in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-V) for a diagnosis of Tourette's Syndrome. In some embodiments, a diagnosis of TS is made when it is discovered that the subject has at least one genetic alteration in an mGluR network gene. In some embodiments, a diagnosis of TS is made when it is discovered that the subject has at least one genetic alteration in an mGluR network gene and when the subject has at least one symptom of TS including, but not limited to, a motor tic, a vocal tic, a motor and vocal tic.

[0011] Also provided herein are methods of treating TS comprising administering an effective amount of a nonselective activator of metabotropic glutamate receptors (mGluRs) to a subject that has at least one genetic alteration in an mGluR network gene, such as a CNV, thereby treating TS. In some embodiments, where the subject has a CNV in an mGluR network gene, the CNV is a duplication or deletion.

[0011a] In one aspect of the disclosure, there is provided a use of fasoracetam in the preparation of a medicament for treating Tourette syndrome (TS) in a subject,wherein an effective amount of fasoracetam is to be administered to the subject, thereby treating TS.

[0012] In some embodiments, the invention comprises a method a subject having a motor and/or vocal tic comprising administering an effective amount of a nonselective activator of metabotropic glutamate receptors (mGluRs), thereby treating TS. In some embodiments, the subject also has at least one genetic alteration in an mGluR network gene.

[0013] Also provided are methods of treating TS in a subject comprising obtaining results from a genetic screen that determines whether a subject has a genetic alteration in an mGluR network gene, and, if the results show that the subject has at least

one genetic alteration in an mGluR network gene, treating the subject by administering an effective amount of a nonselective activator of mGluRs.

[0014] In some embodiments of the above methods, the nonselective activator of mGluRs is fasoracetam, such as fasoracetam monohydrate (NS-105 or NFC-1). In some

[0019] In some embodiments, tic symptoms in the TS subject, such as frequency of tics or degree of movement for movement-based tics or the intensity of language-based tics, are reduced in the subject. In some embodiments, symptoms of inattentiveness, hyperactivity, and/or impulsiveness are reduced in the subject.

[0020] Also provided herein are methods for diagnosing TS in a subject comprising isolating a nucleic-acid comprising sample from a subject, analyzing the sample for the presence or absence of a genetic alteration in at least one mGluR network genes, and diagnosing TS if the subject has at least one genetic alteration in a mGluR network gene. Also provided are methods for diagnosing TS in a subject comprising isolating a nucleic-acid comprising sample from a subject, isolating nucleic acid from the sample, analyzing the nucleic acid for the presence or absence of a genetic alteration in at least one mGluR network genes, and diagnosing TS if the subject has at least one genetic alteration in a mGluR network gene. Provided as well are methods for identifying a subject as having TS comprising obtaining a sample from a patient, optionally isolating nucleic acid from the sample, optionally amplifying the nucleic acid, and analyzing the nucleic acid in the sample for the presence or absence of a genetic alteration, such as a CNV, in at least one mGluR network gene, wherein the subject is identified as having TS if at least one genetic alteration, such as a CNV, in an mGluR network gene is detected. Additionally, provided are methods for diagnosing TS in a subject comprising analyzing genetic information about one or more mGluR network genes, comparing the subject's information to a control subject that does not have TS, and diagnosing TS if the genetic information suggests that the subject has at least one genetic alteration in an mGluR network gene.

[0020a] In another aspect of the disclosure, there is provided a method for diagnosing Tourette syndrome (TS) in a subject comprising analyzing a sample comprising nucleic acid which has been isolated from a subject, for the presence or absence of a copy number variation (CNV) in at least one metabotropic glutamate receptor (mGluR) network genes, and diagnosing TS if the subject has at least one CNV in an mGluR network gene.

What is Claimed is:

1. Use of fasoracetam in the preparation of a medicament for treating Tourette syndrome (TS) in a subject, wherein an effective amount of fasoracetam is to be administered to the subject, thereby treating TS.

2. The use according to claim 1, wherein the subject has at least one genetic alteration in a metabotropic glutamate receptor (mGluR) network gene.

3. The use according to claim 1 or claim 2, wherein the use further comprises obtaining results from a genetic screen that determines whether the subject has a genetic alteration in an mGluR network gene.

4. The use according to claim 2 or claim 3, wherein the genetic alteration is a copy number variation (CNV).

5. The use according to claim 4, wherein the CNV is a duplication or deletion.

6. The use of ay one of claims 1-5, wherein fasoracetam is to be administered at a dose of 50-400 mg, 100-400 mg, or 200-400 mg, and wherein the dose is to be administered once, twice, or three times daily.

7. The use according to any one of claims 1-6, wherein the TS is one or more of: persistent (chronic) motor tic disorder, persistent (chronic) vocal tic disorder, or provisional tic disorder.

8. The use according to any one of claims 1-7, wherein the subject is between the ages of 5 and 17, 5 and 8, 8 and 17, 8 and 12, or 12 and 17.

9. The use according to any one of claims 1-8, wherein the fasoracetam is to be administered in combination with another pharmaceutical or non-pharmaceutical therapy.

10. The use according to any one of claims 1-9, wherein tic symptoms are reduced in the subject following at least 1 week, such as at least 2 weeks, such as at least 3 weeks, such as at least 4 weeks of the treatment with fasoracetam.

11. The use according to claim 10, wherein the tic symptoms comprise frequency and/or degree of movement.

12. The use according to any one of claims 1-11, wherein symptoms of inattentiveness, hyperactivity, and/or impulsiveness are reduced in the subject following at least 1 week, such as at least 2 weeks, such as at least 3 weeks, such as at least 4 weeks of treatment with the activator.

13. The use according to any one of claims 1-12, wherein the subject also has obsessive compulsive disorder (OCD), and wherein symptoms of OCD are reduced in the subject following at least 1 week, such as at least 2 weeks, such as at least 3 weeks, such as at least 4 weeks of treatment with the activator.

14. A method for diagnosing Tourette syndrome (TS) in a subject comprising

a. analyzing a sample comprising nucleic acid which has been isolated from a subject, for the presence or absence of a copy number variation (CNV) in at least one metabotropic glutamate receptor (mGluR) network genes, and

b. diagnosing TS if the subject has at least one CNV in an mGluR network gene.

15. The method according to claim 14, wherein the method comprises detecting CNVs in mGluR network genes by subjecting the sample to a screen that assesses CNVs in at least 2, 3, 4, 5, 6, 7, 8, 9, or 10 mGluR network genes.

16. The method according to claim 14 or 15, wherein CNVs in mGluR network genes are determined by subjecting the sample to a screen that assesses CNVs in at least 5, 6, 7, 8, 9, 10, 15, 20, 30, 40, 50, 60, 70, or all of Tier 1 mGluR network genes.

17. The method accordng to claim 14, 15, or 16, wherein CNVs in mGluR network genes are determined by subjecting the sample to a screen that assesses CNVs in at least 50, at least 100, at least 150, at least 175, or all of Tier 2 mGluR network genes.

18. The method according to any one of claims 14-17, wherein CNVs in mGluR network genes are determined by subjecting the sample to a screen that assesses CNVs in at least 50, at least 100, at least 200, at least 300, at least 400, at least 500, or all of Tier 3 mGluR network genes.

19. The use according to any one of claims 1-13, wherein the subject has TS as well as one or more of obsessive compulsive disorder (OCD), schizophrenia, and.attention deficit hyperactivity disorder (ADHD)

20. The use of any one of claims 1-13, wherein the subject does not have one or more of ADHD, schizophrenia, conduct disorder, anxiety disorder, autism, a mood disorder, phobia, OCD, or depression.