CLAIMS

1. A method of inhibiting or reversing the progression of cataract formation or presbyopia in an eye comprising

contacting the eye with an effective cataract-inhibiting amount of an ophthalmic composition comprising at least one γ-crystallin charge masking agent, wherein the charge masking agent is not a polypeptide.

2. The method of claim 1, wherein the ophthalmic composition comprises greater than 400 mM of a salt as the γ-crystallin charge masking agent.

3. The method of claim 1, wherein the γ-crystallin charge masking agent is a bifunctional molecule containing a leaving group covalently linked to a molecular bristle.

4. The method of claim 3, wherein the leaving group masks positively charged lysine and arginine amino acid residues or negatively charged glutamate and aspartate amino acid residues on the γ-crystallin.

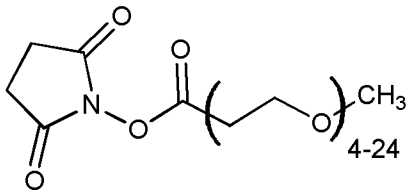
5. The method of claim 4, wherein the leaving group is selected from succinimide and carboxylic acid functional groups.

6. The method of claim 4, wherein the leaving group is selected from N-hydroxysuccinimide, isocyanate, isothiocyanate, sulfonyl chloride, aldehyde, carbodiimide, acyl azide, anhydride, fluorobenzene, carbonate, N-hydroxysuccinimide ester, imidoester, epoxide and fluorophenyl ester, and COOH.

7. The method of claim 3, wherein the molecular bristle is a hydrophilic, water soluble molecule having a molecular weight of 150 to 8000.

8. The method of claim 7, wherein the molecular bristle is a polyethylene glycol, an alkoxy-polyethylene glycol, or an alkoxypolyethylene glycol having 4 to 200 oxyethylene, alkoxyethylene or aryloxyethylene groups; poly(2-hydroxypropyl)methacrylamide (HPMA); poly(2-hydroxyethyl)methacrylate (HEMA);a ply(2-oxaziline), poly(m-phosphocholine, poly lysine, or poly glutamic acid.

9. The method of claim 3, wherein the γ-crystallin charge masking agent is



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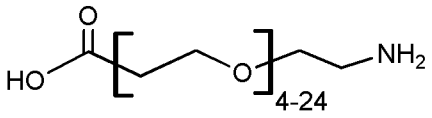


10. The method of claim 1, wherein the ophthalmic composition is an eye drop or an ophthalmic device.

11. The method of claim 10, wherein the ophthalmic device is a contact lens, an intraocular lens or a punctal plug.

12. The method of claim 1, wherein the ophthalmic composition is administered by injection.

13. The method of claim 1, wherein the ophthalmic composition is administered by iontophoresis.

14. The method of claim 1, wherein the ophthalmic composition is administered using ultrasound enhancement.

15. An ophthalmic composition comprising a bifunctional molecule containing a leaving group covalently linked to a molecular bristle.

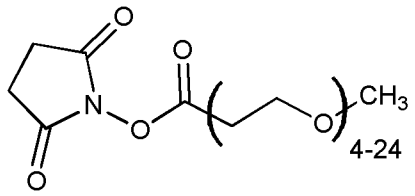
16. The ophthalmic composition of claim 15, wherein the leaving group is selected from succinimide and carboxylic acid functional groups.

17. The ophthalmic composition of claim 15, wherein the leaving group is selected from N-hydroxysuccinimide, isocyanate, isothiocyanate, sulfonyl chloride, aldehyde, carbodiimide, acyl azide, anhydride, fluorobenzene, carbonate, N-hydroxysuccinimide ester, imidoester, epoxide and fluorophenyl ester, and COOH.

18. The ophthalmic composition of claim 15, wherein the molecular bristle is a hydrophilic, water soluble molecule having a molecular weight of 150 to 8000.

19. The ophthalmic composition of claim 18, wherein the molecular bristle is a polyethylene glycol, an alkoxy-polyethylene glycol, or an alkoxypolyethylene glycol having 4 to 200 oxyethylene, alkoxyethylene or aryloxyethylene groups; poly(2-hydroxypropyl)methacrylamide (HPMA); poly(2-hydroxyethyl)methacrylate (HEMA);a ply(2-oxaziline), poly(m-phosphocholine), poly lysine, or poly glutamic acid. .

20. The ophthalmic composition of claim 15, wherein the bifunctional molecule is



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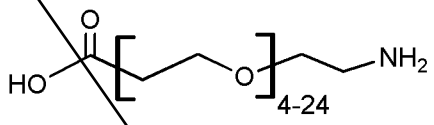


21. The ophthalmic composition of claim 15, wherein the ophthalmic composition is an eye drop or an ophthalmic device.

22. The method of claim 21, wherein the ophthalmic device is a contact lens, an intraocular lens or a punctal plug.

23. A method of inhibiting or reversing the progression of age related degeneration of a crystalline lens in an eye, comprising contacting the eye with an effective degeneration -inhibiting amount of an ophthalmic composition comprising at least one γ-crystallin charge masking agent, wherein the γ-crystallin charge masking agent is not a polypeptide.

24. A method of treating a diseases relating to protein folding in a patient in need thereof, comprising administering a therapeutically effective amount of a bifunctional molecule containing a leaving group covalently linked to a molecular bristle.

25. The method of claim 24, wherein the disease relating to protein folding is selected from Alzheimer's disease, Parkinson's disease, and Huntington's disease.

CLAIMS

1. An ophthalmic composition for use in a method of inhibiting or reversing the progression of cataract formation, presbyopia, or age related degeneration of a crystalline lens in an eye, said method comprising

contacting the eye with an effective cataract-inhibiting amount of said composition, said composition comprising at least one γ-crystallin charge masking agent,

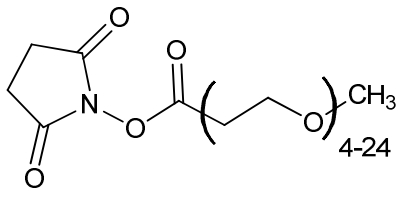
wherein the γ-crystallin charge masking agent is a bifunctional molecule containing a reactive group covalently linked to a molecular bristle,

wherein the reactive group is NH_2, a succinimide, a carboxylic acid, isocyanate, isothiocyanate, sulfonyl chloride, aldehyde, carbodiimide, acyl azide, anhydride, fluorobenzene, carbonate, N-hydroxysuccinimide ester, imidoester, epoxide and fluorophenyl ester, and

wherein the molecular bristle is a polyethylene glycol, an alkoxy-polyethylene glycol, or an alkoxypolyethylene glycol having 4 to 200 oxyethylene, alkoxyethylene or aryloxyethylene groups; poly(2-hydroxypropyl)methacrylamide (HPMA); poly(2-hydroxyethyl)methacrylate (HEMA);a ply(2-oxaziline), poly(m-phosphocholine, poly lysine, or poly glutamic acid, the molecular bristle having a molecular weight of 150 to 8000.

2. An ophthalmic composition for use according to claim 1, wherein the reactive group is NH_2, N-hydroxysuccinimide or COOH.

3. An ophthalmic composition for use according to claim 1, wherein the γ-crystallin charge masking agent is



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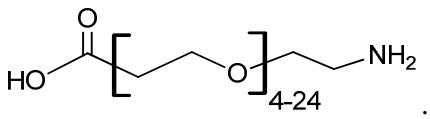

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4. An ophthalmic composition for use according to any one of claims 1 to 3, wherein the ophthalmic composition is an eye drop or comprised within an ophthalmic device.

5. An ophthalmic composition for use according to claim 4, wherein the ophthalmic device is a contact lens or a punctal plug.

6. An ophthalmic composition for use according to any one of claims 1 to 3, wherein in said method the ophthalmic composition is administered by injection, iontophoresis or ultrasound enhancement.

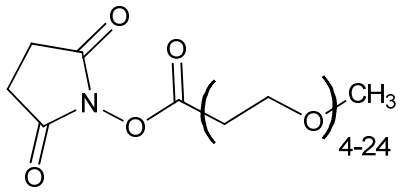
7. An ophthalmic composition comprising a bifunctional molecule containing a reactive group covalently linked to a molecular bristle,

wherein the reactive group is NH_2, a succinimide, a carboxylic acid, isocyanate, isothiocyanate, sulfonyl chloride, aldehyde, carbodiimide, acyl azide, anhydride, fluorobenzene, carbonate, N-hydroxysuccinimide ester, imidoester, epoxide and fluorophenyl ester, and

wherein the molecular bristle is a polyethylene glycol, an alkoxy-polyethylene glycol, or an alkoxypolyethylene glycol having 4 to 200 oxyethylene, alkoxyethylene or aryloxyethylene groups; poly(2-hydroxypropyl)methacrylamide (HPMA); poly(2-hydroxyethyl)methacrylate (HEMA);a ply(2-oxaziline), poly(m-phosphocholine, poly lysine, or poly glutamic acid, the molecular bristle having a molecular weight of 150 to 8000.

8. The ophthalmic composition of claim 7, wherein the reactive group is NH_2, N-hydroxysuccinimide or COOH.

9. The ophthalmic composition of claim 7, wherein the bifunctional molecule is



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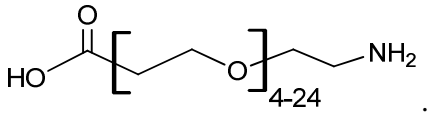

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10. The ophthalmic composition of claim 7, wherein the ophthalmic composition is an eye drop or comprised within an ophthalmic device.

11. The ophthalmic composition of claim 10, wherein the ophthalmic device is a contact lens or a punctal plug.

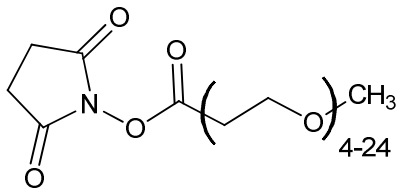
12. A bifunctional molecule for use in a method of treating diseases relating to protein folding in a patient in need thereof, said method comprising administering a therapeutically effective amount of said bifunctional molecule, said bifunctional molecule containing a reactive group covalently linked to a molecular bristle,

wherein the reactive group is NH_2, a succinimide, a carboxylic acid, isocyanate, isothiocyanate, sulfonyl chloride, aldehyde, carbodiimide, acyl azide, anhydride, fluorobenzene, carbonate, N-hydroxysuccinimide ester, imidoester, epoxide and fluorophenyl ester, and

wherein the molecular bristle is a polyethylene glycol, an alkoxy-polyethylene glycol, or an alkoxypolyethylene glycol having 4 to 200 oxyethylene, alkoxyethylene or aryloxyethylene groups; poly(2-hydroxypropyl)methacrylamide (HPMA); poly(2-hydroxyethyl)methacrylate (HEMA);a ply(2-oxaziline), poly(m-phosphocholine, poly lysine, or poly glutamic acid, the molecular bristle having a molecular weight of 150 to 8000.

13. A bifunctional molecule for use according to claim 12, wherein the reactive group is NH_2, N-hydroxysuccinimide or COOH.

14. A bifunctional molecule for use according to claim 12, wherein the bifunctional molecule is



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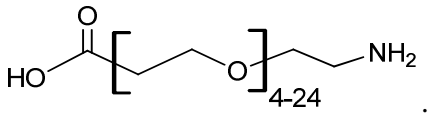

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15. A bifunctional molecule for use according to claim 12, wherein the disease relating to protein folding is selected from Alzheimer's disease, Parkinson's disease, and Huntington's disease.