CLAIMS

~~1. A method for reversing a refractive procedure or treating complications caused by a refractive procedure selected from the group consisting of refractive errors, presbyopia, or keratectasia in a patient that previously underwent a refractive procedure, the method comprising the steps of:~~

~~storing a refractive lenticule obtained in a refractive procedure on an eye of a patient under cryoconditions to cryopreserve the refractive lenticule;~~

~~preparing the refractive lenticule for reimplantation;~~

~~creating a corneal flap in an eye of an acceptor;~~

~~transferring the refractive lenticule under the corneal flap; and~~

~~repositioning and covering the acceptor's corneal flap.~~

~~2. The method as claimed in claim 1, wherein the patient and the acceptor are the same subject.~~

~~3. The method as claimed in claim 1, wherein the patient and the acceptor are different subjects.~~

~~4. The method as claimed in any one of claims 1 to 3, wherein the step of preparing the refractive lenticule for reimplantation comprises thawing the refractive lenticule in a water bath of about 37 °C.~~

~~5. The method as claimed in claim 4, wherein upon thawing, the refractive lenticule is washed in a buffer solution.~~

~~6. The method as claimed in claim 5, wherein the buffer solution is selected from the group consisting of morpholinepropanesulfonic acid, a Phosphate Buffered Solution (PBS), a trehalose buffer, and a sucrose buffer.~~

~~7. The method as claimed in any one of claims 1 to 6, wherein the step of preparing the refractive lenticule for reimplantation further comprises enzymatically~~

~~digesting the thawed refractive lenticule for culture of corneal stromal fibroblast.~~

~~8. The method as claimed in any one of claims 1 to 7, wherein the step of preparing the refractive lenticule for reimplantation further comprises adjusting refractive powers of the refractive lenticule to restore near vision, or to correct presbyopia, or to treat complications of keratectasia.~~

~~9. The method as claimed in any one of claims 1 to 8, wherein the step of repositioning and covering the acceptor's corneal flap comprises placing a bandage contact lens over the repositioned corneal flap.~~

~~10. The method as claimed in any one of claims 1 to 9, wherein the refractive lenticule for reimplantation has been obtained by the refractive procedure comprising the steps of:~~

~~creating an incision in the eye of the patient; and~~

~~extracting the refractive lenticule through the incision.~~

~~11. The method as claimed in claim 10, wherein the incision is made using a one-laser refractive surgery.~~

~~12. The method as claimed in claim 11, wherein the one-laser refractive surgery performs the refractive procedure in its entirety without using an excimer laser and comprises two different surgical approaches.~~

~~13. The method as claimed in claim 12, wherein the one-laser refractive surgery comprises a flap-less form of small-incision surgery, in which the lenticule is extracted through a small superior pocket incision without the formation or lifting of a full flap.~~

~~14. The method as claimed in claim 11, wherein the incision comprises one or two or three or four stromal incisions.~~

~~15. The method as claimed in claim 14, wherein the four stromal incisions further create a corneal flap in the patient's eye.~~

~~16. The method as claimed in claim 12, wherein the one laser refractive surgery is a surgery performing a hinged flap to extract the lenticule, in which a femtosecond laser creates four stromal incisions to form a corneal lenticule and a corneal flap.~~

~~17. The method as claimed in any one of claims 1 to 16, wherein the complications comprise inflammations or extracellular matrix formations or both.~~

18. A refractive lenticule obtained by a refractive procedure on the eye of a patient for use in a method for reversing the refractive procedure or treating complications caused by the refractive procedure selected from the group consisting of refractive errors, presbyopia, or keratectasia in a patient that previously underwent a refractive procedure,

wherein the method comprises the steps of:

storing the refractive lenticule obtained in the refractive procedure on the eye of the patient under cryoconditions to cryopreserve the refractive lenticule;

preparing the refractive lenticule for reimplantation;

creating a corneal flap in an eye of the acceptor;

transferring the refractive lenticule under the corneal flap; and

repositioning and covering the acceptor's corneal flap.

~~19~~2. The refractive lenticule for use as claimed in claim 18, wherein for storage, the refractive lenticule is snap-freezed in liquid nitrogen for about 10 minutes.

~~20~~3. The refractive lenticule for use as claimed in claim 18 or ~~19~~2, wherein the refractive lenticule is stored at about -80 °C.

~~21~~4. The refractive lenticule for use as claimed in any one of claims 18 to ~~20~~3,

wherein to cryopreserve the refractive lenticule, the refractive lenticule is

suspended in a serum-containing medium in a vessel;

a freezing solution of about 10% serum and about 20% organic solvent is added in a dropwise manner into the vessel to form a mixture of about 10% serum and about 10% organic solvent;

the vessel containing the mixture is placed in a -80 °C freezer for at least 4 hours; and

the frozen mixture is transferred into liquid nitrogen for storage.

~~22~~5. The refractive lenticule for use as claimed in claim ~~21~~4, wherein the organic solvent is selected from the group consisting of organic solvent is selected from the group consisting of hexane, heptane, cyclohexane, benzene, pyridine, dichloromethane, chloroform, carbon tetrachloride, carbon disulfide, tetrahydrofuran, dioxane, diethyl ether, diisopropylether, ethylene glycol monobutyl ether, methyl ethyl ketone, methyl isobutyl ketone, acetone, cyclohexanone, ethyl acetate, isobutyl isobutyrate, ethylene glycol diacetate, dimethylformamide, acetonitrile, N,N-dimethyl acetamide, nitromethane, acetonitrile, N-methylpyrrolidone, dimethylsulfoxide water, methanol, ethanol, butyl alcohol and formic acid.

~~23~~6. The refractive lenticule for use as claimed in claim ~~21~~4 or ~~22~~5, wherein the serum is a fetal bovine serum.

~~24~~7. The refractive lenticule for use as claimed in any one of claims ~~1~~8 to ~~23~~6, wherein the refractive lenticule is obtained by creating an incision in an eye of the patient; and extracting the refractive lenticule through the incision.

~~25~~8. The refractive lenticule for use as claimed in claim ~~24~~7, wherein the incision is created using a one-laser refractive surgery.

~~26~~9. The refractive lenticule for use as claimed in claim ~~25~~8, wherein the one-laser refractive surgery performs the refractive procedure in its entirety without using an

excimer laser and comprises two different surgical approaches.

~~27~~10. The refractive lenticule for use as claimed in claim ~~26~~9, wherein the one-laser refractive surgery comprises a flap-less form of small incision surgery, in which the lenticule is extracted through a small superior pocket incision without the formation or lifting of a full flap, or a surgery performing a hinged flap to extract the lenticule, in which a femtosecond laser creates four stromal incisions to form a corneal lenticule and a corneal flap.

~~28~~11. The refractive lenticule for use as claimed in any one of claims 1~~8~~ to ~~27~~10, wherein the patient and the acceptor are the same subject.

~~29~~12. The refractive lenticule for use as claimed in any one of claims 1~~8~~ to ~~27~~10, wherein the patient and the acceptor are different subjects.

1~~3~~0. The refractive lenticule for use as claimed in any one of claims 1~~8~~ to ~~29~~12, wherein prior to the subsequent reimplantation, the stored refractive lenticule is processed to adjust its refractive errors to restore near vision, or to correct presbyopia, or to treat complications of keratectasia.

~~3~~14. Use of a cryopreserved refractive lenticule for the preparation of the refractive lenticule for reimplantation ~~A method of reversing a refractive procedure or~~in the ~~treating~~ treatment of complications caused by a refractive procedure selected from the group consisting of refractive errors, presbyopia, keratectasia, or keratoconus in a patient that previously underwent a refractive procedure~~, the method comprising the steps of:~~

~~storing a refractive lenticule obtained in a refractive procedure on an eye of a donor under cryoconditions to cryopreserve the refractive lenticule;~~

~~preparing the refractive lenticule for reimplantation;~~

~~creating a pocket in an eye of an acceptor;~~

~~transferring the refractive lenticule under the pocket; and~~

~~covering the acceptor's pocket~~.

~~32~~15. A refractive lenticule obtained by a refractive procedure on the eye of a donor for use in a method of reversing the refractive procedure or treating complications caused by the refractive procedure selected from the group consisting of refractive errors, presbyopia, keratectasia, or keratoconus in a patient that previously underwent a refractive procedure,

wherein the method comprises the steps of:

storing the refractive lenticule obtained in the refractive procedure on the eye of the donor under cryoconditions to cryopreserve the refractive lenticule;

preparing the refractive lenticule for reimplantation;

creating a pocket in an eye of the acceptor;

transferring the refractive lenticule under the pocket; and

covering the acceptor's pocket.

CLAIMS

1. A refractive lenticule obtained by a refractive procedure on the eye of a patient for use in a method for reversing the refractive procedure or treating complications caused by the refractive procedure selected from the group consisting of refractive errors, presbyopia, or keratectasia in a patient that previously underwent a refractive procedure,

wherein the method comprises the steps of:

storing the refractive lenticule obtained in the refractive procedure on the eye of the patient under cryoconditions to cryopreserve the refractive lenticule;

preparing the refractive lenticule for reimplantation;

creating a corneal flap in an eye of the acceptor;

transferring the refractive lenticule under the corneal flap; and

repositioning and covering the acceptor's corneal flap.

2. The refractive lenticule for use as claimed in claim 1, wherein for storage, the refractive lenticule is snap-freezed in liquid nitrogen for about 10 minutes.

3. The refractive lenticule for use as claimed in claim 1 or 2, wherein the refractive lenticule is stored at about -80 °C.

4. The refractive lenticule for use as claimed in any one of claims 1 to 3, wherein to cryopreserve the refractive lenticule, the refractive lenticule is

suspended in a serum-containing medium in a vessel;

a freezing solution of about 10% serum and about 20% organic solvent is added in a dropwise manner into the vessel to form a mixture of about 10% serum and about 10% organic solvent;

the vessel containing the mixture is placed in a -80 °C freezer for at least 4 hours; and

the frozen mixture is transferred into liquid nitrogen for storage.

5. The refractive lenticule for use as claimed in claim 4, wherein the organic solvent is selected from the group consisting of organic solvent is selected from the group consisting of hexane, heptane, cyclohexane, benzene, pyridine, dichloromethane, chloroform, carbon tetrachloride, carbon disulfide, tetrahydrofuran, dioxane, diethyl ether, diisopropylether, ethylene glycol monobutyl ether, methyl ethyl ketone, methyl isobutyl ketone, acetone, cyclohexanone, ethyl acetate, isobutyl isobutyrate, ethylene glycol diacetate, dimethylformamide, acetonitrile, N,N-dimethyl acetamide, nitromethane, acetonitrile, N-methylpyrrolidone, dimethylsulfoxide water, methanol, ethanol, butyl alcohol and formic acid.

6. The refractive lenticule for use as claimed in claim 4 or 5, wherein the serum is a fetal bovine serum.

7. The refractive lenticule for use as claimed in any one of claims 1 to 6, wherein the refractive lenticule is obtained by creating an incision in an eye of the patient; and extracting the refractive lenticule through the incision.

8. The refractive lenticule for use as claimed in claim 7, wherein the incision is created using a one-laser refractive surgery.

9. The refractive lenticule for use as claimed in claim 8, wherein the one-laser refractive surgery performs the refractive procedure in its entirety without using an excimer laser and comprises two different surgical approaches.

10. The refractive lenticule for use as claimed in claim 9, wherein the one-laser refractive surgery comprises a flap-less form of small incision surgery, in which the lenticule is extracted through a small superior pocket incision without the formation or lifting of a full flap, or a surgery performing a hinged flap to extract the lenticule, in which a femtosecond laser creates four stromal incisions to form a corneal lenticule and a corneal flap.

11. The refractive lenticule for use as claimed in any one of claims 1 to 10, wherein the patient and the acceptor are the same subject.

12. The refractive lenticule for use as claimed in any one of claims 1 to 10, wherein the patient and the acceptor are different subjects.

13. The refractive lenticule for use as claimed in any one of claims 1 to 12, wherein prior to the subsequent reimplantation, the stored refractive lenticule is processed to adjust its refractive errors to restore near vision, or to correct presbyopia, or to treat complications of keratectasia.

14. Use of a cryopreserved refractive lenticule for the preparation of the refractive lenticule for reimplantation in the treatment of complications caused by a refractive procedure selected from the group consisting of refractive errors, presbyopia, keratectasia, or keratoconus in a patient that previously underwent a refractive procedure.

15. A refractive lenticule obtained by a refractive procedure on the eye of a donor for use in a method of reversing the refractive procedure or treating complications caused by the refractive procedure selected from the group consisting of refractive errors, presbyopia, keratectasia, or keratoconus in a patient that previously underwent a refractive procedure,

wherein the method comprises the steps of:

storing the refractive lenticule obtained in the refractive procedure on the eye of the donor under cryoconditions to cryopreserve the refractive lenticule;

preparing the refractive lenticule for reimplantation;

creating a pocket in an eye of the acceptor;

transferring the refractive lenticule under the pocket; and

covering the acceptor's pocket.