

modulators, adenosine and adenosine receptor and nucleoside transporter modulators, cannabinoids, orexins, melatonin agonists, ampakines, sodium oxybate, modafinil, and armodafinil.

16. The composition of claim 15, wherein the compound and the additional agent are physically mixed or physically separated in the composition.

17. The composition of claim 14, further comprising at least one additional agent that causes changes in breathing control.

18. The composition in claim 17, wherein the additional agent is at least one selected from the group consisting of opioid narcotics, benzodiazepines, sedatives, sleeping aids, hypnotics, propofol, and any combinations thereof.

19. The composition of claim 14, wherein the compound is coated onto a base particle so as to form a core.

20. The composition of claim 19, wherein the base particle is not enterically coated and the composition is contained in a pharmaceutically acceptable capsule that is enterically coated.

21. The composition of claim 19, wherein the core is coated with an enteric coating, thereby forming an enterically coated bead.

22. The composition of claim 21, wherein the enterically coated bead is contained in a pharmaceutically acceptable capsule.

23. The composition of claim 22, wherein the capsule contains beads coated with a plurality of enteric coatings, so that the capsule provides delivery of the compound to different regions of the intestine of the subject.

24. The composition of claim 22, wherein the contents of the capsule are dissolved or suspended in a pharmaceutically acceptable liquid as to provide a liquid-filled capsule.

25. The composition of claim 24, wherein the capsule is enterically coated but the liquid formulation contained within does not comprise an enteric coating.

26. A method of preventing or treating a breathing control disorder or disease in a subject in need thereof, the method comprising administering to the subject an effective amount of at least one compound of any of claims 1-4 or a salt, solvate, enantiomer, diastereoisomer or tautomer thereof.

27. The method of claim 26, wherein the breathing control disorder or disease is at least one selected from the group consisting of respiratory depression, sleep apnea, apnea of prematurity, obesity-hypoventilation syndrome, primary alveolar hypoventilation syndrome, dyspnea, altitude sickness, hypoxia, hypercapnia, chronic obstructive pulmonary disease (COPD), sudden infant death syndrome (SIDS), congenital central hypoventilation syndrome, Alzheimer's disease, Parkinson's disease, stroke, Duchenne muscular dystrophy, and brain and spinal cord traumatic injury.

28. The method of claim 27, wherein the respiratory depression is caused by an anesthetic, a sedative, a sleeping aid, an anxiolytic agent, a hypnotic agent, alcohol or a narcotic.

29. The method of claim 26, wherein the subject is further administered at least one agent useful for treating the breathing disorder or disease.

30. The method of claim 29, wherein the agent is at least one selected from the group consisting of doxapram, acetazolamide, almitrine, theophylline, caffeine, methylprogesterone and related compounds, sedatives that increase arousal threshold in sleep disordered breathing patients, benzodiazepine receptor agonists, orexin antagonists, tricyclic antidepressants, serotonergic modulators, adenosine and adenosine receptor and nucleoside transporter modulators, cannabinoids, orexins, melatonin agonists, ampakines, sodium oxybate, modafinil, and armodafinil.

31. The method of claim 29, wherein the compound and the agent are separately administered to the subject.

32. The method of claim 29, wherein the compound and the agent are co-administered to the subject, further wherein the compound and the agent are physically mixed or physically separated when administered to the subject.

33. The method of claim 26, wherein the subject is further administered at least one additional therapeutic agent that changes normal breathing control in the subject.

34. The method of claim 33, wherein that at least one additional agent is selected from the group consisting of opioid narcotics, benzodiazepines, sedatives, sleeping aids, hypnotics, propofol, and any combinations thereof.

35. The method of claim 26, wherein the compound is administered in conjunction with the use of a mechanical ventilation device or positive airway pressure device on the subject.

36. The method of claim 26, wherein the subject is a mammal or bird.

37. The method of claim 36, wherein the mammal is a human.

38. The method of claim 26, wherein the compound is administered to the subject by at least one route selected from the group consisting of nasal, inhalational, topical, oral, buccal, rectal, pleural, peritoneal, vaginal, intramuscular, subcutaneous, transdermal, epidural, intrathecal and intravenous routes.

39. The method of claim 26, wherein the at least one compound is selected from the group consisting of:

2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (4);

2-[(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-yl)-methyl-amino]-ethanol (6);

3-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-propan-1-ol (8);

1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-2-ol (10);

(S)-1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-propan-2-ol (**12**);

(R)-1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-propan-2-ol (**14**);

2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-2-methylpropan-1-ol (**16**);

(S)-2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-1-ol (**18**);

(R)-2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-1-ol (**20**);

3-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-1,1,1-trifluoro-propan-2-ol (**22**);

1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-butan-2-ol (**24**);

3-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-butan-2-ol (**26**);

2-(2,6-Bis-ethylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (**27**);

2-[8-Propylamino-2,6-bis-(2,2,2-trifluoro-ethylamino)-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (**28**);

1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-2-methylpropan-2-ol (**31**);

1-(2,6-Bis-ethylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-2-methylpropan-2-ol (**32**);

1-[2,6-Bis-(2,2-difluoro-ethylamino)-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-2-methyl-propan-2-ol (**33**);

2-Methyl-1-[8-propylamino-2,6-bis-(2,2,2-trifluoro-ethylamino)-pyrimido[5,4-d]pyrimidin-4-ylamino]-propan-2-ol (**34**);

1-[8-(2,2-difluoro-ethylamino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-2-methyl-propan-2-ol (**36**);

1-{2,6-bis-methylamino-8-[(pyrimidin-2-ylmethyl)-amino]-pyrimido[5,4-d]pyrimidin-4-ylamino}-2-methyl-propan-2-ol (**38**);

1-[8-((R)-*sec*-butylamino)-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-2-methyl-propan-2-ol (**40**);

1-[8-((S)-*sec*-butylamino)-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-2-

methyl-propan-2-ol (42)

1-(8-benzylamino-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-2-methyl-propan-2-ol (44)

1-[8-(cyclopropylmethyl-amino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-2-methyl-propan-2-ol (46)

1-[8-(2,2-difluoro-ethylamino)-2,6-bis-ethylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-2-methyl-propan-2-ol (47)

2-methyl-1-(2,6,8-tris-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-2-ol (48)

2-methyl-1-(2,6,8-tris-ethylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-2-ol (49)

2-(2,6,8-tris-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (52)

2-[8-(cyclopropylmethyl-amino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (54)

2-[8-(2-methoxy-ethylamino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (56)

2-(2,6-bis-methylamino-8-prop-2-ynylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (58)

2-[8-(2,2-difluoro-ethylamino)-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-ethanol (60)

2-[2,6-bis-methylamino-8-(2,2,2-trifluoro-ethylamino)-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (62)

2-(8-benzylamino-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-ethanol (64)

3-(8-ethylamino-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-1-ol (67)

1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-yl)-pyrrolidin-3-ol (71)

1-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-methyl]-cyclobutanol (72)

1-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-yl)-methyl-amino]-propan-2-ol (73)

3-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-methyl]-pentan-3-ol (74)

1-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-yl)-methyl-amino]-2-methyl-propan-2-ol (76)

(1R,2S)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-2-ol (77)

(1S,2S)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-2-ol (**78**)

(1S,2R)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-indan-2-ol (**79**)

(1R,2R)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-2-ol (**80**)

(2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-1-ol (**81**)

(1R,2S)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**82**)

(1S,2S)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**83**)

(1S,2R)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**84**)

(1R,2R)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**85**)

(1S,2S)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclopentanol (**86**)

(1R,2R)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclopentanol (**87**)

2-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-ethanol (**90**)

2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-ethanol (**91**)

2-(6-dimethylamino-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-ethanol (**92**)

1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-2-methylpropan-2-ol (**94**)

1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-propan-2-ol (**95**)

1-[(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-yl)-methyl-amino]-2-methylpropan-2-ol (**96**)

1-[(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-yl)-methyl-amino]-propan-2-ol (**97**)

1-[6-((R)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-2-

methyl-propan-2-ol (**99**)

(R)-1-[6-((R)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**100**)

(S)-1-[6-((R)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**101**)

1-[6-((S)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-2-methyl-propan-2-ol (**103**)

(R)-1-[6-((S)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**104**)

(S)-1-[6-((S)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**105**)

1-[6-(2,2-difluoro-ethylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-2-methyl-propan-2-ol (**107**)

1-{4,8-bis-methylamino-6-[(pyrimidin-2-ylmethyl)-amino]-pyrimido[5,4-d]pyrimidin-2-ylamino}-2-methyl-propan-2-ol (**109**)

3-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-1,1,1-trifluoro-propan-2-ol (**111**)

(S)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**113**)

(R)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**115**)

1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-butan-2-ol (**117**)

3-(4,8-Bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-butan-2-ol (**119**)

(1R,2S)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**123**)

(1S,2S)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**125**)

(1S,2R)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**127**)

(1R,2R)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**129**)

(1R,2S)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-

cyclohexanol (**131**)

(1S,2S)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**133**)

(1S,2R)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**135**)

(1R,2R)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**137**)

(1S,2S)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclopentanol (**139**)

(1R,2R)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclopentanol (**141**)

(S)-1-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**142**)

(S)-1-(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**143**)

(R)-1-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**144**)

(R)-1-(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**145**)

1-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-butan-2-ol (**146**)

1-(6-ethylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-butan-2-ol (**147**)

2-methyl-1-(4,6,8-tris-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**149**)

2-(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-ethanol (**154**)

(S)-1-[(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-yl)-propyl-amino]-propan-2-ol (**155**)

(S)-1-[(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-yl)-methyl-amino]-propan-2-ol (**156**)

(R)-1-[6-(2-methyl-allylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**158**)

(S)-1-[6-(2-methyl-allylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**159**)

2-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-ethanol (**162**)

1-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-2-methyl-

propan-2-ol (**163**)

(S)-1-(4,6,8-Tris-ethylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**165**)

(S)-1-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-propan-2-ol (**166**)

(R)-1-(4,6,8-tris-ethylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**168**)

(R)-1-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-propan-2-ol (**169**)

(R)-1-[4,8-bis-ethylamino-6-(2-methyl-allylamino)-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**174**)

(S)-1-[4,8-bis-ethylamino-6-(2-methyl-allylamino)-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**175**)

a salt, solvate, enantiomer, diastereoisomer or tautomer thereof; and any combinations thereof.

40. The method of claim 26, wherein the salt comprises an acid addition salt, and the acid is at least one selected from the group consisting of sulfuric, hydrochloric, hydrobromic, hydroiodic, nitric, carbonic, phosphoric, formic, acetic, propionic, succinic, glycolic, gluconic, lactic, malic, tartaric, citric, ascorbic, glucuronic, maleic, fumaric, pyruvic, aspartic, glutamic, benzoic, anthranilic, 4-hydroxybenzoic, phenylacetic, mandelic, pantoic, methanesulfonic, ethanesulfonic, benzenesulfonic, pantothenic, sulfanilic, stearic, alginic, trifluoromethanesulfonic, 2-hydroxyethanesulfonic, *p*-toluenesulfonic, cyclohexylaminosulfonic, β -hydroxybutyric, salicylic, galactaric and galacturonic, and any combinations thereof.

41. A method of preventing destabilization or stabilizing breathing rhythm in a subject in need thereof, the method comprising administering to the subject an effective amount of at least one pharmaceutically acceptable carrier and at least one compound of any of claims 1-4, or a salt, solvate, enantiomer, diastereoisomer or tautomer thereof.

42. The method of claim 41, wherein the destabilization is associated with a breathing control disorder or disease selected from the group consisting of respiratory depression, sleep apnea, apnea of prematurity, obesity-hypoventilation syndrome, primary alveolar hypoventilation syndrome, dyspnea, altitude sickness, hypoxia, hypercapnia, chronic obstructive pulmonary disease (COPD), sudden infant death syndrome (SIDS), congenital

central hypoventilation syndrome, Alzheimer's disease, Parkinson's disease, stroke, Duchenne muscular dystrophy, and brain and spinal cord traumatic injury.

43. The method of claim 42, wherein the respiratory depression is caused by an anesthetic, a sedative, a sleeping aid, an anxiolytic agent, a hypnotic agent, alcohol or a narcotic.

44. The method of claim 41, wherein the subject is further administered at least one agent useful for treating the breathing disorder or disease.

45. The method of claim 44, wherein the agent is selected from the group consisting of doxapram, acetazolamide, almitrine, theophylline, caffeine, methylprogesterone and related compounds, sedatives that increase arousal threshold in sleep disordered breathing patients, benzodiazepine receptor agonists, orexin antagonists, tricyclic antidepressants, serotonergic modulators, adenosine and adenosine receptor and nucleoside transporter modulators, cannabinoids, orexins, melatonin agonists, ampakines, sodium oxybate, modafinil, and armodafinil.

46. The method of claim 44, wherein the compound and the agent are separately administered to the subject.

47. The method of claim 44, wherein the compound and the agent are co-administered to the subject, further wherein the compound and the agent are physically mixed or physically separated when administered to the subject.

48. The method of claim 41, wherein the subject is further administered at least one additional therapeutic agent that changes normal breathing control in the subject.

49. The method of claim 48, wherein the additional agent is at least one selected from the group consisting of opioid narcotics, benzodiazepines, sedatives, sleeping aids, hypnotics, propofol, and any combinations thereof.

50. The method of claim 41, wherein the compound is administered in conjunction with the use of a mechanical ventilation device or positive airway pressure

device on the subject.

51. The method of claim 41, wherein the subject is a mammal or bird.

52. The method of claim 41, wherein the compound is administered to the subject by at least one route selected from the group consisting of nasal, inhalational, topical, oral, buccal, rectal, pleural, peritoneal, vaginal, intramuscular, subcutaneous, transdermal, epidural, intrathecal and intravenous routes.

53. The method of claim 41, wherein the compound is selected from the group consisting of:

2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (**4**);

2-[(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-yl)-methyl-amino]-ethanol (**6**);

3-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-propan-1-ol (**8**);

1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-2-ol (**10**);

(S)-1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-propan-2-ol (**12**);

(R)-1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-propan-2-ol (**14**);

2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-2-methyl-propan-1-ol (**16**);

(S)-2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-1-ol (**18**);

(R)-2-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-1-ol (**20**);

3-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-1,1,1-trifluoro-propan-2-ol (**22**);

1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-butan-2-ol (**24**);

3-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-butan-2-ol (**26**);

2-(2,6-Bis-ethylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (**27**);

2-[8-Propylamino-2,6-bis-(2,2,2-trifluoro-ethylamino)-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (**28**);

1-(2,6-Bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-2-methylpropan-2-ol (**31**);

1-(2,6-Bis-ethylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-2-methylpropan-2-ol (**32**);

1-[2,6-Bis-(2,2-difluoro-ethylamino)-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-2-methylpropan-2-ol (**33**);

2-Methyl-1-[8-propylamino-2,6-bis-(2,2,2-trifluoro-ethylamino)-pyrimido[5,4-d]pyrimidin-4-ylamino]-propan-2-ol (**34**);

1-[8-(2,2-difluoro-ethylamino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-2-methylpropan-2-ol (**36**)

1-{2,6-bis-methylamino-8-[(pyrimidin-2-ylmethyl)-amino]-pyrimido[5,4-d]pyrimidin-4-ylamino}-2-methylpropan-2-ol (**38**)

1-[8-((R)-*sec*-butylamino)-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-2-methylpropan-2-ol (**40**)

1-[8-((S)-*sec*-butylamino)-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-2-methylpropan-2-ol (**42**)

1-(8-benzylamino-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-2-methylpropan-2-ol (**44**)

1-[8-(cyclopropylmethyl-amino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-2-methylpropan-2-ol (**46**)

1-[8-(2,2-difluoro-ethylamino)-2,6-bis-ethylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-2-methylpropan-2-ol (**47**)

2-methyl-1-(2,6,8-tris-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-2-ol (**48**)

2-methyl-1-(2,6,8-tris-ethylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-2-ol (**49**)

2-(2,6,8-tris-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (**52**)

2-[8-(cyclopropylmethyl-amino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (**54**)

2-[8-(2-methoxy-ethylamino)-2,6-bis-methylamino-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (**56**)

2-(2,6-bis-methylamino-8-prop-2-ynylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-ethanol (**58**)

2-[8-(2,2-difluoro-ethylamino)-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino]-ethanol (**60**)

2-[2,6-bis-methylamino-8-(2,2,2-trifluoro-ethylamino)-pyrimido[5,4-d]pyrimidin-4-ylamino]-ethanol (**62**)

2-(8-benzylamino-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-ethanol (**64**)

3-(8-ethylamino-2,6-bis-methylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-propan-1-ol (**67**)

1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-yl)-pyrrolidin-3-ol (**71**)

1-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-methyl]-cyclobutanol (**72**)

1-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-yl)-methyl-amino]-propan-2-ol (**73**)

3-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-methyl]-pentan-3-ol (**74**)

1-[(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-yl)-methyl-amino]-2-methyl-propan-2-ol (**76**)

(1R,2S)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-2-ol (**77**)

(1S,2S)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-2-ol (**78**)

(1S,2R)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-indan-2-ol (**79**)

(1R,2R)-1-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-2-ol (**80**)

(2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]-pyrimidin-4-ylamino)-indan-1-ol (**81**)

(1R,2S)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**82**)

(1S,2S)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**83**)

(1S,2R)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**84**)

(1R,2R)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclohexanol (**85**)

(1S,2S)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclopentanol (**86**)

(1R,2R)-2-(2,6-bis-methylamino-8-propylamino-pyrimido[5,4-d]pyrimidin-4-ylamino)-cyclopentanol (**87**)

2-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-ethanol (**90**)

2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-ethanol (**91**)

2-(6-dimethylamino-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-ethanol (**92**)

1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-2-methylpropan-2-ol (**94**)

1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-propan-2-ol (**95**)

1-[(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-yl)-methyl-amino]-2-methylpropan-2-ol (**96**)

1-[(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-yl)-methyl-amino]-propan-2-ol (**97**)

1-[6-((R)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-2-methylpropan-2-ol (**99**)

(R)-1-[6-((R)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**100**)

(S)-1-[6-((R)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**101**)

1-[6-((S)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-2-methylpropan-2-ol (**103**)

(R)-1-[6-((S)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**104**)

(S)-1-[6-((S)-*sec*-butylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**105**)

1-[6-(2,2-difluoro-ethylamino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-2-methylpropan-2-ol (**107**)

1-{4,8-bis-methylamino-6-[(pyrimidin-2-ylmethyl)-amino]-pyrimido[5,4-d]pyrimidin-2-ylamino}-2-methylpropan-2-ol (**109**)

3-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-1,1,1-trifluoro-

propan-2-ol (**111**)

(S)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**113**)

(R)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**115**)

1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-butan-2-ol (**117**)

3-(4,8-Bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-butan-2-ol (**119**)

(1R,2S)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**123**)

(1S,2S)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**125**)

(1S,2R)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**127**)

(1R,2R)-1-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-indan-2-ol (**129**)

(1R,2S)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**131**)

(1S,2S)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**133**)

(1S,2R)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**135**)

(1R,2R)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclohexanol (**137**)

(1S,2S)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclopentanol (**139**)

(1R,2R)-2-(4,8-bis-methylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-cyclopentanol (**141**)

(S)-1-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-propan-2-ol (**142**)

(S)-1-(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**143**)

(R)-1-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-

ylamino]-propan-2-ol (**144**)

(R)-1-(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**145**)

1-[6-(cyclopropylmethyl-amino)-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino]-butan-2-ol (**146**)

1-(6-ethylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-butan-2-ol (**147**)

2-methyl-1-(4,6,8-tris-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**149**)

2-(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-ethanol (**154**)

(S)-1-[(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-yl)-propyl-amino]-propan-2-ol (**155**)

(S)-1-[(6-allylamino-4,8-bis-methylamino-pyrimido[5,4-d]pyrimidin-2-yl)-methyl-amino]-propan-2-ol (**156**)

(R)-1-[6-(2-methyl-allylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**158**)

(S)-1-[6-(2-methyl-allylamino)-4,8-bis-methylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**159**)

2-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-ethanol (**162**)

1-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-2-methyl-propan-2-ol (**163**)

(S)-1-(4,6,8-Tris-ethylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**165**)

(S)-1-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-propan-2-ol (**166**)

(R)-1-(4,6,8-tris-ethylamino-pyrimido[5,4-d]pyrimidin-2-ylamino)-propan-2-ol (**168**)

(R)-1-(4,8-bis-ethylamino-6-propylamino-pyrimido[5,4-d]-pyrimidin-2-ylamino)-propan-2-ol (**169**)

(R)-1-[4,8-bis-ethylamino-6-(2-methyl-allylamino)-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**174**)

(S)-1-[4,8-bis-ethylamino-6-(2-methyl-allylamino)-pyrimido[5,4-d]-pyrimidin-2-ylamino]-propan-2-ol (**175**)

a salt, solvate, enantiomer, diastereoisomer or tautomer thereof; and any combinations thereof.

54. The method of claim 41, wherein the salt comprises an acid addition salt, and the acid is at least one selected from the group consisting of sulfuric, hydrochloric,

hydrobromic, hydroiodic, nitric, carbonic, phosphoric, formic, acetic, propionic, succinic, glycolic, gluconic, lactic, malic, tartaric, citric, ascorbic, glucuronic, maleic, fumaric, pyruvic, aspartic, glutamic, benzoic, anthranilic, 4-hydroxybenzoic, phenylacetic, mandelic, pamoic, methanesulfonic, ethanesulfonic, benzenesulfonic, pantothenic, sulfanilic, stearic, alginic, trifluoromethanesulfonic, 2-hydroxyethanesulfonic, *p*-toluenesulfonic, cyclohexylaminosulfonic, β -hydroxybutyric, salicylic, galactaric and galacturonic, and any combinations thereof.