Claims

1. A dry pharmaceutical formulation, wherein the pharmaceutical formulation comprises a CNP conjugate, a buffering agent and a bulking agent, wherein the CNP conjugate comprises a CNP moiety that is covalently and reversibly conjugated via a side chain of an amino acid residue of its ring moiety or a backbone of its ring moiety to a polymeric moiety, the buffering agent is succinic acid, and the bulking agent is trehalose.

2. The dry pharmaceutical formulation of claim 1, wherein the pharmaceutical formulation comprises a pH-adjusting agent.

3. The dry pharmaceutical formulation of claim 2, wherein the pH-adjusting agent is selected from the group consisting of Tris, sodium hydroxide, potassium hydroxide, lysine and mixtures thereof.

4. The dry pharmaceutical formulation of claim 2 or 3, wherein the pH-adjusting agent is Tris.

5. The dry pharmaceutical formulation of claim 1, wherein the pharmaceutical formulation comprises a mixture of one or more acid and base pH-adjusting agents.

6. The dry pharmaceutical formulation of any one of claims 1 to 4, wherein the pharmaceutical formulation comprises a CNP conjugate, succinic acid, trehalose and Tris.

7. The dry pharmaceutical formulation of any one of claims 1 to 6, wherein the CNP moiety has the sequence of SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25 or SEQ ID NO:30.

8. The dry pharmaceutical formulation of any one of claims 1 to 7, wherein the CNP moiety has the sequence of SEQ ID NO:24.

9. The dry pharmaceutical formulation of any one of claims 1 to 8, wherein the polymeric moiety comprises a polymer selected from the group consisting of poly(acrylic acids), poly(acrylates), poly(acrylamides), poly(alkyloxy) polymers, poly(amides), poly(amidoamines), poly(amino acids), poly(anhydrides), poly(aspartamides), poly(butyric acids), poly(glycolic acids), polybutylene terephthalates, poly(caprolactones), poly(carbonates), poly(cyanoacrylates), poly(dimethylacrylamides), poly(esters), poly(ethylenes), poly(ethyleneglycols), poly(ethylene oxides), poly(ethyl phosphates), poly(ethyloxazolines), poly(glycolic acids), poly(hydroxyethyl acrylates), poly(hydroxyethyl-oxazolines), poly(hydroxymethacrylates), poly(hydroxypropylmethacrylamides), poly(hydroxypropyl methacrylates), poly(hydroxypropyloxazolines), poly(iminocarbonates), poly(lactic acids), poly(lactic-co-glycolic acids), poly(methacrylamides), poly(methacrylates), poly(methyloxazolines), poly(organophosphazenes), poly(ortho esters), poly(oxazolines), poly(propylene glycols), poly(siloxanes), poly(urethanes), poly(vinyl alcohols), poly(vinyl amines), poly(vinylmethylethers), poly(vinylpyrrolidones), silicones, celluloses, carbomethyl celluloses, hydroxypropyl methylcelluloses, chitins, chitosans, dextrans, dextrins, gelatins, hyaluronic acids and derivatives, functionalized hyaluronic acids, mannans, pectins, rhamnogalacturonans, starches, hydroxyalkyl starches, hydroxyethyl starches and other carbohydrate-based polymers, xylans, and copolymers thereof.

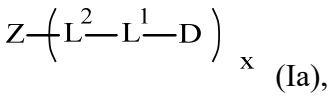
10. The dry pharmaceutical formulation of any one of claims 1 to 9, wherein the formulation comprises based on the total weight of the dry pharmaceutical formulation:

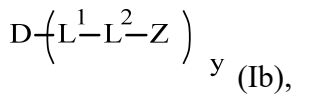
CNP conjugate	1.3 - 45.4 % (w/w)
succinic acid	0.2 - 3.2 % (w/w)
trehalose dihydrate	52.6 - 98.4 % (w/w)
Tris	0.1 - 5.6 % (w/w).

11. The dry pharmaceutical formulation of any one of claims 1 to 10, wherein the formulation comprises based on the total weight of the dry pharmaceutical formulation:

CNP conjugate	1.3 - 38.7 % (w/w)
succinic acid	0.2 - 3.2 % (w/w)
trehalose dihydrate	52.6 - 98.4 % (w/w)
Tris	0.1 - 5.6 % (w/w).

12. The dry pharmaceutical formulation of any one of claims 1 to 11, wherein the CNP conjugate is of formula (Ia) or (Ib):


(Ia),


(Ib),

wherein

-D is the CNP moiety;

-L^1- is a reversible linker moiety;

-L^2- is a single chemical bond or a spacer moiety;

-Z is the polymeric moiety;

x is an integer selected from the group consisting of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16; and

y is an integer selected from the group consisting of 1, 2, 3, 4 and 5.

13. The dry pharmaceutical formulation of claim 12, wherein x of formula (Ia) is an integer selected from the group consisting of 1, 2, 3, 4, 6 and 8.

14. The dry pharmaceutical formulation of claim 12, wherein y of formula (Ib) is an integer selected from the group consisting of 2, 3, 4 and 5.

15. The dry pharmaceutical formulation of claim 12 or 13, wherein the CNP conjugate is of formula (Ia) and x is 1.

16. The dry pharmaceutical formulation of any one of claims 12 to 15, wherein -L^1- is connected to -D through an amide linkage.

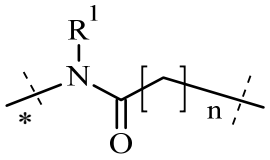
17. The dry pharmaceutical formulation of any one of claims 12 to 16, wherein the linkage between -Z and -L^2- is a stable linkage.

18. The dry pharmaceutical formulation of any one of claims 12 to 17, wherein -L^2- is a spacer moiety.

19. The dry pharmaceutical formulation of any one of claims 12 to 18, wherein -L^2- has a molecular weight in the range of from 14 g/mol to 750 g/mol.

20. The dry pharmaceutical formulation of any one of claims 12 to 19, wherein -L^2- has a chain length of 1 to 20 atoms.

21. The dry pharmaceutical formulation of any one of claims 12 to 20, wherein -L^2- is of formula (i):



(i),

wherein

the dashed line marked with the asterisk indicates attachment to -L^1-;

the unmarked dashed line indicates attachment to -Z;

-R^1 is selected from the group consisting of -H, C_{1-6} alkyl, C_{2-6} alkenyl and C_{2-6} alkynyl;

n is selected from the group consisting of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and 18; and

wherein the moiety of formula (i) is optionally further substituted.

22. The dry pharmaceutical formulation of claim 21, wherein n of formula (i) is selected from the group consisting of 3, 4, 5, 6, 7, 8 and 9.

23. The dry pharmaceutical formulation of any one of claims 12 to 22, wherein -Z has a molecular weight ranging from 5 to 200 kDa.

24. The dry pharmaceutical formulation of any one of claims 12 to 23, wherein -Z comprises a polymer selected from the group consisting of poly(acrylic acids), poly(acrylates), poly(acrylamides), poly(alkyloxy) polymers, poly(amides), poly(amidoamines), poly(amino acids), poly(anhydrides), poly(aspartamides), poly(butyric acids), poly(glycolic acids), polybutylene terephthalates, poly(caprolactones), poly(carbonates), poly(cyanoacrylates), poly(dimethylacrylamides), poly(esters), poly(ethylenes), poly(ethyleneglycols), poly(ethylene oxides), poly(ethyl phosphates), poly(ethyloxazolines), poly(glycolic acids), poly(hydroxyethyl acrylates), poly(hydroxyethyl-oxazolines), poly(hydroxymethacrylates), poly(hydroxypropylmethacrylamides), poly(hydroxypropyl methacrylates), poly(hydroxypropyloxazolines), poly(iminocarbonates), poly(lactic acids), poly(lactic-co-glycolic acids), poly(methacrylamides), poly(methacrylates), poly(methyloxazolines), poly(organophosphazenes), poly(ortho esters), poly(oxazolines), poly(propylene glycols), poly(siloxanes), poly(urethanes), poly(vinyl alcohols), poly(vinyl amines), poly(vinylmethylethers), poly(vinylpyrrolidones), silicones, celluloses, carbomethyl celluloses, hydroxypropyl methylcelluloses, chitins, chitosans, dextrans, dextrins, gelatins, hyaluronic acids and derivatives, functionalized hyaluronic acids, mannans, pectins, rhamnogalacturonans, starches, hydroxyalkyl starches, hydroxyethyl starches and other carbohydrate-based polymers, xylans, and copolymers thereof.