

CLAIMS

What is claimed is:

1. A method for treating a subepidermal tissue in a patient, comprising:
 - a. visualizing the tissue beneath a skin surface of the patient;
 - b. vibrating the tissue beneath the skin surface;
 - c. locating one or more entrapped nerves within the subepidermal tissue;
 - d. introducing a probe into the subepidermal tissue at the site of the entrapped nerve;
 - e. manipulating the subepidermal tissue and/or the entrapped nerve with the probe;
 - and
 - f. injecting a liquid composition into the subepidermal tissue via the probe at the site of the entrapped nerve.
2. The method of claim 1, wherein the subepidermal tissue is a mesoderm-derived tissue.
3. The method of claim 2, wherein the mesoderm-derived tissue is a connective tissue.
4. The method of claim 3, wherein the connective tissue is located in the patient's neck, back, knees, hips, shoulders, elbows, feet, ankles, toes, hands, wrists, and/or fingers.
5. The method of claim 1, wherein the liquid composition comprises one or more regenerative proteins or cells, and a buffer.
6. The method of claim 1, wherein the visualizing comprises ultrasound imaging.
7. The method of claim 6, wherein the ultrasound imaging operates at a frequency of about 4-100 MHz.
8. The method of claim 1, wherein the subepidermal tissue is located within about 10 cm from the skin surface.
9. The method of claim 1, wherein the vibrating is an acoustic radiation force impulse or a palpitation.

10. The method of claim 9, wherein the acoustic radiation force impulse is a shear wave.
11. The method of claim 1, wherein the probe is a needle probe.
12. The method of claim 11, wherein the needle probe includes one or more fenestrated holes to allow for delivery of the liquid composition.
13. The method of claim 1, wherein the manipulating the entrapped nerve includes vibration and/or separation of the tissue via the needle.
14. The method of claim 1, wherein the visualizing, vibrating and/or locating coincide with movement by the patient causing movement of the subepidermal tissue.
15. The method of claim 1, wherein the visualizing includes real-time image analysis to locate the entrapped nerves and abnormal tissue.
16. The method of claim 1, further comprising dissipating the liquid composition within the tissue via one or more of manual manipulation, percussion massaging, application of a sound wave, and application of a pulsed electromagnetic field.
17. A method for treating a mesoderm-derived tissue in a patient, comprising:
 - a. visualizing the mesoderm-derived tissue beneath a skin surface of the patient via dynamic ultrasound imaging and real-time image analysis;
 - b. vibrating the connective tissue beneath the skin surface;
 - c. locating one or more entrapped nerves within the connective tissue;
 - d. introducing a needle probe into the connective tissue at the site of the entrapped nerve;
 - e. manipulating the tissue and/or the entrapped nerve with the needle probe; and
 - f. injecting a liquid composition into the connective tissue via the needle probe, the liquid composition comprising one or more regenerative proteins and a buffer.

18. The method of claim 17, wherein the mesoderm-derived tissue is a connective tissue.
19. The method of claim 18, wherein the connective tissue is located in the patient's neck, back, knees, hips, shoulders, elbows, feet, ankles, toes, hands, wrists, and/or fingers.
20. The method of claim 17, wherein the liquid composition comprises dextrose, plasma-lyte and one or more placental proteins selected from the group consisting of:
 - Basic fibroblast growth factor (bFGF);
 - Epidermal growth factor (EGF);
 - Granulocyte colony-stimulating factor (GCSF);
 - Platelet-derived growth factor (PDGF-AA);
 - Platelet-derived growth factor (PDGF-BB);
 - Placental growth factor (PLGF);
 - Transforming growth factor alpha (TGF – alpha);
 - Transforming growth factor beta 1 (TGF-B1);
 - interleukin 4 (IL-4);
 - interleukin 6 (IL-6);
 - interleukin 8 (IL-8);
 - interleukin 10 (IL-10);
 - Tissue inhibitor of metalloproteinase (TIMP-1);
 - Tissue inhibitor of metalloproteinase (TIMP-2);
 - Tissue inhibitor of metalloproteinase (TIMP-4);
 - Growth Differentiation Factor (GDF-15);
 - Granulocyte macrophage colony-stimulating factor (GM-CSF);
 - Interferon gamma (IFN- γ);

Interleukin 1 alpha (IL-1 α);
Interleukin 1 Beta (IL-1 β);
Interleukin 1 receptor antagonist (IL-1ra);
Interleukin 5 (IL-5);
Interleukin 7 (IL-7);
Interleukin 12 p40 (IL-12p40);
Interleukin 12 p70 (IL-12p70);
Interleukin 15 (IL-15);
Interleukin 17 (IL-17);
Interleukin 16 (IL-16);
Macrophage colony- stimulating factor (M-CSF);
Osteoprotegerin (OPG);
B lymphocyte chemoattractant (CXCL13) (BLC);
Chemokine ligand 1 (CCL1) (I-309);
Eotaxin-2;
Monocyte chemotactic protein 1 (CCL2) (MCP-1);
Monokine induced by gamma interferon (CXCL9) (MIG);
Macrophage inflammatory protein 1 alpha (CCL3) (MIP-1 α);
Macrophage inflammatory protein 1 beta (CCL4) (MIP-1 β);
Macrophage inflammatory protein 1D (MIP-5, CCL15) (MIP-1d);
Regulated on activation, normal T cell expressed and secreted (CCL5) (RANTES);
Brain-derived neurotrophic factor (BDNF);
Bone morphogenetic protein 5 (BMP-5);

Endocrine gland- derived vascular endothelial growth factor (EG-VEGF);

Fibroblast growth factor 4 (FGF-4);

Keratinocyte growth factor (FGF-7);

Growth hormone (GH);

Insulin-like growth factor (IGF-I);

Insulin-like growth factor binding protein – 1 (IGFBP-1);

Insulin-like growth factor binding protein – 2 (IGFBP-2);

Insulin-like growth factor binding protein – 3 (IGFBP-3);

Insulin-like growth factor binding protein – 4 (IGFBP-4); and

Insulin-like growth factor binding protein – 6 (IGFBP-6).

21. The method of claim 17, wherein the ultrasound imaging operates at a frequency of about 4-100 MHz.
22. The method of claim 17, wherein the connective tissue is located within about 10 cm from the skin surface.
23. The method of claim 17, wherein the vibrating is an acoustic radiation force impulse or a palpitation.
24. The method of claim 23, wherein the acoustic radiation force impulse is a shear wave.
25. The method of claim 17, wherein the needle probe includes one or more fenestrated holes to allow for delivery of the liquid composition.
26. The method of claim 17, wherein the manipulating the entrapped nerve includes vibration and/or separation of the tissue via the needle.

27. The method of claim 17, further comprising dissipating the liquid composition within the connective tissue via one or more of manual manipulation, percussion massaging, application of a sound wave, and application of a pulsed electromagnetic field.
28. The method of claim 17, further comprising movement of the connective tissue by the patient to help aid in re-structuring the connective tissue.
29. The method of claim 17, further comprising re-administering the composition comprising regenerative proteins to the connective tissue at about 14-90 days after the initial administering.
30. The method of claim 29, wherein the re-administering occurs about every 14-90 days for a period of 1-12 months.
31. A kit for carrying out treatment of connective tissue of a patient, comprising:
 - a. a liquid composition comprising dextrose, plasma-lyte and one or more placental proteins selected from the group consisting of:
 - Basic fibroblast growth factor (bFGF);
 - Epidermal growth factor (EGF);
 - Granulocyte colony-stimulating factor (GCSF);
 - Platelet-derived growth factor (PDGF-AA);
 - Platelet-derived growth factor (PDGF-BB);
 - Placental growth factor (PLGF);
 - Transforming growth factor alpha (TGF – alpha);
 - Transforming growth factor beta 1 (TGF-B1);
 - interleukin 4 (IL-4);
 - interleukin 6 (IL-6);

interleukin 8 (IL-8);
interleukin 10 (IL-10);
Tissue inhibitor of metalloproteinase (TIMP-1);
Tissue inhibitor of metalloproteinase (TIMP-2);
Tissue inhibitor of metalloproteinase (TIMP-4);
Growth Differentiation Factor (GDF-15);
Granulocyte macrophage colony-stimulating factor (GM-CSF);
Interferon gamma (IFN- γ);
Interleukin 1 alpha (IL1-alpha);
Interleukin 1 Beta (IL1- β);
Interleukin 1 receptor antagonist (IL-1ra);
Interleukin 5 (IL-5);
Interleukin 7 (IL-7);
Interleukin 12 p40 (IL-12p40);
Interleukin 12 p70 (IL-12p70);
Interleukin 15 (IL-15);
Interleukin 17 (IL-17);
Interleukin 16 (IL-16);
Macrophage colony- stimulating factor (MCSF);
Osteoprotegerin (OPG);
B lymphocyte chemoattractant (CXCL13) (BLC);
Chemokine ligand 1 (CCL1) (I-309);
Eotaxin-2;

Monocyte chemotactic protein 1 (CCL2) (MCP-1);

Monokine induced by gamma interferon (CXCL9) (MIG);

Macrophage inflammatory protein 1 alpha (CCL3) (MIP-1 α);

Macrophage inflammatory protein 1 beta (CCL4) (MIP-1 β);

Macrophage inflammatory protein 1D (MIP-5, CCL15) (MIP-1d);

Regulated on activation, normal T cell expressed and secreted (CCL5)
(RANTES);

Brain-derived neurotrophic factor (BDNF);

Bone morphogenetic protein 5 (BMP-5);

Endocrine gland- derived vascular endothelial growth factor (EG-VEGF);

Fibroblast growth factor 4 (FGF-4);

Keratinocyte growth factor (FGF-7);

Growth hormone (GH);

Insulin-like growth factor (IGF-I);

Insulin-like growth factor binding protein – 1 (IGFBP-1);

Insulin-like growth factor binding protein – 2 (IGFBP-2);

Insulin-like growth factor binding protein – 3 (IGFBP-3);

Insulin-like growth factor binding protein – 4 (IGFBP-4); and

Insulin-like growth factor binding protein – 6 (IGFBP-6); and

- b. a needle probe for injecting the liquid composition into the connective tissue and for manipulating an entrapped nerve; and
- c. instructions for carrying out the method of treatment of the connective tissue.

32. The kit of claim 31, wherein the needle probe includes one or more fenestrated holes to allow for delivery of the liquid composition.
33. The kit of claim 31, further comprising one or more instruments for manual manipulation, percussion massaging, application of a sound wave, or application of a pulsed electromagnetic field, to the connective tissue.