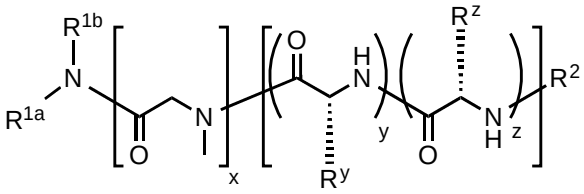
CLAIMS

1. A multiblock copolymer of **Formula I**:



I

wherein:

R^{1a} is H or an optionally substituted aliphatic group;

R^{1b} is H or an optionally substituted aliphatic group;

R^2 is H, an optionally substituted aliphatic group or an optionally substituted CO-(C1-C6)aliphatic group;

each R^y is independently a D-amino acid side chain;

each R^z is independently a L-amino acid side chain;

x is 125-350;

y is 5-35;

z is 5-35.

~~2. The multiblock copolymer according to claim 1,~~

~~wherein:~~

~~each R^y is independently the side chain of γ benzyl D glutamate, D leucine, D tyrosine, D phenylalanine, D alanine, D valine, D isoleucine, D norleucine, O acetyl D tyrosine, O benzyl D tyrosine, or ε benzyl D lysine; and~~

~~each R^z is independently the side chain of γ benzyl L glutamate, L leucine, L tyrosine, L phenylalanine, L alanine, L valine, L isoleucine, L norleucine, O acetyl L tyrosine, O benzyl L tyrosine, or ε benzyl L lysine.~~

~~3. The multiblock copolymer according to claim 1,~~

~~wherein:~~

~~each R^y is independently the side chain of γ benzyl D glutamate, D leucine, D tyrosine, or D phenylalanine; and~~

~~each R^z is independently the side chain of γ benzyl L glutamate, L leucine, L tyrosine, or L phenylalanine~~

~~4. The multiblock copolymer according to claim 1,~~

~~wherein:~~

~~each R^y is the side chain of D-leucine; and~~

~~each R^z is the side chain of L-tyrosine.~~

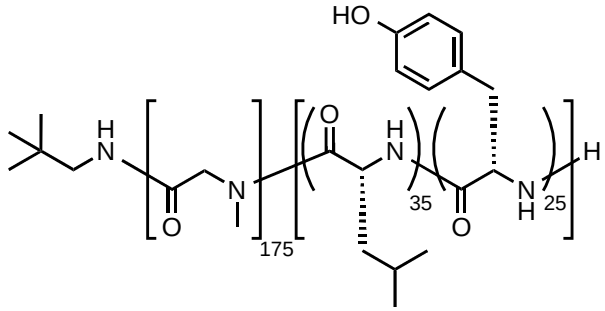
~~5. The multiblock copolymer according to any one of claims 1-4, wherein~~

~~R^{1a} is H;~~

~~R^{1b} is a benzyl, methoxybenzyl, neopentyl or hexyl group; and~~

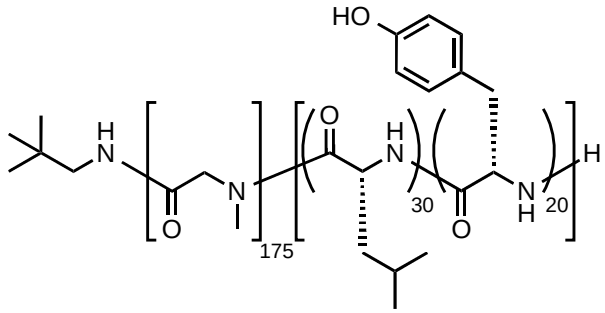
~~R^2 is H or $COCH_3$.~~

~~6.~~2. A multiblock copolymer having the following structure:



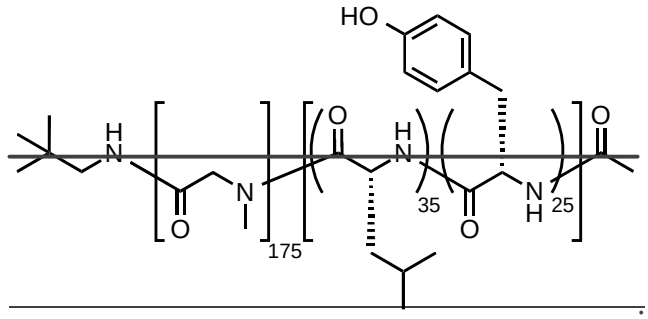
.

~~7.~~3. A multiblock copolymer having the following structure:



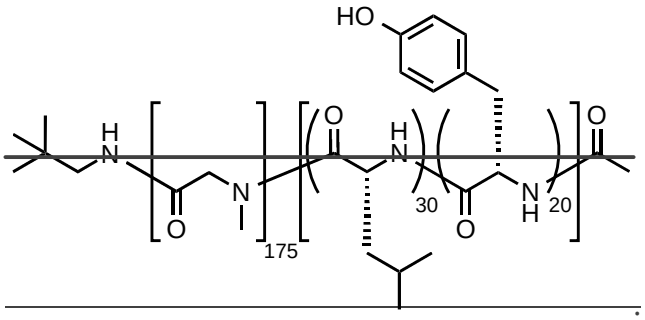
.

~~8. A multiblock copolymer having the following structure:~~

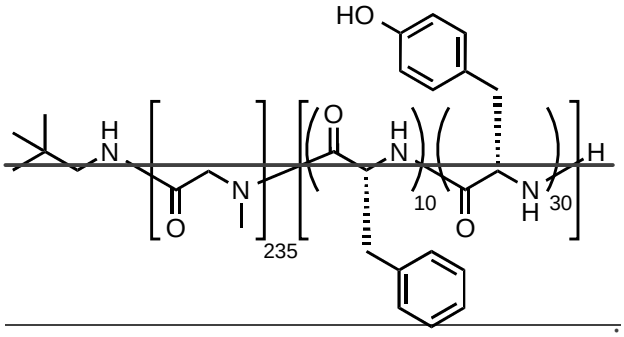


.

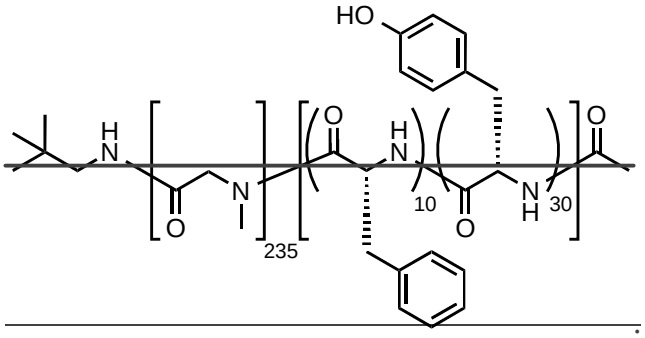
~~9. A multiblock copolymer having the following structure:~~



10. A multiblock copolymer having the following structure:



11. A multiblock copolymer according to the following structure:



12. A composition comprising a multiblock copolymer according to any one of claims 1-11 and one or more hydrophobic molecules.
13. The composition according to claim 12, wherein the hydrophobic molecule is present in an amount of about 1% by weight to about 25% by weight of the composition.
14. The composition according to claim 12 or 13, wherein the hydrophobic molecule is paclitaxel, docetaxel, cabazitaxel or SN-38, or a pharmaceutically acceptable salt of those compounds.
15. The composition according to any one of claims 12-14, further comprising a cryoprotectant.

16. The composition according to claim 15, wherein the cryoprotectant is glycine, polyvinyl pyrrolidine, polyethylene glycol, mannitol, sorbitol, sucrose, glucose, raffinose, sucralose, lactose, trehalose, dextran, or dextrose.

17. The composition according to claim 16, wherein the cryoprotectant is trehalose.

18. The composition according to any one of claims 12-18, wherein the composition is in the form of a lyophilized powder.

19. The composition according to any one of claims 12-18, further comprising a pharmaceutically acceptable vehicle.

20. The composition according to claim 19, wherein the vehicle is selected from water, 1,3-butanediol, Ringer's solution or an isotonic sodium chloride solution.

21. A method of increasing the solubility of a hydrophobic molecule in an aqueous solution comprising encapsulating the hydrophobic molecule in a multiblock copolymer according to any one of claims 1-11.

22. The method according to claim 21, comprising:

    a. providing the multiblock copolymer in an aqueous solution;

    b. providing the hydrophobic molecule in an organic solution;

    c. mixing the aqueous solution and the organic solution to produce an emulsion;

    d. collecting a supernate from the emulsion;

    e. producing a dry powder from the supernate; and

    f. solubilizing the dry powder.

23. The method according to claim 22, wherein the aqueous solution and the organic solution are mixed with a homogenizer.

24. The method according to claim 22 or 23, wherein the emulsion is processed using a microfluidizer to produce an extruded solution.

25. The method according to claim 24, further comprising filtering the extruded solution and collecting the supernate.

26. The method according to any one of claims 22-25, wherein a cryoprotectant is added to the aqueous solution, the supernate or both.

27. The method according to claim 26, wherein the cryoprotectant is glycine, polyvinyl pyrrolidine, polyethylene glycol, mannitol, sorbitol, sucrose, glucose, raffinose, sucralose, lactose, trehalose, dextran, or dextrose.

28. The method according to any one of claims 22-26, wherein the dry powder is produced via lyophilization.

29. The method according to any one of claims 21-29, wherein the hydrophobic molecule is paclitaxel, docetaxel, cabazitaxel or SN-38, or a pharmaceutically acceptable salt of those compounds.

30. A method of preparing a composition of any one of claims 12-18 comprising:

a) dissolving a hydrophobic molecule, a copolymer of **Formula I** and, optionally, a cryoprotectant, in aqueous *tert* butanol, thereby forming a mixed solution; and

b) optionally lyophilizing the mixed solution.

31. A method of preparing a composition of any one of claims 12-18 comprising:

a) dissolving hydrophobic molecule in *tert*-butanol, thereby forming a hydrophobic molecule solution;

b) dissolving a copolymer of **Formula I** and, optionally, a cryoprotectant, in an aqueous *tert*-butanol solution, thereby forming a copolymer solution;

c) mixing the hydrophobic molecule solution and the copolymer solution thereby forming a mixed solution; and

d) optionally lyophilizing the mixed solution.

32. A method of preparing a composition of any one of claims 12-18 comprising:

a) dissolving hydrophobic molecule in *tert* butanol, thereby forming a paclitaxel solution;

b) dissolving a copolymer of **Formula I** and, optionally, a cryoprotectant, in an aqueous *tert* butanol solution, thereby forming a copolymer solution;

c) mixing the hydrophobic molecule solution and the copolymer solution thereby forming a mixed solution;

d) filtering the mixed solution, thereby forming a filtered solution;

e) optionally lyophilizing the filtered solution.

33. A method of preparing a composition of any one of claims 12-18 comprising:

a. dissolving a hydrophobic molecule, a copolymer of **Formula I** and, optionally, a cryoprotectant, in an aqueous solution, thereby forming a mixed solution;

b. processing the mixed solution through a high shear mixer, thereby forming a high shear mixer solution; and

c. optionally lyophilizing the high shear mixer solution.

34. A method of preparing a composition of any one of claims 12-18 comprising:

a. dissolving a hydrophobic molecule in an organic solvent, thereby forming a hydrophobic molecule solution;

b. dissolving a copolymer of **Formula I** and, optionally, a cryoprotectant, in an aqueous solution, thereby forming a copolymer solution;

c. mixing the hydrophobic molecule solution and the copolymer solution, thereby forming a mixed solution;

d. processing the mixed solution through a high shear mixer, thereby forming a high shear mixer solution; and

e. optionally lyophilizing the high shear mixer solution.

35. A method of preparing a composition of any one of claims 12-18 comprising:

a. dissolving a hydrophobic molecule in an organic solvent, thereby forming a hydrophobic molecule solution;

b. dissolving a copolymer of **Formula I** and, optionally, a cryoprotectant, in an aqueous solution, thereby forming a copolymer solution;

c. mixing the hydrophobic molecule solution and the copolymer solution, thereby forming a mixed solution;

d. processing the mixed solution through a high shear mixer, thereby forming a high shear mixer solution;

e. processing the high shear mixer solution with a diafiltration system, thereby forming a diafiltered solution;

f. filtering the diafiltered solution, thereby forming a filtered solution; and

g. optionally lyophilizing the filtered solution.