leucine at Kabat position 108.

26. An antibody that specifically binds GDF-8, comprising an antibody heavy chain defined by the amino acid sequence of SEQ ID NO:58 and an antibody light chain defined by the amino acid sequence of SEQ ID NO:59.

27. The antibody of claim 26, wherein said antibody consists essentially of two antibody heavy chains, each defined by the amino acid sequence of SEQ ID NO:58; and two antibody light chains, each defined by the amino acid sequence of SEQ ID NO:59.

28. A pharmaceutical composition comprising the antibody of claim 1 and a pharmaceutically acceptable carrier.

29. An isolated polynucleotide comprising a nucleic acid sequence encoding at least one polypeptide chain of an antibody or fragment thereof that specifically binds GDF-8, said antibody or fragment comprising:

an antibody variable heavy (VH) region comprising the first, second and third complementarity determining regions (CDR) from the VH region defined by the amino acid sequence of SEQ ID NO:44,

wherein said VH region comprises leucine at the amino acid position corresponding to residue number 111 of SEQ ID NO:44 (Kabat position 108); and

an antibody variable light (VL) region comprising the first, second and third complementarity determining regions (CDR) from the VL region defined by the amino acid sequence of SEQ ID NO:46,

wherein said VL region comprises glycine at the amino acid position corresponding to residue number 100 of SEQ ID NO:46 (Kabat position 100).

30. The isolated polynucleotide of claim 29, wherein the nucleic acid sequence encoding the VH region is the nucleic acid sequence of SEQ ID NO:43 or SEQ ID NO:49, and wherein the nucleic acid sequence encoding the VL region is the nucleic acid sequence of SEQ ID NO:45 or SEQ ID NO:51.

31. The isolated polynucleotide of claim 29, further comprising a nucleic acid sequence encoding a human antibody CH region.

32. The isolated polynucleotide of claim 29, further comprising a nucleic acid sequence encoding a human antibody CL region.

33. The isolated polynucleotide of claim 32, wherein the CL region is encoded by the nucleic acid sequence of SEQ ID NO:16.

34. An expression vector comprising the polynucleotide of claim 29.

35. A host cell comprising the polynucleotide of claim 29 operably linked to a regulatory sequence.

36. A method of producing an antibody or fragment thereof that specifically binds GDF-8, comprising the steps of culturing the host cell of claim 35 and recovering the antibody or fragment produced thereby.

37. A method of increasing the mass or strength of a muscle of a mammal, comprising administering to a mammal an amount of the antibody or antigen binding fragment thereof of claim 1 effective to increase the mass or strength of a muscle of the mammal.

38. The method of claim 37, wherein the muscle is skeletal muscle or cardiac muscle.

39. The method of claim 37, wherein the skeletal muscle is active in breathing.

40. A method of treating a muscular disorder, comprising administering to a subject in need of treatment for a muscular disorder a therapeutically effective amount of the antibody or antigen binding fragment thereof of claim 1.

41. The method of claim 40, wherein the muscular disorder is selected from the group consisting of muscular dystrophy, muscle atrophy, sarcopenia, cachexia, muscle wasting syndrome, age-related loss of muscle mass or strength, and frailty.

42. The method of claim 41, wherein the muscular disorder is muscular dystrophy.

43. The method of claim 42, wherein the muscular dystrophy is Duchenne muscular dystrophy.

44. The method of claim 43, wherein treatment is effective to increase the subject's performance in a 6 minute walk test.

45. The method of claim 43, wherein said antibody is administered to a subject also being treated with a glucocorticoid.

46. A method of preventing a muscular disorder, comprising administering to a subject in need of prevention of a muscular disorder an amount of the antibody or antigen binding fragment thereof of claim 1 effective to prevent the muscular disorder.

47. The method of claim 46, wherein the muscular disorder is selected from the group consisting of muscular dystrophy, muscle atrophy, sarcopenia, cachexia, muscle wasting syndrome, age-related loss of muscle mass or strength, and frailty.

48. The method of claim 47, wherein the muscular disorder is muscular dystrophy.

49. The method of claim 48, wherein the muscular dystrophy is Duchenne muscular dystrophy.

50. A method of treating or preventing a neuromuscular disorder, comprising administering to a subject in need of treatment for a neuromuscular disorder a therapeutically effective amount of antibody or antigen binding fragment thereof of claim 1.

51. The method of claim 50, wherein the neuromuscular disorder is ALS.

52. A method of treating or preventing a metabolic disorder, comprising administering to a subject in need of treatment for a metabolic disorder a therapeutically effective amount of antibody or antigen binding fragment thereof of claim 1.

53. The method of claim 52, wherein the metabolic disorder is selected from the group consisting of: type 2 diabetes mellitus, metabolic syndrome, syndrome X, insulin resistance, and impaired glucose tolerance.

54. A method of treating or preventing an adipose tissue disorder, comprising administering to a subject in need of treatment for an adipose tissue disorder a therapeutically effective amount of antibody or antigen binding fragment thereof of claim 1.

55. The method of claim 54, wherein the adipose tissue disorder is obesity.

56. A method of treating or preventing a bone loss disorder, comprising administering to a subject in need of treatment for a bone loss disorder a therapeutically effective amount of antibody or antigen binding fragment thereof of claim 1.

57. The method of claim 56, wherein the bone loss disorder is selected from the group consisting of: osteoporosis, osteopenia, osteoarthritis, and osteoporosis-related bone fractures.

58. An antibody that specifically binds GDF-8 comprising:

an antibody VH region consisting of SEQ ID NO:44 and an antibody VL region consisting of SEQ ID NO:46,

wherein said antibody expresses at a higher level under similar conditions compared with an otherwise identical second antibody comprising a VH region consisting of SEQ ID NO:7 and a VL region consisting of SEQ ID NO:9.

59. The antibody of claim 58, wherein said antibody expresses at a higher level compared to said second antibody by an amount that is at least about 1.5 fold, 2 fold, 3 fold, 4 fold, 5 fold, 6 fold, 7 fold, 8 fold, 9 fold, 10 fold, 11 fold, 12 fold, 13 fold, 14 fold, 15 fold, 20 fold, or 30 fold greater.

60. The antibody of claim 59, wherein said antibody expresses about 12 fold higher than said second antibody when expressed in COS cells.

61. The antibody of claim 59, wherein said antibody expresses about 6 fold higher than said second antibody when expressed in CHO cells.

What is claimed is:

1. An antibody, or antigen binding fragment thereof, that specifically binds GDF-8, said antibody or fragment comprising:

an antibody variable heavy (VH) region comprising the first, second and third complementarity determining regions (CDR) from the VH region defined by the amino acid sequence of SEQ ID NO:44; and

an antibody variable light (VL) region comprising the first, second and third complementarity determining regions (CDR) from the VL region defined by the amino acid sequence of SEQ ID NO:46;

wherein said VH region comprises leucine at the amino acid position corresponding to residue number 111 of SEQ ID NO:44 (Kabat position 108).

2. The antibody or fragment of claim 1, wherein VH CDR1 comprises SEQ ID NO:10 or SEQ ID NO:20, VH CDR2 comprises SEQ ID NO:11 or SEQ ID NO:21, VH CDR3 comprises SEQ ID NO:12, VL CDR1 comprises SEQ ID NO:13, VL CDR2 comprises SEQ ID NO:14, and VL CDR3 comprises SEQ ID NO:15.

3. The antibody or fragment of claim 1, wherein the fourth framework region (FR4) of said VH region comprises amino acids 106-116 of SEQ ID NO:44.

4. The antibody or fragment of claim 1, wherein said VL region comprises glycine at the amino acid position corresponding to residue number 100 of SEQ ID NO:46 (Kabat position 100).

5. The antibody or fragment of claim 1, wherein said VL region comprises glycine at the amino acid position corresponding to residue number 100 of SEQ ID NO:46 (kabat position 100).

6. The antibody or fragment of claim 4, wherein the fourth framework region of said VL region comprises amino acids 98-107 of SEQ ID NO:46.

7. The antibody or fragment of claim 5, wherein the fourth framework region of said VL region comprises amino acids 98-107 of SEQ ID NO:9.

8. The antibody or fragment of claim 1, wherein the VH region comprises the amino acid sequence of SEQ ID NO:44.

9. The antibody or fragment of claim 8, wherein the VL region comprises the amino acid sequence of SEQ ID NO:46.

10. The antibody or fragment of claim 8, wherein the VL region comprises the amino acid sequence of SEQ ID NO:9.

11. The antibody or fragment of claim 1, further comprising an antibody constant heavy (CH) region derived from an antibody subtype selected from the group consisting of IgA,

IgG, IgD, IgE, or IgM.

12. The antibody or fragment of claim 11, wherein said IgG subtype is further selected from the group consisting of IgG1, IgG2, IgG3 and IgG4.

13. The antibody or fragment of claim 12, wherein said IgG subtype is IgG1.

14. The antibody or fragment of claim 12, wherein said IgG subtype is comprises at least one mutation that alters Fc domain function.

15. The antibody or fragment of claim 11, wherein the heavy chain of said antibody or fragment comprises the amino acid sequence of SEQ ID NO:57.

16. The antibody or fragment of claim 1, further comprising an antibody constant light (CL) region.

17. The antibody or fragment of claim 16, wherein said CL region is a kappa or lambda CL region.

18. The antibody or fragment of claim 16, wherein the light chain of said antibody or fragment comprises the amino acid sequence of SEQ ID NO:17.

19. The antibody or fragment of claim 8, wherein said VH region is encoded by the nucleic acid sequence of SEQ ID NO:43.

20. An antibody, or antigen binding fragment thereof, that specifically binds GDF-8, said antibody or fragment comprising: a VH region at least 95% identical to the amino acid sequence of SEQ ID NO:44, and a VL region at least 95% identical to the amino acid sequence of SEQ ID NO:46, wherein said VH region comprises leucine at Kabat position 108.

21. An antibody that specifically binds GDF-8, comprising an antibody heavy chain defined by the amino acid sequence of SEQ ID NO:58 and an antibody light chain defined by the amino acid sequence of SEQ ID NO:59.

22. A pharmaceutical composition comprising the antibody of claim 1 and a pharmaceutically acceptable carrier.

23. An isolated polynucleotide comprising a nucleic acid sequence encoding at least one polypeptide chain of an antibody or fragment thereof that specifically binds GDF-8, said antibody or fragment comprising:

an antibody variable heavy (VH) region comprising the first, second and third complementarity determining regions (CDR) from the VH region defined by the amino acid sequence of SEQ ID NO:44,

wherein said VH region comprises leucine at the amino acid position corresponding to residue number 111 of SEQ ID NO:44 (Kabat position 108); and

an antibody variable light (VL) region comprising the first, second and third complementarity determining regions (CDR) from the VL region defined by the amino acid sequence of SEQ ID NO:46,

wherein said VL region comprises glycine at the amino acid position corresponding to residue number 100 of SEQ ID NO:46 (Kabat position 100).