calcineurin inhibitor is selected from the group consisting of cyclosporine, pimecrolimus, and tacrolimus. In certain embodiments, the pharmaceutical formulation does not contain nicotine in any form.

[0016] In certain embodiments, the pharmaceutical formulation comprises between 5 mg/mL and 200 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof. In certain embodiments, the pharmaceutical formulation comprises between 10 mg/mL and 75 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof. In certain embodiments, the pharmaceutical formulation comprises between 10 mg/mL and 50 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof. In certain embodiments, the pharmaceutical formulation comprises between 500 micrograms and 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose. In certain embodiments, the pharmaceutical formulation comprises less than 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose. In certain embodiments, the pharmaceutical formulation comprises between 1 milligram and 3 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose. In certain embodiments, the pharmaceutical formulation comprises between 1 milligram and 2 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose. In certain embodiments, the pharmaceutical formulation comprises about 1 milligram of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose. In certain embodiments, the pharmaceutical formulation comprises about 1.5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose. In certain embodiments, the pharmaceutical formulation comprises about 2 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[0017] In certain embodiments, the pharmaceutical formulation is formulated for administration as needed in response to symptoms. In certain embodiments, the pharmaceutical formulation is formulated for administration at least once daily. In certain embodiments, the pharmaceutical formulation is formulated for administration at least twice daily. In certain embodiments, the pharmaceutical formulation is formulated for administration at least once weekly.

[0018] In certain embodiments, the pharmaceutical formulation is formulated as a liquid, suspension, aerosol, gel, ointment, dry powder, cream, paste, lotion, or balm. In certain embodiments, the pharmaceutical formulation is formulated for local delivery into the nasal cavity via a syringe, dropper, bottle nebulizer, atomization pump, inhaler, powder spray device, vaporizer, patch, medicated stick, pipette, or jet of liquid.

embodiments of improving ocular discomfort, about 25 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, about 10 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity.

[00133] In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 1 microgram and 100 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 1 microgram and 75 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 5 micrograms and 100 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 5 micrograms and 75 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 15 micrograms and 100 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 15 micrograms and 75 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 25 micrograms and 100 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 25 micrograms and 75 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 25 micrograms and 60 micrograms of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In some embodiments, the compound of Formula (I) is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

[00134] In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 500 micrograms and 10 milligrams of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of improving ocular discomfort, between 500 micrograms and 5 milligrams of a compound of Formula (I), (II), (IIIa), or (IIIb) is administered into the nasal cavity. In another embodiment of any of the aforementioned embodiments of

[00252] A “tissue” comprises two or more cells. The two or more cells may have a similar function. The tissue may be a connective tissue, epithelial tissue, muscular tissue, or nervous tissue. Alternatively, the tissue is a bone, tendon (both referred to as musculoskeletal grafts), cornea, skin, heart valve, or vein.

[00253] An “organ” comprises two or more tissues. The two or more tissues may perform a specific function or group of functions. In some instances, the organ is a lung, mouth, nose, parathyroid gland, pineal gland, pituitary gland, carotid body, salivary gland, skin, gall bladder, pancreas, small intestine, stomach, spleen, spinal cord, thymus, thyroid gland, trachea, uterus, or vermiform appendix. Alternatively, the organ is an adrenal gland, appendix, brain, bladder, kidney, intestine, large intestine, small intestine, liver, heart, or muscle.

[00254] The term “nicotinic acetylcholine receptor agonist” encompasses a full agonist or a partial agonist of the nicotinic acetylcholine receptor. In some embodiemnts described herein, the nicotinic acetylcholine receptor agonist is a compound of compound of Formula (I), (II), (IIIa), or (IIIb).

[00255] The terms “treat,” “treating” or “treatment,” as used herein, include alleviating, abating or ameliorating at least one symptom of a disease or condition, preventing additional symptoms, preventing progression of the condition, inhibiting the disease or condition, e.g., arresting the development of the disease or condition, relieving the disease or condition, causing regression of the disease or condition, relieving a condition caused by the disease or condition, or stopping the symptoms of the disease or condition. In one embodiment, treatment is prophylactic treatment. In another embodiment, treatment refers to therapeutic treatment.

[00256] The term “does not cross the blood-brain barrier in a pharmacologically relevant concentration” as used herein, refers to an insufficient amount of a nicotinic acetylcholine receptor agonist (i.e. compound of Formula (I), (II), (IIIa), or (IIIb)) as disclosed herein passing through the blood-brain barrier to produce a pharmacological response.

[00257] The term “undesired psychoactive side effects” as used herein, refers to unintended effects in the brain including, but not limited to, anxiety, depression, hallucination, euphoria, addiction, sleep disorder/disturbances, insomnia, abnormal dreams, and nightmares.

[00258] The term “undesired systemic side effects” as used herein, refers to unintended effects in the body including, but not limited to, abdominal pain, vomiting, nausea, constipation, diarrhea, flatulence, dyspepsia, and dry mouth.

[00259] The term “formulated to prevent desensitization” as used herein, refers to a formulation that does not result in tolerance, dependence, withdrawal, or loss of sensitivity to the effect of the nicotinic acetylcholine receptor agonist (i.e. compound of Formula (I), (II), (IIIa), or (IIIb)).

R_2 is a bond or -CH_2-;

R_3 is hydrogen, C_{1-6}alkyl, C_{3-8}cycloalkyl, C_{3-8}heterocycloalkyl, aryl, -C_{1-6}alkyl-(aryl), -aryl-(C_{1-6}alkyl), or heteroaryl; and

R_4 and R_5 are independently hydrogen, C_{1-6}alkyl, C_{3-8}cycloalkyl, C_{3-8}heterocycloalkyl, aryl, -C_{1-6}alkyl-(aryl), -aryl-(C_{1-6}alkyl), or heteroaryl; or R_4 and R_5 together with the nitrogen to which they are attached, form a heterocycloalkyl ring;

or a pharmaceutically acceptable salt thereof.

[00379] Embodiment I-16. The method of any one of Embodiments I-13 to I-15, wherein R_1 is heteroaryl optionally substituted with one to three non-hydrogen substituents independently selected from C_{1-6}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-8}heterocycloalkyl, C_{3-8}cycloalkyl, heteroaryl, aryl, -C_{1-6}alkyl-(aryl), -aryl-(C_{1-6}alkyl), heteroaryl, -C_{1-6}alkyl-(heteroaryl), -heteroaryl-(C_{1-6}alkyl), halogen, -CN, -OR_3, -NR_4R_5, -CF_3, -$C(O)NR_4R_5$, -$NR_4C(O)R_3$, -$C(O)R_3$, -$C(O)OR_3$, -$OC(O)R_3$, -$OC(O)NR_4R_5$, -$NR_4C(O)OR_3$, -SO_2R_3, -$NR_4SO_2R_5$, and -$SO_2NR_4R_5$.

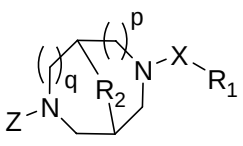
[00380] Embodiment I-17. The method of any one of Embodiments I-13 to I-16, wherein R_1 is 2-furanyl, 3-furanyl, 2-oxazolyl, 4-oxazolyl, 5-oxazolyl, 3-isoxazolyl, 4- isoxazolyl, 5-isoxazolyl, l,3,4-oxadiazol-2-yl, l,2,4-oxadiazol-3-yl, 1,2,4- oxadiazol-5-yl, 2-thiazolyl, 4-thiazolyl, 5-thiazolyl, 3-isothiazolyl, 4-isothiazolyl, 5-isothiazolyl, l,3,4-thiadiazol-2-yl, l,2,4-thiadiazol-3-yl, l,2,4-thiadiazol-5-yl or 4-pyridinyl.

[00381] Embodiment I-18. The method of any one of Embodiments I-13 to I-17, wherein R_2 is a bond.

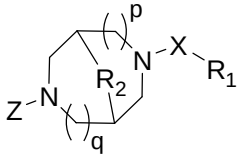
[00382] Embodiment I-19. The method of any one of Embodiments I-13 to I-17, wherein R_2 is -CH_2-.

[00383] Embodiment I-20. The method of any one of Embodiments I-13 to I-17, wherein the compound of Formula (II) is N-(5-chlorofuran-2-ylcarbonyl)-3,7-diazabicyclo[3.3.0]octane.

[00384] Embodiment I-21. A method of increasing tear production, comprising the local administration of a therapeutically effective amount of a compound of Formula (IIIa) or (IIIb) into the nasal cavity of an individual in need thereof, wherein the compound of Formula (IIIa) or (IIIb) binds to the peripheral nicotinic acetylcholine receptor and the compound of Formula (IIIa) or (IIIb) has the structure:



Formula (IIIa)



Formula (IIIb);

wherein:

X is C(O), C(S), or $S(O)_n$;

[00501] Embodiment II-41. The pharmaceutical formulation of Embodiment II-40, wherein the pharmaceutically acceptable salt is a galactarate salt.

[00502] Embodiment II-42. The pharmaceutical formulation of Embodiment II-40, wherein the pharmaceutically acceptable salt is a citrate salt.

[00503] Embodiment II-43. The pharmaceutical formulation of Embodiment II-42, wherein the citrate salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine mono-citrate salt.

[00504] Embodiment II-44. The pharmaceutical formulation of any one of Embodiments II-38 to II-43 wherein the pharmaceutical formulation is formulated for administration of a dose between 500 micrograms and 10 milligrams per dose.

[00505] Embodiment II-45. The pharmaceutical formulation of any one of Embodiments II-38 to II-44 wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is formulated in a dosage amount that is not systemically bioavailable.

[00506] Embodiment II-46. The pharmaceutical formulation of any one of Embodiments II-38 to II-44, wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is formulated in a dosage amount that does not result in undesired systemic side effects.

[00507] Embodiment II-47. The pharmaceutical formulation of any one of Embodiments II-38 to II-46, further comprising one or more substances selected from the group consisting of protein kinase C (PKC) or factors that upregulate or up-modulate PKC, cAMP-dependent protein kinase (PKA) or factors that upregulate or up-modulate PKA, and calcineurin inhibitors.

[00508] Embodiment II-48. The pharmaceutical formulation of Embodiment II-47, wherein the calcineurin inhibitor is selected from the group consisting of cyclosporine, pimecrolimus, and tacrolimus.

[00509] Embodiment II-49. The pharmaceutical formulation of any one of Embodiments II-38 to II-48, wherein the pharmaceutical formulation does not contain nicotine in any form.

[00510] Embodiment II-50. The pharmaceutical formulation of any one of Embodiments II-38 to II-49, wherein the pharmaceutical formulation comprises between 5 mg/mL and 200 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

[00511] Embodiment II-51. The pharmaceutical formulation of Embodiment II-50, wherein the pharmaceutical formulation comprises between 10 mg/mL and 75 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

[00512] Embodiment II-52. The pharmaceutical formulation of Embodiment II-51, wherein the pharmaceutical formulation comprises between 10 mg/mL and 50 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

[00513] Embodiment II-53. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising between 500 micrograms and 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00514] Embodiment II-54. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising less than 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00515] Embodiment II-55. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising between 1 milligram and 3 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00516] Embodiment II-56. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising between 1 milligram and 2 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00517] Embodiment II-57. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising about 1 milligram of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00518] Embodiment II-58. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising about 1.5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00519] Embodiment II-59. The pharmaceutical formulation of any one of Embodiments II-38 to II-52, comprising about 2 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

[00520] Embodiment II-60. The pharmaceutical formulation of any one of Embodiments II-38 to II-59, wherein the pharmaceutical formulation is formulated for administration as needed in response to symptoms.

[00521] Embodiment II-61. The pharmaceutical formulation of any one of Embodiments II-38 to II-59, wherein the pharmaceutical formulation is formulated for administration at least once daily.

[00522] Embodiment II-62. The pharmaceutical formulation of any one of Embodiments II-38 to II-59, wherein the pharmaceutical formulation is formulated for administration at least twice daily.

[00523] Embodiment II-63. The pharmaceutical formulation of any one of Embodiments II-38 to II-59, wherein the pharmaceutical formulation is formulated for administration at least once weekly.

CLAIMS

1. Use of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for the treatment of dry eye, wherein the medicament is to be administered via local nasal administration to an individual in need thereof.

2. The use of claim 1, wherein the dry eye results from Lasik surgery.

3. Use of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for increasing tear production in an individual with an acute condition resulting from an ophthalmologic surgical procedure or ophthalmalogic treatment, wherein the medicament is to be administered via local nasal administration to the individual.

4. The use of claim 3, wherein the ophthalmologic surgical procedure or ophthalmalogic treatment is Lasik surgery.

5. The use according to any one of claims 1-4, wherein the pharmaceutically acceptable salt is a galactarate or citrate salt of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine.

6. The use according to any one of claims 1-5, wherein the pharmaceutically acceptable salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine mono-citrate.

7. The use according to any one of claims 1-5, wherein the pharmaceutically acceptable salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine hemigalactarate.

8. The use according to any one of claims 1-5, wherein the pharmaceutically acceptable salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine hemigalactarate dihydrate or (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine hemigalactarate monohydrate.

9. The use according to any one of claims 1-8, wherein between 1 microgram and 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, are to be administered to the individual.

10. The use according to any one of claims 1-8, wherein between 1 microgram and 3 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, are to be administered to the individual.

11. The use according to any one of claims 1-8, wherein between 1 microgram and 2 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, are to be administered to the individual.

12. The use according to any one of claims 1-8, wherein between 100 micrograms and 1000 micrograms of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, are to be administered to the individual.

13. The use according to any one of claims 1-8, wherein between 150 micrograms and 1000 micrograms of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, are to be administered to the individual.

14. The use according to any one of claims 1-8, wherein between 500 micrograms and 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, are to be administered to the individual.

15. The use according to any one of claims 1-14, wherein the medicament is to be administered with one or more substances that prevent the entry or reduce the entry of the nicotinic acetylcholine receptor into the desensitized state, or facilitate the recovery of a peripheral nicotinic acetylcholine receptor from the desensitized state.

16. The use according to claim 15, wherein the one or more substances are selected from the group consisting of protein kinase C (PKC) or factors that upregulate or up-modulate

PKC, cAMP-dependent protein kinase (PKA) or factors that upregulate or up-modulate PKA, and calcineurin inhibitors.

17. The use according to claim 16, wherein the calcineurin inhibitor is selected from the group consisting of cyclosporine, pimecrolimus, and tacrolimus.

18. The use according to any one of claims 1-17, wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered at least once daily.

19. The use according to any one of claims 1-17, wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered at least twice daily.

20. The use according to any one of claims 1-19, wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered as a liquid, suspension, aerosol, gel, ointment, dry powder, cream, paste, lotion, or balm.

21. The use according to any one of claims 1-19, wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered as a nasal spray.

22. The use according to any one of claims 1-21, wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered by a syringe, dropper, bottle nebulizer, atomization pump, inhaler, powder spray device, vaporizer, patch, medicated stick, pipette, or jet of liquid.

23. The use according to any one of claims 1-21 wherein (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered by a nasal spray bottle.

24. The use according to any one of claims 1-23, wherein the (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered in a

pharmaceutical formulation for nasal administration comprising between 10 mg/mL and 25 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

25. The use according to any one of claims 1-23, wherein the (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered in a pharmaceutical formulation for nasal administration comprising between 5 mg/mL and 50 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

26. The use according to any one of claims 1-23, wherein the (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered in a pharmaceutical formulation for nasal administration comprising about 5 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

27. The use according to any one of claims 1-23, wherein the (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, is to be administered in a pharmaceutical formulation for nasal administration comprising about 10 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

28. Use of a pharmaceutical formulation comprising (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for the treatment of dry eye, wherein the medicament is to be administered via local nasal administration to an individual in need thereof.

29. The use of claim 28, wherein the dry eye results from Lasik surgery.

30. Use of a pharmaceutical formulation comprising (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for increasing tear production in an individual with an acute condition resulting from an ophthalmologic surgical procedure or ophthalmalogic treatment, wherein the medicament is to be administered via local nasal administration to the individual.

31. The use of claim 30, wherein the ophthalmologic surgical procedure or ophthalmalogic treatment is Lasik surgery.

32. The use according to any one of claims 28-31, wherein the pharmaceutically acceptable salt is a galactarate or citrate salt.

33. The use according to any one of claims 28-32, wherein the pharmaceutically acceptable salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine mono-citrate.

34. The use according to any one of claims 28-32, wherein the pharmaceutically acceptable salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine hemigalactarate.

35. The use according to any one of claims 28-32, wherein the pharmaceutically acceptable salt is (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine hemigalactarate dihydrate or (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine hemigalactarate monohydrate.

36. The use according to any one of claims 28-35, comprising between 1 microgram and 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

37. The use according to any one of claims 28-35, comprising between 1 microgram and 3 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

38. The use according to any one of claims 28-35, comprising between 1 microgram and 2 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

39. The use according to any one of claims 28-35, comprising between 100 micrograms and 1000 micrograms of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

40. The use according to any one of claims 28-35, comprising between 150 micrograms and 1000 micrograms of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

41. The use according to any one of claims 28-35, comprising between 500 micrograms and 5 milligrams of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof, per dose.

42. The use according to any one of claims 28-41, wherein the medicament is a liquid, suspension, aerosol, gel, ointment, dry powder, cream, paste, lotion, or balm.

43. The use according to any one of claims 28-41, wherein the medicament is a nasal spray.

44. The use according to any one of claims 28-43, wherein the medicament is provided in conjunction with a syringe, dropper, bottle nebulizer, atomization pump, inhaler, powder spray device, vaporizer, patch, medicated stick, pipette, or jet of liquid.

45. The use according to any one of claims 28-43, wherein the medicament is provided in conjunction with a nasal spray bottle.

46. The use according to any one of claims 28-45, wherein the medicament comprises between 10 mg/mL and 25 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

47. The use according to any one of claims 28-45, wherein the medicament comprises between 5 mg/mL and 50 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

48. The use according to any one of claims 28-45, wherein the medicament comprises about 5 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

49. The use according to any one of claims 28-45, wherein the medicament comprises about 10 mg/mL of (R)-5-((E)-2-pyrrolidin-3-ylvinyl)pyrimidine, or a pharmaceutically acceptable salt thereof.

50. The use according to any one of claims 1-49, wherein the medicament is to be administered in alternating nostrils in the individual.

51. The use according to any one of claims 1-50, wherein the medicament is preservative-free.