WHAT IS CLAIMED:

1. A stable co-formulation composition, wherein:

the composition has a pH of between 6.8 to 7.8; and

the composition comprises:

a) a therapeutically effective amount of a fast-acting insulin;

b) a hyaluronan-degrading enzyme in an amount sufficient to render the composition super-fast acting, wherein a super-fast acting insulin composition more closely mimics the endogenous post-prandial insulin release of a nondiabetic subject compared to the fast-acting insulin alone;

c) NaCl at a concentration between 50 mM to 200 mM;

d) an anti-microbially effective amount of a preservative or mixture of preservatives, wherein:

at least one preservative is a phenolic preservative; and

the total amount of the one or more preservative agents as a percentage (%) of mass concentration (w/v) in the formulation is or is between 0.1% and 0.4%, inclusive; and

e) a stabilizing agent or agents,

whereby the composition is stable for at least 6 months at a temperature from 2°C to 8°C, inclusive, and/or for at least 14 days at a temperature from 20°C to 30°C, inclusive.

2. The stable co-formulation of claim 1, wherein the total amount of the one or more preservatives as a percentage (%) of mass concentration (w/v) in the formulation is at least or about at least 0.25% but less than 0.4% total preservative.

3. The stable co-formulation of claim 1 or claim 2, wherein the NaCl concentration is between 80 mM to 200 mM..

4. The stable co-formulation of any of claims 1-3, wherein the NaCl concentration is between 50 mM to 120 mM.

5. The stable co-formulation of any of claims 1-3, wherein the NaCl concentration is between 80 mM to 120 mM.

6. A stable co-formulation composition, wherein:

the composition has a pH of between 6.5 to 7.5;

the composition comprises:

a) a therapeutically effective amount of a fast-acting insulin;

b) a hyaluronan-degrading enzyme in an amount sufficient to render the composition super-fast acting, wherein a super-fast acting insulin composition more closely mimics the endogenous post-prandial insulin release of a nondiabetic subject compared to the fast-acting insulin alone;

c) NaCl at a concentration between 120 mM to 200 mM;

d) an anti-microbially effective amount of a preservative or mixture of preservatives, wherein:

at least one preservative is a phenolic preservative; and

the total amount of the one or more preservative agents as a percentage (%) of mass concentration (w/v) in the formulation is or is between 0.1% and 0.4%, inclusive; and

e) a stabilizing agent or agents;

whereby the composition is stable for at least 3 days at a temperature from 32°C to 40°C, and/or is stable for at least 3 hours under agitation.

7. The stable co-formulation of claim 6, wherein the stabilizing agent comprises a hyaluronidase inhibitor.

8. The stable co-formulation of claim 7, wherein the hyaluronidase inhibitor is a hyaluronidase substrate that is a hyaluronan (HA) oligosaccharide.

9. The stable co-formulation of claim 8, wherein the concentration of HA is between 1 mg/mL to 20 mg/mL.

10. The stable co-formulation of any of claims 6-9, wherein the NaCl concentration is between 150 mM to 200 mM or 160 mM to 180 mM.

11. The stable co-formulation of any of claims 1-10, wherein the hyaluronan-degrading enzyme is a soluble hyaluronidase that is active at neutral pH.

12. The stable co-formulation of claim 11, wherein the soluble hyaluronidase is a PH20 or a C-terminal truncated form thereof.

13. The stable co-formulation of claim 11 or claim 12, wherein the soluble PH20 polypeptide is selected from ovine PH20, bovine PH20 and a soluble human PH20, wherein the soluble human PH20 lacks all or a portion of the glycosylphosphatidylinositol (GPI) anchor attachement sequence.

14. The stable co-formulation of any of claims 1-13, wherein the hyaluronan-degrading enzyme is a PH20 polypeptide that has the sequence of amino acids set forth in any of SEQ ID NOS: 4-9, 47-48, 234-254, and 267-273, or a sequence of amino acids that exhibits at least 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or more sequence identity to any of SEQ ID NOS: 4-9, 47-48, 234-254, and 267-273

15. The stable co-formulation of any of claims 1-14, wherein the hyaluronan-degrading enzyme is a C-terminal truncated PH20 that comprises the sequence of amino acids set forth in any of SEQ ID NOS: 4-9.

16. The stable co-formulation of any of claims 1-15, wherein:

the amount of a hyaluronan-degrading enzyme is between 10 U/mL to 20000 U/mL, 10 U/mL to 15000 U/mL, 10 U/mL to 10000 U/mL, 10 U/mL to 5000 U/mL, 50 U/mL to 10000 U/mL, 50 U/mL to 4000 U/mL, 100 U/mL to 2000 U/mL, 300 U/mL to 2000 U/mL, 600 U/mL to 2000 U/mL, or 100 U/mL to 1000 U/mL; or

the amount of a hyaluronan-degrading enzyme is at least or is 30 U/mL, 35 U/mL, 40 U/mL, 50 U/mL, 100 U/mL, 150 U/mL, 200 U/mL, 250 U/mL, 300 U/mL, 350 U/mL, 400 U/mL, 450 U/mL, 500 U/mL, 600 U/mL, 700 U/mL, 800 U/mL, 900 U/mL, 1000 U/mL, 2000 U/mL, 3000 U/mL, 4000 U/mL, 5000 U/mL, 10000 U/mL, 15000 U/mL or 20000 U/mL.

17. The stable co-formulation of any of claims 1-16, wherein the fast-acting insulin is a regular insulin or is an insulin analog.

18. The stable co-formulation of claim 17, wherein the fast-acting insulin is a regular insulin and the regular insulin is a human insulin or pig insulin.

19. The stable co-formulation of claim 17, wherein the fast-acting insulin is an insulin analog and the insulin analog is selected from among insulin lispro, insulin aspart and insulin glulisine.

20. The stable co-formulation of claim 19, wherein the insulin analog is selected from among an insulin having an A chain with a sequence of amino acids set forth in SEQ NOS:103 and a B chain having a sequence of amino acids set forth in any of SEQ NOS:147-149.

21. The stable co-formulation of any of claims 1-20, wherein the amount of fast-acting insulin is 10 U/mL to 1000 U/mL, 50 U/mL to 500 U/mL, 100 U/mL to 1000 U/mL or 500 U/mL to 1000 U/mL, inclusive.

22. The stable co-formulation of any of claims 1-21, wherein the pH range is maintained by a buffering agent selected from among Tris, histidine, phosphate and citrate.

23. The stable co-formulation of any of claims 1-22 , wherein the phenolic preservative is selected from among phenol, m-cresol, methylparaben, o-cresol, p-cresol, chlorocresol, benzethonium chloride, ethyl paraben, propylparaben, butylparaben and any combinations thereof.

24. The stable co-formulation of any of claims 1-23, wherein the preservative(s) is(are) phenol, m-cresol or phenol and m-cresol.

25. The stable co-formulation of any of claims 1-24, wherein the total amount of the one or more preservative agents as a percentage (%) of mass concentration (w/v) in the formulation is or is between 0.1% to 0.3%, 0.15% to 0.325%, 0.15% to 0.25%, 0.1% to 0.2%, 0.2%to 0.3% or 0.3% to 0.4% inclusive.

26. The stable co-formulation of any of claims 1-25, wherein the preservatives are phenol and m-cresol and the amount as a % of mass concentration (w/v) in the formulation is between 0.1% to 0.25% phenol and between 0.05% to 0.2% m-cresol, is between 0.10% to 0.2% phenol and between 0.6% to 01.8% m-cresol, between 0.1% to 0.15% phenol and 0.8% t 0.15% m-cresol, is between 0.10% to 0.15% phenol and between 0.06 to 0.09% m-cresol or is between 0.12% to 0.18% phenol and between 0.14 to 0.22% m-cresol.

27. The stable co-formulation of any of claims 1-26, wherein the stabilizing agent is selected from among an amino acid, an amino acid derivative, an amine, a sugar, a polyols, a salt and a surfactant.

28. The stable co-formulation of claim 27, wherein the stabilizing agent is selected from among:

an amino acid that is glycine or proline;

an amino acid selected from among arginine, glutamic acid, and/or salts thereof and/or combinations thereof; or

a surfactant selected from among a polypropylene glycol, polyethylene glycol, glycerin, sorbitol, poloxamer and polysorbate.

29. The stable co-formulation of claim 27 or claim 28, wherein the stabilizing agent is a surfactant and the amount of surfactant as a % of mass concentration (w/v) in the formulation is between 0.005% to 1.0%, 0.01% to 0.5%, 0.01% to 0.1%, 0.01% to 0.05%, or 0.01% to 0.02%.

30. The stable co-formulation of any of claims 27-29, wherein the surfactant is selected from among poloxamer 188, polysorbate 20 and polysorbate 80.

31. The stable co-formulations of any of claims 1-30, comprising a tonicity modifier, an antioxidant, zinc or a nicotinic compound.

32. The stable co-formulation of any of claims 1-31, wherein the formulation has a pH of between 7.0 to 7.6, and comprises:

a hyaluronan-degrading enzyme that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

a fast-acting insulin analog in an amount between 10 U/mL to 1000 U/mL, inclusive;

a Tris buffering agent at a concentration of between 10 mM to 50 mM, inclusive;

NaCl at a concentration of between 50 to 200 mM, inclusive;

methionine at a concentration between 5 mM to 50 mM, inclusive;

glycerin at a concentration from between 0 mM to 50 mM, inclusive;

a surfactant that is poloxamer 188, polysorbate 20 or polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.5%; and

a preservative(s) that comprises phenol at a percentage (%) of mass concentration (w/v) of between 0.1% to 0.25% and m-cresol at a % w/v of between or between about 0.05% to 0.2%.

33. The stable co-formulation of claim 32, wherein:

the fast-acting insulin is a fast-acting insulin analog that is insulin lispro,

the formulation has a pH between 7.0 to 7.6; and

the formulation comprises:

a hyaluronan-degrading enzyme that is a PH20 in an amount between or 100 U/mL to 1000 U/mL, inclusive;

insulin lispro in an amount between 10 U/mL to 1000 U/mL, inclusive;

a Tris buffering agent at a concentration of between 25 mM to 35 mM, inclusive;

NaCl at a concentration of between 50 mM to 120 mM, inclusive; methionine at a concentration between 10 mM to 30 mM, inclusive;

glycerin at a concentration from between 40 mM to 60 mM, inclusive;

a surfactant that is poloxamer 188, polysorbate 20 or polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive;

zinc at a concentration of 0.017 to 0.024 mg per 100 units of insulin (mg/100U); and

a preservative(s) that comprises a percentage (%) of mass concentration(w/v) of between 0.08% to 0.17% phenol, inclusive, and between 0.07% to 0.17% m-cresol.

34. The stable co-formulation of claim 32, wherein:

the fast-acting insulin is a fast-acting insulin analog that is insulin aspart,

the formulation has a pH between 7.0 to 7.6; and

the formulation comprises:

a hyaluronan-degrading enzyme that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

insulin aspart in an amount between 10 U/mL to 1000 U/mL, inclusive;

a Tris buffering agent at a concentration of between 25 mM to 35 mM, inclusive;

NaCl at a concentration of between 80 mM to 160 mM, inclusive; methionine at a concentration between 10 mM to 30 mM, inclusive;

glycerin at a concentration from between 20 mM to 50 mM, inclusive;

a surfactant that is poloxamer 188, polysorbate 20 or polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive;

zinc at a concentration of 0.017 to 0.024 mg per 100 units of insulin (mg/100U); and

a preservative(s) that comprises a percentage (%) of mass concentration(w/v) of between 0.08% to 0.17% phenol, inclusive, and between 0.07% to 0.17% m-cresol.

35. The stable co-formulation of claim 32, wherein: the fast-acting insulin is a fast-acting insulin analog that is insulin glulisine;

the formulation has a pH between 7.0 to 7.6; and

the formulation comprises:

a hyaluronan-degrading enzyme that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

insulin glulisine in an amount between 10 U/mL to 1000 U/mL, inclusive;

a Tris buffering agent at a concentration of between 25 mM to 35 mM, inclusive;

NaCl at a concentration of between 80 mM to 200 mM, inclusive;

methionine at a concentration between 10 mM to 30 mM, inclusive;

glycerin at a concentration from between 40 mM to 60 mM, inclusive;

a surfactant that is poloxamer 188 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive; and

a preservative(s) that comprises a percentage (%) of mass concentration(w/v) of between 0.08% to 0.17% phenol, inclusive, and between 0.07% to 0.17% m-cresol.

36. The stable co-formulation of any of claims 1-35 that is formulated for multi-dose administration.

37. A composition, comprising:

a therapeutically effective amount of a hyaluronan-degrading enzyme; and

lysyl lysine (Lys-Lys) in an amount to render the hyaluronan-degrading enzyme stable.

38. The composition of claim 37 wherein the Lys-Lys concentration is between 5 mM to 120 mM, 10 mM to 100 mM, 5 mM to 50 mM, 10 mM to 50 mM, 30 mM to 110 mM, 30 mM to 80 mM, 50 mM to 100 mM or 100 mM to 120 mM.

39. The composition of claim 37 or claim 38, wherein the pH of the formulation is between 6.5 to 8.0, 6.5 to 7.4, 6.8 to 7.8, 7.0 to 7.6 or 6.8 to 7.2, inclusive.

40. The composition of any of claims 37-39, wherein the formulation further comprises a stabilizing agent selected from among an amino acid, an amino acid derivative, an amine, a sugar, a polyol, a salt and a surfactant.

41. The composition of claim 40, wherein the stabilizing agent is a surfactant and the amount of surfactant, as a % of mass concentration (w/v) in the formulation, is between 0.0005% to 1.0%, 0.0005% to 0.005%, 0.001% to 0.01%, 0.01% to 0.5%, 0.01% to 0.1%, 0.01% to 0.05%, or 0.01% to 0.02%, inclusive.

42. The composition of claim 40 or claim 41, wherein the surfactant is selected from among a polypropylene glycol, polyethylene glycol, glycerin, sorbitol, poloxamer and polysorbate.

43. The composition of any of claims 40-42, wherein the surfactant is selected from among poloxamer 188, polysorbate 20 and polysorbate 80.

44. The composition of any of claims 37-43, wherein the composition comprises an antioxidant or a tonicity modifier.

45. The composition of any of claims 37-44, comprising a sufficient amount of a buffering agent to maintain the pH range of between 6.5 to 8.0, 6.8 to 7.8, 7.0 to 7.6, 6.5 to 7.2, or 6.8 to 7.4, inclusive, wherein the buffering agent is selected from among Tris, histidine, phosphate and citrate.

46. The composition of any of claims 37-45, wherein the hyaluronan-degrading enzyme is a soluble hyaluronidase that is active at neutral pH.

47. The composition of claim 46, wherein the soluble hyaluronidase is a PH20 or a C-terminally truncated fragment thereof.

48. The composition of claim 46 or claim 47, wherein the soluble PH20 polypeptide is selected from ovine PH20, bovine PH20 and a soluble human PH20, wherein the soluble human PH20 lacks all or a portion of the glycosylphosphatidylinositol (GPI) anchor attachement sequence.

49. The composition of any of claims 37-48, wherein the hyaluronan-degrading enzyme is a PH20 polypeptide that has the sequence of amino acids set forth in any of SEQ ID NOS: 4-9, 47-48, 234-254, and 267-273, or a sequence of amino acids that exhibits at least 70%, 75%, 80%, 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or more sequence identity to any of SEQ ID NOS: 4-9, 47-48, 234-254, and 267-273.

50. The composition of any of claims 37-49, wherein the hyaluronan-degrading enzyme is a C-terminal truncated PH20 that comprises the sequence of amino acids set forth in any of SEQ ID NOS: 4-9.

51. The composition of any of claims 37-50, wherein:

the amount of a hyaluronan-degrading enzyme is between 10 U/mL to 20,000 U/mL, 50 U/mL to 15,000 U/mL, 50 U/mL to 10,000 U/mL, 50 U/mL to 5000 U/mL, 50 U/mL to 4000 U/mL, 100 U/mL to 10000 U/mL, 100 U/mL to 5000 U/mL, 100 U/mL to 2000 U/mL, 300 U/mL to 5000 U/mL, 300 U/mL to 2000 U/mL, 600 U/mL to 5000 U/mL, 600 U/mL to 2000 U/mL, 100 U/mL to 1000 U/mL, 200 U/mL to 800 U/mL, 100 U/mL to 500 U/mL, or 150 U/mL to 300 U/ml, inclusive; or

the amount of a hyaluronan-degrading enzyme is at least or is 30 U/mL, 35 U/mL, 40 U/mL, 50 U/mL, 100 U/mL, 150 U/mL, 200 U/mL, 250 U/mL, 300 U/mL, 350 U/mL, 400 U/mL, 450 U/mL, 500 U/mL, 600 U/mL, 700 U/mL, 800 U/mL, 900 U/mL, 1000 U/mL, 2000 U/mL, 3000 U/mL, 4000 U/mL, 5000 U/mL, 10000 U/mL, 15000 U/mL or 20000 U/mL.

52. The composition of any of claims 37-51, wherein:

the pH of the composition is between 6.5 to 7.2;

and the composition comprises:

a hyaluronan-degrading enzyme in an amount that is between 100 U/mL to 500 U/mL, inclusive;

Lys-Lys at a concentration that is between 5 mM to 30 mM, inclusive;

NaCl at a concentration less than 140 mM NaCl;

a surfactant that is polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive;

methionine at a concentration that is between 5 mM to 20 mM, inclusive; and

sodium phosphate at a concentration that is between 5 mM to 50 mM, inclusive.

53. The composition of any of claims 37-52, further comprising a fast-acting insulin.

54. The composition of claim 53, wherein the concentration of Lys-Lys is 30 mM to 120 mM, 50 mM to 105 mM or 80 mM to 100 mM, inclusive.

55. The composition of claim 53 or claim 54, wherein the fast-acting insulin is a regular insulin or an insulin analog.

56. The composition of claim 55, wherein the fast-acting insulin is a regular insulin and the regular insulin is a human insulin or pig insulin.

57. The composition of claim 55, wherein the fast-acting insulin is an insulin analog and the insulin analog is selected from among insulin aspart, insulin lispro and insulin glulisine.

58. The composition of claim 57, wherein the insulin analog is selected from among an insulin having an A chain with a sequence of amino acids set forth in SEQ NOS:103 and a B chain having a sequence of amino acids set forth in any of SEQ NOS:147-149.

59. The composition of any of claims 53-58, wherein the amount of fast-acting insulin is between 10 U/mL to 1000 U/mL, 20 U/mL to 500 U/mL, 50 U/mL to 300 U/mL or 200 U/mL to 800 U/mL, inclusive.

60. The composition of any of claims 37-59 that is for single dosage administration or is for multiple dosage administration.

61. The composition of claim 60, wherein the composition is for multiple dosage administration and comprises an anti-microbially effective amount of a preservative or mixture of preservatives.

62. The composition of any of claims 37-61, wherein:

the pH of the composition is between 6.8 to 7.4; and

the composition comprises:

a hyaluronan-degrading enzyme that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

a fast-acting insulin analog that is insulin glulisine is an amount between 10 U/mL to 1000 U/mL, inclusive;

Lys-Lys at a concentration between 50 mM to 105 mM, inclusive;

NaCl at a concentration of less than 100 mM;

a surfactant that is polysorbate 20 at a percentage (%) of mass concentration (w/v) of between 0.0005% to 0.005%, inclusive;

methionine at a concentration between 5 mM to 20 mM, inclusive; and

a preservative(s) that comprises phenol at a percentage (%) of mass concentration (w/v) of between 0.1% to 0.25% and m-cresol at a % w/v of between 0.05% to 0.2%.

63. The composition of any of claims 37-61, wherein:

the pH of the composition is between 6.8 to 7.4; and

the composition comprises:

a hyaluronan-degrading enzyme that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

a fast-acting insulin analog that is insulin aspart or insulin lispro is an amount between 10 U/mL to 1000 U/mL, inclusive;

Lys-Lys at a concentration between 80 mM to 100 mM, inclusive;

NaCl at a concentration of less than 30 mM;

a surfactant that is polysorbate 20 at a percentage (%) of mass concentration (w/v) of between 0.0005% to 0.005%, inclusive;

methionine at a concentration between 5 mM to 20 mM, inclusive; and

a preservative(s) that comprises phenol at a percentage (%) of mass concentration (w/v) of between 0.1% to 0.25% and m-cresol at a % w/v of between 0.05% to 0.2%.

64. The stable co-formulation or composition of any of claims 1-63, wherein the volume of the composition is between 0.5 mL to 50 mL, 1 mL to 40 mL, 1 mL to 20 mL, 1 mL to 10 mL, or 3 mL to 10 mL, inclusive.

65. The stable co-formulation of any of claims 1-36 or composition of any of claims 53-63 that is formulated for delivery using a vial, syringe, pen, reservoir for a pump, or a closed loop system.

66. The stable co-formulation of any of claims 1-36 or composition of any of claims 53-63 that is formulated for delivery using a continuous subcutaneous insulin infusion.

67. A syringe or vial, comprising the stable co-formulation or composition of any of claims 1-66.

68. A closed loop system, comprising the stable co-formulation of any of claims 1-36 or composition of any of claims 53-66.

69. An insulin pump, comprising the stable co-formulation of any of claims 1-36 or composition of any of claims 53-66.

70. An insulin pen, comprising the stable co-formulation of any of claims 1-36 or composition of any of claims 53-66.

71. A stable co-formulation of any of claims 1-36 or composition of any of claims 53-66 for use in treating diabetes or for use in controlling blood glucose levels in a subject.

72. Use of a stable co-formulation of any of claims 1-36 or composition of any of claims 53-66 for treating diabetes or for controlling blood glucose levels in a subject.

73. Use of stable co-formulation of any of claims 1-36 or composition of any of claims 53-66 for the manufacture of a medicament for treating diabetes or for controlling blood glucose levels in a subject.

74. The stable co-formulation or composition or use of any of claims 71-73, wherein the diabetes is selected from among type 1 diabetes mellitus, type 2 diabetes mellitus and gestational diabetes.

WHAT IS CLAIMED:

1. A stable co-formulation composition, wherein:

the composition has a pH of between 6.8 to 7.8; and

the composition comprises:

a) a therapeutically effective amount of a fast-acting insulin;

b) a hyaluronidase in an amount sufficient to render the composition super-fast acting, wherein a super-fast acting insulin composition more closely mimics the endogenous post-prandial insulin release of a nondiabetic subject compared to the fast-acting insulin alone;

c) NaCl at a concentration between 50 mM to 120 mM, inclusive;

d) an anti-microbially effective amount of an antimicrobial preservative or mixture of antimicrobial preservatives, wherein:

at least one preservative is a phenolic preservative; and

the total amount of the one or more preservative agents as a percentage (%) of mass concentration (w/v) in the formulation is or is between 0.1% and 0.4%, inclusive; and

e) a stabilizing agent or agents,

whereby the composition is stable for at least 6 months at a temperature from 2 °C to 8 °C, inclusive, and/or for at least 14 days at a temperature from 20 °C to 30 °C, inclusive.

2. The stable co-formulation of claim 1, wherein the total amount of the one or more preservatives as a percentage (%) of mass concentration (w/v) in the formulation is at least or about at least 0.25% but less than 0.4% total preservative.

3. The stable co-formulation of claim 1 or claim 2, wherein the NaCl concentration is between 50 mM to 100 mM.

4. The stable co-formulation of any of claims 1-3, wherein the NaCl concentration is between 80 mM to 100 mM.

5. The stable co-formulation of claim 1 or claim 2, wherein the NaCl concentration is between 80 mM to 120 mM.

6. A stable co-formulation composition, wherein:

the composition has a pH of between 6.5 to 7.5;

the composition comprises:

a) a therapeutically effective amount of a fast-acting insulin that is insulin glulisine;

b) a hyaluronidase in an amount sufficient to render the composition super-fast acting, wherein a super-fast acting insulin composition more closely mimics the endogenous post-prandial insulin release of a nondiabetic subject compared to the fast-acting insulin alone;

c) NaCl at a concentration between 120 mM to 200 mM;

d) an anti-microbially effective amount of an antimicrobial preservative or mixture of antimicrobial preservatives, wherein:

at least one preservative is a phenolic preservative; and

the total amount of the one or more preservative agents as a percentage (%) of mass concentration (w/v) in the formulation is or is between 0.1% and 0.4%, inclusive; and

e) a stabilizing agent or agents;

whereby the composition is stable for at least 3 days at a temperature from 32 °C to 40 °C, and/or is stable for at least 3 hours under agitation.

7. The stable co-formulation of claim 6, wherein the stabilizing agent comprises a hyaluronidase inhibitor.

8. The stable co-formulation of claim 7, wherein the hyaluronidase inhibitor is a hyaluronidase substrate that is a hyaluronan (HA) oligosaccharide.

9. The stable co-formulation of claim 8, wherein the concentration of HA is between 1 mg/mL to 20 mg/mL.

10. The stable co-formulation of any of claims 6-9, wherein the NaCl concentration is between 150 mM to 200 mM or 160 mM to 180 mM.

11. The stable co-formulation of any of claims 1-10, wherein the hyaluronidase is a soluble hyaluronidase that is active at neutral pH.

12. The stable co-formulation of claim 11, wherein the soluble hyaluronidase is a PH20 or a C-terminal truncated form thereof.

13. The stable co-formulation of claim 11 or claim 12, wherein the soluble hyaluronidase is selected from ovine PH20, bovine PH20 and a soluble human PH20, wherein the soluble human PH20 lacks all or a portion of the glycosylphosphatidylinositol (GPI) anchor attachment sequence.

14. The stable co-formulation of any of claims 1-13, wherein the hyaluronidase is a PH20 polypeptide that has the sequence of amino acids set forth in any of SEQ ID NOS: 4-9, 47-48, 234-254, and 267-273, or a sequence of amino acids that has at least 85%, 86%, 87%, 88%, 89%, 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, 99% or more sequence identity to any of SEQ ID NOS: 4-9, 47-48, 234-254, and 267-273.

15. The stable co-formulation of any of claims 1-14, wherein the hyaluronidase is a C-terminal truncated PH20 that comprises the sequence of amino acids set forth in any of SEQ ID NOS: 4-9.

16. The stable co-formulation of any of claims 1-15, wherein:

the amount of a hyaluronidase is between 10 U/mL to 20000 U/mL, 10 U/mL to 15000 U/mL, 10 U/mL to 10000 U/mL, 10 U/mL to 5000 U/mL, 50 U/mL to 10000 U/mL, 50 U/mL to 4000 U/mL, 100 U/mL to 2000 U/mL, 300 U/mL to 2000 U/mL, 600 U/mL to 2000 U/mL, or 100 U/mL to 1000 U/mL; or

the amount of a hyaluronidase is at least or is 30 U/mL, 35 U/mL, 40 U/mL, 50 U/mL, 100 U/mL, 150 U/mL, 200 U/mL, 250 U/mL, 300 U/mL, 350 U/mL, 400 U/mL, 450 U/mL, 500 U/mL, 600 U/mL, 700 U/mL, 800 U/mL, 900 U/mL, 1000 U/mL, 2000 U/mL, 3000 U/mL, 4000 U/mL, 5000 U/mL, 10000 U/mL, 15000 U/mL or 20000 U/mL.

17. The stable co-formulation of any of claims 1-5 and 14-16, wherein the fast-acting insulin is a regular insulin or is an insulin analog.

18. The stable co-formulation of claim 17, wherein the fast-acting insulin is a regular insulin and the regular insulin is a human insulin or pig insulin.

19. The stable co-formulation of claim 17, wherein the fast-acting insulin is an insulin analog and the insulin analog is selected from among insulin lispro, insulin aspart and insulin glulisine.

20. The stable co-formulation of claim 19, wherein the insulin analog is selected from among an insulin having an A chain with a sequence of amino acids set forth in SEQ NOS:103 and a B chain having a sequence of amino acids set forth in any of SEQ NOS:147-149.

21. The stable co-formulation of any of claims 1-20, wherein the amount of fast-acting insulin is 10 U/mL to 1000 U/mL, 50 U/mL to 500 U/mL, 100 U/mL to 1000 U/mL or 500 U/mL to 1000 U/mL, inclusive.

22. The stable co-formulation of any of claims 1-21, wherein the pH range is maintained by a buffering agent selected from among Tris, histidine, phosphate and citrate.

23. The stable co-formulation of any of claims 1-22 , wherein the phenolic preservative is selected from among phenol, m-cresol, methylparaben, o-cresol, p-cresol, chlorocresol, benzethonium chloride, ethyl paraben, propylparaben, butylparaben and any combinations thereof.

24. The stable co-formulation of any of claims 1-23, wherein the preservative(s) is(are) phenol, m-cresol or phenol and m-cresol.

25. The stable co-formulation of any of claims 1-24, wherein the total amount of the one or more preservative agents as a percentage (%) of mass concentration (w/v) in the formulation is or is between 0.1% to 0.3%, 0.15% to 0.325%, 0.15% to 0.25%, 0.1% to 0.2%, 0.2% to 0.3% or 0.3% to 0.4% inclusive.

26. The stable co-formulation of any of claims 1-25, wherein the preservatives are phenol and m-cresol and the amount as a % of mass concentration (w/v) in the formulation is between 0.1% to 0.25% phenol and between 0.05% to 0.2% m-cresol, is between 0.10% to 0.2% phenol and between 0.6% to 01.8% m-cresol, between 0.1% to 0.15% phenol and 0.8% t 0.15% m-cresol, is between 0.10% to 0.15% phenol and between 0.06 to 0.09% m-cresol or is between 0.12% to 0.18% phenol and between 0.14 to 0.22% m-cresol.

27. The stable co-formulation of any of claims 1-26, wherein the stabilizing agent is selected from among an amino acid, an amino acid derivative, an amine, a sugar, a polyols, a salt and a surfactant.

28. The stable co-formulation of claim 27, wherein the stabilizing agent is selected from among:

an amino acid that is glycine or proline;

an amino acid selected from among arginine, glutamic acid, and/or salts thereof and/or combinations thereof; or

a surfactant selected from among a polypropylene glycol, polyethylene glycol, glycerin, sorbitol, poloxamer and polysorbate.

29. The stable co-formulation of claim 27 or claim 28, wherein the stabilizing agent is a surfactant and the amount of surfactant as a % of mass concentration (w/v) in the formulation is between 0.005% to 1.0%, 0.01% to 0.5%, 0.01% to 0.1%, 0.01% to 0.05%, or 0.01% to 0.02%.

30. The stable co-formulation of any of claims 27-29, wherein the surfactant is selected from among poloxamer 188, polysorbate 20 and polysorbate 80.

31. The stable co-formulations of any of claims 1-30, comprising a tonicity modifier, an antioxidant, zinc or a nicotinic compound.

32. A stable co-formulation composition, wherein:

the composition has a pH of between 7.0 to 7.6; and

the composition comprises:

a) a hyaluronidase that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

b) a fast-acting insulin analog in an amount between 10 U/mL to 1000 U/mL, inclusive;

c) a Tris buffering agent at a concentration of between 10 mM to 50 mM, inclusive;

d) NaCl at a concentration of between 50 to 200 mM, inclusive;

e) methionine at a concentration between 5 mM to 50 mM, inclusive;

f) glycerin at a concentration from between 0 mM to 50 mM, inclusive;

g) a surfactant that is poloxamer 188, polysorbate 20 or polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.5%; and

h) a preservative(s) that comprises phenol at a percentage (%) of mass concentration (w/v) of between 0.1% to 0.25% and m-cresol at a % w/v of between or between about 0.05% to 0.2%,

whereby the composition is stable for at least 6 months at a temperature from 2 °C to 8 °C, inclusive, and/or for at least 14 days at a temperature from 20 °C to 30 °C, inclusive.

33. A stable co-formulation composition, wherein:

the composition has a pH between 7.0 to 7.6; and

the composition comprises:

a) a hyaluronidase that is a PH20 in an amount between or 100 U/mL to 1000 U/mL, inclusive;

b) a fast-acting insulin analog that is insulin lispro in an amount between 10 U/mL to 1000 U/mL, inclusive;

c) a Tris buffering agent at a concentration of between 25 mM to 35 mM, inclusive;

d) NaCl at a concentration of between 50 mM to 120 mM, inclusive;

e) methionine at a concentration between 10 mM to 30 mM, inclusive;

f) glycerin at a concentration from between 40 mM to 60 mM, inclusive;

g) a surfactant that is poloxamer 188, polysorbate 20 or polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive;

f) zinc at a concentration of 0.017 to 0.024 mg per 100 units of insulin (mg/100U); and

g) a preservative(s) that comprises phenol at a percentage (%) of mass concentration (w/v) of between 0.08% to 0.17%, inclusive, and m-cresol at a % w/v of between 0.07% to 0.17%,

whereby the composition is stable for at least 6 months at a temperature from 2 °C to 8 °C, inclusive, and/or for at least 14 days at a temperature from 20 °C to 30 °C, inclusive.

34. A stable co-formulation composition, wherein:

the composition has a pH between 7.0 to 7.6; and

the composition comprises:

a) a hyaluronidase that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

b) a fast-acting insulin analog that is insulin aspart in an amount between 10 U/mL to 1000 U/mL, inclusive;

c) a Tris buffering agent at a concentration of between 25 mM to 35 mM, inclusive;

d) NaCl at a concentration of between 80 mM to 160 mM, inclusive;

e) methionine at a concentration between 10 mM to 30 mM, inclusive;

f) glycerin at a concentration from between 20 mM to 50 mM, inclusive;

g) a surfactant that is poloxamer 188, polysorbate 20 or polysorbate 80 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive;

f) zinc at a concentration of 0.017 to 0.024 mg per 100 units of insulin (mg/100U); and

g) a preservative(s) that comprises phenol at a percentage (%) of mass concentration (w/v) of between 0.08% to 0.17%, inclusive, and m-cresol at a % w/v of between 0.07% to 0.17%,

whereby the composition is stable for at least 6 months at a temperature from 2 °C to 8 °C, inclusive, and/or for at least 14 days at a temperature from 20 °C to 30 °C, inclusive.

35. A stable co-formulation composition, wherein:

the composition has a pH between 7.0 to 7.6; and

the composition comprises:

a) a hyaluronidase that is a PH20 in an amount between 100 U/mL to 1000 U/mL, inclusive;

b) a fast-acting insulin analog that is insulin glulisine in an amount between 10 U/mL to 1000 U/mL, inclusive;

c) a Tris buffering agent at a concentration of between 25 mM to 35 mM, inclusive;

d) NaCl at a concentration of between 80 mM to 200 mM, inclusive;

e) methionine at a concentration between 10 mM to 30 mM, inclusive;

f) glycerin at a concentration from between 40 mM to 60 mM, inclusive;

g) a surfactant that is poloxamer 188 at a percentage (%) of mass concentration (w/v) of between 0.01% to 0.05%, inclusive; and

h) a preservative(s) that comprises phenol at a percentage (%) of mass concentration(w/v) of between 0.08% to 0.17%, inclusive, and m-cresol at a % w/v of between 0.07% to 0.17%,

whereby the composition is stable for at least 6 months at a temperature from 2 °C to 8 °C, inclusive, and/or for at least 14 days at a temperature from 20 °C to 30 °C, inclusive.

36. The stable co-formulation of any of claims 1-35 that is formulated for multi-dose administration.

37. The stable co-formulation of any of claims 1-36, wherein the volume of the co-formulation is between 0.5 mL to 50 mL, 1 mL to 40 mL, 1 mL to 20 mL, 1 mL to 10 mL, or 3 mL to 10 mL, inclusive.

38. The stable co-formulation of any of claims 1-36 that is formulated for delivery using a vial, syringe, pen, reservoir for a pump, or a closed loop system.

39. The stable co-formulation of any of claims 1-36 that is formulated for delivery using a continuous subcutaneous insulin infusion.

40. A syringe or vial, comprising the stable co-formulation or composition of any of claims 1-39.

41. A closed loop system, comprising the stable co-formulation of any of claims 1-39.

42. An insulin pump, comprising the stable co-formulation of any of claims 1-39.

43. An insulin pen, comprising the stable co-formulation of any of claims 1-39.

44. A stable co-formulation of any of claims 1-39 for use in treating diabetes or for use in controlling blood glucose levels in a subject.

45. Use of a stable co-formulation of any of claims 1-39 for the manufacture of a medicament for treating diabetes or for controlling blood glucose levels in a subject.

46. The stable co-formulation or use of claim 44 or claim 45, wherein the diabetes is selected from among type 1 diabetes mellitus, type 2 diabetes mellitus and gestational diabetes.