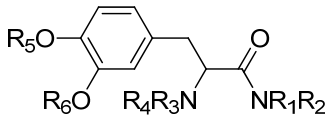
I 

or an enantiomer, diastereomer, or racemate thereof,

wherein

R_1, R_2, R_3 and R_4 each independently is H, (C_1-C_6)alkyl, (C_2-C_6)alkenyl, (C_2-C_6)alkynyl, cycloalkyl, aryl, -O-C(=O)-R', -C(=O)-OR', -C(=O)-R', -C(=S)-R', -O-C(=O)-NR'R', -O-C(=S)-NR'R', or -O-C(=O)-R", or R_1 and R_2 together with the nitrogen atom to which they are attached form a 5- or 6-membered ring, or R_3 and R_4, together with the nitrogen atom to which they are attached form a 5- or 6-membered ring; and

R_5 and R_6 each independently is H, (C_1-C_3)alkyl, cycloalkyl, phenyl, or -P(=O)(OR')$_2$,

R' each independently is H, (C_1-C_6)alkyl, (C_2-C_6)alkenyl, cycloalkyl, aryl, or heteroaryl bonded through a ring carbon; and

R" is a saturated or unsaturated hydrocarbon chain having at least 10 carbon atoms, and

an organic- or inorganic-acid having n acidic groups, wherein n is an integer of 1 or more,

wherein the molar ratio of said LDA compound to said acid is about 1:1/n to about 1:≥1.1, and said composition is stable for at least 24 hours at room temperature.

[0010] The pharmaceutical composition A defined above may further comprise a decarboxylase inhibitor such as carbidopa, and at least one of a basic amino acid, e.g., arginine, or an amino sugar, e.g., meglumine; and optionally at least one of a buffer, an antioxidant, an additional active agent such as a catechol-O-methyl transferase (COMT) inhibitor or a monoamine oxidase (MAO) inhibitor, and a surfactant.

[0010a] In one aspect of the present disclosure, there is provided an aqueous pharmaceutical composition having a pH of 3 to 7 at 25°C, said composition comprising:

2-amino-3-(3,4-dihydroxyphenyl)propanamide

or an enantiomer, a diastereomer, a racemate, or a salt thereof;

a buffer selected from the group consisting of citrate buffer, acetate buffer, and tartrate buffer, or a mixture thereof; and

an acid selected from the group consisting of tartaric acid, acetic acid, citric acid, and succinic acid,

wherein the molar ratio of 2-amino-3-(3,4-dihydroxyphenyl)propanamide to said acid is from 1:0.33 to 1:1.1, from 1:0.5 to 1:1.1, or from 1:1 to 1:1.1, and said composition is stable for at least 24 hours at room temperature

[0011] The present disclosure also provides an aqueous pharmaceutical composition, also referred to herein as "***pharmaceutical composition B***", having a pH of about 3 to about 9.5, or about 4 to about 8, or about 5 to about 7, or about 5.5 to about 6.5, at 25°C, said composition comprising a salt of a LDA compound of the general formula I as defined above, or an enantiomer, diastereomer, or racemate thereof, a decarboxylase inhibitor, e.g., carbidopa, or a salt thereof, and optionally at least one of a basic amino acid, e.g., arginine, or an amino sugar, e.g., meglumine,

particular embodiment, the disease treated with the pharmaceutical compositions of the disclosure is Parkinson's disease.

[0017] The present disclosure thus relates to a method for treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine, comprising administering to a patient, e.g., an individual, in need thereof a therapeutically effective amount of a pharmaceutical composition A as defined above, provided that said composition comprises a decarboxylase inhibitor and at least one of a basic amino acid or an amino sugar; or a pharmaceutical composition B as defined above.

[0017a] In another aspect of the present disclosure, there is provided a use of a pharmaceutical composition as defined above, for the preparation of a medicament for treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

[0018] The present disclosure also relates to a method for treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine, comprising co-administering to a patient, e.g., an individual, in need thereof (i) a first pharmaceutical composition selected from a pharmaceutical composition A as defined above, provided that said composition does not comprise a decarboxylase inhibitor or a salt thereof, or a pharmaceutical composition C as defined above; and (ii) a second pharmaceutical composition comprising a decarboxylase inhibitor and optionally at least one of a basic amino acid or an amino sugar; and/or a COMT inhibitor; and/or a MAO inhibitor.

[0018a] In a further aspect of the present disclosure, there is provided a use of a first pharmaceutical composition as defined above; and a second pharmaceutical

composition comprising a decarboxylase inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, a catechol-O-methyl transferase (COMT) inhibitor, or a monoamine oxidase (MAO) inhibitor, as a combination in the preparation of a medicament for treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

[0019] The present disclosure further provides a kit comprising (i) a first pharmaceutical composition selected from a pharmaceutical composition A as defined above, provided that said composition comprises neither a decarboxylase inhibitor nor a salt thereof, or a pharmaceutical composition C as defined above; (ii) a second pharmaceutical composition comprising a decarboxylase inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, and/or a COMT inhibitor; and/or a MAO inhibitor; and (iii) optionally instructions for co-administration of said pharmaceutical compositions for treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine.

[0019a] In another aspect of the present disclosure, there is provided a kit comprising (i) a first pharmaceutical composition as defined above; (ii) a second pharmaceutical composition comprising a decarboxylase inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, a catechol-O-methyl transferase (COMT) inhibitor, or a monoamine oxidase (MAO) inhibitor; and (iii) optionally instructions for co-administration of said pharmaceutical compositions for use in the treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

[0019b] In a further aspect of the present disclosure, there is provided a use of a kit comprising (i) a first pharmaceutical composition disclosed herein; (ii) a second pharmaceutical composition comprising a decarboxylase inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, a catechol-O-methyl transferase (COMT) inhibitor, or a monoamine oxidase (MAO) inhibitor; and (iii) optionally instructions for co-administration of said pharmaceutical compositions, in

the manufacture of a medicament for the treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

BRIEF DESCRIPTION OF THE FIGURES

[0020] **Fig. 1** depicts the plasma concentrations of LDA and LD in CD-1 mice plasma after Intravenous administration of LDA-HCl (20mg/kg).

[0021] **Fig. 2** depicts the plasma concentrations of LDA and LD in CD-1 mice plasma after Oral administration of LDA-HCl (20mg/kg).

CLAIMS

1. An aqueous pharmaceutical composition having a pH of 3 to 7 at 25°C, said composition comprising:

2-amino-3-(3,4-dihydroxyphenyl)propanamide

or an enantiomer, a diastereomer, a racemate, or a salt thereof;

a buffer selected from the group consisting of citrate buffer, acetate buffer, and tartrate buffer, or a mixture thereof; and

an acid selected from the group consisting of tartaric acid, acetic acid, citric acid, and succinic acid,

wherein the molar ratio of 2-amino-3-(3,4-dihydroxyphenyl)propanamide to said acid is from 1:0.33 to 1:1.1, from 1:0.5 to 1:1.1, or from 1:1 to 1:1.1, and said composition is stable for at least 24 hours at room temperature.

2. The pharmaceutical composition of claim 1, comprising from 1% to 30%, or from 5% to 20%, by weight of 2-amino-3-(3,4-dihydroxyphenyl)propanamide, or an enantiomer, a diastereomer, a racemate, or a salt thereof.

3. The pharmaceutical composition of claim 1 or 2, further comprising carbidopa, and at least one of arginine or meglumine.

4. The pharmaceutical composition of claim 3, wherein the weight ratio of carbidopa to 2-amino-3-(3,4-dihydroxyphenyl)propanamide is from 1:1 to 1:100, from 1:2 to 1:60, from 1:4 to 1:40, or from 1:10 to 1:40; or the molar ratio of carbidopa to arginine or meglumine is from 1:1 to 1:4, from 1:1 to 1:3.5, or from 1:1 to 1:2.5.

5. The pharmaceutical composition of claim 1 or 2, further comprising carbidopa.

6. The pharmaceutical composition of any one of claims 1 to 5, further comprising at least one antioxidant selected from ascorbic acid or a salt thereof, L-cysteine, N-acetyl cysteine, a bisulfite or a salt thereof, and glutathione.

7. The pharmaceutical composition of claim 6, wherein said antioxidant is N-acetylcysteine.

8. The pharmaceutical composition of any one of claims 1 to 7, further comprising a surfactant.

9. The pharmaceutical composition of claim 8, wherein the surfactant is Tween-80.

10. The pharmaceutical composition of any one of claims 1-9, wherein the salt of 2-amino-3-(3,4-dihydroxyphenyl)propanamide is the hydrochloric salt.

11. The pharmaceutical composition of any one of claims 1-10, wherein the composition is stable for at least about 72 hours, at least about 1 week, or at least about 2 weeks at room temperature.

12. The pharmaceutical composition of any one of claims 1-11, wherein the composition has a pH of about 3 to about 4, about 4 to about 5 , about 5 to about 6, or about 6 to about 7 at 25°C.

13. The pharmaceutical composition of any one of claims 1 to 12, formulated for subcutaneous, transdermal, intradermal, transmucosal, intravenous, intraarterial, intramuscular, intraperitoneal, intrathecal, intrapleural, intratracheal, intranasal, sublingual, buccal, intestinal, intraduodenal, rectal, or intraocular administration.

14. Use of a pharmaceutical composition according to any one of claims 1-13, for the preparation of a medicament for treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson’s like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer’s disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

15. Use of a first pharmaceutical composition according to any one of claims 1-13; and a second pharmaceutical composition comprising a decarboxylase inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, a catechol-O-methyl transferase (COMT) inhibitor, or a monoamine oxidase (MAO) inhibitor, as a combination in the preparation of a medicament for treatment of a

disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

16. The use of claim 15, wherein said decarboxylase inhibitor is carbidopa; said basic amino acid is arginine; said amino sugar is meglumine; said COMT inhibitor is entacapone, tolcapone or opicapone; and said MAO inhibitor is moclobemide, rasagiline, selegiline or safinamide.

17. The use of claim 15 or 16, wherein said first pharmaceutical composition is to be administered parenterally, intravenously, subcutaneously, intraduodenally, rectally, intrathecally, sublingually, intradermally, intranasally, or intramuscularly; and said second pharmaceutical compositions is to be administered parenterally, intravenously, subcutaneously, transdermally, rectally, intrathecally, sublingually, intradermally, intranasally, intramuscularly, or orally.

18. The use of claim 15 or 16, wherein said first pharmaceutical composition and said second pharmaceutical composition are to be administered by different administration routes.

19. The use of claim 18, wherein said second pharmaceutical composition is to be administered orally.

20. The use of any one of claims 14-19, wherein said disease or disorder is Parkinson's disease.

21. A kit comprising (i) a first pharmaceutical composition according to any one of claims 1-13; (ii) a second pharmaceutical composition comprising a decarboxylase

inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, a catechol-O-methyl transferase (COMT) inhibitor, or a monoamine oxidase (MAO) inhibitor; and (iii) optionally instructions for co-administration of said pharmaceutical compositions for use in the treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.

22. Use of a kit comprising (i) a first pharmaceutical composition according to any one of claims 1-13; (ii) a second pharmaceutical composition comprising a decarboxylase inhibitor or a salt thereof, and optionally at least one of a basic amino acid or an amino sugar, a catechol-O-methyl transferase (COMT) inhibitor, or a monoamine oxidase (MAO) inhibitor; and (iii) optionally instructions for co-administration of said pharmaceutical compositions, in the manufacture of a medicament for the treatment of a disease or disorder characterized by neurodegeneration and/or reduced levels of brain dopamine,

wherein said disease or disorder is selected from restless leg syndrome, Parkinson's disease, secondary parkinsonism, Huntington's disease, Parkinson's like syndrome, progressive supranuclear palsy (PSP), multiple system atrophy (MSA), amyotrophic lateral sclerosis (ALS), Shy-Drager syndrome, dystonia, Alzheimer's disease, Lewy body disease (LBD), akinesia, bradykinesia, and hypokinesia; conditions resulting from brain injury including carbon monoxide or manganese intoxication; and conditions associated with a neurological disease or disorder including alcoholism, opiate addiction, and erectile dysfunction.