CLAIMS

We claim:

1. A synthetic prosthesis for use in eye surgery, the synthetic prosthesis comprising a porous part and a solid part and a hole through the porous part and the solid part configured for receiving an optical cylinder.

2. The synthetic prosthesis of claim 1, wherein the synthetic prosthesis is configured for use in keratoprosthesis surgery such as a replacement for standard prosthetic materials such as a modified dental material used in performing osteo-odonto-keratoprosthesis (OOKP) surgery.

3. The synthetic prosthesis of claim 1, wherein the porous part and solid part are laminate parts.

4. The synthetic prosthesis of claim 1, wherein the porous part and solid part of the synthetic prosthesis are permanently attached or are removably attached.

5. The synthetic prosthesis of claim 1, wherein the porous part and the solid part comprise or consist of the same material, or wherein the porous part and the solid part comprise or consist of different materials.

6. The synthetic prosthesis of claim 1, wherein the porous part and the solid part comprise or consist of, or are coated using, the same material or different materials selected from metal material such as a metal or a metal alloy, ceramic material such as a hydroxyapatite or tri-calcium phosphate material, polymeric material such as poly(methyl methacrylate) (PMMA) or polyethylene material, or a composite comprising any combination of metal material, ceramic material, and polymeric material.

7. The synthetic prosthesis of claim 1, wherein the dimensions of the porous part and the solid part are the same or are different.

8. The synthetic prosthesis of claim 1,

wherein the Width (W) of the porous part ranges from 2 to 20 mm, or ranges from 6-16 mm, or ranges from 10-12 mm; and

wherein the Depth (D) of the porous part ranges from 1 to 15 mm, or ranges from 4-12 mm, or ranges from 7-9 mm; and

wherein the Height (H) of the porous part ranges from 0.1 to 5 mm, or ranges from 0.5-2.5 mm, or ranges from 1-2 mm; and

wherein the width (W) of the solid part ranges from 2 to 20 mm, or ranges from 6-16 mm, or ranges from 10-12 mm; and

wherein the Depth (D) of the solid part ranges from 1 to 15 mm, or ranges from 4-12 mm, or ranges from 7-9 mm; and

wherein the Height (H) of the solid part ranges from 0.1 to 5 mm, or ranges from 0.25-2 mm, or ranges from 0.5-1.5 mm.

9. The synthetic prosthesis of claim 1, wherein the porous part or the solid part comprises or is made of metal material such as titanium or titanium alloy such as Ti-6Al-4V alloy, or wherein the porous part or the solid part comprises or is made of ceramic material such as hydroxyapatite or tri-calcium phosphate material.

10. The synthetic prosthesis of claim 1, wherein the porous part or the solid part comprises or is made of a polymeric material such as poly(methyl methacrylate) (PMMA) or polyethylene material, or wherein the porous part or the solid part comprises or is made of a composite comprising a combination of any of metal material, ceramic material, and/or polymeric material.

11. The synthetic prosthesis of claim 1, wherein the porous part or the solid part may be coated using any of metal material, ceramic material, polymeric material and/or

a composite comprising a combination of any of metal material, ceramic material, and/or polymeric material.

12. The synthetic prosthesis of claim 1, wherein the porous part comprises pores having an average effective pore size of 10 to 1000 microns, or of 100 to 800 microns, or of 200-600 microns.

13. The synthetic prosthesis of claim 1, wherein the porous part has a volumetric porosity of 10 to 95%, or of 20-80%, or of 45-75%.

14. The synthetic prosthesis of claim 1, wherein the porous part facilitates bio-integration of the prosthesis into an eye of a patient.

15. The synthetic prosthesis of claim 1, wherein the diameter of the hole through the prosthesis has a diameter that is the same through the porous part as through the solid part, or wherein the diameter of the hole through the prosthesis has a diameter that is different through the porous part than through the solid part.

16. The synthetic prosthesis of claim 1, wherein the hole has a diameter from 1 to 8 mm, or from 2-6 mm, or from 3-5 mm.

17. The synthetic prosthesis of claim 1, wherein the hole is substantially centered in the prosthesis through the porous part and the solid part.

18. The synthetic prosthesis of claim 1, wherein the hole deviates from the center of the porous part and/or the solid part.

19. The synthetic prosthesis of claim 1 further comprising an optical cylinder placed in the hole of the synthetic prosthesis.

20. The synthetic prosthesis of claim 19, wherein the optical cylinder comprises clear polymeric material with tissue tolerance and optical properties such as poly(methyl methacrylate) (PMMA) and/or polyethylene material.