Claims:

1. Use of a composition comprising a photoinitiator compound in the manufacture of a medicament for altering a mechanical and/or chemical property of a tissue in a subject, wherein the composition does not include a photopolymerizable compound, and

wherein the photoinitiator compound is activated by a visible light irradiation of the tissue to directly alter a mechanical and/or chemical property of the tissue.

2. The use of claim 1, wherein the medicament is for strengthening the tissue, stabilizing the tissue shape, changing the shape of the tissue, or a combination thereof.

3. The use of claim 1, wherein the tissue is an ocular tissue.

4. The use of claim 3, wherein the ocular tissue includes at least a portion of a cornea and/or a sclera.

5. The use of claim 3, wherein the ocular tissue includes at least a portion of a lamina cribrosa.

6. The use of claim 4, wherein when the tissue includes at least a portion of the cornea, the medicament is to be used substantially concurrently with a corneal operation and the photoinitiator compound is provided in a therapeutically effective amount which directly reduces the risk of a post operative corneal deformation condition.

7. The use of claim 1, wherein

a) the subject has or is at risk of developing an ocular deformation condition comprising one or more of keratoconus, post-laser-assisted in situ keratomileusis (LASIK) ectasia, post-photorefractive keratectomy (PRK) ectasia, post-infection ectasia, peripheral ectasia, rheumatoid condition of the cornea, degenerative myopia, regular myopia, scleral staphyloma, ocular hypertension glaucoma, or low tension glaucoma,

b) the photoinitiator compound is provided in a therapeutically effective amount which directly treats or directly reduces the risk of the ocular deformation condition, and

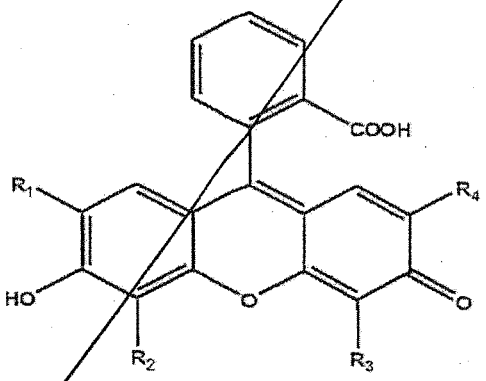
c) the visible light irradiation occurs over a period of 30 minutes or less.

8. The use of claim 7, wherein the subject has corneal ectasia.

9. The use of claim 7, wherein the subject has keratoconus.

10. The use of claim 7, wherein the subject has degenerative myopia.

11. The use of claim 1, wherein the photoinitiator compound comprises a photoinitiator, a PEG-photoinitiator, or a combination thereof, the photoinitiator having the structure of Formula I:



wherein R_1, R_2, R_3, and R_4 are each independently H, halogen, or NO_2 or pharmaceutical salts thereof.

12. The use of claim 11, wherein R_1, R_2, R_3, and R_4 are each independently H, Br, or NO_2.

13. The use of claim 11, wherein the photoinitiator compound comprises Eosin Y, Eosin B or fluorescein.

14. The use of claim 1, wherein the medicament is to be administered topically or by injection.

15. Use of a composition comprising a photoinitiator compound in a therapeutically effective amount in the manufacture of a medicament for treating or reducing the risk of an ocular deformation condition in a subject, wherein the composition does not include a photopolymerizable compound, wherein the medicament directly treats, or directly reduces the risk of an ocular deformation condition in an ocular tissue of the subject; and

wherein the photoinitiator compound is activated by a light irradiation of the tissue to directly treat or directly reduce the risk of the ocular deformation condition.

16. The use of claim 15 wherein the photoinitiator compound is provided to treat an ocular deformation condition and the therapeutically effective amount of the photoinitiator compound treats a symptom of the ocular deformation condition by strengthening the ocular tissue, stabilizing the ocular tissue shape, changing the shape of the ocular tissue, or a combination thereof.

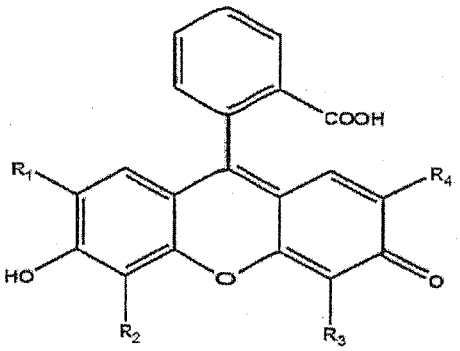
17. The use of claim 15, wherein the ocular tissue includes at least a portion of a lamina cribrosa, a cornea and/or a sclera.

18. The use of claim 15, wherein the subject has an ocular deformation condition comprising one or more of keratoconus, post-laser-assisted in situ keratomileusis (LASIK) ectasia, post-photorefractive keratectomy (PRK) ectasia, post-infection ectasia, peripheral ectasia, rheumatoid condition of the cornea, degenerative myopia, regular myopia or scleral staphyloma, ocular hypertension glaucoma, or low tension glaucoma.

19. The use of claim 15, wherein the ocular deformation condition is degenerative myopia.

20. The use of claim 15, wherein the ocular deformation condition is keratoconus.

21. The use of claim 15, wherein the photoinitiator compound comprises a compound defined by Formula I:

a. 

wherein R_1, R_2, R_3, and R_4 are each independently H, halogen, or NO_2 or pharmaceutical salts thereof.

22. The use of claim 21, wherein the photoinitiator compound comprises a polyethylene glycol derivative of the compound represented by Formula I.

23. The use of claim 15, wherein the photoinitiator compound is capable of directly treating or reducing the risk of the ocular deformation condition upon illumination of the photoinitiator compound for 30 minutes or less using light comprising a wavelength of 500±50 nm at an illumination intensity of from 1-100 mW/cm^2.

24. The use of claim 15, wherein the photoinitiator compound is to be administered topically.

25. The use of claim 15, wherein the photoinitiator compound is to be administered by injection.

26. The use of claim 15, wherein when the ocular tissue includes at least a portion of the cornea, the medicament is to be used substantially concurrently with a corneal operation and the photoinitiator compound is provided in a therapeutically effective amount which directly reduces the risk of a post operative corneal deformation condition.

27. The use of claim 1, wherein the photoinitiator compound is a Type II photoinitiator, and wherein the composition further comprises a co-initiator.

28. The use of claim 27, wherein the photoinitiator compound is Eosin Y and the co-initiator is triethanolamine.

29. The use of claim 1, wherein the visible light irradiation occurs over a period of 30 minutes or less.

30. The use of claim 1, wherein the visible light irradiation occurs over a period of 20 minutes or less.

31. The use of claim 1, wherein the visible light irradiation occurs over a period of 10 minutes or less.

32. The use of claim 1, wherein the visible light irradiation occurs over a period of 5 minutes or less.

33. The use of claim 11, wherein the visible light irradiation occurs over a period of 30 minutes or less.

34. The use of claim 11, wherein the visible light irradiation occurs over a period of 20 minutes or less.

35. The use of claim 11, wherein the visible light irradiation occurs over a period of 10 minutes or less.

36. The use of claim 11, wherein the visible light irradiation occurs over a period of 5 minutes or less.

37. The use of claim 15, wherein the light irradiation occurs over a period of 30 minutes or less.

38. The use of claim 15, wherein the light irradiation occurs over a period of 20 minutes or less.

39. The use of claim 15, wherein the light irradiation occurs over a period of 10 minutes or less.

40. The use of claim 15, wherein the light irradiation occurs over a period of 5 minutes or less.

41. The use of claim 21, wherein the light irradiation occurs over a period of 30 minutes or less.

42. The use of claim 21, wherein the light irradiation occurs over a period of 20 minutes or less.

43. The use of claim 21, wherein the light irradiation occurs over a period of 10 minutes or less.

44. The use of claim 21, wherein the light irradiation occurs over a period of 5 minutes or less.

45. The use of claim 15, wherein the photoinitiator compound is a Type II photoinitiator, and wherein the composition further comprises a co-initiator.

46. The use of claim 45, wherein the photoinitiator compound is Eosin Y and the co-initiator is triethanolamine.

47. The use of claim 46, wherein the light irradiation occurs over a period of 30 minutes or less.

48. The use of claim 46, wherein the light irradiation occurs over a period of 20 minutes or less.

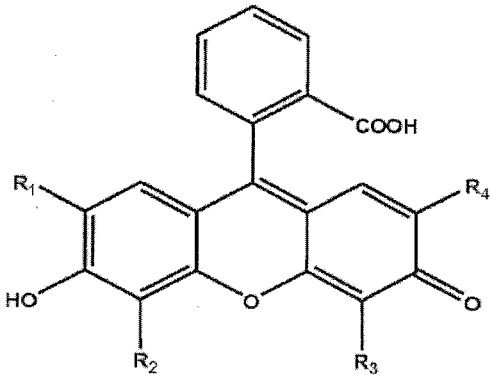
49. The use of claim 46, wherein the light irradiation occurs over a period of 10 minutes or less.

50. The use of claim 46, wherein the light irradiation occurs over a period of 5 minutes or less.

Claims

1. Use of a composition comprising a photoinitiator compound in the manufacture of a medicament for directly altering a mechanical and/or chemical property of a tissue in a subject,

wherein the photoinitiator compound comprises a photoinitiator, a PEG-photoinitiator, or a combination thereof, the photoinitiator having the structure of Formula I:



wherein R_1, R_2, R_3, and R_4 are each independently H, halogen, or NO_2 or pharmaceutical salts thereof,

wherein the composition does not include a photopolymerizable compound, and

wherein the photoinitiator compound is activated by a visible light irradiation of the tissue to directly alter a mechanical and/or chemical property of the tissue, and the subject has or is at risk of developing an ocular deformation condition comprising one or more of keratoconus, post-laser-assisted in situ keratomileusis (LASIK) ectasia, post-photorefractive keratectomy (PRK) ectasia, post-infection ectasia, peripheral ectasia, rheumatoid condition of the cornea, degenerative myopia, regular myopia, scleral staphyloma, ocular hypertension glaucoma, or low tension glaucoma.

2. The use of claim 1, wherein the medicament is for strengthening the tissue, stabilizing the tissue shape, changing the shape of the tissue, or a combination thereof.

3. The use of claim 1, wherein the tissue is an ocular tissue.

4. The use of claim 3, wherein the ocular tissue includes at least a portion of a cornea and/or a sclera.

5. The use of claim 3, wherein the ocular tissue includes at least a portion of a lamina cribrosa.

6. The use of claim 4, wherein when the tissue includes at least a portion of the cornea, the medicament is to be used substantially concurrently with a corneal operation and the photoinitiator compound is provided in a therapeutically effective amount which directly reduces the risk of a post operative corneal deformation condition.

7. The use of claim 1, wherein

a) the photoinitiator compound is provided in a therapeutically effective amount which directly treats or directly reduces the risk of the ocular deformation condition, and

b) the visible light irradiation occurs over a period of 30 minutes or less.

8. The use of claim 7, wherein the subject has corneal ectasia.

9. The use of claim 7, wherein the subject has keratoconus.

10. The use of claim 7, wherein the subject has degenerative myopia.

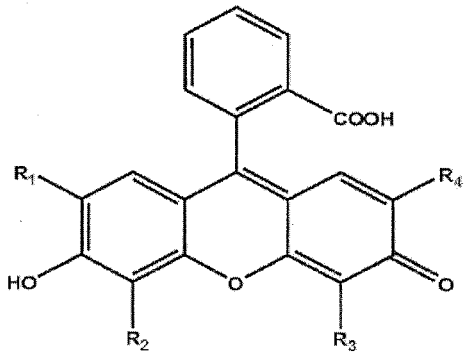
11. The use of claim 1, wherein R_1, R_2, R_3, and R_4 are each independently H, Br, or NO_2.

12. The use of claim 1, wherein the photoinitiator compound comprises Eosin Y, Eosin B or fluorescein.

13. The use of claim 1, wherein the medicament is to be administered topically or by injection.

14. Use of a composition comprising a photoinitiator compound in a therapeutically effective amount in the manufacture of a medicament for treating or reducing the risk of an ocular deformation condition in a subject, wherein the composition does not include a photopolymerizable compound, wherein the medicament directly treats, or directly reduces the risk of an ocular deformation condition in an ocular tissue of the subject; and

wherein the photoinitiator compound comprises a photoinitiator, a PEG-photoinitiator, or a combination thereof, the photoinitiator having the structure of Formula I:



wherein R_1, R_2, R_3, and R_4 are each independently H, halogen, or NO_2 or pharmaceutical salts thereof, and

wherein the photoinitiator compound is activated by a light irradiation of the tissue to directly treat or directly reduce the risk of the ocular deformation condition.

15. The use of claim 14 wherein the photoinitiator compound is provided to treat an ocular deformation condition and the therapeutically effective amount of the photoinitiator compound treats a symptom of the ocular deformation condition by strengthening the ocular tissue, stabilizing the ocular tissue shape, changing the shape of the ocular tissue, or a combination thereof.

16. The use of claim 14, wherein the ocular tissue includes at least a portion of a lamina cribrosa, a cornea and/or a sclera.

17. The use of claim 14, wherein the subject has an ocular deformation condition comprising one or more of keratoconus, post-laser-assisted in situ keratomileusis (LASIK) ectasia, post-photorefractive keratectomy (PRK) ectasia, post-infection ectasia, peripheral ectasia, rheumatoid condition of the cornea, degenerative myopia, regular myopia or scleral staphyloma, ocular hypertension glaucoma, or low tension glaucoma.

18. The use of claim 14, wherein the ocular deformation condition is degenerative myopia.

19. The use of claim 14, wherein the ocular deformation condition is keratoconus.

20. The use of claim 14, wherein the photoinitiator compound is capable of directly treating or reducing the risk of the ocular deformation condition upon illumination of the photoinitiator compound for 30 minutes or less using light comprising a wavelength of 500±50 nm at an illumination intensity of from 1-100 mW/cm^2.

21. The use of claim 14, wherein the photoinitiator compound is to be administered topically.

22. The use of claim 14, wherein the photoinitiator compound is to be administered by injection.

23. The use of claim 14, wherein when the ocular tissue includes at least a portion of the cornea, the medicament is to be used substantially concurrently with a corneal operation and the photoinitiator compound is provided in a therapeutically effective amount which directly reduces the risk of a post operative corneal deformation condition.

24. The use of claim 1, wherein the composition further comprises a co-initiator.

25. The use of claim 24, wherein the photoinitiator compound is Eosin Y and the co-initiator is triethanolamine.

26. The use of claim 1, wherein the visible light irradiation occurs over a period of 30 minutes or less.

27. The use of claim 1, wherein the visible light irradiation occurs over a period of 20 minutes or less.

28. The use of claim 1, wherein the visible light irradiation occurs over a period of 10 minutes or less.

29. The use of claim 1, wherein the visible light irradiation occurs over a period of 5 minutes or less.

30. The use of claim 1, wherein the visible light irradiation occurs over a period of 30 minutes or less.

31. The use of claim 1, wherein the visible light irradiation occurs over a period of 20 minutes or less.

32. The use of claim 1, wherein the visible light irradiation occurs over a period of 10 minutes or less.

33. The use of claim 1., wherein the visible light irradiation occurs over a period of 5 minutes or less.

34. The use of claim 14, wherein the light irradiation occurs over a period of 30 minutes or less.

35. The use of claim 14 wherein the light irradiation occurs over a period of 20 minutes or less.

36. The use of claim 14, wherein the light irradiation occurs over a period of 10 minutes or less.

37. The use of claim 14, wherein the light irradiation occurs over a period of 5 minutes or less.

38. The use of claim 14, wherein the light irradiation occurs over a period of 30 minutes or less.

39. The use of claim 14, wherein the light irradiation occurs over a period of 20 minutes or less.

40. The use of claim 14, wherein the light irradiation occurs over a period of 10 minutes or less.

41. The use of claim 14, wherein the light irradiation occurs over a period of 5 minutes or less.

42. The use of claim 14, wherein the composition further comprises a co-initiator.

43. The use of claim 42, wherein the photoinitiator compound is Eosin Y and the co-initiator is triethanolamine.

44. The use of claim 43, wherein the light irradiation occurs over a period of 30 minutes or less.

45. The use of claim 43, wherein the light irradiation occurs over a period of 20 minutes or less.

46. The use of claim 43, wherein the light irradiation occurs over a period of 10 minutes or less.

47. The use of claim 43, wherein the light irradiation occurs over a period of 5 minutes or less.