CLAIMS

1. A pharmaceutical composition for topical, transdermal, superficial, or intradermal administration comprising:

(a) a herpes simplex virus comprising a recombinant herpes simplex virus genome, wherein the recombinant herpes simplex virus genome comprises a first polynucleotide encoding a first cosmetic protein and a second polynucleotide encoding a second cosmetic protein; and

(b) a pharmaceutically acceptable excipient;

wherein the recombinant herpes simplex virus genome comprises an inactivating mutation in both copies of the Infected Cell Protein (ICP4) herpes simplex virus gene;

wherein the first cosmetic protein is selected from the group consisting of a first collagen protein, a first fibronectin protein, a first elastin protein, a first lumican protein, a first vitronectin protein, a first vitronectin receptor protein, a first laminin protein, a first neuromodulator protein, and a first fibrillin protein; and

wherein the recombinant herpes simplex virus genome does not comprise a polynucleotide encoding a Collagen alpha-1 (VII) chain polypeptide (COL7).

2. The pharmaceutical composition of claim 1, wherein the herpes simplex virus comprising the recombinant herpes simplex virus genome is replication defective.

3. The pharmaceutical composition of claim 1 or 2, wherein the recombinant herpes simplex virus genome is a recombinant herpes simplex virus type 1 (HSV-1) genome.

4. The pharmaceutical composition of any one of claims 1-3, wherein the recombinant herpes simplex virus genome comprises an inactivating mutation in a herpes simplex virus gene selected from the group consisting of ICP0, ICP22, ICP27, and ICP47.

5. The pharmaceutical composition of any one of claim 1-4, wherein the first collagen protein is selected from the group consisting of a Collagen alpha-1(I) chain polypeptide (COL1-1), a Collagen alpha-2(I) chain polypeptide (COL1-2), a Collagen alpha-1(II) chain polypeptide (COL2), a Collagen alpha-1(III) chain polypeptide (COL3), a Collagen alpha-1(IV) chain polypeptide (COL4-1), a Collagen alpha-2(IV) chain polypeptide (COL4-2), a Collagen alpha-3(IV) chain polypeptide (COL4-3), a Collagen alpha-4(IV) chain polypeptide (COL4-4), a Collagen alpha-5(IV) chain polypeptide (COL4-5), a Collagen alpha-6(IV) chain polypeptide (COL4-6), a Collagen alpha-1(V) chain polypeptide (COL5-1), a Collagen alpha-2(V) chain polypeptide (COL5-2), a Collagen alpha-3(V) chain polypeptide (COL5-3), a Collagen alpha-1(VI) chain polypeptide (COL6-1), a Collagen alpha-2(VI) chain polypeptide

(COL6-2), a Collagen alpha-3(VI) chain polypeptide (COL6-3), a Collagen alpha-4(VI) chain polypeptide (COL6-4), a Collagen alpha-5(VI) chain polypeptide (COL6-5), a Collagen alpha-6(VI) chain polypeptide (COL6-6), a Collagen alpha-1(VIII) chain polypeptide (COL8), a Collagen alpha-1(IX) chain polypeptide (COL9-1), a Collagen alpha-2(IX) chain polypeptide (COL9-2), a Collagen alpha-3(IX) chain polypeptide (COL9-3), a Collagen alpha-1(X) chain polypeptide (COL10), a Collagen alpha-1(XI) chain polypeptide (COL11-1), a Collagen alpha-2(XI) chain polypeptide (COL11-2), a Collagen alpha-1(XII) chain polypeptide (COL12), a Collagen alpha-1(XIII) chain polypeptide (COL13), a Collagen alpha-1(XIV) chain polypeptide (COL14), a Collagen alpha-1(XV) chain polypeptide (COL15), a Collagen alpha-1(XVI) chain polypeptide (COL16), a Collagen alpha-1(XVII) chain polypeptide (COL17), a Collagen alpha-1(XVIII) chain polypeptide (COL18), a Collagen alpha-1(XIX) chain polypeptide (COL19), a Collagen alpha-1(XX) chain polypeptide (COL20), a Collagen alpha-1(XXI) chain polypeptide (COL21), a Collagen alpha-1(XXII) chain polypeptide (COL22), a Collagen alpha-1(XXIII) chain polypeptide (COL23), a Collagen alpha-1(XXIV) chain polypeptide (COL24), a Collagen alpha-1(XXV) chain polypeptide (COL25), a Collagen alpha-1(XXVI) chain polypeptide (COL26), a Collagen alpha-1(XXVII) chain polypeptide (COL27), and a Collagen alpha-1(XXVIII) chain polypeptide (COL28).

6. The pharmaceutical composition of any one of claims 1-5, wherein the first collagen protein is a human COL3 polypeptide.

7. The pharmaceutical composition of any one of claims 1-5, wherein the first collagen protein is a human COL1-1 polypeptide.

8. The pharmaceutical composition of any one of claims 1-7, wherein the herpes simplex virus has reduced cytotoxicity as compared to a corresponding wild-type herpes simplex virus.

9. The pharmaceutical composition of any one of claims 1-8, wherein the pharmaceutical composition is to be administered via intradermal injection.

10. The pharmaceutical composition of any one of claims 1-8,wherein the pharmaceutical composition is to be administered via superficial injection.

11. The pharmaceutical composition of any one of claims 1-10, wherein the pharmaceutical composition is a cosmetic composition.

12. The pharmaceutical composition of any one of claims 1-11, wherein the recombinant herpes simplex virus genome is delivered to one or more target cells of the skin of the subject.

13. The pharmaceutical composition of any one of claims 1-12, wherein the first cosmetic protein is expressed in one or more target cells of the skin of a subject.

14. The pharmaceutical composition of any one of claims 1-13, wherein the first and second cosmetic proteins are the same.

15. The pharmaceutical composition of any one of claims 1-13, wherein the first and second cosmetic proteins are different.

16. A method of improving skin condition, quality, and/or appearance in a subject, the method comprising administering to the subject an effective amount of a pharmaceutical composition comprising:
(a) a herpes simplex virus comprising a recombinant herpes simplex virus genome, wherein the recombinant herpes simplex virus genome comprises a first polynucleotide encoding a first cosmetic protein and a second polynucleotide encoding a second cosmetic protein; and
(b) a pharmaceutically acceptable excipient:
wherein the recombinant herpes simplex virus genome comprises an inactivating mutation in both copies of the ICP4 herpes simplex virus gene;
wherein the first cosmetic protein is selected from the group consisting of a first collagen protein, a first fibronectin protein, a first elastin protein, a first lumican protein ,a first vitronectin protein, a first vitronectin receptor protein, a first laminin protein, a first neuromodulator protein, and a first fibrillin protein;
wherein the recombinant herpes simplex virus genome does not comprise a polynucleotide encoding a Collagen alpha-1 (VII) chain polypeptide (COL7);
wherein the pharmaceutical composition is to be administered topically, transdermally, intradermally, or via superficial injection to the subject;
wherein the recombinant herpes simplex virus genome is delivered to one or more target cell of the skin of a subject; and
wherein the first cosmetic protein is expressed in one or more target cells of the skin of a subject.

17. The method of claim 16, wherein the subject's skin comprises one or more of sun or UV damage, rough texture, sagging, wrinkles, or any combinations thereof.

18. The method of claim 16 or 17, wherein the subject is a human.

19. The method of any one of claims 16-18, wherein the pharmaceutical composition is to be administered intradermally to the subject.

20. The method of any one of claims 16-18, wherein the pharmaceutical composition is to be administered by superficial injection to the subject.

21. The method of any one of claims 16-20, wherein the recombinant herpes simplex virus genome is a recombinant herpes simplex virus type 1 (HSV-1) genome.

22. The method of any one of claims 16-21, wherein the recombinant HSV-1 genome comprises an inactivating mutation in a herpes simplex virus gene selected from the group consisting of ICP0, ICP22, ICP27, and ICP47.

23. The method of any one of claims 16-22, wherein the first collagen protein is selected from the group consisting of a Collagen alpha-1(I) chain polypeptide (COL1-1), a Collagen alpha-2(I) chain polypeptide (COL1-2), a Collagen alpha-1(II) chain polypeptide (COL2), a Collagen alpha-1(III) chain polypeptide (COL3), a Collagen alpha-1(IV) chain polypeptide (COL4-1), a Collagen alpha-2(IV) chain polypeptide (COL4-2), a Collagen alpha-3(IV) chain polypeptide (COL4-3), a Collagen alpha-4(IV) chain polypeptide (COL4-4), a Collagen alpha-5(IV) chain polypeptide (COL4-5), a Collagen alpha-6(IV) chain polypeptide (COL4-6), a Collagen alpha-1(V) chain polypeptide (COL5-1), a Collagen alpha-2(V) chain polypeptide (COL5-2), a Collagen alpha-3(V) chain polypeptide (COL5-3), a Collagen alpha-1(VI) chain polypeptide (COL6-1), a Collagen alpha-2(VI) chain polypeptide (COL6-2), a Collagen alpha-3(VI) chain polypeptide (COL6-3), a Collagen alpha-4(VI) chain polypeptide (COL6-4), a Collagen alpha-5(VI) chain polypeptide (COL6-5), a Collagen alpha-6(VI) chain polypeptide (COL6-6), a Collagen alpha-1(VIII) chain polypeptide (COLE), a Collagen alpha-1(IX) chain polypeptide (COL5-1), a Collagen alpha-2(IX) chain polypeptide (COL5-2), a Collagen alpha-3(IX) chain polypeptide (COL9-3), a Collagen alpha-1(X) chain polypeptide (COL10), a Collagen alpha-1(XI) chain polypeptide (COL11-1), a Collagen alpha-2(XI) chain polypeptide (COL11-2), a Collagen alpha-1(XII) chain polypeptide (COL12), a Collagen alpha-1(XIII) chain polypeptide (COL13), a Collagen alpha-1(XIV) chain polypeptide (COL14), a Collagen alpha-1(XV) chain polypeptide (COL15), a Collagen alpha-1(XVI) chain polypeptide (COL16), a Collagen alpha-1(XVII) chain polypeptide (COL17), a Collagen alpha-1(XVIII) chain polypeptide (COL18), a Collagen alpha-1(XIX) chain polypeptide (COL19), a Collagen alpha-1(XX) chain polypeptide (COL20), a Collagen

alpha-1(XXI) chain polypeptide (COL21), a Collagen alpha-1(XXII) chain polypeptide (COL22), a Collagen alpha-1(XXIII) chain polypeptide (COL23), a Collagen alpha-1(XXIV) chain polypeptide (COL24), a Collagen alpha-1(XXV) chain polypeptide (COL25), a Collagen alpha-1(XXVI) chain polypeptide (COL26), a Collagen alpha-1(XXVII) chain polypeptide (COL27), and a Collagen alpha-1(XXVIII) chain polypeptide (COL28).

24. The method of any one of claims 16-23, wherein the first collagen protein is a human COL3 polypeptide.

25. The method of any one of claims 16-23, wherein the first collagen protein is a human COL1-1 polypeptide.

26. The method of any one of claims 16-25, wherein the herpes simplex virus has reduced cytotoxicity as compared to a corresponding wild-type herpes simplex virus.

27. The method of any one of claims 16-26, wherein the first and second cosmetic proteins are the same.

28. The method of any one of claims 16-26, wherein the first and second cosmetic proteins are different.