occurring collagen or elastin may comprise one or more amino acid trim er repeats of the sequence glycine-glutamic acid-lysine (GEK) and/or glycine-aspartic acid-lysine (GDK), the number of GEK and/or GDK trimer repeats can range from 2 to 50 trimer repeats. In one aspect, the secretion tag is DsbA, PelB, OmpA, TolB, MalE, lpp, TorA, or HylA, or a hybrid secretion tag that comprises a portion of one secretion tag fused to a portion of a second secretion tag. An exemplary embodiment secretion tag is DsbA.

[0025] The polynucleotides and vectors can be used to transform host cells and express the polynucleotides. Polynucleotides encoding a non-naturally occurring collagen, wherein the polynucleotide is SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19 SEQ ID NO: 73, SEQ ID NO: 75, SEQ ID NO: 77, SEQ ID NO: 79, SEQ ID NO: 81, SEQ ID NO: 83, SEQ ID NO: 85, SEQ ID NO: 90, SEQ ID NO: 93, SEQ ID NO: 95, SEQ ID NO: 97, SEQ ID NO: 103, SEQ ID NO: 105, SEQ ID NO: 107, SEQ ID NO: 109, SEQ ID NO:111, SEQ ID NO: 113, or SEQ ID NO: 105 are provided. Polynucleotides encoding a non-naturally occurring elastin, wherein the polynucleotide is SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50, SEQ ID NO: 52, SEQ ID NO: 54, SEQ ID NO: 56, SEQ ID NO: 58, SEQ ID NO: 60, SEQ ID NO: 62, SEQ ID NO: 64, SEQ ID NO: 66, SEQ ID NO: 68, SEQ ID NO: 70, and SEQ ID NO: 72, SEQ ID NO: 99, or SEQ ID NO:101provided.

[0026] Host cells that express the polynucleotides of the invention are disclosed. Host cells can be any host cell including bacterial cells, yeast cells, fungal cells, insect cells, mammalian cells, plant cells and any other cells used to express exogenous polynucleotides.

[0027] Bacterial host cells in which the cells have been modified to inhibit cell division and the periplasmic space is increased are provided. An exemplary host cell is *E. coli*.

[0028] One embodiment provides a method of producing a non-naturally occurring collagen or a non-naturally occurring elastin. The method comprises the steps of inoculating a culture medium with a recombinant host cell comprising polynucleotides that encode the collagen or elastin, cultivating the host cell, and isolating the non-naturally occurring collagen or the non-naturally occurring elastin from the host cell.

[0028a] In yet another aspect, provided herein is a recombinant polypeptide comprising the amino acid sequence of SEQ ID NO: 1 having an internal truncation of from 50 amino acids to 250 amino acids.

[0028b] In yet another aspect, provided herein is a composition comprising from 0.005% w/w to 30% w/w of a recombinant polypeptide described herein.

[0028c] In yet another aspect, provided herein is a use of the composition described herein in the manufacture of a medicament for treating the skin of a subject, wherein the medicament is to be administered to the skin of the subject.

[0028d] In yet another aspect, provided herein is a composition as described herein for use in therapy.