CLAIMS

1. A composition for use in the treatment or prevention of a disorder, disease, or condition alleviated by

i) stimulating or modulating collagen expression in a subject in need thereof; and/or

ii) stimulating or modulating claudin-1 expression in a subject in need thereof; and/or

iii) stimulating or modulating one more anti-inflammatory genes in a subject in need thereof,

the composition comprising silk fibroin fragments having an average weight average molecular weight selected from between about 1 kDa and about 5 kDa, between about 5 kDa and about 10 kDa, between about 6 kDa and about 17 kDa, between about 10 kDa and about 15 kDa, between about 15 kDa and about 20 kDa, between about 17 kDa and about 39 kDa, between about 14 kDa and about 30 kDa, between about 20 kDa and about 25 kDa, between about 25 kDa and about 30 kDa, between about 30 kDa and about 35 kDa, between about 35 kDa and about 40 kDa, between about 39 kDa and about 54 kDa, between about 39 kDa and about 80 kDa, between about 40 kDa and about 45 kDa, between about 45 kDa and about 50 kDa, between about 60 kDa and about 100 kDa, and between about 80 kDa and about 144 kDa, and a polydispersity between 1 and about 5,

wherein the concentration of silk fibroin fragments in the composition is from about 0.001% w/v to about 10% w/v.

2. Use of a composition comprising silk fibroin fragments having an average weight average molecular weight selected from between about 1 kDa and about 5 kDa, between about 5 kDa and about 10 kDa, between about 6 kDa and about 17 kDa, between about 10 kDa and about 15 kDa, between about 15 kDa and about 20 kDa, between about 17 kDa and about 39 kDa, between about 14 kDa and about 30 kDa, between about 20 kDa and about 25 kDa, between about 25 kDa and about 30 kDa, between about 30 kDa and about 35 kDa, between about 35 kDa and about 40 kDa, between about 39 kDa and about

54 kDa, between about 39 kDa and about 80 kDa, between about 40 kDa and about 45 kDa, between about 45 kDa and about 50 kDa, between about 60 kDa and about 100 kDa, and between about 80 kDa and about 144 kDa, and a polydispersity between 1 and about 5, wherein the concentration of silk fibroin fragments in the composition is from about 0.001% w/v to about 10% w/v, in the manufacture of a medicament for the treatment or prevention of a disorder, disease, or condition alleviated by

i) stimulating or modulating collagen expression in a subject in need thereof; and/or

ii) stimulating or modulating claudin-1 expression in a subject in need thereof; and/or

iii) stimulating or modulating one more anti-inflammatory genes in a subject in need thereof.

3. The use of claim 2, wherein the composition further comprises 0 to 500 ppm lithium bromide.

4. The use of claim 2 or claim 3, wherein the composition further comprises 0 to 500 ppm sodium carbonate

5. The use of any one of claims 2 to 4, wherein the silk fibroin fragments have a polydispersity between 1 and about 1.5.

6. The use of any one of claims 2 to 4, wherein the silk fibroin fragments have a polydispersity between about 1.5 and about 2.0.

7. The use of any one of claims 2 to 4, wherein the silk fibroin fragments have a polydispersity between about 1.5 and about 3.0.

8. The use of any one of claims 2 to 4, wherein the silk fibroin fragments have a polydispersity between about 2.0 and about 2.5.

9. The use of any one of claims 2 to 4, wherein the silk fibroin fragments have a polydispersity between about 2.5 and about 3.0.

10. The use of any one of claims 2 to 9, wherein the silk fibroin fragments do not spontaneously or gradually gelate and do not visibly change in color or turbidity when in an aqueous solution for at least 10 days prior to formulation into the composition.

11. The use of any one of claims 2 to 10, wherein the silk fibroin fragments are present in the composition at about 0.001% w/v to about 1% w/v.

12. The use of any one of claims 2 to 10, wherein the silk fibroin fragments are present in the composition at about 0.01% w/v to about 1% w/v.

13. The use of any one of claims 2 to 10, wherein the silk fibroin fragments are present in the composition at about 0.025% w/v to about 1% w/v.

14. The use of any one of claims 2 to 10, wherein the silk fibroin fragments are present in the composition at about 0.05% w/v to about 0.7% w/v.

15. The use of any one of claims 2 to 14, wherein the composition is formulated as an injectable composition or as a topical composition.

16. The use of any one of claims 2 to 15, wherein the composition further comprises a pharmaceutically acceptable carrier.

17. The use of claim 16, wherein the pharmaceutically acceptable carrier comprises an aqueous phase.

18. The use of claim 16 or 17, wherein the pharmaceutically acceptable carrier comprises an oil-in-water emulsion or a water-in-oil emulsion.

19. The use of any one of claims 2 to 18, wherein the composition is formulated for administration to an epithelial surface.

20. The use of claim 19, wherein the epithelial surface is a superficial epidermal area, a stratum corneum, an eye surface, or an intestinal surface.

21. The use of any one of claims 2 to 18, wherein the composition is formulated for reducing trans-epidermal water loss.

22. The use of any one of claims 2 to 18, wherein the composition is formulated as a barrier formulation.

23. The use of any one of claims 2 to 18, wherein the composition is formulated as a wound-closure formulation.

24. The use of any one of claims 2 to 18, wherein the composition is formulated for preventing or reversing wrinkles in the subject, preventing or reversing age spots in the subject, preventing or reversing dry skin in the subject, or preventing or reversing uneven skin tone in the subject.

25. The use of any one of claims 2 to 18, wherein the composition is formulated for preventing or reversing skin sagging in the subject, preventing or reversing skin aging in the subject, preventing or reversing reduced skin tensile strength in the subject, preventing or reversing photodamaged skin in the subject, or preventing or reversing *striae distensae* (stretch marks) in the subject.

26. The use of any one of claims 2 to 18, wherein the disease, or condition comprises wrinkles, age spots, dry skin, uneven skin tone, skin sagging, skin aging, reduced skin tensile strength, photodamaged skin, or *striae distensae* (stretch marks).