WHAT IS CLAIMED IS:

1. An annuloplasty ring prosthesis comprising:

a frame comprising an outer surface; and

a cover surrounding the frame, the cover comprising a fixed, non-regenerative bioprosthetic tissue.

2. The annuloplasty ring prosthesis of claim 1, wherein the fixed, non-regenerative bioprosthetic tissue is selected from the group consisting of: pericardium, blood vessels, skin, dura mater, small intestinal submucosa, ligaments, tendons, muscle, ureter, urinary bladder, liver, and heart.

3. The annuloplasty ring prosthesis of claim 2, wherein the fixed, non-regenerative bioprosthetic tissue is a pericardium.

4. The annuloplasty ring prosthesis of any one of the preceding claims, wherein the fixed, non-regenerative bioprosthetic tissue is fixed with an aldehyde.

5. The annuloplasty ring prosthesis of claim 4, wherein the aldehyde is a glutaraldehyde.

6. The annuloplasty ring prosthesis of claim 4, wherein free aldehyde groups in the fixed, non-regenerative bioprosthetic tissue are subjected to a capping treatment comprising a capping agent.

7. The annuloplasty ring prosthesis of claim 6, wherein the capping agent comprises an amine.

8. The annuloplasty ring prosthesis of claim 7, wherein the capping treatment further comprises a reducing agent.

9. The annuloplasty ring prosthesis of claim 8, wherein the reducing agent is a borohydride.

10. The annuloplasty ring prosthesis of any one of the preceding claims, wherein the fixed, non-regenerative bioprosthetic tissue is plasticized.

11. The annuloplasty ring prosthesis of claim 10, wherein the fixed, non-regenerative bioprosthetic tissue is plasticized with a polyol.

12. The annuloplasty ring prosthesis of claim 11, wherein the polyol is a glycerol.

13. The annuloplasty ring prosthesis of any one of the preceding claims, wherein:

the cover comprises a sheet having a first edge and a second edge;

the sheet covers the outer surface of the frame; and

the first edge and the second edge are joined together to form a seam.

14. The annuloplasty ring prosthesis of claim 13, wherein:

the sheet is dimensioned to permit the first edge and the second edge of the sheet to fold or roll upon each other to form a lip; and

the lip protrudes away from the outer surface of the frame.

15. The annuloplasty ring prosthesis of any one of the preceding claims, wherein the frame comprises one or both of a non-degradable polymer and a non-degradable metal or metal alloy.

16. The annuloplasty ring prosthesis of claim 15, wherein the frame comprises a non-degradable metal or metal alloy selected from the group consisting of: stainless steel, a nickel-based alloy, a cobalt-chromium alloy, a nickel-cobalt-chromium alloy, Nitinol, and combinations thereof.