



- (51) **International Patent Classification:**
A61K 38/01 (2006.01) *C07K 14/415* (2006.01)
- (21) **International Application Number:**
PCT/EP2016/067097
- (22) **International Filing Date:**
18 July 2016 (18.07.2016)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
15177017.9 16 July 2015 (16.07.2015) EP
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- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

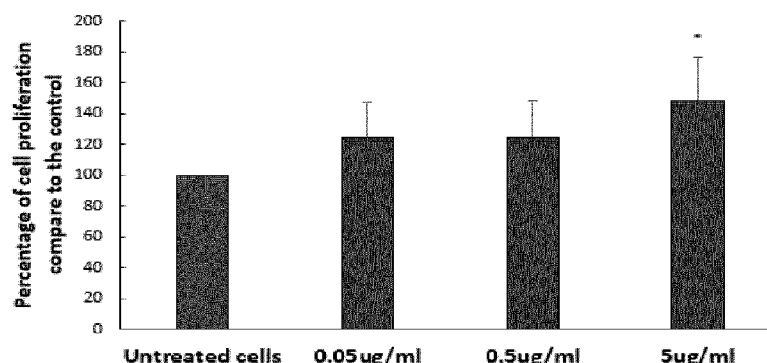
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- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) **Title:** GROWTH PROMOTING PEPTIDES AND USES THEREOF

**FIGURE 1**

(57) **Abstract:** A natural peptide comprising a cellular growth promoting fragment of a protein selected from SEQUENCE ID NO's: 1 to 13, and a composition comprising a plurality of growth promoting peptides, is described. Also disclosed is the use of the peptides and compositions in prevention of ageing of human skin, treatment of diseases or conditions characterised by damaged epithelial cells or tissue such as colon cancer and peripheral inflammatory disorders, and wound treatment. Specific pea and rice protein derived peptides are described in SEQUENCE ID NO'S 15 to 505, and 546 to 704.

Title

GROWTH PROMOTING PEPTIDES AND USES THEREOF

5 Background to the Invention

The growing will of maintaining a youthful appearance is leading to more and more research of new dermatological procedures for treatment of skin aging, especially when people keeps living longer and healthier. With age, structural and functional changes are be observed in human skin (Calleja-Agius J. *et al.* 2013) and many factors are responsible for them like
10 environmental factors such as UV radiation from sunlight or internal factors such as changes in hormones due menopause (Affinito P. *et al.* 1999).

The alterations of connective tissue in the dermis and epidermis, especially the reduction of the extracellular matrix is highly responsible for skin wrinkling and sagging since they induce important changes in its mechanical properties. Furthermore, metabolism and synthesis of the
15 extra-cellular matrix are affected by the ageing process through enzymatic activities.

There are mainly four solutions to fight against ageing process at the moment:

Diet and hormones management: fighting the ageing process by managing our diet by using supplements. This method is still controverted at the moment. Some studies suggest that
20 antioxidant supplements like Vitamin C or lipoic acid for example could have anti-ageing properties.

Hormone treatment: a risky and controverted solution for anti-ageing purpose. One have to be really careful with anything related to hormones since it can have a broad spectrum of adverse effects. This solution isn't widely used and most of the studies are still on the animal
25 stage.

Surgical anti-aging solutions: they are very effective on the short term but they are costly and can require long period of healing. Like in every surgical operation, there are risks but also side effects. For example, during surgical anti-aging solutions like eyelifts and facelifts, where an incision is made at the hairline, there are some risks of bruising, swelling, drooping
30 eyelids, and secondary infections can occur.

Recently, there has been an increasing enthusiasm on minimally invasive treatments and techniques designed to deal with problems like wrinkles, volume loss and other skin

damages. The most common topical anti-ageing solutions are creams and serums. Their active ingredients can be divided in several families:

Moisturiser ingredients will keep the skin hydrated. It's mostly big polar molecules that will make bonds with water like glycosaminoglycan (hyaluronic acid for instance).

5 *Collagen and other extra-cellular matrix* related ingredients will contribute to maintain a well organised skin structure by stimulating biosynthesis if they can trigger the right receptors.

Cell proliferation ingredients are important as well since they help to regenerate skin cells which will synthesise the component the skin needs like extra-cellular matrix and growth factors.

10

It is an object of the invention to provide an alternative minimally invasive treatment of skin ageing.

15 Statements of Invention

The pea genome codes for over 70,000 different proteins. The Applicant has identified six of these proteins, each of which contains one or more peptides capable of promoting cellular growth and/or proliferation (hereafter “growth promoting peptide” or “growth promoting fragment”). Likewise, out of the more than 60,000 proteins encoded by the rice genome, the

20 Applicant has identified seven proteins, each of which contains one or more peptides that are bioactive, typically capable of promoting cellular growth and/or proliferation. Cellular growth promoting fragments of the fourteen identified proteins have been shown to have an effect on elastin and collagen production and cell proliferation (Figs 1 to 109). The specific plant proteins from which the natural peptides are derived are provided in SEQUENCE ID

25 NO: 1-14 and 705 to 716. The specific pea proteins from which the peptides are derived include SEQUENCE ID NO: 1-2 and 7-10, and the specific rice proteins from which the peptides are derived include SEQUENCE ID NO: 3-6 and 11-13. Homologs of these proteins are described in SEQUENCE ID NO: 525 to 564. The specific peptides initially identified in the pea proteins are shown in SEQUENCE ID NO's: 15-215 and 283-340. The specific

30 peptides initially identified in the rice proteins are shown in SEQUENCE ID NO's: 216-282 and 341-412. Additional peptides identified in the pea and rice proteins disclosed herein, and variants thereof, are provided in SEQUENCE ID NO'S 418 to 515 and 546 to 704 and 717-775.

In a first aspect, the invention provides a peptide, typically 5 to 50 amino acids in length, and comprising (a) a fragment of a pea or rice protein, for example the pea and rice protein disclosed herein such as one selected from SEQUENCE ID NO's: 1 to 14 and 705 to 716 and 717-732, or a homolog thereof, or (b) a variant of the fragment, or (c) a fragment of the peptide (hereafter "peptide of the invention"). In one embodiment the peptide is bioactive. In one embodiment, the peptide has cellular growth or proliferation promotion activity.

In one embodiment, the peptide of the invention comprises a sequence selected from SEQUENCE ID NO: 15-505 and 546-704 and 717-775.

In one embodiment, the peptide of the invention consists essentially of a sequence selected from SEQUENCE ID NO: 15-505 and 546-704 and 717-775..

In one embodiment, the peptide of the invention consists of about 3-50 amino acids. In one embodiment, the peptide of the invention consists of about 4-50 amino acids. In one embodiment, the peptide of the invention consists of about 5-50 amino acids. In one embodiment, the peptide of the invention consists of about 6-50 amino acids. In one embodiment, the peptide of the invention consists of about 7-50 amino acids.

In one embodiment, the fragment has 8 to 37 amino acids. In one embodiment, the fragment has a charge of between -10 and +4.

Preferably, the c-terminal amino acid is not cysteine (C) or methionine (M).

Preferably, the n-terminal amino acid is not cysteine (C), histidine (H), or proline (P).

Preferably, the c-terminal domain of the fragment does not contain cysteine (C).

Preferably, the n-terminal domain of the fragment does not contain cysteine (C).

Preferably, the fragment does not contain cysteine (C).

Preferably, the peptide does not contain cysteine (C).

In one embodiment of the invention, the peptide comprises a sequence selected from SEQUENCE ID NO: 15 to 505.

In one embodiment of the invention, the peptide consists essentially of a sequence selected from SEQUENCE ID NO: 15 to 505.

5

Preferably, the fragment is selected from SEQUENCE ID NO's: 15-215 and 283-340, or a bioactive variant of the fragment.

Preferably, the fragment is selected from SEQUENCE ID NO's: 216-282 and 341-412, or a
10 bioactive variant of the fragment.

Preferably, the peptide consists of a fragment selected from SEQUENCE ID NO's: 15 to 417, or a bioactive variant of the fragment.

15 Preferably, the peptide consists of a sequence selected from SEQUENCE ID NO's: 15 to 417.

Preferably, the fragment is selected from SEQUENCE ID NO's: 413-417, or a bioactive variant of the fragment.

20 In one embodiment, the peptide comprises or consists of a fragment selected from SEQ ID NO'S: 246, 283, 284, 245 and 42, or a bioactive variant of the fragment.

In one embodiment, the peptide comprises a fragment selected from SEQ ID NO'S: 247 to 268.

25

In one embodiment, the peptide of the invention is modified. In one embodiment the peptide is modified with a protecting group. In one embodiment, the peptide is modified to increase its lipophilicity. In one embodiment, the peptide is modified to increase its half-life. In one embodiment, an N or C-terminal amino acid of the peptide is modified. In one embodiment,
30 the N or C-terminal amino acid of the peptide is modified with a protecting group.

[SEQUENCE ID NO: 1 (Pea Protein 1 – P13918)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 1 or a homolog thereof, or a bioactive variant of the fragment.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 15 to 90, or a bioactive variant of the fragment.

- 5 The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which typically comprises a different a bioactive fragment of SEQUENCE ID NO: 1 or a homolog thereof. Preferably, the composition
- 10 comprises a first bioactive peptide comprising a first a bioactive fragment selected from SEQUENCE ID NO: 15 to 90 (or a bioactive variant of the fragment), and a second bioactive peptide comprising a second a bioactive fragment selected from SEQUENCE ID NO: 15-90 (or a bioactive variant of the fragment).
- 15 In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Pea Protein 1 (SEQUENCE ID NO: 1) include *Vicia fabia*, *Cicer arietinum* and *Lens culinaris* homologs (SEQ ID NO: 525 to 527).

20

[SEQUENCE ID NO: 2 (Pea Protein 2 – Q9M3X6)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 2, or a homolog thereof, or a bioactive variant of the fragment.

- 25 Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 91 to 215, or a bioactive variant of the fragment.

- The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6,
- 30 preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different a bioactive fragment of SEQUENCE ID NO: 2 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 91-215,

and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 91-215.

5 In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Pea Protein 2 (SEQUENCE ID NO: 2) include *Pisum abyssinicum*, *Lathyrus annuus*, and *Vicia villosa* (SEQ ID 528 to 530).

10 [SEQUENCE ID NO: 3 (Rice Protein 1 – Q0DEV5)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 3, or a homolog thereof, or a bioactive variant of the fragment.

15 Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 216-244, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10
20 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 3 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 216-244, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 216-244.

25

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

30 Homologs of Rice Protein 1 (SEQUENCE ID NO: 15) include *Oryza rufipogon*, *Oryza officinalis*, *Hordeum vulgare* subsp. *vulgare* (SEQ ID NO: 531 to 533).

[SEQUENCE ID NO: 4 (Rice Protein 2 – P14323)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 4, or a homolog thereof, or a bioactive variant of the fragment.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 245-246, or a bioactive variant of the fragment.

- 5 The invention also provides a composition comprising at least one or more peptides of the invention that comprise different bioactive fragments of SEQUENCE ID NO: 4 or a homolog thereof. Preferably, the composition comprises a first peptide comprising the bioactive fragment SEQ ID NO: 245 and a second peptide comprising the bioactive fragment SEQ ID NO: 246.

10

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

- Homologs of Rice Protein 2 (SEQUENCE ID NO: 4) include *Oryza brachyantha*, and *Zizania*
15 *latifolia* (SEQ ID NO: 534 to 536).

[SEQUENCE ID NO: 5 (Rice Protein 3 – P29835)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 5, or a homolog thereof, or a bioactive variant of the fragment.

20

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 247-268, or a bioactive variant of the fragment.

- The invention also provides a composition comprising at least 1, preferably at least 2,
25 preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 5 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 247-
30 268, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 247-268.

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Rice Protein 3 (SEQUENCE ID NO: 5) include Zea Mays, Sorghum bicolor and Setaria italica (SEQ ID 537 to 539).

5 [SEQUENCE ID NO: 6 (Rice Protein 4 – P14614)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 6 or a homolog thereof, or a bioactive variant of the fragment.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S:
10 269-282, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10
15 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 6 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 269-282, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 269-282.

20

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Rice Protein 4 (SEQUENCE ID NO: 6) include Oryza sativa Japonica Group,
25 Brachipodium distachyon (SEQ ID NO: 540 to 542).

[SEQUENCE ID NO: 7 (Pea Protein 3 – P09918)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 7 or a homolog thereof, or a bioactive variant of the fragment.

30

Preferably, the peptide comprises a bioactive fragment of SEQUENCE ID NO'S: 283, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of
5 SEQUENCE ID NO: 7 or a homolog thereof. Preferably, the composition comprises a bioactive fragment SEQUENCE ID NO'S: 283, or a bioactive variant of the fragment.

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

10 Homologs of Pea Protein 3 (SEQUENCE ID NO: 7) include *Medicago truncatula*, *Glycine soja*, and *Phaseolus vulgaris* (SEQ ID NO: 543 to 545).

[SEQUENCE ID NO: 8 (Pea Protein 4 – P02857)]

15 Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 8 or a homolog thereof, or a bioactive variant of the fragment.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 284-307, or a bioactive variant of the fragment.

20 The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of
25 SEQUENCE ID NO: 8 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 284-307, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 284-307.

30 In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Pea Protein 4 (SEQUENCE ID NO: 8) include *Vicia sativa*, *Vicia narbonesis* and *Cicer arietinum* (SEQ ID NO: 546 to 548).

[SEQUENCE ID NO: 9 (Pea Protein 5 – P02855)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 9 or a homolog thereof, or a bioactive variant of the fragment.

5

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 308-339, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 9 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 308-339, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 308-339.

15

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

20

Homologs of Pea Protein 5 (SEQUENCE ID NO: 9) include *Lathyrus hirsutus*, *Lathyrus cicero*, *Lathyrus sativus* (SEQ ID NO: 549 to 551).

[SEQUENCE ID NO: 10 (Pea Protein 6 – D3VNE1)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 10 or a homolog thereof, or a bioactive variant of the fragment.

25

Preferably, the peptide comprises the bioactive fragment SEQUENCE ID NO: 340, or a bioactive variant of the fragment.

30

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of

SEQUENCE ID NO: 10 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising the bioactive fragment SEQUENCE ID NO 340.

5 In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Pea Protein 6 (SEQUENCE ID NO: 10) include *Medicago truncatula*, *Vicia peregrine*, and *Vicia lutea* (SEQ ID NO: 552 to 554).

10 [SEQUENCE ID NO: 11 (Rice Protein 5 – P07728)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 11 or a homolog thereof, or a bioactive variant of the fragment.

15 Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 341-358, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10
20 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 11 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 341-358, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 341-358.

25

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

30 Homologs of Rice Protein 5 (SEQUENCE ID NO: 11) include *Oryza sativa Indica Group*, *Zizania latifolia*, *Avena sativa* (SEQ ID NO: 555 to 557).

[SEQUENCE ID NO: 12 (Rice Protein 6 – P07730)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 12 or a homolog thereof, or a bioactive variant of the fragment.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 359-401, or a bioactive variant of the fragment.

- 5 The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 12 or a homolog thereof. Preferably, the composition comprises a first
10 bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 359-401, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 359-401.

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or
15 proliferation promoting peptide, variant or fragment, respectively.

Homologs of Rice Protein 6 (SEQUENCE ID NO: 12) include *Oryza brachyantha*, *Brachipodium distachyon* (SEQ ID NO: 558 to 560).

20 [SEQUENCE ID NO: 13 (Rice Protein 7 – Q0D7S0)]

Preferably, the peptide comprises a bioactive fragment of the protein of SEQUENCE ID NO: 13 or a homolog thereof, or a bioactive variant of the fragment.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S:
25 402-412, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10
30 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 13 or a homolog thereof. Preferably, the composition comprises a first bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 402-412, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 402-412.

In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

- 5 Homologs of Rice Protein 7 (SEQUENCE ID NO: 13) include *Oryza sativa* Indica Group, *Zizania latifolia*, *Avena sativa* (SEQ ID NO: 561 to 564).

[SEQUENCE ID NO: 14 (Staphylococcus Aureus Protein 1 – P0C1U8)]

- 10 Preferably, the peptide comprises a fragment of the protein of SEQUENCE ID NO: 14 or a homolog thereof.

Preferably, the peptide comprises a bioactive fragment selected from SEQUENCE ID NO'S: 413-417, or a bioactive variant of the fragment.

- 15 The invention also provides a composition comprising at least 1, preferably at least 2, preferably at least 3, preferably at least 4, preferably at least 5, preferably at least 6, preferably at least 7, preferably at least 8, preferably at least 9, or preferably at least 10 bioactive peptides of the invention, each of which comprises a different bioactive fragment of SEQUENCE ID NO: 14 or a homolog thereof. Preferably, the composition comprises a first
- 20 bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 413-417, and a second bioactive peptide comprising a bioactive fragment selected from SEQUENCE ID NO 413-417.

- 25 In one embodiment, the bioactive peptide, variant or fragment is a cellular growth or proliferation promoting peptide, variant or fragment, respectively.

Homologs of Staphylococcus Aureus_Protein 1 (SEQUENCE ID NO: 14) include:

- 30 >gi|580560623|gb|EVF84961.1| glutamyl endopeptidase [Staphylococcus aureus COAS6020]
 >gi|580687002|gb|EVH10169.1| glutamyl endopeptidase [Staphylococcus aureus UCIM6080]
 >gi|751815683|gb|KIN24957.1| glutamyl endopeptidase [Staphylococcus aureus MRSA_CVM43477]
 >gi|781884797|dbj|BAR08486.1| glutamyl endopeptidase precursor [Staphylococcus aureus subsp. aureus]
 >gi|781887762|dbj|BAR11210.1| glutamyl endopeptidase precursor [Staphylococcus aureus subsp. aureus]

The invention also provides a composition comprising at least one and preferably a plurality of peptides of the invention, wherein each of the peptides of the invention comprises a bioactive fragment of a protein disclosed herein, for example selected from SEQUENCE ID NO: 1 to 14 or a homolog thereof, or a bioactive variant of the fragment.

5

Typically, the or each peptide of the invention comprises, a bioactive fragment selected from, SEQUENCE ID NO: 15-505 and 546 to 704 and 717-775, or a bioactive variant of the fragment.

10 Typically, the or each peptide of the invention is selected from a bioactive fragment selected from, SEQUENCE ID NO: 15-505 and 546 to 704 and 717-775, or a bioactive variant of the fragment.

The invention also provides a composition comprising at least one and preferably a plurality
15 of peptides of the invention, wherein the or each of the peptides of the invention comprise a bioactive fragment of a pea or rice protein disclosed herein, typically selected from SEQUENCE ID NO: 1-2 and 7-10. Typically, the or each peptide of the invention is selected from, or comprises a bioactive fragment selected from, SEQUENCE ID NO: 15-215 and 283 to 340, or a bioactive variant of the fragment.

20

The invention also provides a composition comprising at least one and preferably a plurality of peptides of the invention, wherein the or each of the peptides of the invention comprise a bioactive fragment of a protein disclosed herein typically selected from SEQUENCE ID NO: 3-6 and 11-13. Typically, the or each peptide of the invention is selected from, or comprises a
25 bioactive fragment selected from, SEQUENCE ID NO: 216-282 and 341-412, or a bioactive variant of the fragment.

Preferably, the composition comprises at least two distinct growth promoting peptides of the invention.

30

Preferably, the composition comprises at least three distinct growth promoting peptides of the invention.

Preferably, the composition comprises at least four distinct growth promoting peptides of the invention.

5 Preferably, the composition comprises at least five distinct growth promoting peptides of the invention.

Preferably, the composition comprises at least six distinct growth promoting peptides of the invention.

10 Preferably, the composition comprises at least seven distinct growth promoting peptides of the invention.

Preferably, the composition comprises at least eight distinct growth promoting peptides of the invention.

15 Preferably, the composition comprises at least nine distinct growth promoting peptides of the invention.

20 Preferably, the composition comprises at least ten distinct growth promoting peptides of the invention.

In one embodiment, the composition comprises one or more of SEQUENCE ID NO'S 247 to 268.

25 In one embodiment, the composition comprises one or more of SEQUENCE ID NO'S 248, 249, 252, 253 and 257.

30 In one embodiment, the invention comprises a composition comprising substantially all of fragments SEQUENCE ID NO: 15-215 and 283-340, or growth promoting variants of the fragments, or a mixture of the growth promoting fragments and variants.

In one embodiment, the invention comprises a composition comprising substantially all of fragments SEQUENCE ID NO: 216-282 and 341-412, or growth promoting variants of the fragments, or a mixture of the growth promoting fragments and variants.

In one embodiment, the composition is enriched in peptides having a molecular weight of less than 10 KD.

- 5 In one embodiment, the composition is a powder.

The invention also relates to a plaster, bandage or dressing suitable for application to a wound and comprising a peptide or composition of the invention.

- 10 The invention also relates to a man-made cell culture media comprising a peptide of the invention. The invention also relates to a man-made cell culture media comprising a composition of the invention. In one embodiment, the cell culture media is formulated for culture of eukaryotic cells. In one embodiment, the cell culture media is formulated for culture of prokaryotic cells.

15

The invention also relates to a plaster, bandage or dressing suitable for application to a wound and comprising a peptide or composition of the invention.

- 20 The invention also relates to a comestible product comprising a growth promoting peptide of the invention. Preferably the comestible product is man-made.

The invention also relates to a comestible product comprising a composition of peptides of the invention. Preferably the comestible product is man-made.

- 25 Preferably, the comestible product is a food product for human or animal (mammalian) or cellular consumption.

- 30 In one embodiment the man-made comestible product is a beverage, In one embodiment the man-made comestible product is a bakery product. In one embodiment the man-made comestible product is a dairy product. In one embodiment the man-made comestible product is a snack product. In one embodiment the man-made comestible product is a baked extruded food product. In one embodiment the man-made comestible product is powdered milk. In one embodiment the man-made comestible product is an infant formula product. In one embodiment the man-made comestible product is a confectionary product. In one

embodiment the man-made comestible product is a yoghurt. In one embodiment the man-made comestible product is a yoghurt drink. In one embodiment the man-made comestible product is an ice cream product. In one embodiment the man-made comestible product is a frozen food product. In one embodiment the man-made comestible product is a breakfast cereal. In one embodiment the man-made comestible product is a bread. In one embodiment the man-made comestible product is a flavoured milk drink. In one embodiment the man-made comestible product is a confectionary bar. In one embodiment the man-made comestible product is a tea or tea product. In one embodiment the man-made comestible product is a based extruded snack product. In one embodiment the man-made comestible product is a fried snack product. In one embodiment the man-made comestible product is a nutritional supplement. In one embodiment the man-made comestible product is a sports nutritional product. In one embodiment the man-made comestible product is a baby food product. In one embodiment the man-made comestible product is a speciality food product for immunocompromised individuals. In one embodiment the man-made comestible product is a food for geriatric patients.

The invention also relates to a peptide of the invention for use in promoting growth of a cell.

The invention also relates to a peptide of the invention for use in promoting growth of a cell culture.

The invention also relates to a peptide of the invention for use in promoting growth of a tissue.

The invention also relates to a peptide of the invention for use in promoting growth of dermal or epithelial tissue.

The invention also relates to a peptide of the invention for use in promoting growth of skin.

The invention also relates to a peptide of the invention for use in promoting growth of an organ.

The invention also relates to a peptide of the invention for use in promoting growth of an organism.

The invention also relates to a composition of the invention for use in promoting growth of a cell.

The invention also relates to a composition of the invention for use in promoting growth of a cell culture.

The invention also relates to a composition of the invention for use in promoting growth of a tissue.

The invention also relates to a composition of the invention for use in promoting growth of epithelial tissue.

The invention also relates to a composition of the invention for use in promoting growth of skin.

- 5 The invention also relates to a composition of the invention for use in promoting growth of an organ.

The invention also relates to a composition of the invention for use in promoting growth of an organism.

- 10 In one embodiment, the cell, tissue or organism has a normal pathology (for example ageing skin). In one embodiment of the invention, the cell, tissue or skin has abnormal pathology (for example tissue damaged due to trauma, drug use, or epithelial tissue in the GI tract damaged due to an inflammatory disorder).

- 15 The growth promoting uses may be *in-vivo* or *in-vitro* uses. The growth promoting uses may involve administration to mammal externally (i.e. to the skin) or internally (i.e. to the GI tract).

- 20 The invention also relates to a peptide of the invention for use in slowing or inhibiting ageing of human skin.

- The invention also relates to a method of slowing or inhibiting ageing of human skin comprising a step of administering a peptide of the invention to the human skin. Typically, the peptide of the invention is administered topically to the skin. Administration may be by means of a plaster or patch or a formulation suitable for topical application.

- 25 The invention also relates to a composition of the invention for use in slowing or inhibiting ageing of human skin. The invention also relates to a peptide of the invention for use in preventing or slowing ageing of the human skin.

- 30 The invention also relates to a method of slowing or inhibiting ageing of human skin comprising a step of administering a composition of the invention to the human skin. Typically, the composition of the invention is administered topically to the skin.

The invention also relates to a peptide of the invention for use in treatment of a wound in a mammal.

5 The invention also relates to a composition of peptides of the invention for use in treatment of a wound in a mammal.

The invention also relates to a wound treatment composition or product of the invention for use in treatment of a wound in a mammal.

10 The invention also relates to a peptide of the invention for use in treatment or prevention of a disease or condition characterised by damaged epithelial cells or tissue.

The invention also relates to a composition of peptides of the invention for use in treatment or prevention of a disease or condition characterised by damaged dermal or epithelial cells or
15 tissue.

In one embodiment, the disease or condition characterised by damaged dermal or epithelial cells or tissue is selected from cancer, trauma

20 The invention also relates to a peptide of the invention for use in maintaining or restoring gut health in a mammal.

The invention also relates to a composition of peptides of the invention for use in maintaining or restoring gut health in in a mammal.

25

The invention also relates to a peptide of the invention for use in maintaining or restoring muscle health (for example lean tissue mass) in a mammal.

The invention also relates to a composition of peptides of the invention for use in maintaining
30 or restoring muscle health (for example lean tissue mass) in in a mammal.

The invention also relates to a pharmaceutical composition comprising a peptide of the invention in combination with a pharmaceutically acceptable carrier.

The invention also relates to a pharmaceutical composition comprising a composition of peptides of the invention in combination with a pharmaceutically acceptable carrier.

5 The invention also relates to a peptide of the invention for use in treatment or prevention of an inflammatory disorder in a mammal.

The invention also relates to a composition of the invention for use in treatment or prevention of an inflammatory disorder in a mammal.

10 The invention also relates to a comestible product, for example a food product comprising a peptide or composition of the invention, for example a dairy or non-dairy product, a solid food or a beverage, a food additive or supplement. The dairy product may be a milk, a cheese, or yoghurt. In one embodiment, the food product is a snack bar. The food product may comprise any amount of the composition of the invention, for example from 0.1% to
15 30% (w/w).

The peptides of the invention are used in the topical cosmetic or pharmaceutical composition of this invention at cosmetically or pharmaceutically effective concentrations to achieve the desired effect; in a preferred form with regards to the total weight of the composition,
20 between 0.00000001% (in weight) and 20% (in weight); preferably between 0.000001% (in weight) and 15% (in weight), more preferably between 0.0001% (in weight) and 10% (in weight) and even more preferably between 0.0001% (in weight) and 5% (in weight). Ideally, the peptides of the present invention are preferably used from about 0.00001% w/w to about 0.5% w/w [0.1 to 5000 ppm], and more preferably from 0.00005 w/w to about 0.05 w/w [0.5
25 to 500 ppm], and most preferably from about 0.0001 w/w to about 0.01 w/w of the composition [1 to 100 ppm]. Ideally, the peptides of the present invention are preferably used from about 0.0001% w/w to about 0.004% w/w of the composition.

For compositions of peptides of the invention, a typical daily dosage may be 0.2g to 100g.
30 However, when administered as a food for special medicinal purpose, or medical food, the daily dosage may be 50-500g per day.

The dosage of compositions of the invention for use in food products and food supplements (i.e. comestible compositions) will be broadly in the 0.2-100 g/day range. In one

embodiment, the daily dosage is 1-10 g/day, ideally about 3-8 g/day. In one embodiment, the daily dosage is 10-20 g/day. In one embodiment, the daily dosage is 20-30 g/day. In one embodiment, the daily dosage is 30-40 g/day. In one embodiment, the daily dosage is 10-100 g/day. In one embodiment, the daily dosage is about 5 g/day, ideally about 3-8 g/day. In one embodiment, the dosage is 2-1000 mg/day/kg body weight. In one embodiment, the dosage is 10-500 mg/day/kg body weight. In one embodiment, the dosage is 10-100 mg/day/kg body weight. In one embodiment, the dosage is 30-70 mg/day/kg body weight. The dosage of peptides of the invention for food supplements may be 0.00001mg-0.01mg per day or dose.

10 The food product may be a Food for Specific Medicinal Purposes (FSMP) which is defined as foods that are specifically formulated, processed and intended for the dietary management of diseases, disorders or medical conditions of individuals who are being treated under medical supervision. These foods are intended for the exclusive or partial feeding of people whose nutritional requirements cannot be met by normal foods.

15

The invention also relates to a man-made personal care composition comprising a peptide of the invention.

20 The invention also relates to a man-made personal care composition comprising a composition of peptides of the invention.

In one embodiment the personal care composition is a skincare product. In one embodiment the personal care composition is a product formulated for topical application to the skin of a human. In one embodiment the personal care composition is an anti-aging product. In one embodiment the personal care composition is a dentrifice product. In one embodiment the personal care composition is a perfumery product. In one embodiment the personal care composition is a deodorant product. In one embodiment the personal care composition is an anti-perspirant product. In one embodiment the personal care composition is a soap. In one embodiment the personal care composition is a liquid soap. In one embodiment the personal care composition is a cream. In one embodiment the personal care composition is a lotion. In one embodiment the personal care composition is a gel. In one embodiment the personal care composition is a powder.

The invention also relates to a man-made wound treatment composition comprising a peptide of the invention. The invention also relates to a man-made wound treatment composition comprising a composition of the invention. Typically, the wound treatment composition is formulated for topical application to a wound. In one embodiment, the composition
5 comprises a cream, gel, lotion, powder.

The invention also provides topical composition comprising a peptide of the invention. It will be appreciated that the topical composition may comprise a plurality of peptides, fragments and/or variants. In one embodiment, the topical composition comprises substantially all the
10 peptides. In one embodiment, the topical composition comprises substantially all the variants. The topical composition of the invention may be presented in a formulation selected from the group comprising creams, multiple emulsions, anhydrous compositions, aqueous dispersions, oils, milks, balsams, foams, lotions, gels, cream gels, hydro-alcoholic solutions, hydro-glycolic solutions, cosmetic, personal care product, hydrogels, liniments, sera, soaps, dusting
15 powder, paste, semi solid formulations, liniments, serums, shampoo, conditioner, ointments, any rinse off formulation, talc, mousses, powders, sprays, aerosols, solutions, suspensions, emulsions, syrups, elixirs, polysaccharide films, patches, gel patches, bandages, an adhesive system, water-in-oil emulsions, oil-in-water emulsions, and silicone emulsions.

In an embodiment of the current invention, the emulsion contains a lipid or oil. The emulsion may be, but is not limited to, oil-in-water, water-in-oil, water-in-oil-in-water and oil-in-water-in-silicone emulsions. The emulsion may contain a humectant. The emulsion may contain an anti-foaming agent, such as silicone. The emulsion may have any suitable viscosity. Emulsions may further contain an emulsifier and/or an anti-foaming agent. Methods of
20 preparing an emulsion are known to a person skilled in the art.
25

The topical composition of the invention may be incorporated into a medical device for administration. Such a device can include but is not limited to a fabric, patch, bandage, gauge, sock, tight, underwear, dressing, glove, mask, adhesive patches, non-adhesive patches,
30 occlusive patches and microelectric patches or suitable adhesive system. In such an embodiment, the device is in direct contact with the keratinous layer such as the skin, thus releasing the peptides of the invention. It will be understood that the topical composition may be incorporated in any suitable form as detailed herein. For example, the topical composition or peptides of the invention can be incorporated into the device or be present on

the surface of the device or can be in a cream, gel or wax formulation or any suitable formulation defined herein and incorporated into the device or on the surface of the device.

The device may be adapted for adhesion or attachment to the skin.

- 5 In one embodiment the device is adapted to release a constant quantity of the composition or the peptides of the invention. It will be understood that the amount of the composition contained in the sustained release system will depend, for example, on where the composition is to be administered, the kinetics and duration of the release of the composition of the invention, as well as the nature of the condition, disorder and/or disease to be treated and/or
10 cared for. The device may be such that the composition is released by biodegradation of the device, or by friction between the device and the body, due to bodily moisture, the skin's pH or body temperature.

- In an embodiment of the invention the topical composition may further comprise at least one
15 cosmetically or pharmaceutically acceptable excipient. Excipient may be used interchangeably with functional ingredient or additive. It will be understood that although the topical compositions of the current invention can be administered alone, they will generally be administered in admixture with a cosmetic or pharmaceutical excipient. Cosmetically or pharmaceutically acceptable excipient are well known in the art and any known excipient,
20 may be used provided that it is suitable for topical administration and is dermatologically acceptable without undue toxicity, incompatibility and/or allergic reaction.

- Preferably any excipient included is present in trace amounts. The amount of excipient included will depend on numerous factors, including the type of excipient used, the nature of
25 the excipient, the component(s) of the topical composition, the amount of active or peptide in the topical composition and/or the intended use of the topical composition. The nature and amount of any excipient should not unacceptably alter the benefits of the peptides of this invention.

- 30 In an embodiment of the invention the excipient may be a suitable diluent, carrier, binder, lubricant, suspending agent, coating agent, preservative, stabilisers, dyes, vehicle, solubilising agent, base, emollient, emulsifying agent, fragrance, humectant, and/or surfactants.

Examples of suitable diluents include, but are not limited to, any diluent disclosed in disclosed in US2014120131 or US2004132667. Examples include ethanol, glycerol and water.

- 5 Examples of suitable carriers include, but are not limited to, lactose, starch, glucose, methyl cellulose, magnesium stearate, mannitol, sorbitol and any suitable carrier disclosed in US2014120131 or US2004132667.

- 10 Examples of suitable binders include, but are not limited to, starch, gelatin, natural sugars such as glucose, anhydrous lactose, free-flow lactose, beta-lactose, corn sweeteners, natural and synthetic gums, such as acacia, tragacanth or sodium alginate, carboxymethyl cellulose and polyethylene glycol and any suitable binder disclosed in US2014120131 or US2004132667.

- 15 Examples of suitable lubricants include, but are not limited to, sodium oleate, sodium stearate, magnesium stearate, sodium benzoate, sodium acetate, and sodium chloride and any suitable lubricant disclosed in US2014120131 or US2004132667.

- 20 The carrier may be any suitable carrier known in the art or disclosed in US2014120131 or US2004132667. In some embodiments, the carrier may include, but is not limited to, a liquid, such as water, oils or surfactants, including those of petroleum, animal, plant or synthetic origin, polymer, oil, such as peanut oil, mineral oil, castor oil, soybean oil, alcohol, polysorbates, sorbitan esters, ether sulfates, sulfates, betaines, glycosides, maltosides, fatty alcohols, nonoxynols, poloxamers, polyoxyethylenes, polyethylene glycols, dextrose, 25 glycerol, or digitonin. It will be understood that the carrier will be dermatologically acceptable. Preferred carriers contain an emulsion such as oil-in-water, water-in-oil, water-in-oil-in-water and oil-in-water-in-silicone emulsions. Emulsions may further contain an emulsifier and/or an anti-foaming agent.

- 30 In an embodiment of the invention, the topical composition may further comprise one or more additional ingredients. The topical composition of the invention may be administered consecutively, simultaneously or sequentially with the one or more other additional agents. Such additional ingredients may be those of benefit to include in a topical composition, or of

benefit depending on the intended use of the topical composition. The additional ingredient may be active or functional or both.

5 Examples of such additional ingredients include, but are not limited to, one or more of cleaning agents, conditioning agents, sunscreen, pigment, moisturiser, thickening agents, gelling agents, essential oil, astringents, pigments, anti-caking agent, anti-foaming agent, binders, additives, buffers, chelating agents, external analgesics, film formers or materials, bulking agents, polymers, opacifying agents, pH adjusters, propellants, reducing agents, sequestrants, skin bleaching and lightening agents, skin conditioning agents, aloe vera,
10 healing agents, soothing agents, smoothing agents, pantothenic acid, treating agents, thickeners, vitamins, colourants, pharmaceuticals, antiseptic agents, antifoaming agents, buffering agents, astringents, polymers, pH adjuster, deodorant or any other dermatologically acceptable carrier or surfactant.

15 It is to be understood that additional ingredients listed may provide more than one benefit. The classification given herein is for clarity and convenience only and not intended to limit the additional ingredient to that particular application or category listed.

Any additional ingredients should be suitable for application to the skin without undue
20 toxicity, incompatibility and/or allergic reaction.

In some embodiments, the additional ingredient has glucose transport activity or aids glucose transport activity. In some embodiments, the additional ingredient has anti-inflammatory activity or aids anti-inflammatory activity. In some embodiments, the additional ingredient
25 has anti-aging activity or aids anti-aging activity. In some embodiments, the additional ingredient is for keratinous layer health and/or development, skin health and/or development, and/or muscle health, recovery and/or development. The active agent may be a pharmacological enhancer. Such active agents are known and available on the market. In such cases, the topical composition of the invention may be administered consecutively,
30 simultaneously or sequentially with the one or more other active agents.

In some embodiments, the additional ingredient may be farnesol ([2E, 6E], -3, 7, 11,-trimethyl-2, 6, 10, dodecatrien-1-ol), phytantriol (3, 7, 11, 15, tetramethylhexadecane-1, 2, 3,-triol), desquamation actives, enzymes, enzyme inhibitors, enzyme activators, botanical

extracts and marine extracts, anti-acne actives, anti-wrinkle or anti atrophy actives, anti-oxidant/radical scavengers, chelators, flavonoids, anti-inflammatory agents, anti-cellulite agents, topical anaesthetics, tanning actives, skin lightening agents, skin healing agents, bisabolol, antimicrobial or antifungal active, sunscreen actives, particulate material,
5 conditioning agents, structuring agents, thickening agent,

The desquamation active may be any suitable agent that enhances the skin appearance or texture of the skin and is as disclosed in US2014120131 or US2004132667.

10 Examples of anti-acne actives are as disclosed in US2014120131 or US2004132667 and include, resorcinol, salicylic acid, erythromycin, zinc, sulfur, benzoyl peroxides.

Examples of thickening agents are as disclosed in US2014120131 or US2004132667 and include carboxylic acid polymers, crosslinked polyacrylate polymers, polyacrylamide
15 polymers, polysaccharides.

Examples of conditioning agents are as disclosed in US2014120131 or US2004132667 and include humectants, moisturiser or skin conditioner.

20 Examples of structuring agents are as disclosed in US2014120131 or US2004132667 and include any agent that provide rheological characteristics to the composition and contributes to the stability of the composition.

Any suitable antimicrobial or antifungal active may be used and examples are as disclosed in
25 US2014120131 or US2004132667. Such actives are capable of destroying microbes, preventing growth or action of microbes. Examples include but are not limited to β -lactam drugs, quinolone drugs, tetracycline, erythromycin, streptomycin sulfate, salicylic acid, benzoyl peroxide.

30 Examples of a particulate material include metallic oxide. Examples of anti-cellulite agents include xanthine agents. Examples of tanning actives includes 1, 3-dihydroxy-2-propanone and those disclosed in US2014120131 or US2004132667. Examples of topical anaesthetics include benzocaine, lidocaine and bupivacaine and those disclosed in US2014120131 or US2004132667.

Examples of skin lightening agents include any agent known in the art such as kojic acid, ascorbic acid and those disclosed in US2014120131 or US2004132667.

Examples of sunscreen actives include any suitable organic or inorganic sunscreen active. Examples include metallic oxides, 2-ethylhexyl-p-methoxycinnamate and those disclosed in
5 US2014120131 or US2004132667.

Examples of skin healing agents includes panthenoic acid as disclosed in US2014120131 or US2004132667.

Examples of anti-inflammatory agents include any agent that enhances the skin appearance, tone or colour and include but are not limited to corticosteroids, hydrocortisone, non-steroidal
10 agents such as ibuprofen and aspirin and those disclosed in US2014120131 or US2004132667.

Examples of flavonoids includes flavanones, methoxy flavonones, unsubstituted chalcone and mixtures thereof and those disclosed in US2014120131 or US2004132667.

Examples of enzymes include lipases, proteases, catalase, super oxide-dismutase, amylase,
15 peroxidase, glucuronidase, ceramidases, hyaluronidases. Examples of enzyme inhibitors include trypsin inhibitors, Bowman Birk inhibitors, chymotrypsin inhibitors, botanical extracts, flavonoids, quercetin chalcone and those disclosed in US2014120131 or US2004132667 and mixtures thereof. Examples of enzyme activators include coenzyme A, Q10 (ubiquinone), glycyrrhizin, berberine, chrysin and those disclosed in US2014120131 or
20 US2004132667 and mixtures thereof

Examples of anti-wrinkle or anti atrophy actives include sulfur containing D and L amino acids, particular, N-acyl derivatives such as N-acetyl-L-cysteine, hydroxyl acids, phytic acid, lipoic acid, lysophosphatidic acid, skin peel agents, vitamin B₃, retinoids and those disclosed
in US2014120131 or US2004132667 and mixtures thereof.

25 The anti-oxidant/radical scavenger agent may be any agent that is useful for providing protection against UV radiation or other environmental agents which may cause skin damage such as those disclosed in US2014120131 or US2004132667. Examples of anti-oxidant/radical scavengers include ascorbic acid, its salts and derivatives (vitamin C),
30 tocopherol its salts and derivatives (vitamin E), butylated hydroxyl benzoic acids and their salts, peroxides, gallic acids and alkyl esters, sorbic acid, lipoic acid, amines, lysine pidolate, arginine pilolate, nordihydroguaiaretic acid, bioflavonoids, curcumin, lysine, methionine, proline, superoxide dismutase, silymarin, tea extracts and mixtures thereof.

Examples of chelators include EDTA, NTA, hydroxamic acids, phytic acid, lactoferrin and those disclosed in US2014120131 or US2004132667 and mixtures thereof. A chelator means an agent capable of removing a metal ion by forming a complex so that the metal ion cannot participate in or catalyse chemical reactions. A chelator is useful for protection against UV radiation or other environmental agents that can cause skin damage.

It will be appreciated that a plurality of additional ingredients may be added. The amount of the additional ingredient may be from about 0.001% to about 50% weight of the composition, preferably, about 0.01% to about 20%, preferably about 0.1% to about 10%, about 0.5% to about 10%, about 1% to about 5%, preferably 2% weight of the composition. The amount of additional ingredient included will depend on numerous factors, including the type of additional ingredient used, the nature of the additional ingredient, the component(s) of the topical composition, the amount of active or peptide in the topical composition and/or the intended use of the topical composition. The nature and amount of any additional ingredient should not unacceptably alter the benefits of the peptides of this invention.

The topical composition may be alcohol free.

In some embodiments of the invention, the composition further comprises one or more additional active agents, in addition to the peptide of the invention (also known as the active of the composition). In addition, or alternatively, the composition may be administered with one or more other additional active agents. Typical said additional active agent is present in trace amounts only. In some embodiments, there may be no additional active agent present in the composition. The amount of additional active agent included will depend on numerous factors, including the type of additional active agent used, the nature of the additional active agent, the component(s) of the topical composition, the amount of active or peptide in the topical composition and/or the intended use of the topical composition. The nature and amount of any additional active agent should not unacceptably alter the benefits of the peptides of this invention.

It is to be understood that an ingredient that is considered to be an “active” ingredient in one product may be a “functional” or “excipient” ingredient in another and vice versa. It will also be appreciated that some ingredients play a dual role as both an active ingredient and as a functional or excipient ingredient.

Examples of the additional active agents include glucose transport promoting drugs, skin supplement, agent for treatment and/or care of the skin, anti-inflammatory agent, an anti-aging agent, a cellular growth promoting agent and pharmacological enhancers. Such agents are well known in the art and it will be appreciated that any suitable additional active agent may be used. Additional active agents for treatment and/or care of the skin may include collagen synthesis agents, retinoids, exfoliating agents, anti-cellulite agents, elastase inhibiting agents, melanin synthesis stimulating or inhibiting agents, self-tanning agents, antiaging agents, antimicrobial agents, antifungal agents, fungistatic agents, bactericidal agents, and healing agents. Active agents also include anti-inflammatory agents.

Any additional active agent should be suitable for application to the skin without undue toxicity, incompatibility and/or allergic reaction.

It will be understood that the classification given herein is for clarity and convenience only and not intended to limit the additional ingredient, excipient, or active to that particular application or category listed.

In a particularly preferred embodiment, the methods and uses of the invention involve administration of a peptide or composition of the invention in combination with one or more other active agents, for example, existing growth promoting drugs or pharmacological enhancers available on the market. In such cases, the compounds of the invention may be administered consecutively, simultaneously or sequentially with the one or more other active agents.

The effect of the current invention is accomplished by topical application or administration of the topical composition of the invention described herein to a person, animal or a patient in need of treatment or care. Topical delivery preferably means delivery to a keratinous layer such as the skin, hair and/or nails, but can also mean delivery to a body lumen lined with epithelial cells, for example the lungs or airways, the gastrointestinal tract, the buccal cavity. The effect may be confined to the surface of the skin or may be within the skin or a combination of both.

The topical composition of the invention is administered in a cosmetically or pharmaceutically effective amount. In other words, in an amount that is non-toxic but sufficient amount to provide the desired effect. It will be appreciated that a person skilled in the art would be capable of determining an appropriate dose of the topical compositions of the invention to administer without undue experimentation. Alternatively, a physician will determine the actual dose that is most suitable for a patient depending on the particular condition, disease or disorder to be treated or cared for and the age, body weight and/or health of the person. It will depend on a variety of factors including the activity of the specific compound employed, the metabolic stability and length of action of that compound, the age, body weight, general health, sex, diet, mode and time of administration, rate of excretion, drug combination, the severity of the particular condition, and the individual undergoing therapy. There can, of course, be individual instances where higher or lower dosage ranges are merited, and such are within the scope of this invention. For example, the composition may be administered at a dose of from 0.01 to 50 mg/kg body weight, such as from 0.1 to 30 mg/kg, more preferably from 0.1 to 20 mg/kg body weight, more preferably from 0.1 to 10 mg/kg body weight, preferably 0.1 to 5mg/kg body weight. In an exemplary embodiment, one or more doses of 10 to 300 mg/day or more preferably, 10 to 150 mg/day, will be administered to the patient. The amount and the frequency is as best suited to the purpose. The frequency of application or administration can vary greatly, depending on the needs of each subject, with a recommendation of an application or administration range from once a month to ten times a day, preferably from once a week to four times a day, more preferably from three times a week to three times a day, even more preferably once or twice a day.

In preferred embodiments, repeated use of the topical composition is provided.

The topical composition may be applied by, but not limited to, rubbing, or massaging into the keratinous tissue, skin or area of the body to be treated or cared for. In some embodiments, the composition is left on or not removed from the area of the body. In other embodiments, the composition is removed after a period of time, such as, but not limited to, from about 2 minutes to 60 minutes, from about 5 minutes to about 30 minutes, preferably from about 10 minutes to about 20 minutes. The composition may be removed immediately after application. In some embodiments of the current invention, the composition of the invention may be applied to an area to be treated by means to achieve a greater penetration of the composition and/or peptide of the invention, such as, but not limited to, iontophoresis,

sonophoresis, electroporation, microelectric patches, mechanical pressure, osmotic pressure gradient, occlusive cure, microinjections or needle-free injections by means of pressure, such as injections by oxygen pressure, or any combination thereof.

- 5 The peptides of the invention are used in the topical cosmetic or pharmaceutical composition of this invention at cosmetically or pharmaceutically effective concentrations to achieve the desired effect; in a preferred form with regards to the total weight of the composition, between 0.00000001% (in weight) and 20% (in weight); preferably between 0.000001% (in weight) and 15% (in weight), more preferably between 0.0001% (in weight) and 10% (in weight) and even more preferably between 0.0001% (in weight) and 5% (in weight).

In some embodiments of the current invention, the composition may be delivered via any one of liposomes, mixed liposomes, oleosomes, niosomes, ethosomes, millicapsules, capsules, macrocapsules, nanocapsules, nanostructured lipid carriers, sponges, cyclodextrins, vesicles, micelles, mixed micelles of surfactants, surfactant-phospholipid mixed micelles, millispheres, spheres, lipospheres, particles, nanospheres, nanoparticles, milliparticles, solid nanoparticles as well as microemulsions including water-in-oil microemulsions with an internal structure of reverse micelle and nanoemulsions microspheres, microparticles.

- 20 A variety of methods are available for preparing liposomes. See, e.g., Szoka et al., *Ann. Rev. Biophys. Bioeng.* 9:467 (1980), U.S. Pat. Nos. 4,186,183, 4,217,344, 4,235,871, 4,261,975, 4,485,054, 4,501,728, 4,774,085, 4,837,028, 4,235,871, 4,261,975, 4,485,054, 4,501,728, 4,774,085, 4,837,028, 4,946,787, PCT Publication No. WO 91/17424, Deamer & Bangham, *Biochim. Biophys. Acta* 443:629-634 (1976); Fraley, et al., *PNAS* 76:3348-3352 (1979); Hope et al., *Biochim. Biophys. Acta* 812:55-65 (1985); Mayer et al., *Biochim. Biophys. Acta* 858:161-168 (1986); Williams et al., *PNAS* 85:242-246 (1988); Liposomes (Ostro (ed.), 1983, Chapter 1); Hope et al., *Chem. Phys. Lip.* 40:89 (1986); Gregoriadis, *Liposome Technology* (1984) and Lasic, *Liposomes: from Physics to Applications* (1993)). Suitable methods include, for example, sonication, extrusion, high pressure/homogenization, microfluidization, detergent dialysis, calcium-induced fusion of small liposome vehicles and ether fusion methods, all of which are well known in the art.

These delivery systems may be adapted to achieve a greater penetration of the compound and/or peptides of the invention. This may improve pharmacokinetic and pharmacodynamics

properties. The delivery system may be a sustained release system wherein the compound or peptide of the invention is gradually released during a period of time and preferably with a constant release rate over a period of time. The delivery systems are prepared by methods known in the art. The amount of peptide contained in the sustained release system will
5 depend on where the composition is to be delivered and the duration of the release as well as the type of the condition, disease and/or disorder to be treated or cared for.

The topical composition of the invention may be for human or animal usage in human and veterinary medicine.

10 The topical composition of the invention may be used for pharmaceutical, personal care and/or cosmetic uses.

The composition can be used to treat or care for any disease, disorder or condition of the skin,
15 including but not limited to, psoriasis, dermatitis, allergic dermatitis, eczema, spongiosis, edema, skin cancer, ulcers, acne, scars, cellulitis, elastosis, keratosis, rosacea, varicose veins, inflammatory disorders.

The topical composition may be used to for treating or caring for visible signs of aging
20 including but not limited to wrinkles, stretch marks and dark circles, dryness, fine lines, age spots, red blotches, sagging skin, and conditions caused by sun exposure including sunburn, stress, pollution and/diet. The topical composition may also be used for delaying, slowing or inhibiting the skins or the onset of aging. The composition may be administered by a medical device, such as a plaster or a patch as described herein.

25 The topical composition may be used to treat or care for a wound in a mammal. In another embodiment, the topical composition is for use in the treatment or prevention of a disease or condition characterised by damaged epithelial cells or tissue, and/or damaged dermal or epithelial cells or tissue. The disease may be but is not limited to cancer and trauma.

30 The topical composition may be used to treat or care for any muscle condition, to improve, muscle status in a mammal, to promote recovery of muscle, typically following exercise, to maintain or restore muscle health (for example lean tissue mass) in a mammal, to enhance

physical performance, in treatment or prevention of a disease or condition characterised by lethargy or low energy levels.

5 The topical composition may be used to promote growth of a tissue, promote growth of epithelial tissue, promote growth of skin, promote growth of an organ, promote growth of an organism. The skin can have a normal pathology and/or an abnormal pathology.

The topical composition may also be used to treat or care for any inflammatory disorder.

10 A further aspect of the invention relates to a pharmaceutical composition comprising a peptide of the invention or a composition of peptides of the invention, admixed with one or more pharmaceutically acceptable diluents, excipients or carriers. Even though the peptides and compositions of the present invention can be administered alone, they will generally be administered in admixture with a pharmaceutical carrier, excipient or diluent, particularly for
15 human therapy. The pharmaceutical compositions may be for human or animal usage in human and veterinary medicine. Examples of such suitable excipients for the various different forms of pharmaceutical compositions described herein may be found in the "Handbook of Pharmaceutical Excipients, 2nd Edition, (1994), Edited by A Wade and PJ Weller. In particular, formulations for topical delivery are described in Topical drug delivery
20 formulations edited by David Osborne and Antonio Aman, Taylor & Francis, the complete contents of which are incorporated herein by reference. Acceptable carriers or diluents for therapeutic use are well known in the pharmaceutical art, and are described, for example, in Remington's Pharmaceutical Sciences, Mack Publishing Co. (A. R. Gennaro edit. 1985). Examples of suitable carriers include lactose, starch, glucose, methyl cellulose, magnesium
25 stearate, mannitol, sorbitol and the like. Examples of suitable diluents include ethanol, glycerol and water. The choice of pharmaceutical carrier, excipient or diluent can be selected with regard to the intended route of administration and standard pharmaceutical practice. The pharmaceutical compositions may comprise as, or in addition to, the carrier, excipient or diluent any suitable binder(s), lubricant(s), suspending agent(s), coating agent(s), solubilising
30 agent(s). Examples of suitable binders include starch, gelatin, natural sugars such as glucose, anhydrous lactose, free-flow lactose, beta-lactose, corn sweeteners, natural and synthetic gums, such as acacia, tragacanth or sodium alginate, carboxymethyl cellulose and polyethylene glycol. Examples of suitable lubricants include sodium oleate, sodium stearate, magnesium stearate, sodium benzoate, sodium acetate, sodium chloride and the like.

Preservatives, stabilizers, dyes and even flavouring agents may be provided in the pharmaceutical composition. Examples of preservatives include sodium benzoate, sorbic acid and esters of p-hydroxybenzoic acid. Antioxidants and suspending agents may be also used.

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The peptide or composition of the invention may be adapted for topical, oral, rectal, parenteral, intramuscular, intraperitoneal, intra-arterial, intrabronchial, subcutaneous, intradermal, intravenous, nasal, vaginal, buccal or sublingual routes of administration. For oral administration, particular use is made of compressed tablets, pills, tablets, gellules, drops, and capsules. Preferably, these compositions contain from 1 to 250 mg and more preferably from 10-100 mg, of active ingredient per dose. Other forms of administration comprise solutions or emulsions which may be injected intravenously, intra-arterial, subcutaneously, intradermally, intraperitoneally or intramuscularly, and which are prepared from sterile or sterilisable solutions. The pharmaceutical compositions of the present invention may also be in form of suppositories, vaginal rings, pessaries, suspensions, emulsions, lotions, ointments, creams, gels, sprays, solutions or dusting powders. The composition of the invention may be formulated for topical delivery. Topical delivery generally means delivery to the skin, but can also mean delivery to a body lumen lined with epithelial cells, for example the lungs or airways, the gastrointestinal tract, the buccal cavity. In particular, formulations for topical delivery are described in Topical drug delivery formulations edited by David Osborne and Antonio Aman, Taylor & Francis, the complete contents of which are incorporated herein by reference. Compositions or formulations for delivery to the airways are described in O'Riordan et al (Respir Care, 2002, Nov. 47), EP2050437, WO2005023290, US2010098660, and US20070053845. Composition and formulations for delivering active agents to the iluem, especially the proximal iluem, include microparticles and microencapsulates where the active agent is encapsulated within a protecting matrix formed of polymer or dairy protein that is acid resistant but prone to dissolution in the more alkaline environment of the ileum. Examples of such delivery systems are described in EP1072600.2 and EP13171757.1. An alternative means of transdermal administration is by use of a skin patch. For example, the active ingredient can be incorporated into a cream consisting of an aqueous emulsion of polyethylene glycols or liquid paraffin. The active ingredient can also be incorporated, at a concentration of between 1 and 10% by weight, into an ointment consisting of a white wax or white soft paraffin base together with such stabilisers and preservatives as may be required.

30

Injectable forms may contain between 10-1000 mg, preferably between 10-250 mg, of active ingredient per dose.

Compositions may be formulated in unit dosage form, i.e., in the form of discrete portions containing a unit dose, or a multiple or sub-unit of a unit dose.

5

A person of ordinary skill in the art can easily determine an appropriate dose of one of the instant compositions to administer to a subject without undue experimentation. Typically, a physician will determine the actual dosage which will be most suitable for an individual patient and it will depend on a variety of factors including the activity of the specific compound employed, the metabolic stability and length of action of that compound, the age, body weight, general health, sex, diet, mode and time of administration, rate of excretion, drug combination, the severity of the particular condition, and the individual undergoing therapy. The dosages disclosed herein are exemplary of the average case. There can of course be individual instances where higher or lower dosage ranges are merited, and such are within the scope of this invention. Depending upon the need, the agent may be administered at a dose of from 0.01 to 30 mg/kg body weight, such as from 0.1 to 10 mg/kg, more preferably from 0.1 to 1 mg/kg body weight. In an exemplary embodiment, one or more doses of 10 to 300 mg/day or more preferably, 10 to 150 mg/day, will be administered to the patient for the treatment of an inflammatory disorder.

20

In a particularly preferred embodiment, the methods and uses of the invention involve administration of a peptide or composition of the invention in combination with one or more other active agents, for example, existing anti-inflammatory drugs or pharmacological enhancers available on the market. In such cases, the compounds of the invention may be administered consecutively, simultaneously or sequentially with the one or more other active agents.

25

In one embodiment of the invention, the peptide of the invention may be administered in the form of a conjugate comprising the peptide, and may optionally include a linker, and a partner molecule, for example a protein such as an antibody molecule intended to increase the half-life of the conjugate in-vivo. In one embodiment, the peptide may be modified to substitute one or more amino acids with amino acids employed to attach partner molecules. For example, an amino acid may be substituted with a lysine residue for the purpose of conjugating a partner molecule such as a PEG molecule.

30

Definitions

All publications, patents, patent applications and other references mentioned herein are hereby incorporated by reference in their entireties for all purposes as if each individual publication, patent or patent application were specifically and individually indicated to be incorporated by reference and the content thereof recited in full.

Where used herein and unless specifically indicated otherwise, the following terms are intended to have the following meanings in addition to any broader (or narrower) meanings the terms might enjoy in the art:

Unless otherwise required by context, the use herein of the singular is to be read to include the plural and vice versa. The term "a" or "an" used in relation to an entity is to be read to refer to one or more of that entity. As such, the terms "a" (or "an"), "one or more," and "at least one" are used interchangeably herein.

As used herein, the term "comprise," or variations thereof such as "comprises" or "comprising," are to be read to indicate the inclusion of any recited integer (e.g. a feature, element, characteristic, property, method/process step or limitation) or group of integers (e.g. features, element, characteristics, properties, method/process steps or limitations) but not the exclusion of any other integer or group of integers. Thus, as used herein the term "comprising" is inclusive or open-ended and does not exclude additional, unrecited integers or method/process steps.

As used herein, the term "disease" is used to define any abnormal condition that impairs physiological function and is associated with specific symptoms. The term is used broadly to encompass any disorder, illness, abnormality, pathology, sickness, condition or syndrome in which physiological function is impaired irrespective of the nature of the aetiology (or indeed whether the aetiological basis for the disease is established). It therefore encompasses conditions arising from infection, trauma, injury, surgery, radiological ablation, poisoning or nutritional deficiencies.

As used herein, the term "treatment" or "treating" refers to an intervention (e.g. the administration of an agent to a subject) which cures, ameliorates or lessens the symptoms of a disease or removes (or lessens the impact of) its cause(s) (for example, the reduction in accumulation of pathological levels of lysosomal enzymes). In this case, the term is used synonymously with the term "therapy".

Additionally, the terms "treatment" or "treating" refers to an intervention (e.g. the administration of an agent to a subject) which prevents or delays the onset or progression of a disease or reduces (or eradicates) its incidence within a treated population. In this case, the term treatment is used synonymously with the term "prophylaxis".

As used herein, an effective amount or a therapeutically effective amount of an agent defines an amount that can be administered to a subject without excessive toxicity, irritation, allergic response, or other problem or complication, commensurate with a reasonable benefit/risk ratio, but one that is sufficient to provide the desired effect, e.g. the treatment or prophylaxis manifested by a permanent or temporary improvement in the subject's condition. The amount will vary from subject to subject, depending on the age and general condition of the individual, mode of administration and other factors. Thus, while it is not possible to specify an exact effective amount, those skilled in the art will be able to determine an appropriate "effective" amount in any individual case using routine experimentation and background general knowledge. A therapeutic result in this context includes eradication or lessening of symptoms, reduced pain or discomfort, prolonged survival, improved mobility and other markers of clinical improvement. A therapeutic result need not be a complete cure.

The term "human or animal" should be understood to mean humans or mammalian or non-mammalian animals such as fish.

The term "composition" should be understood to mean a composition of matter made by the hand of man and not occurring in nature. Exemplary compositions include food compositions, beverage compositions, pharmaceutical compositions, nutritional supplement compositions, personal care compositions and healthcare compositions.

The term "peptide" used herein refers to a polymer composed of 5 to 50 amino acid monomers typically via peptide bond linkage. Peptides (including fragments and variants

thereof) of and for use in the invention may be generated wholly or partly by chemical synthesis or by expression from nucleic acid. For example, the peptides of and for use in the present invention can be readily prepared according to well-established, standard liquid or, preferably, solid-phase peptide synthesis methods known in the art (see, for example, J. M. Stewart and J. D. Young, *Solid Phase Peptide Synthesis*, 2nd edition, Pierce Chemical Company, Rockford, Illinois (1984), in M. Bodanzsky and A. Bodanzsky, *The Practice of Peptide Synthesis*, Springer Verlag, New York (1984). When necessary, any of the peptides employed in the invention can be chemically modified to increase their stability. A chemically modified peptide or a peptide analog includes any functional chemical equivalent of the peptide characterized by its increased stability and/or efficacy in vivo or in vitro in respect of the practice of the invention. The term peptide analog also refers to any amino acid derivative of a peptide as described herein. A peptide analog can be produced by procedures that include, but are not limited to, modifications to side chains, incorporation of unnatural amino acids and/or their derivatives during peptide synthesis and the use of cross-linkers and other methods that impose conformational constraint on the peptides or their analogs. Examples of side chain modifications include modification of amino groups, such as by reductive alkylation by reaction with an aldehyde followed by reduction with NaBH_4 ; amidation with methylacetimidate; acetylation with acetic anhydride; carbamylation of amino groups with cyanate; trinitrobenzylation of amino groups with 2, 4, 6, trinitrobenzene sulfonic acid (TNBS); alkylation of amino groups with succinic anhydride and tetrahydrophthalic anhydride; and pyridoxylation of lysine with pyridoxa-5'-phosphate followed by reduction with NABH_4 . The guanidino group of arginine residues may be modified by the formation of heterocyclic condensation products with reagents such as 2,3-butanedione, phenylglyoxal and glyoxal. The carboxyl group may be modified by carbodiimide activation via o-acylisourea formation followed by subsequent derivatization, for example, to a corresponding amide. Sulfhydryl groups may be modified by methods, such as carboxymethylation with iodoacetic acid or iodoacetamide; performic acid oxidation to cysteic acid; formation of mixed disulphides with other thiol compounds; reaction with maleimide; maleic anhydride or other substituted maleimide; formation of mercurial derivatives using 4-chloromercuribenzoate, 4-chloromercuriphenylsulfonic acid, phenylmercury chloride, 2-chloromercuric-4-nitrophenol and other mercurials; carbamylation with cyanate at alkaline pH. Tryptophan residues may be modified by, for example, oxidation with N-bromosuccinimide or alkylation of the indole ring with 2-hydroxy-5-nitrobenzyl bromide or sulphonyl halides. Tyrosine residues may be altered by nitration with

tetranitromethane to form a 3-nitrotyrosine derivative. Modification of the imidazole ring of a histidine residue may be accomplished by alkylation with iodoacetic acid derivatives or N-carbethoxylation with diethylpyrocarbonate. Examples of incorporating unnatural amino acids and derivatives during peptide synthesis include, but are not limited to, use of
5 norleucine, 4-amino butyric acid, 4-amino-3-hydroxy-5-phenylpentanoic acid, 6-aminohexanoic acid, t-butylglycine, norvaline, phenylglycine, ornithine, sarcosine, 4-amino-3-hydroxy-6-methylheptanoic acid, 2-thienyl alanine and/or D-isomers of amino acids. Peptide structure modification includes the generation of retro-inverso peptides comprising the reversed sequence encoded by D-amino acids.

10

The term “modified peptide” is used interchangeably with the term derivative of the peptide. The modified peptide includes a peptide which has been substituted with one or more groups as defined herein. The modification may be any modified that provides the peptides and or the composition of the invention with an increased ability to penetrate a cell. The
15 modification may be any modification that increases the half-life of the composition or peptides of the invention. In one embodiment, the group is a protecting group. The protecting group may be an N-terminal protecting group, a C-terminal protecting group or a side-chain protecting group. The peptide may have one or more of these protecting groups. The person skilled in the art is aware of suitable techniques to react amino acids with these protecting
20 groups. These groups can be added by preparation methods known in the art, for example the methods as outlined in paragraphs [0104] to [0107] of US2014120141. The groups may remain on the peptide or may be removed. The protecting group may be added during synthesis. In an embodiment of the invention the peptides may be substituted with a group selected from one or more straight chain or branched chain, long or short chain, saturated, or
25 unsaturated, substituted with a hydroxyl, amino, amino acyl, sulfate or sulphide group or unsubstituted having from 1 to 29 carbon atoms. N-acyl derivatives include acyl groups derived from acetic acid, capric acid, lauric acid, myristic acid, octanoic acid, palmitic acid, stearic acid, behenic acid, linoleic acid, linolenic acid, lipoic acid, oleic acid, isosteric acid, elaidic acid, 2-ethylhexanoic acid, coconut oil fatty acid, tallow fatty acid, hardened tallow
30 fatty acid, palm kernel fatty acid, lanolin fatty acid or similar acids. These may be substituted or unsubstituted. When substituted they are preferably substituted with hydroxyl, or sulphur containing groups such as but not limited to SO_3H , SH , or S-S . In an embodiment of the current invention, the peptide is $\text{R}_1\text{-X-R}_2$. R_1 and/or R_2 groups respectively bound to the amino-terminal (N-terminal) and carboxyl-terminal (C-terminal) of the peptide sequence. In

one embodiment, the peptide is R_1 -X. Alternatively, the peptide is X- R_2 . Preferably, R_1 is H, C_{1-4} alkyl, acetyl, benzoyl or trifluoroacetyl; X is the peptide of the invention; R_2 is OH or NH_2 . In an embodiment, R_1 is selected from the group formed by H, a non-cyclic substituted or unsubstituted aliphatic group, substituted or unsubstituted alicyclyl, substituted or unsubstituted heterocyclyl, substituted or unsubstituted heteroarylalkyl, substituted or unsubstituted aryl, substituted or unsubstituted aralkyl, Tert-butyloxycarbonyl, 9-fluorenylmethyloxycarbonyl (Fmoc) and R_5 -CO-, wherein R_5 is selected from the group formed by H, a non-cyclic substituted or unsubstituted aliphatic group, substituted or unsubstituted alicyclyl, substituted or unsubstituted aryl, substituted or unsubstituted aralkyl, substituted or unsubstituted heterocyclyl and substituted or unsubstituted heteroarylalkyl; R_2 is selected from the group formed by $-NR_3R_4$, $-OR_3$ and $-SR_3$, wherein R_3 and R_4 are independently selected from the group formed by H, a non-cyclic substituted or unsubstituted aliphatic group, substituted or unsubstituted alicyclyl, substituted or unsubstituted heterocyclyl, substituted or unsubstituted heteroarylalkyl, substituted or unsubstituted aryl, and substituted or unsubstituted aralkyl; and with the condition that R_1 and R_2 are not α -amino acids. In accordance with another preferred embodiment, R_2 is $-NR_3R_4$, $-OR_3$ or $-SR_3$ wherein R_3 and R_4 are independently selected from the group formed by H, substituted or unsubstituted C_{1-24} alkyl, substituted or unsubstituted C_{2-24} alkenyl, Tert-butyloxycarbonyl, 9-fluorenylmethyloxycarbonyl (Fmoc), substituted or unsubstituted C_{2-24} alkynyl, substituted or unsubstituted C_3-C_{24} cycloalkyl, substituted or unsubstituted C_{5-24} cycloalkenyl, substituted or unsubstituted C_8-C_{24} cycloalkynyl, substituted or unsubstituted C_6-C_{30} aryl, substituted or unsubstituted C_7-C_{24} aralkyl, substituted or unsubstituted heterocyclyl ring of 3-10 members, and substituted or unsubstituted heteroarylalkyl of 2 to 24 carbon atoms and 1 to 3 atoms other than carbon wherein the alkyl chain is of 1 to 6 carbon atoms. Optionally, R_3 and R_4 can be bound by a saturated or unsaturated carbon-carbon bond, forming a cycle with the nitrogen atom. More preferably R_2 is $-NR_3R_4$ or $-OR_3$, wherein R_3 and R_4 are independently selected from the group formed by H, substituted or unsubstituted C_1-C_{24} alkyl, substituted or unsubstituted C_2-C_{24} alkenyl, substituted or unsubstituted C_2-C_{24} alkynyl, substituted or unsubstituted C_3-C_{10} cycloalkyl, substituted or unsubstituted C_6-C_{15} aryl and substituted or unsubstituted heterocyclyl of 3-10 members, substituted or unsubstituted heteroarylalkyl with a ring of 3 to 10 members and an alkyl chain of 1 to 6 carbon atoms. More preferably R_3 and R_4 are selected from the group formed by H, methyl, ethyl, hexyl, dodecyl, or hexadecyl. Even more preferably R_3 is H and R_4 is selected

from the group formed by H, methyl, ethyl, hexyl, dodecyl, or hexadecyl. In accordance with an even more preferred embodiment, R₂ is selected from -OH and -NH₂.

In accordance with another embodiment of this invention R₁ is selected from the group formed by H, acetyl, lauroyl, myristoyl or palmitoyl, and R₂ is -NR₃R₄ or -OR₃ wherein R₃ and R₄ are independently selected from H, methyl, ethyl, hexyl, dodecyl and hexadecyl, preferably R₂ is -OH or -NH₂. More preferably, R₁ is acetyl or palmitoyl and R₂ is -NH₂. In a preferred embodiment, the acyl group is bound to the N-terminal end of at least one amino acid of the peptide. In an embodiment of the invention, the peptide is modified to comprise a side chain protecting group. The side chain protecting group may be one or more of the group comprising benzyl or benzyl based groups, t-butyl-based groups, benzyloxy-carbonyl (Z) group, and allyloxycarbonyl (alloc) protecting group. The side chain protecting group may be derived from an achiral amino acid such as achiral glycine. The use of an achiral amino acid helps to stabilise the resultant peptide and also facilitate the facile synthesis route of the present invention. Preferably, the peptide further comprises a modified C-terminus, preferably an amidated C-terminus. The achiral residue may be alpha-aminoisobutyric acid (methylalaine). It will be appreciated that the specific side chain protecting groups used will depend on the sequence of the peptide and the type of N-terminal protecting group used.

“Conjugate”: In one embodiment of the invention the peptide is conjugated, linked or fused to a binding partner, for example one or more polyethylene glycol polymers or other compounds, such as molecular weight increasing compounds or lipophilic groups. The molecular weight increasing compound is any compound that will increase the molecular weight, typically by 10% to 90%, or 20% to 50% of the resulting conjugate and may have a molecular weight of between 200 and 20, 000, preferably between 500 and 10, 000. The molecular weight increasing compound may be PEG, any water-soluble(amphiphilic or hydrophilic) polymer moiety, homo or co-polymers of PEG, a monomethyl-substituted polymer of PEG (mPEG) and polyoxyethylene glycerol (POG), polyamino acids such as poly-lysine, poly-glutamic acid, poly-aspartic acid, particular those of L conformation, pharmacologically inactive proteins such as albumin, gelatin, a fatty acid, oligosaccharide, a lipid amino acid and dextran. The polymer moiety may be straight chained or branched and it may have a molecular weight of 500 to 40000Da, 5000 to 10000 Da, 10000 to 5000, Da. The compound (binding partner) may be any suitable cell penetrating compound, such as tat peptide, penetratin, pep-1. The compound (binding partner) may be an antibody molecule.

The compound (binding partner) may be a lipophilic moiety or a polymeric moiety. The lipophilic substituent and polymeric substituents are known in the art. The lipophilic substituent includes an acyl group, a sulphonyl group, an N atom, an O atom or an S atom which forms part of the ester, sulphonyl ester, thioester, amide or sulphonamide. The lipophilic moiety may include a hydrocarbon chain having 4 to 30 C atoms, preferably between 8 and 12 C atoms. It may be linear or branched, saturated or unsaturated. The hydrocarbon chain may be further substituted. It may be cycloalkane or heterocycloalkane. The peptide may be modified at the N-terminal, C-terminal or both. The polymer or compound (binding partner) is preferably linked to an amino, carboxyl or thio group and may be linked by N-termini or C-termini of side chains of any amino acid residue. The polymer or compound (binding partner) may be conjugated to the side chain of any suitable residue. The polymer or compound (binding partner) may be conjugated via a spacer. The spacer may be a natural or unnatural amino acid, succinic acid, lysyl, glutamyl, asparagyl, glycyl, beta-alanyl, gamma-amino butanoyl. The polymer or compound (binding partner) may be conjugated via an ester, a sulphonyl ester, a thioester, an amide, a carbamate, a urea, a sulphonamide. A person skilled in the art is aware of suitable means to prepare the described conjugate.

“Fragment” means a segment of a protein selected from SEQUENCE ID NO’s: 1 to 14, the fragment typically being 7 to 37 contiguous amino acids in length, and generally having a charge of between -9 and +3; a c-terminal amino acid that typically is not cysteine (C) or methionine (M); and an n-terminal amino acid that typically is not cysteine (C), histidine (H), proline (P) or threonine (T). The charge of a peptide, fragment or region is determined using the method of Cameselle, J.C., Ribeiro, J.M., and Sillero, A. (1986). Derivation and use of a formula to calculate the net charge of acid-base compounds. Its application to amino acids, proteins and nucleotides. *Biochem. Educ.* 14, 131–136.

The term “natural” as applied to a peptide means a peptide that includes (a) a fragment of a plant protein, typically rice or pea protein, or variants of pea protein including lentil, sweet pea, or chick pea or variants of rice protein including oat, grass, corn, wild rice and bananas, or (b) a variant of the fragment of a plant protein, for example a fragment of a homolog of the plant protein. The peptides or fragments of the invention may be isolated from plant proteins or made synthetically using methods known to a person skilled in the art and described herein.

“C-terminal domain” as applied to a fragment means the first three amino acids at the c-terminus of the fragment.

- 5 “N-terminal domain” as applied to a fragment means the last three amino acids at the n-terminus of the fragment.

“Bioactive” as applied to a peptide or fragment means having a health promoting effect when administered a mammal, for example one or more of glucose transport promoting, anti-
10 bacterial, anti-inflammatory, or cellular growth or proliferation promoting. In one embodiment, the term “bioactive” means cellular growth promoting.

“Growth promoting” or “growth promoting activity” as applied to a peptide or fragment means a peptide or fragment that is capable of increasing elastin production or cellular
15 proliferation of human skin treated with a 20μM solution of peptide or fragment as described in the assay below.

“Glucose transport promoting” or “glucose transport promoting activity” as applied to a peptide or variant or fragment means a peptide, variant or fragment that is capable of
20 increasing GLUT4 translocation into skeletal muscle compared with an untreated control when employed at a concentration of 2μM in the following *in-vitro* assay. L6-GLUT4myc cells were grown in 10% FBS and 2 μg/ml blasticidin. Cells were grown for 48-72 hours before being seeded in 24-well plates at 15,000 cells per well in 2% FBS and allowed to differentiate for 6 to 8 days prior to experimentation. L6-GLUT4myc cells were serum-
25 starved for three hours prior to incubation with 100 nM of insulin for 30mins, or 200, 20, 2.0 and 0.2 μM of SP, and 2, 1, 0.5 and .25mg/ml of peptide/peptide composition for 3 hours respectively. A 3-hour incubation period was selected based on previous findings identifying that incubation with branch chain amino acid containing di-peptides for 3 hours increases glucose uptake in L6 myotubes 1. Treatments were staggered in order to determine
30 GLUT4myc translocation at the same time point. The quantity of myc-tagged GLUT4 at the cell surface was measured by antibody-coupled colorimetric assay. Briefly, after incubation with either insulin for 30mins or synthetic peptide or peptide composition for 3 hours respectively, L6-GLUT4myc cells were fixed via incubation with 3% paraformaldehyde (PFA). A 0.1 M glycine solution was then added to quench PFA and cells were blocked with

5% goat serum. The myotube monolayer was exposed to anti-myc antibody and then incubated with peroxidase conjugated donkey anti-mouse IgG. 1mL of o-phenylenediamine dihydrochloride (OPD) reagent was added to each well and this reaction was stopped by adding 250µl/well of 3 M HCL. To determine GLUT4 translocation to cell surface, a measured aliquot of each condition was determined spectrophotometrically on a plate reader using absorbance at 492nm. Preferably the peptide or fragment is capable of increasing GLUT4 translocation compared with an untreated control by at least 50% (i.e a relative unit increase in GLUT4 translocation of 1% to 1.5%).

“Antibacterial” or “antibacterial activity” as applied to a peptide or fragment means a peptide or fragment that is capable of visibly inhibiting the growth of a bacteria in the following agar-plate based growth inhibition assay: Peptide stock=5mg/mL dissolved in DMSO. Bacterial inoculums were adjusted to McFarland 0.5 standard and MHA plates swabbed. Blank disks were placed in the plates and 10 µL of each compound (at 64 µg/mL – maximum concentration tested) added. Plates were incubated at 37°C for 16-18 hours. Appropriate controls (DMSO; Mueller-Hinton media alone; and two antibiotic discs – ciprofloxacin and tetracycline) were also performed.

“Anti-inflammatory” as applied to a peptide or fragment means a peptide or fragment that is capable of significantly reducing the secretion of TNFα by LPS-stimulated J774.2 macrophages (compared with untreated LPS-stimulated J774.2 macrophages) when the macrophages are treated with 100µM of the peptide or fragment. J774.2 macrophages were treated with 100µM of synthetic peptide for 24 hours and then stimulated with (A) LPS (10ng/ml) for five hours or (B) LPS (10ng/ml) for 5 hours followed by ATP (5mM) for one hour. Supernatant was collected and levels of TNFα were determined by ELISA.

“Enriched in peptides having a molecular weight of less than 10 KD” as applied to a composition of the invention means that the dry weight % of peptides in the composition having a molecular weight of less than 10 KD is greater than the dry weight % of polypeptide/protein in the composition having a molecular weight of 10 KD or greater.

“Homolog” of a reference protein should be understood to mean a protein from a different species of plant having at least 60%, 70%, 80%, 90%, 91%, 92%, 93%, 94%, 95%, 96%,

97%, 98%, 99% sequence homology with the reference protein. Thus, for example, homologs of pea protein P13918 include:

>gi|137584|sp|P08438.1|VCL_VICFA RecName: Full=Vicilin; Flags: Precursor [Vicia faba]

5 >gi|22057|emb|CAA68559.1| vicilin [Vicia faba var. minor] >gi|383931031|gb|AFH56916.1| vicilin [Vicia faba]

>gi|502105533|ref|XP_004492829.1| PREDICTED: vicilin-like isoform X1 [Cicer arietinum] ChickPea

>gi|29539109|emb|CAD87730.1| allergen Len c 1.0101 [Lens culinaris] Lentil

10 A “variant” of a growth promoting fragment shall be taken to mean a fragment having an amino acid sequence that is substantially identical to the reference growth promoting fragment, and which has growth promoting activity as defined above. Thus, for example, the term should be taken to include fragments that are altered in respect of one or more amino acid residues. Preferably such alterations involve the insertion, addition, deletion and/or
15 substitution of 5 or fewer amino acids, more preferably of 4 or fewer, even more preferably of 3 or fewer, most preferably of 1 or 2 amino acids only. Insertion, addition and substitution with natural and modified amino acids is envisaged. The variant may have conservative amino acid changes, wherein the amino acid being introduced is similar structurally, chemically, or functionally to that being substituted. Generally, the variant will have at least
20 70% amino acid sequence homology, preferably at least 80% sequence homology, more preferably at least 90% sequence homology, and ideally at least 95%, 96%, 97%, 98% or 99% sequence homology with the reference growth promoting fragment.

In this specification, the term “sequence identity” should be understood to comprise both
25 sequence identity and similarity, i.e. a variant (or homolog) that shares 70% sequence identity with a reference sequence is one in which any 70% of aligned residues of the variant (or homolog) are identical to or conservative substitutions of the corresponding residues in the reference sequence across the entire length of the sequence. Sequence identity is the amount of characters which match exactly between two different sequences. Hereby, gaps are not
30 counted and the measurement is relational to the shorter of the two sequences. In terms of “sequence homology”, the term should be understood to mean that a variant (or homolog) which shares a defined percent similarity or identity with a reference sequence when the percentage of aligned residues of the variant (or homolog) are either identical to, or conservative substitutions of, the corresponding residues in the reference sequence and where

the variant (or homolog) shares the same function as the reference sequence. This alignment and the percent homology or sequence identity can be determined using software programs known in the art, for example, one alignment program is BLAST, using default parameters. Details of these programs can be found at the following Internet address:

5 <http://www.ncbi.nlm.nih.gov/blast/Blast.cgi>.

Variants of SEQUENCE ID NO: 448 (QSFLLSGNQ)

Variants of SEQUENCE ID NO: 448 (QSFLLSGNQ) including variants having 1 or 2 conservative amino acid substitutions, 1, 2 to 3 non-conservative amino acid substitutions, 1-
10 2 amino acid additions, 1, 2 or 3 amino acid deletions, are provided below:

One conservative amino acid substitution:

QSFILSGNE, ESFLLSGNQ, QSYLLSGNQ, QSFLLSGDQ (SEQ ID NO'S 418-421)

15 Two conservative amino acid substitutions:

QSYLLSGNE, ESFLLSGNE, ESYLLSGNQ, QSFLLSGDE, QSYLLSGDQ (SEQ ID NO'S 422 to 426)

One non-conservative amino acid substitution

20 QSFRLSGNQ, QSFLLSYNQ, QFFLLSGNQ, QSFLLSGAQ, QSFLLSGNP (SEQ ID NO'S 427 to 431)

Two non-conservative amino acid substitution

25 QSFRRSGNQ, QSFLLSYIQ, QFFLLSGNL, QSFLLSGAQ, QSFLLSGNP (SEQ ID NO'S 432 to 436)

One or two amino acid additions

QSFLLSGNQQ, QSFLLLSGNQ, AQSFGLLSGNQ, RQSFLLSGNQ, QSFLLSGNQK
(SEQ ID NO'S 437 to 441)

30

One, two or three amino acid deletions

QFLLSGNQ, SFLLSGNQ, QSFLLSGN, QSFLLGNG, QSFLSGNQ, QSLLSGNQ,
SFLLSGNQ, QSFLLSGN, SFLLSGN, QSFSGNQ (SEQ ID NO'S 442 to 451)

The term “variant” also includes fragment of peptides of the invention. “Fragment of a peptide of the invention” or “peptide fragment” means a fragment of one of the peptides of the invention having at least 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 or 22 amino acids and that typically has a bioactivity, for example anti-inflammatory activity, anti-ageing activity, glucose transport promoting activity, or anti-bacterial activity. In one embodiment, the fragment consists of at least 30%, 40%, 50%, 60%, 70%, 80%, or 90% of the reference sequence. Thus, the invention also provides bioactive fragments of the peptides of the invention, and peptides comprising one or more of these fragments. In one embodiment, the fragments are bioactive. In one embodiment, the fragments are cellular growth or proliferation promoting fragments. Examples of fragments of peptides of the invention are provide in SEQUENCE ID NO’S 494 to 524.

“Ani-ageing” means inhibiting or slowing the appearance of ageing of a human skin and/or reversing the appearance of ageing. “Slowing or inhibiting ageing of the skin” means slowing or inhibiting the ageing process in the skin, and/or reversing the appearance of ageing.

“Disease or condition characterised by damaged dermal or epithelial cells or tissue” means any condition or disease that results in damaged dermal or epithelial tissue or cells or organs. One example is trauma which often results in damaged skin. Another example is an inflammatory skin condition such as psoriasis or excezma which often results in damaged skin. Another example is an inflammatory disorder of the lower intestines which can result in damaged epithelial cells/tissue lining the lower intestines. Another example is damaged epithelial cells/tissue lining the lower intestines caused by ingestion of a toxic or damaging substance, for example toxic chemicals or drugs. Another example is cancer, for example bowel cancer, which can result in damaged epithelial tissue in the bowel. Another condition is a peripheral inflammatory disorder such as atopic dermatitis which can result in damage to the skin in humans.

“Inflammatory disorder” means an immune-mediated inflammatory condition that affects humans and is generally characterised by dysregulated expression of one or more cytokines. Examples of inflammatory disorders include skin inflammatory disorders, inflammatory disorders of the joints, inflammatory disorders of the cardiovascular system, certain autoimmune diseases, lung and airway inflammatory disorders, intestinal inflammatory

disorders. Examples of skin inflammatory disorders include dermatitis, for example atopic dermatitis and contact dermatitis, acne vulgaris, and psoriasis. Examples of inflammatory disorders of the joints include rheumatoid arthritis. Examples of inflammatory disorders of the cardiovascular system are cardiovascular disease and atherosclerosis. Examples of autoimmune diseases include Type 1 diabetes, Graves disease, Guillain-Barre disease, Lupus, Psoriatic arthritis, and Ulcerative colitis. Examples of lung and airway inflammatory disorders include asthma, cystic fibrosis, COPD, emphysema, and acute respiratory distress syndrome. Examples of intestinal inflammatory disorders include colitis and inflammatory bowel disease. Other inflammatory disorders include cancer, hay fever, periodontitis, allergies, hypersensitivity, ischemia, depression, systemic diseases, post infection inflammation and bronchitis. The invention also relates to a peptide or composition of the invention for use in treating an inflammatory disorder in a mammal.

“Metabolic disorder” should be understood to include pre-diabetes, diabetes; Type-1 diabetes; Type-2 diabetes; metabolic syndrome; obesity; diabetic dyslipidemia; hyperlipidemia; hypertension; hypertriglyceridemia; hyperfattyacidemia; hypercholesterolemia; hyperinsulinemia, and MODY. The invention also relates to a peptide or composition of the invention for use in treating a metabolic disorder in a mammal.

“Disease or condition characterised by damaged dermal or epithelial cells or tissue” means any condition or disease that results in damaged dermal or epithelial tissue or cells or organs. One example is trauma which often results in damaged skin. Another example is an inflammatory skin condition such as psoriasis or eczema which often results in damaged skin. Another example is an inflammatory disorder of the lower intestines which can result in damaged epithelial cells/tissue lining the lower intestines. Another example is damaged epithelial cells/tissue lining the lower intestines caused by ingestion of a toxic or damaging substance, for example toxic chemicals or drugs. Another example is cancer, for example bowel cancer, which can result in damaged epithelial tissue in the bowel. Another condition is a peripheral inflammatory disorder such as atopic dermatitis which can result in damage to the skin in humans.

“Disease or condition characterised by bacterial infection” means any condition or disease characterised having a pathology caused by growth of bacteria or by bacterial infection, including for example MRSA, salmonella, listeria, bacterial pneumonia, Staphylococcal food

poisoning, bacterial meningitis. Specific examples are provided in https://en.wikipedia.org/wiki/List_of_infectious_diseases.

5 “Man-made” as applied to comestible products should be understood to mean made by a human being and not existing in nature.

10 “Maintaining or restoring gut health” means reducing and/or regulating the pro-inflammatory response in the gut and more specifically the epithelial cells. The healthy microbiome offers some protection against pathogenic viruses and bacteria, and their presence is needed to guide the development of our immune system. It has been shown that these bacteria can react to human signals of stress, sickness, or age which can be manifested by inflammation and as a consequence switch on their virulence genes and cause or contribute to disease. Having the ability to reduce and maintain at healthy levels the inflammatory response can help maintain the healthy bacteria. Digestive problems, which comprise the number one health problem in 15 North America, appear to be occurring with more frequency in recent years. One way to maintain digestive health is to maintain proper inflammation and intestinal flora.

20 “Improving muscle status” means improving the muscle health, for example promoting skeletal muscle protein synthesis, skeletal glucose absorption, improving lean tissue mass in therapeutic or non-therapeutic context, promoting muscle recovery generally after activity exercise, or improving muscle performance. The methods or uses may be therapeutic or non-therapeutic. The term “improving lean tissue mass status” should be understood to mean increasing lean tissue mass, or inhibiting or preventing the rate of lean tissue mass degradation.

25

“Promoting muscle recovery” means causing an increase in absorption of glucose in skeletal muscle compared with untreated skeletal muscle.

30 “Disease or condition characterised by lethargy or low energy levels” means any condition or disease characterised by a feeling of tiredness or low energy. Examples include allergies, asthma, anaemia, cancer and its treatments, chronic pain, heart disease, infection, depression, eating disorders, grief, sleeping disorders, thyroid problems, medication side effects, alcohol use, or drug use.

“Maintaining or restoring muscle health” means helping retain or restore mammalian muscle health resulting from damage incurred during exercise. By promoting glucose transport in skeletal muscle the peptides promote recovery from exercise, and relieve muscle soreness/pain and injury connected with exercise. They can also be used to decrease and prevent muscle cramping, and to allow a faster recovery from muscle cramping. Cramping can result from physical stress, mental stress, and or Repetitive Strain Injury stress. By promoting glucose transport the peptides help reduce Myopathy of the muscle, and help prevent Sarcopenia in mammals, promote recovery from injuries during exercise, and relieve muscle soreness/pain and injury connected with exercise. The invention also relates to a peptide or composition of the invention for use in maintaining or restoring muscle health in a mammal.

In this specification, the term “substantially all” as applied to a list of peptides should be understood to mean at least 60%, 70%, 80%, 90% or 95% of the peptides.

“Man-made” as applied to comestible products should be understood to mean made by a human being and not existing in nature.

Brief Description of the Figures

Figures 1 to 100: Effect of synthetic peptides of the invention on proliferation of Human Dermal Fibroblasts (HDF).

Figure 101: Effect of synthetic peptide of the invention (SEQ ID 42) on elastin synthesis of Human Dermal Fibroblasts (HDF).

Figure 102: Effect of synthetic peptide of the invention (SEQ ID 42) on collagen synthesis of Human Dermal Fibroblasts (HDF).

Figure 103: Effect of synthetic peptide of the invention (SEQ ID 701) on elastin synthesis of Human Dermal Fibroblasts (HDF).

Figure 104: Effect of synthetic peptide of the invention (SEQ ID 701) on collagen synthesis of Human Dermal Fibroblasts (HDF).

Figure 105: Effect of synthetic peptide of the invention (SEQ ID 246) on elastin synthesis of Human Dermal Fibroblasts (HDF).

Figure 106: Effect of synthetic peptide of the invention (SEQ ID 246) on collagen synthesis of Human Dermal Fibroblasts (HDF).

Figure 107: Effect of synthetic peptide of the invention (SEQ ID 284) on elastin synthesis of Human Dermal Fibroblasts (HDF).

5 **Figure 108:** Effect of synthetic peptide of the invention (SEQ ID 245) on elastin synthesis of Human Dermal Fibroblasts (HDF).

Figure 109: Effect of synthetic peptide of the invention (SEQ ID 245) on collagen synthesis of Human Dermal Fibroblasts (HDF).

Figure 110. shows the integrity controls and viability controls for the assay system.

10 **Figure 111.** % of elastin expression in superficial dermis compared to control (water or DMSO) for peptides P1, P2 and P3

* shows significant increases of elastin expression in superficial AND middle dermis.

Figure 112. % of elastin expression in middle dermis compared to control (water or DMSO) for peptides P1, P2 and P3.

15 * shows significant increases of elastin expression in superficial AND middle dermis.

Figure 113. % of cell proliferation in the basal layer of epidermis compared to control (water or DMSO) for peptides P6 and P8, and peptide compositions P9 and P10

* shows significant increases.

Figure 114. Histological analysis of the elastic fibers (+catechin, x200)

20 **Figure 115.** Immunohistochemical evaluation of the mitotic index (Ki67, x400)

Detailed Description of the Invention

25 EXAMPLE 1 – CELL PROLIFERATION ASSAY

BrDu is incorporated into newly synthesised DNA strands of actively proliferating cells. Following partial denaturation of double stranded DNA, Brdu is detected immunochemically allowing the assessment of the population of cells which are synthesizing DNA.

Human Dermal Fibroblasts (HDF – Sigma 10605a) were seeded in a 96 well plate at 10,000
30 cells per well in DMEM containing 10% fetal calf serum (FCS), 1% Pen/strep, 1% L-glutamine and allowed to adhere for 24h.

Following the initial 24h incubation the cells were incubated with 5 µg/ml, 0.5 µg/ml or 0.05µg/ml synthetic peptide for 24h respectively.

After 18 h incubation with synthetic peptides 20 μ l BrDu reagent was added to each well. At 24h incubation the cell were fixed and the amount of 2-DG6P was measured using the BrdU Cell Proliferation Assay, all steps were carried out according to the manufacturer's instructions.

- 5 Results were calculated as a percentage of the untreated control. An increase in optical density reading indicates greater incorporation of BrDu and increase cell proliferation.

The results are shown in Figures 1-100 and Table 1 below.

Table 1

FIGURE NO	SEQ ID	INCREASE IN PROLIFERATION	FIGURE NO	SEQ ID	INCREASE IN PROLIFERATION
1	121	48%	29	98	49%
2	105	40%	30	454	38%
3	249	30%	31	85	35%
4	226	30%	32	453	25%
5	84	20%	33	158	21%
6	330	18%	34	464	18%
7	181	33%	35	73	16%
8	83	32%	36	359	15%
9	247	28%	37	124	15%
10	97	26%	38	112	15%
11	74	29%	39	733	
12			40	728	
13	168		41	727	
14	151		42	730	
15	470	119%	43	731	
16	257	118%	44	148	
17	256	117%	45	343	
18	457	114%	46	345	
19	499	113%	47	484	
20	253	112%	48	729	
21	222	110%	49	456	
22	272	97%	50	494	
23	252	111%	51	723	
24	248	86%	52	722	
25	472	77%	53	498	
26	365	58%	54	475	13%
27	502	68%	55	718	
28	496	51%	56	337	8%

57	500	6%	79	463	100%
58	717		80	465	96%
59	297		81	467	90%
60	340		82	461	85%
61	719		83	341	83%
62	726		84	468	82%
63	725		85	285	81%
64	724		86	496	81%
65	720		87	146	80%
66	721		88	478	76%
67	503	125%	89	452	76%
68	474	121%	90	495	68%
69	504	119%	91	403	51%
70	114	119%	92	455	47%
71	505	118%	93	270	47%
72	482	113%	94	501	43%
73	479	106%	95	473	41%
74	477	81%	96		39%
75	410	73%	97	471	38%
76	475	69%	98	460	38%
77	497	58%	99	93	26%
78	480	102%	100	462	15%

EXAMPLE 2 – COLLAGEN PRODUCTION ASSAY

Hydroxyproline in tissue preparations is a direct measure of the amount of collagen present.

- 5 FIRELISA Human Hydroxyproline ELISA kit assay is designed to measure hydroxyproline in tissue or peptide compositions..

Human Dermal Fibroblasts (HDF Sigma 10605a) were seeded in 24 well plates at 50,000 cells per well in DMEM containing 10% fetal calf serum (FCS), 1% Pen/strep, 1% L-glutamine and allowed to adhere for 24h.

- 10 Following the initial 24h incubation the cells were incubated with 5 µg/ml, 1 µg/ml or 0.1µg/ml synthetic peptide for 96h respectively.

After treatment the cells were lysed using 4 freeze thaw cycles in liquid nitrogen. The lysed cells were centrifuged and 50 µl/ml of each supernatant was assayed using the FIRELISA Human Hydroxyproline ELISA kit. All steps were carried out according to the manufacturer's instructions.

- 5 Results were calculated as a percentage of the untreated control. An increase in optical density reading indicates an increase collagen content.

The results are shown in Figures 102, 104, 106 and 109

EXAMPLE 3 – ELASTIN PRODUCTION ASSAY

- 10 Elastin is a highly elastic protein in connective tissue and allows many tissues in the body to resume their shape after stretching or contracting. FIRELISA Human Elastin ELISA kit assay is designed to measure Elastin in tissue or protein/peptide compositions.

Human Dermal Fibroblasts (HDF) were seeded in 24 well plates at 50,000 cells per well in DMEM containing 10% fetal calf serum (FCS), 1% Pen/strep, 1% L-glutamine and allowed
15 to adhere for 24h.

Following the initial 24h incubation the cells were incubated with 5 µg/ml, 1 µg/ml or 0.1µg/ml synthetic peptide for 96h respectively.

After treatment the cells were lysed using 4 freeze thaw cycles in liquid nitrogen. The lysed cells were centrifuged and 50 µl/ml of each supernatant was assayed using the FIRELISA

- 20 Human Elastin ELISA kit. All steps were carried out according to the manufacturer's instructions.

Results were calculated as a percentage of the untreated control. An increase in optical density reading indicates an increase collagen content.

The results are shown in Figures 101, 103, 105, 107, 108 and 109.

25

EXAMPLE 4 – ELASTIN AND CELL PROLIFERATION ASSAYS

5

Table 2. Test items. Orange bands correspond to samples dissolved into DMSO 0.3% instead of water.

Item	Denomination	Concentration	Provider	Nature	Intertek reference	Solubility	Storage
Peptide 1	E_280_PJ	20µM	Nuritas	Peptide	14-CHL-0723-01	Water	-80°C
Peptide 2	I_222two_IN	20µM	Nuritas	Peptide	14-CHL-0723-02	Water	Ambient
Peptide 3	E_134_two_IN	20µM	Nuritas	Peptide	14-CHL-0723-03	Water	-80°C
Peptide 4	E_30two_IN	20µM	Nuritas	Peptide	14-CHL-0723-04	Water	-80°C
Peptide 5	E_121two_IN	20µM	Nuritas	Peptide	14-CHL-0723-05	Water	-80°C
Peptide 6	I_10two_IN	20µM	Nuritas	Peptide	14-CHL-0723-06	DMSO 0.3%	-80°C
Peptide 7	I_41two_IN	20µM	Nuritas	Peptide	14-CHL-0723-07	DMSO 0.3%	-80°C
Peptide 8	E_41_PJ	10µM*	Nuritas	Peptide	14-CHL-0723-08	Water	-80°C
Composition P9	E_2_IN	500µg/mL	Nuritas	Composition of peptides	14-CHL-0723-09	Water	-80°C
Composition P10	I_2_IN	500µg/mL	Nuritas	Composition of peptides	14-CHL-0723-10	Water	-80°C

10

Equipment

Incubator, Flow Laminar Chamber, Sterile Polished Plastic Rod, Pipettor, Maintenance medium, Plate 6 well, Plate 24 well.

15 *Reagents*

MTT, PBS, SDS, Formaldehyde, Xylene, Ethanol absolute, Dulbecco's phosphate-buffered saline (DPBS), Metal Enhanced DAB substrate kit, ABC peroxidase staining kit, Citric acid, Sodium hydroxide 2N, Hydrogen peroxide 30%, Anti-Filaggrin, Anti-rabbit IgG-Biotin, Tween 20.

5

Test system

Nature: Human skin tissue 5mm diameter

Batch number: EXP004050B009 and EXP004050B011

Provider: Laboratoire Biopredic International – 8-18 rue Jean Pecker – 35000 Rennes -
10 France. Tel: +33 (0)2.99.14.36.14 – Fax: +33 (0)2.99.54.44.72.

Certificates of analysis are present in Annex 1.

Two batches are used for the assay. Batch EXP004050B005 is used for experiment day 1, and Batch EXP004050B006 is used for experiment day 5.

15 *Maintenance medium*

Maintenance Medium: Batch n°: MIL 218C

Provider: Laboratoire Biopredic International – 8-18 rue Jean Pecker – 35000 Rennes -
France.

20 *Peptides Tested*

P1: SEQ ID NO: 283

P2: SEQ ID NO: 246

P3: SEQ ID NO: 284

P4: RPYYSNAPQEIF

25 P5: VLLEQQEQEPQH

P6: SEQ ID NO: 245

P7: QQYGIAASPFLQSAA

P8: SEQ ID NO: 42

30 *Compositons tested*

P9 (14-CHL-0723-09) is the Pea composition (SEQ ID Numbers:50, 85, 74, 140, 82, 136, 189, 77, 169, 149, 171, 178, 143, 127, 190, 141, 147, 133, 186, 125, 122, 119, 87, 90, 86, 89, 138, 129, 123, 120, 117, 113, 110, 121, 105, 98, 55, 161, 19, 317, 135, 130, 146, 177, 160, 170, 188, 83, 78, 36, 96, 159, 26, 330, 168, 148, 184, 151, 151, 165, 114, 284)

P10 (14-CHL-0723-010) is the Rice composition (SEQ ID Numbers: 245, 246, 263, 250, 257, 259, 276, 255, 251, 264, 256, 266, 274, 270, 269, 356, 245, 380, 262, 258, 356, 218, 252, 358, 271, 253, 344, 275, 272, 226, 224, 220, 248, 261, 265, 373, 375, 247, 249, 363, 273, 343, 273, 362)

5

Application method

Skin explants were prepared from abdominal plastic surgery. Some explants were delipidated with alcohol to obtain a dehydrated skin.

These explants were maintained in maintenance medium supplied by the provider Bioprédic International for 5 days. Test items are applied twice per day with 5µL per explant.

10

At the end of the test, viabilities controls are realized with the MTT on two explants, the third explant is fixed in the formaldehyde 4% for histology and cell staining.

For each time of analysis (D1 and D5), histologies on delipidated explants, treated explants with test items, the DMSO 0.3% control and water control, are performed.

15

After receipt in the laboratory, each skin explant in the maintenance medium is delipidated with 5µL alcohol during 3 hours.

After 3 hours, all skin explants are treated two per day with test items, and they are incubated at 37°C +/- 2°C, 5% CO₂ for 1 day or 5 days.

Integrity of the system is realized at day 1 and day 5 with a viability control with MTT.

20

Immunostaining

Histology is realized by the laboratory *Gredeco* and the immunostaining to elastin and Ki67 are realized by the same laboratory. Immunostaining to filaggrin is realized by the laboratory *Intertek*.

25

The detection of elastin (rabbit monoclonal antibody, clone P15502, LSBio) is performed using an immunoperoxidase technique two layers (ABC kit, Vector Laboratories) and revealed by AEC (3-amino-9 -éthylcarbazole). The immunohistochemical staining intensity in the elastic fibers is evaluated using a semi-quantitative histological score.

Epithelial proliferation was analyzed by immunohistochemistry using anti-Ki67 antibody.

30

Immunodetection was performed using an indirect immunoperoxidase technique three layers, amplified (DAKO kit) and revealed by AEC (3-Amino-9-ethylcarbazole). Counting the number of labeled cells (keratinocytes of the basal layer of the epidermis) is performed and provides the total number of basal cells to calculate the % of labeled cells.

The specific staining of filaggrin is performed with an immunoperoxidase staining (ABC kit, Fisher). The intensity of immunohistochemical marker in the epidermis is evaluated relative to the negative control of the solvent (Water or DMSO 0.3%).

5 C: Results

Viability control

The integrity control and the viability control are present in Figure 1. These controls do allow to validate the assay system. The viability is > 50% for test items, and they do not show a cytotoxicity according to the test.

10

Immunostaining

Elastin Expression

15 The elastic fibers of the dermis were revealed by staining with the catechin and morphometrically quantified by analysis by computer-assisted image. The percentage area taken up by elastic fibers in the dermis was calculated in the dermis and the average superficial dermis. Results are presents in Table 1, Figure 2 and Figure 3.

Table 3. Morphometric quantification of elastic fibers in the superficial dermis (%) and middle dermis. Orange bands correspond to samples dissolved into DMSO 0.3% instead of water.

Conditions	Morphometric quantification of elastic fibers in the superficial dermis (%)		Morphometric quantification of elastic fibers in the middle dermis (%)	
	D1	D5	D1	D5
Dehydrated with alcohol and hydrated with water	4,31	4,9	5	5,83
Dehydrated	2,38	7,26	4,39	9,59
<i>EGF (Epidermal Growth Factor) 10ng/mL</i>	<i>3,64</i>	<i>5,61</i>	<i>5,68</i>	<i>6,61</i>
Dehydrated with alcohol and hydrated with DMSO 0,3%	3,76	7,24	6	10,36
0723.01	4,45	10,21	7,59	10,17
0723.02	6,09	7,59	11,75	9,08
0723.03	3	11,68	4,9	9
0723.04	3,28	8,94	5,22	9
0723.05	6,34	6,26	8,8	6,61
0723.06	3,8	4,03	4,54	8,67
0723.07	4	5,15	6,46	5,33
0723.08	2,7	5,32	3,52	7,27
0723.09	3,26	8,26	5,75	7,92
0723.10	4,1	8	5,73	8,34

Under the experimental conditions of the study, 0723-1 and 0723-3 samples show an increase by twice of elastic fibers in the superficial dermis compared to control water (Figure), and an increase in the middle dermis compared to the water control at D5.

- 10 The 0723-2 sample shows an increase doubled in the middle dermis at day 1 compared to control water and an increase at day 5.

Ki67 Expression

The results of the immunohistochemical analysis of Ki67 are reported in

Table and expressed as % of labelled at the basal layer of the epidermis. The Figure shows the percentage of Ki 67 cells compared to negative controls (water or DMSO). Immunohistochemical analysis of mitotic activity is shown in annex 4 with a reminder of the average for each analysed conditions.

Table 4. % of Ki67 positive cells in the basal layer of the epidermis. Orange bands correspond to samples dissolved into DMSO 0.3% instead of water.

Conditions	D1	D5
Dehydrated with alcohol and hydrated with water	19,09	3,53
Dehydrated	17,05	1,76
EGF (Epidermal Growth Factor) 10ng/mL	25,11	4,2
Dehydrated with alcohol and hydrated with DMSO 0.3%	17,2	2,61
0723.01	18,57	3,92
0723.02	19,61	6,73
0723.03	22,01	10,04
0723.04	14,97	11,36
0723.05	9,48	3,08
0723.06	31,97	5,04
0723.07	22,22	5,26
0723.08	27,83	5,72
0723.09	31,02	2,4
0723.10	31,94	3,57

Under the experimental conditions of the study, test item 0723-06, 0723-08, 0723-09 and 0723-010 show an increase in the number of mitotic cells compared to EGF at day 1. A

decrease in the mitotic index was observed on day 5 compared to day 1 for all analysed conditions.

The decrease in this cell staining on day 5 is caused by the model. Indeed, after approximately 3 days cell turnover is exhausted on this model.

5

The invention is not limited to the embodiments hereinbefore described which may be varied in construction and detail without departing from the spirit of the invention.

SEQUENCES

PROTEIN : P13918 - 2 – PEA

5 MAATTMKASFLLMLMGISFLASVCVSSRSDPQNPFIFKSNKFQTLFENENGHIRLLQKFDQRSKIFENLQNYRLLEYKSKPHTIFLPQHTDADYI
 LVLVLSGKAILTVLKPDDRNSFNLERGDTIKLPAGTIAYLVNRDDNEELRVLDLAIPVNRPGQLQSFLLSGNQNNQNYLSGFSKNILEASFNTDYEE
 IEKVLLLEEHEKETQHRRLKDKRQQSQEENVIVKLRSRGQIEELSKNAKSTSKKSVSSESEPFNLRSRGPIYSNEFGKFFEITPEKNPQLQDLDFVNS
 VEIKEGSLLLPHYNSRAIVIVTVNEGKGFELVQQRNENQQEQRKEDDEEEQGEIEINKQVQNYKAKLSSGDVFIAGHPVAVKASSNLDLL
 GFGINAENNQRNFLAGDEDNVISQIQRPVKELAFPGSAQEVDRILENQKQSHFADAQPQQRERGSRETRDRLSSV [SEQ ID 1]

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PEPTIDE : QNYLSGFSKNILE [SEQ ID 15]
 PEPTIDE : TIKLPAGTIAYLVNRDDNEE [SEQ ID 16]
 PEPTIDE : LAIPVNRPGQLQSFL [SEQ ID 17]
 PEPTIDE : AIPVNRPGQLQ [SEQ ID 18]
 PEPTIDE : PAGHPVAVK [SEQ ID 19]
 PEPTIDE : VQNYKAKLSSGDVFIAG [SEQ ID 20]
 PEPTIDE : NNQRNFLAGDEDNVISQIQRPVKE [SEQ ID 21]
 PEPTIDE : INKQVQNYKAKLSSGDVFIAG [SEQ ID 22]
 PEPTIDE : LAIPVNRPGQ [SEQ ID 23]
 PEPTIDE : NFLAGDEDNVISQIQRPVKE [SEQ ID 24]
 PEPTIDE : DLAIPVNRPGQLQSF [SEQ ID 25]
 PEPTIDE : VIPAGHPVAVK [SEQ ID 26]
 PEPTIDE : DTIKLPAGTIAYLVNRDDNEE [SEQ ID 27]
 PEPTIDE : LAIPVNRPGQLQSF [SEQ ID 28]
 PEPTIDE : KQVQNYKAKLSSGDVFIAG [SEQ ID 29]
 PEPTIDE : RGDITIKLPAGTIAYLVNRDDNEE [SEQ ID 30]
 PEPTIDE : FLAGDEDNVISQIQRPVKE [SEQ ID 31]
 PEPTIDE : LAIPVNRPGQLQS [SEQ ID 32]
 PEPTIDE : VLDLAIPVNRPGQLQ [SEQ ID 33]
 PEPTIDE : DLAIPVNRPGQLQ [SEQ ID 34]
 PEPTIDE : VFIAGHPVAVK [SEQ ID 35]
 PEPTIDE : TIFLPQHTDADYILVLVLSGK [SEQ ID 36]
 PEPTIDE : NQRNFLAGDEDNVISQIQRPVKE [SEQ ID 37]
 PEPTIDE : LAIPVNRPGQLQ [SEQ ID 38]
 PEPTIDE : HPVAVKASSNLDLLGFG [SEQ ID 39]
 PEPTIDE : LAIPVNRPGQL [SEQ ID 40]
 PEPTIDE : DLAIPVNRPGQL [SEQ ID 41]
 PEPTIDE : SKPHTIFLPQHTDADYILVLVLSGK [SEQ ID 42]
 PEPTIDE : FVIAGHPVAVK [SEQ ID 43]
 PEPTIDE : DLAIPVNRPGQLQS [SEQ ID 44]
 PEPTIDE : SGDVFVIAGHPVAVKASSNLD [SEQ ID 45]
 PEPTIDE : AIPVNRPGQLQSF [SEQ ID 46]
 PEPTIDE : ELAFPGSAQEVDR [SEQ ID 47]
 PEPTIDE : LAIPVNRPGQLQSFLLSG [SEQ ID 48]
 PEPTIDE : VFIAGHPVAVKASSNLDLLGFG [SEQ ID 49]
 PEPTIDE : AGHPVAVK [SEQ ID 50]
 PEPTIDE : HPVAVKASSNLDLLGFGINAE [SEQ ID 51]
 PEPTIDE : LAIPVNRPGQLQSFLLSGNQNNQ [SEQ ID 52]
 PEPTIDE : SGDVFVIAG [SEQ ID 53]
 PEPTIDE : GSLLPHYNSRAIVIVTVNE [SEQ ID 54]
 PEPTIDE : NFLAGDEDNVISQIQRPVK [SEQ ID 55]
 PEPTIDE : SGDVFVIAGHPVA [SEQ ID 56]
 PEPTIDE : GSLLPHYNSRAIVIV [SEQ ID 57]
 PEPTIDE : RGDITIKLPAGTIAYLVNRDD [SEQ ID 58]
 PEPTIDE : SGDVFVIAGHPVAVK [SEQ ID 59]
 PEPTIDE : LSSGDVFVIAGHPVAVK [SEQ ID 60]
 PEPTIDE : LDLAIPVNRPGQL [SEQ ID 61]
 PEPTIDE : AIPVNRPGQL [SEQ ID 62]
 PEPTIDE : LAIPVNRPGQLQSFL [SEQ ID 63]
 PEPTIDE : PHTIFLPQHTDADYILVLVLSGK [SEQ ID 64]
 PEPTIDE : VFIAGHPVAVKASSNLD [SEQ ID 65]
 PEPTIDE : LAIPVNRPGQLQSFLS [SEQ ID 66]
 PEPTIDE : VLDLAIPVNRPGQLQSF [SEQ ID 67]

PEPTIDE : AIPVNRPGQLQS [SEQ ID 68]
 PEPTIDE : DTIKLPAGTIAYLVNRDDNE [SEQ ID 69]
 PEPTIDE : NYKAKLSSGDVFIIPAG [SEQ ID 70]
 PEPTIDE : GKAILTVLKPDDRNSFNLE [SEQ ID 71]
 5 PEPTIDE : YKSKPHTIFLPQHTDAD[SEQ ID 72]
 PEPTIDE : ASSNLDLLGFG[SEQ ID 73]
 PEPTIDE : DEEEEQGEEIINK[SEQ ID 74]
 PEPTIDE : YKSKPHTIFLPQHTD[SEQ ID 75]
 PEPTIDE : VLDLAIPVNR[SEQ ID 76]
 10 PEPTIDE : FFEITPEKNPQLQDLDFVNSVEIK[SEQ ID 77]
 PEPTIDE : TIFLPQHTDADYIL[SEQ ID 78]
 PEPTIDE : SFLLSGNQNNYLSG[SEQ ID 79]
 PEPTIDE : SFLLSGNQNNYLSGF5[SEQ ID 80]
 PEPTIDE : NQQEQRKEDDEEEQGEIE[SEQ ID 81]
 15 PEPTIDE : EEQGEIEIINK[SEQ ID 82]
 PEPTIDE : SRGPIYSNE[SEQ ID 83]
 PEPTIDE : EDDEEEQGEIEIINK[SEQ ID 84]
 PEPTIDE : DDEEEQGEIEIINK[SEQ ID 85]
 PEPTIDE : KEDDEEEQGEIEIN[SEQ ID 86]
 20 PEPTIDE : KEDDEEEQGEIE[SEQ ID 87]
 PEPTIDE : QRKEDDEEEQGEIE[SEQ ID 88]
 PEPTIDE : KEDDEEEQGEIEIINK[SEQ ID 89]
 PEPTIDE : KEDDEEEQGEIE[SEQ ID 90]
 25
 PROTEIN : Q9M3X6 - 3 – PEA
 MATTIKSRFPLLLGLIFLASVVCVTYANYDEGSEPRVPAQRERGRQEGEKEEKRHGEWRPSYEKEDEEEGQRRERGRQEGEKEEKRHGEWR
 PSYEKQDEEEQKYRYQREKEDEEEQKYQYQREKEQKEVQPGRRWEREEDEEQVDEEWGRSGRRREDPEERARLRHREERTKRDRRHQ
 REGEEERSSESQERRNPFLFKSNKFLTFFENENGHIRLLQRFDKRSDLFENLQNYRLVEYRAKPHTIFLPQHIDADLILVVLGKAILTVLSPNDR
 30 NSYNLERGDTIKLPAGTTSYLVNQDDEEDLRLVDLIPVNGPGKFEAFDLAKNKNQYLRGFSKNILEASYNTRYETIEKVLEEQEKDRKRQQG
 EETDAIVKVSREQIEELKKLAKSSSKSLPSEFEPINLRSHKPEYSNKFGLFEITPEKKYPQLQDLDFVSCVEINEGALMLPHYNSRAIVVLLVNEG
 KGNLELLGLKNEQEREDRKERNNEVQRYEARLSPGDVVIIPAGHPVAITASSNLNLLGFGINAENNERNFLSGSDDNVISQIENPVKELTFPGS
 VQEIINRLIKNQKQSHFANAPEQEKEGSGKRSPLSILGTIFY [SEQ ID 2]
 35 PEPTIDE : HPVAITASSNLNLLG[SEQ ID 91]
 PEPTIDE : ASSNLNLLGFG[SEQ ID 92]
 PEPTIDE : ITASSNLNLLGFG[SEQ ID 93]
 PEPTIDE : ITASSNLNLLGFGINAE[SEQ ID 94]
 PEPTIDE : SSNLNLLGFG[SEQ ID 95]
 40 PEPTIDE : VDLVIPVNGPGKF[SEQ ID 96]
 PEPTIDE : LVIPVNGPGKFE[SEQ ID 97]
 PEPTIDE : LVIPVNGPGKFEA[SEQ ID 98]
 PEPTIDE : LRLVDLVIPVNGPGKFE[SEQ ID 99]
 PEPTIDE : YRAKPHTIFLPQHIDAD[SEQ ID 100]
 45 PEPTIDE : HPVAITASSNLNLLGFGINAE[SEQ ID 101]
 PEPTIDE : SNLNLLGFG[SEQ ID 102]
 PEPTIDE : HPVAITASSNLNLLGFGINAENNE[SEQ ID 103]
 PEPTIDE : LVDLVIPVNGPGKFE[SEQ ID 104]
 PEPTIDE : LVIPVNGPGKF[SEQ ID 105]
 50 PEPTIDE : TIKLPAGTTSYLVNQDDE[SEQ ID 106]
 PEPTIDE : DLRLVDLVIPVNGPGKFE[SEQ ID 107]
 PEPTIDE : EDLRLVDLVIPVNGPGKFE[SEQ ID 108]
 PEPTIDE : HPVAITASSNLNLLGFG[SEQ ID 109]
 PEPTIDE : LVDLVIPVNGPGKFEAFDLAK[SEQ ID 110]
 55 PEPTIDE : DNVISQIENPVKE[SEQ ID 111]
 PEPTIDE : VVIIPAGHPVAITASSNLNLLGFG[SEQ ID 112]
 PEPTIDE : LVDLVIPVNGPGKFEAF[SEQ ID 113]
 PEPTIDE : YPQLQDLDL[SEQ ID 114]
 PEPTIDE : VIPVNGPGKF[SEQ ID 115]
 60 PEPTIDE : SKKSLPSE[SEQ ID 116]
 PEPTIDE : LPQHIDADLILVVLGK[SEQ ID 117]
 PEPTIDE : RGDITIKLPAGTTSYLVNQD[SEQ ID 118]
 PEPTIDE : IPVNGPGKF[SEQ ID 119]

5 PEPTIDE : LPQHIDADL[SEQ ID 120]
 PEPTIDE : LVIPVNGPGK[SEQ ID 121]
 PEPTIDE : IFLPQHIDAD[SEQ ID 122]
 PEPTIDE : LPQHIDAD[SEQ ID 123]
 PEPTIDE : VIPVNGPGK[SEQ ID 124]
 PEPTIDE : IFLPQHIDA[SEQ ID 125]
 PEPTIDE : TIKLPAGTTSYLVNQDDEE[SEQ ID 126]
 PEPTIDE : HGEWRPSYEKEEDEEEGQRER[SEQ ID 127]
 10 PEPTIDE : EKRHGEWRPSYEKEEDEEEGQRE[SEQ ID 128]
 PEPTIDE : LPAGTTSYLVNQDDEEDLR[SEQ ID 129]
 PEPTIDE : PSYEKEEDEEEGQRER[SEQ ID 130]
 PEPTIDE : EKRHGEWRPSYE[SEQ ID 131]
 PEPTIDE : TIKLPAGTTSYLVNQDDEED[SEQ ID 132]
 PEPTIDE : HGEWRPSYEKQEDEEEK[SEQ ID 133]
 15 PEPTIDE : EWRPSYEKEEDEEE[SEQ ID 134]
 PEPTIDE : PSYEKEEDEEEGQR[SEQ ID 135]
 PEPTIDE : EKEEDEEEGQR[SEQ ID 136]
 PEPTIDE : EWRPSYEKEEDEEEGQRE[SEQ ID 137]
 PEPTIDE : KEEDEEEGQR[SEQ ID 138]
 20 PEPTIDE : VQPGRRERWEREEDEEQVDE[SEQ ID 139]
 PEPTIDE : DVVIIPAGHPVA[SEQ ID 140]
 PEPTIDE : HGEWRPSYEKQEDE[SEQ ID 141]
 PEPTIDE : EEDEEEGQR[SEQ ID 142]
 PEPTIDE : HGEWRPSYEKEEDEEEGQR[SEQ ID 143]
 25 PEPTIDE : EEWRGSQRREDPEE[SEQ ID 144]
 PEPTIDE : REEDEEQVDEEWRGSQRREDPEE[SEQ ID 145]
 PEPTIDE : RHGEWRPSY[SEQ ID 146]
 PEPTIDE : HGEWRPSYEKQEDEE[SEQ ID 147]
 PEPTIDE : VVIIPAGHPVA[SEQ ID 148]
 30 PEPTIDE : HGEWRPSYE[SEQ ID 149]
 PEPTIDE : KEEDEEEGQRER[SEQ ID 150]
 PEPTIDE : VVIIPAGHPVAIT[SEQ ID 151]
 PEPTIDE : EKRHGEWRPSYEKEEDE[SEQ ID 152]
 PEPTIDE : QVDEEWRGSQRREDPEE[SEQ ID 153]
 35 PEPTIDE : GDTIKLPAGTTSYLVNQDDEEDLR[SEQ ID 154]
 PEPTIDE : GSEPRVPAQRE[SEQ ID 155]
 PEPTIDE : EEKRHGEWRPSYEKE[SEQ ID 156]
 PEPTIDE : EWRPSYEKEEDEE[SEQ ID 157]
 PEPTIDE : NYDEGSEPRVPAQRE[SEQ ID 158]
 40 PEPTIDE : VIIPAGHPVAIT[SEQ ID 159]
 PEPTIDE : RHGEWRPSYEK[SEQ ID 160]
 PEPTIDE : NYDEGSEPR[SEQ ID 161]
 PEPTIDE : WRPSYEKEEDEE[SEQ ID 162]
 PEPTIDE : WRPSYEKQEDEEE[SEQ ID 163]
 45 PEPTIDE : EKRHGEWRPSYEKQEDEEE[SEQ ID 164]
 PEPTIDE : VVIIPAGHPVAITA[SEQ ID 165]
 PEPTIDE : KRHGEWRPSYE[SEQ ID 166]
 PEPTIDE : GSDDNVISQIENPVKE[SEQ ID 167]
 PEPTIDE : VVIIPAGHPV[SEQ ID 168]
 50 PEPTIDE : HGEWRPSY[SEQ ID 169]
 PEPTIDE : RPSYEKEEDEEEGQR[SEQ ID 170]
 PEPTIDE : HGEWRPSYEK[SEQ ID 171]
 PEPTIDE : KRHGEWRPSYEKEE[SEQ ID 172]
 PEPTIDE : VVIIPAGHPVAITAS[SEQ ID 173]
 55 PEPTIDE : RGDITIKLPAGTTSYLVNQDDEED[SEQ ID 174]
 PEPTIDE : KRHGEWRPSYEKQEDEEE[SEQ ID 175]
 PEPTIDE : DEEQVDEEWRGSQRREDPEE[SEQ ID 176]
 PEPTIDE : RHGEWRPSYE[SEQ ID 177]
 PEPTIDE : HGEWRPSYEKE[SEQ ID 178]
 60 PEPTIDE : KRHGEWRPSYEKEEDEEE[SEQ ID 179]
 PEPTIDE : EKRHGEWRPSYEKEEDEEE[SEQ ID 180]
 PEPTIDE : TIKLPAGTTSYLVNQDDEEDLRLVD[SEQ ID 181]
 PEPTIDE : WRPSYEKEEDEEEGQRE[SEQ ID 182]

PEPTIDE : KRHGEWRPSYEKEEDEE[SEQ ID 183]
 PEPTIDE : VVIIPAGHPVAI[SEQ ID 184]
 PEPTIDE : EWRGSQRREDPEE[SEQ ID 185]
 PEPTIDE : HGEWRPSYEKQEDEEEKQK[SEQ ID 186]
 5 PEPTIDE : SGSDDNVISQIENPVKE[SEQ ID 187]
 PEPTIDE : RPSYEKEEDEEGQRER[SEQ ID 188]
 PEPTIDE : EKEEDEEGQRER[SEQ ID 189]
 PEPTIDE : HGEWRPSYEKQ[SEQ ID 190]
 10 PEPTIDE : WRPSYEKEEDEEE[SEQ ID 191]
 PEPTIDE : LAKNKNQYLRGFS[SEQ ID 192]
 PEPTIDE : NKNQYLRGFS[SEQ ID 193]
 PEPTIDE : LRGFSKNILE[SEQ ID 194]
 PEPTIDE : LAKNKNQYLRGFSKN[SEQ ID 195]
 15 PEPTIDE : TVLSPNDRNSY[SEQ ID 196]
 PEPTIDE : QYLRGFSKNILE[SEQ ID 197]
 PEPTIDE : GKAILTVLSPNDRNSYNLE[SEQ ID 198]
 PEPTIDE : RGFSKNILE[SEQ ID 199]
 PEPTIDE : NKNQYLRGFSKNILE[SEQ ID 200]
 20 PEPTIDE : ASSNLNLLGFGINAE[SEQ ID 201]
 PEPTIDE : ASSNLNLLGF[SEQ ID 202]
 PEPTIDE : LAKNKNQYLRGFSK[SEQ ID 203]
 PEPTIDE : RGDITKLPAGTTSYLVNQDDEE[SEQ ID 204]
 PEPTIDE : ARLSPGDVVIIPAGHPVAITASSN[SEQ ID 205]
 25 PEPTIDE : VQRYEARLSPGD[SEQ ID 206]
 PEPTIDE : ARLSPGDVVIIPAGHPVAIT[SEQ ID 207]
 PEPTIDE : RGDITKLPAGTTSYLVNQDDE[SEQ ID 208]
 PEPTIDE : ARLSPGDVVIIPAGHPVA[SEQ ID 209]
 PEPTIDE : GALMLPHYNSRAIVVLLVNE[SEQ ID 210]
 30 PEPTIDE : ARLSPGDVVIIPAGHPVAITASS[SEQ ID 211]
 PEPTIDE : LSPGDVVIIPAGHPVAITASSNLNLLGFGINAENNER[SEQ ID 212]
 PEPTIDE : ARLSPGDVVIIPAGHPVAITAS[SEQ ID 213]
 PEPTIDE : LSPGDVVIIPAGHPVAITASSNL[SEQ ID 214]
 PEPTIDE : ARLSPGDVVIIPAGHPVAITA[SEQ ID 215]
 35
 PROTEIN : QODEV5 - 5 – RICE
 MSALTTSQLATSATGFGIADRSAPSSLLRHGFQGLKPRSPAGGDATSLSVTTSARATPKQQRSVQRGSRFRPSVVVYATGAGMNVVFGAEM
 APWSKTGGLGDLVGLGPPAMAANGHRVMVISPRYDQYKDAWDTSVVAEIKVADRYERVFFHCYKRGVDVRFIDHPSFLEKVWGKTGEKIY
 40 GPDGTGVDYKDNQMRFSLLCQAALAPRILNLNNNPYFKGTYGEDVVFVNCNDWHTGPLASYLKNNYQPNGIYRNAKVAFCIHNISYQGRFAFE
 DYPELNLSEFRSSFDIDGYDTPVEGRKINWMKAGILEADRLTVSPYYAEELISGIARGCELDNIMRLTGITGIVNGMDVSEWDPSKDKYITA
 KYDATTAIEAKALNKEALQAEAGLPVDRKIPLIAFIGRLEEQKGPDMVMAAAPELMQEDVQIVLLGTGKKKFEKLLKSMEEKYPGKVRVAVKFNA
 PLAHLIMAGADVLAVPSRFEPGLIQLQGMRYGTPCACAAGTGLVDTVIEGKTGFHMGRLSVDCKVVEPSDVKKVAATLKRAIKVVGTPAYEE
 MVRNCMNQDLQSWKGPKNWENVLLGLGVAGSAPGIEGDEIAPLAKENVAAP [SEQ ID 3]
 45
 PEPTIDE : NWENVLLGLGVAGSAPGIEGDEIAPLAK[SEQ ID 216]
 PEPTIDE : YDQYKDAWDTSVVAEIK[SEQ ID 217]
 PEPTIDE : SSFDFIDGYDTPVEGR[SEQ ID 218]
 PEPTIDE : GPDGTGVDYKDNQM[SEQ ID 219]
 50 PEPTIDE : ILNLNNNPYFK[SEQ ID 220]
 PEPTIDE : VVGTPAYEE[SEQ ID 221]
 PEPTIDE : IDGYDTPVEGR[SEQ ID 222]
 PEPTIDE : VVGTPAYE[SEQ ID 223]
 PEPTIDE : IYGPDTGVDYK[SEQ ID 224]
 PEPTIDE : VAGSAPGIEGDE[SEQ ID 225]
 55 PEPTIDE : IYGPDTGVDYKDNQMR[SEQ ID 226]
 PEPTIDE : VVGTPAYEEMVR[SEQ ID 227]
 PEPTIDE : DFIDGYDTPVEGR[SEQ ID 228]
 PEPTIDE : LGLGVAGSAPGIEGDEIAPLAK[SEQ ID 229]
 PEPTIDE : FNAPLAHLIMAGADVLAVPSR[SEQ ID 230]
 60 PEPTIDE : LGLGVAGSAPGIEGDE[SEQ ID 231]
 PEPTIDE : LGLGVAGSAPGIEGDEIAPL[SEQ ID 232]
 PEPTIDE : VLTVSPYYAEELISGIAR[SEQ ID 233]
 PEPTIDE : EALQAEAGLPVDR[SEQ ID 234]

	PEPTIDE : LGLGVAGSAPGIEGD[SEQ ID 235]
	PEPTIDE : IMAGADVLAVPSR[SEQ ID 236]
	PEPTIDE : GLGVAGSAPGIEGDE[SEQ ID 237]
	PEPTIDE : EALQAEAGLPVDRK[SEQ ID 238]
5	PEPTIDE : TGGLGDVLGGLPPAMAANGHR[SEQ ID 239]
	PEPTIDE : LEEQKGPDMVA[SEQ ID 240]
	PEPTIDE : LGVAGSAPGIEGDEIAPLAK[SEQ ID 241]
	PEPTIDE : GLGVAGSAPGIEGDEIAPLAK[SEQ ID 242]
	PEPTIDE : TGGLGDVLGGLPPAM[SEQ ID 243]
10	PEPTIDE : NVLLGLGVAGSAPGIEGDE[SEQ ID 244]

15 PROTEIN : P14323 - 6 - RICE
MASSVFSRFSIYFCVLLCHGSMAGLFPNPSTNPWHSPRQGSFRECRRDLQAFELPKRVRSEAGVTEYFDEKNELFQCTGTGTVIRRVIQPGQLL
VPRYTNIPIGVVYIIQGRGSMGLTFPGCPATYQQQFQQFSSQGSQSQKFRDEHQKIHQFRQGDIVALPAGVAHWFYNDGDAPIVAVVYVDV
NNNANQLEPRQKEFLLAGNNNRAQQQVYGSIEQHSQGNIFSGFGVEMLSEALGINAVAAKRLQSQNDQRGEIHHVKNGLQLLKPTLTQQ
QEQAQAQDQYQQVQYSERQQTSSRWNGLEENFCTIKVRVNIENPSRADSYNPRAGRITSVNSQKFPILNLIQMSATRVNLYQNAILSPFWNV
NAHSLVYMIQGRSRVQVVSNFGKTVFDGVLRLPGQLLIIPQHYAVLKAEREGCQYIAIKTNANAFVSHLAGKNSVFRALPVDVVANAYRISRE
20 QARSLKNNRGEEHGAFTPRFQQQYYPGLSNESESETSE [SEQ ID 4]

PEPTIDE : TVFDGVLRLPGQL[SEQ ID 245]
PEPTIDE : RLQSQNDQRGEIHHVK[SEQ ID 246]

25 PROTEIN : P29835 - 5 – RICE
MASKVVFFAAALMAAMVAISGAQLSESEMRFRDRQCQREVQDSPLDACRQVLDRQLTGRERFQPMFRPRPGALGLRMQCCQQLQDVSR
CRCAAIRRMVRSYEESMPMPLEQGWSSSSSEYYGGEGSSSEQGYYGEGSSEEGYYGEQQQQPGMTRVRLTRARQYAAQLPSMCRVEPQQC
SIFAAGQY [SEQ ID 5]

30 PEPTIDE : EGYGGEQQQQPGMTR[SEQ ID 247]
PEPTIDE : GYYGEQQQQPGMTR[SEQ ID 248]
PEPTIDE : EEGYYGEQQQQPGMTR[SEQ ID 249]
PEPTIDE : YYGEGSSSEQGYYGEGSSE[SEQ ID 250]
PEPTIDE : YGGEGSSSEQGYYGEGSSE[SEQ ID 251]

35 PEPTIDE : SSEGYGGEQQQQPGMTR[SEQ ID 252]
PEPTIDE : SEEGYYGEQQQQPGMTR[SEQ ID 253]
PEPTIDE : QGYYGEGSSEE[SEQ ID 254]
PEPTIDE : YGGEGSSSEQGYYGEGSSEEGY[SEQ ID 255]
PEPTIDE : YGEQQQQPGMTR[SEQ ID 256]

40 PEPTIDE : YYGEQQQQPGMTR[SEQ ID 257]
PEPTIDE : SYEESMPMPLEQGWSSSSSE[SEQ ID 258]
PEPTIDE : YYGEGSSEEGYYGEQQQQPGMTR[SEQ ID 259]
PEPTIDE : QQQQPGMTRV[SEQ ID 260]
PEPTIDE : GEQQQQPGMTR[SEQ ID 261]

45 PEPTIDE : SYEESMPMPLEQGWSSSSSEY[SEQ ID 262]
PEPTIDE : YYGEGSSSEQGYYGEGSSEEGY[SEQ ID 263]
PEPTIDE : YGEQQQQPGMTRVR[SEQ ID 264]
PEPTIDE : GEGSSEEGYYGEQQQQPGMTR[SEQ ID 265]
PEPTIDE : YGEGSSEEGYYGEQQQQPGMTR[SEQ ID 266]

50 PEPTIDE : QQQQPGMTRVR[SEQ ID 267]
PEPTIDE : QYAAQLPSMCRVEPQQCSIFAAGQY[SEQ ID 268]

55 PROTEIN : POC1U8 - 5 - *Staphylococcus aureus*
MKGKFLKVSSLFVATLTATLVSSPAANALSSKAMDNPQQQTQSSKQQTPKIQKGGNLKPLEQREHANVILPNNDRHQITDTTNGHYAPVTY
QVEAPTGTFIASGVVVGKDTLLTNKHVVDDATHGDPHALKAFPSAINQDNYPNGGFTAEQITKYSGEGLAIVKFSFNEQNKHIGEVVVKPATMS
NNAETQVNQINITVTGYPGDKPVATMWESKGIKITYLKGEAMQYDLSTTGGNSGSPVFNEKNEVIGIHWGGVPNEFNGAVFINENVRNFLKQ
NIEDIHFANDDQPNPNPDNPDPNPNPDNPNNPDNPNNPDNPDPDNGDNNNSDNPDA [SEQ ID 14]

60 PEPTIDE : APTGTFIASGVVVGKD[SEQ ID 413]
PEPTIDE : LAIVKFSFNEQNKHIGE[SEQ ID 414]
PEPTIDE : RHQITDTTNGHYAPVTYIQVE[SEQ ID 415]
PEPTIDE : GDLAIVKFSFNEQNKHIGE[SEQ ID 416]

PEPTIDE : NPDNPDNPNPDNPNPD[SEQ ID 417]

PROTEIN : P14614 - 4 - RICE

5 MATIAFSRLSIYFCVLLCHGSMALFGPNVNPWHNPRQGGFRECRRDRLQAFEPLRRVRSEAGVTEYFDEKNEQFQCTGTFVIRRVIEPQGL
LVPRYSNTPGMVYIIQGRGSMGLTFPGCPATYQQQFQQFLPEGQSQSQKFRDEHQKIHQFRQGDIVLPAGVAHWFYNEGDAPVVALYVF
DLNNANQLEPRQKEFLLAGNNNREQQMYGRSIEQHSQGNIFSGFNNELLSEALGVNALVAKRLQGQNDQRGEIIRVKNGLKLRLPAFAQQ
QEQAQQQEQEAQYQVYSEEQPPSTRCNGLDENFCTIKARLNIENPASHADTYNPRAGRITRLNSQKFPILNLVQLSATRVNLYQNAILSPF
10 WNVNAHSLVYIVQGHARVQVVSNLGKTVFNGVLRPGQLLIIPQHYVVLKKAHEGCGQYISFKTNANSMVSHLAGKNSIFRAMPVDVIANAYR
ISREQARSLKNNRGEELGAFTPRYQQQTPGFSNESENEALE [SEQ ID 6]

PEPTIDE : TVFNGVLRPGQL[SEQ ID 269]

PEPTIDE : TVFNGVLRPGQL[SEQ ID 270]

PEPTIDE : SGFNNELLSEALGVNALVAK[SEQ ID 271]

15 PEPTIDE : NGVLRPGQL[SEQ ID 272]

PEPTIDE : ALVAKRLQGQNDQRGEI[SEQ ID 273]

PEPTIDE : VPRYSNTPGM[SEQ ID 274]

PEPTIDE : PRYSNTPGMV[SEQ ID 275]

PEPTIDE : YSNTPGMVY[SEQ ID 276]

20 PEPTIDE : LVPRYSNTPGM[SEQ ID 277]

PEPTIDE : FYNEGDAPVV[SEQ ID 278]

PEPTIDE : FYNEGDAPVVAL[SEQ ID 279]

PEPTIDE : FEPLRRVRSEAGVTE[SEQ ID 280]

PEPTIDE : FYNEGDAPVVALY[SEQ ID 281]

25 PEPTIDE : FYNEGDAPVVA[SEQ ID 282]

PROTEIN : P09918 - 14 - *Pisum sativum*

30 MFSGVTGILNRGHKIKGTVVLMRKNVLDINSLTVGGVIGQGFDILGSTVDNLTAFLGRSVSLQLISATKPDATGKGKLGKATFLEGISSSLPTLG
AGQSFAKIHFEWDDDMGIPGAFYIKNFMQTEFFLVSLTDDIPNHGSIYFVCNSWIYNAKHHKIDRIFFANQTYLPSETPAPLVHYREEELNNLR
GDGTGERKEWERIYDYVYNDLGNPDSDGENHARVPLGGSETYPYPRRGRTGRKPTRKDPNSESRSYVYLPRDEAFGHLKSSDFLTLYGLKAVS
QNVVPALESVFFDLNFTPNFEFDSFDEVHGLYEGGIKLPNTILSQISLPVLKEIFRTDGENTLKYPPPKVIQVSRSGWMTDEEFAREMLAGVNP
VICCLQEFPFRSKLDSQIYGDHTSKISKEHLEPNLEGLTVEEAIQNKKLFLDDHDSIMPYLRRINSTSTKAYATRILFNNNNQNLKPLAIELSLPHP
QGDEHGAVSYVYQPALEGVESIIWLLAKAYVIVNDSCYHQLVSHWLNTHAVVEPFVIATNRHLSLCHPIYKLLYPHYRDTMNINSLARLSLVND
35 GGIIEKFTLWGRYSMEMSSKVYKNWVFTEQALPADLIKRGMAIEDPSSPCGVKLVEDYPYAVDGLIEWAIKTWVQDYVSLYTSDEKLQD
SELQAWWKELVEVGHGDKKNEPWPKMQTREDLIEVCISVIWTASALHAANFGQYSYGGILNRPTLSRRFMPEKGSAAFEELVKSPQKA
YLKTITPKFQTLIDLSVIELSRHASDELYLGERDNPWNWTSKRALEAFKKFGNKLAEIEKKLTQRNNDKLRNRHGPVEMPYTLTPSSKEGLTFR
GIPNSISI [SEQ ID 7]

40 PEPTIDE : HGPVEMPYTLTPSSK[SEQ ID 283]

PROTEIN : P02857 - 1 - PEA

45 MAKLLALSLSFCLLGGCFALREQPQQNECQLERLDALEPDNRIESEGGLIETWNPNNKQFRCAVALSRATLQRNALRRPYSNAPQEIFIQ
QGNGYFGMVFPGPCPETFEPEQSEGEGRYRDRHQVNRFRREGDIIAVPTGIVFWMYNDQDTPVIAVSLTDIRSSNNQLDQMPRRFYLAG
NHEQEFLQYQHQQGGKQEQENEGNNIFSGFKRDYLEDAFNVRNHIVDLQGRNEDEEKGAIVKVGGLSIISPPEKQARHQGRSRQEEDED
EEKQPRHQGRSRQEEDEDEERQPRHQRRRGEEDKKERGGSQKGSRRQGDNGLEETVCTAKLRLNIGPSSSPDIYNPEAGRIKVTSL
DLPVLRWLKLSAEHGLHKNAMFVPHYNLNANSIIYALKGRARLQVVCNNGNTVFDGELEAGRALTVPQNYAVAAKSLSDRFYVAFKTNDR
50 AGIARLAGTSSVINNLPLDVVAATFNLQRNEARQLKSNNPFKFLVPARESENRA [SEQ ID 8]

PEPTIDE : LDALEPDNR[SEQ ID 284]

PEPTIDE : DALEPDNR[SEQ ID 285]

PEPTIDE : HGLHKNAMFVPHYNLNANSIIYA[SEQ ID 286]

PEPTIDE : LAGTSSVINNLPLDVVAATF[SEQ ID 287]

55 PEPTIDE : FREGDIIAVPTGIVFW[SEQ ID 288]

PEPTIDE : GTSSVINNLPLDVVAATFNLQRNE[SEQ ID 289]

PEPTIDE : KGAIVKVGGLSIISPPE[SEQ ID 290]

PEPTIDE : RLAGTSSVINNLPLD[SEQ ID 291]

PEPTIDE : AGTSSVINNLPLDVVAATFNLQRNE[SEQ ID 292]

60 PEPTIDE : AGTSSVINNLPL[SEQ ID 293]

PEPTIDE : LAGTSSVINNLPLDVVA[SEQ ID 294]

PEPTIDE : AGTSSVINNLPLDV[SEQ ID 295]

PEPTIDE : AGRIKVTSLDLPVLRW[SEQ ID 296]

5 PEPTIDE : AGRIKTVTSLDLPVLR[SEQ ID 297]
 PEPTIDE : FREGDIIAVPTGIVF[SEQ ID 298]
 PEPTIDE : AGTSSVINNLPLD[SEQ ID 299]
 PEPTIDE : LAGTSSVINNLPL[SEQ ID 300]
 PEPTIDE : LAGTSSVINNLPLDVV[SEQ ID 301]
 PEPTIDE : EGDIIAVPTGIVF[SEQ ID 302]
 PEPTIDE : LAGTSSVINNLPLDV[SEQ ID 303]
 PEPTIDE : AGRALTVPQNYAVAAKSLSD[SEQ ID 304]
 10 PEPTIDE : AGRALTVPQNYA[SEQ ID 305]
 PEPTIDE : LAGTSSVINNLPLD[SEQ ID 306]
 PEPTIDE : RAGIARLAGTSSVINNLPLDVVA[SEQ ID 307]

PROTEIN : P02855 - 4 – PEA

15 DNAEIEKILLEEHKETHHRRGLRDKRQQSQEKNVIVKVSKKQIEELSKNAKSSSKSVSSRSEPFNLKSSDPIYSNQYGKFFEITPKKNPQLQDL
 IFVNYVEIKEGSLWLPHYNSRAIVIVTVNEGKGFELVQQRNENQQGLREEDDEEEQREEETKNQVQSYKAKLTPGDVFPVAGHPVAVRAS
 SNLNLGFGINAENNQRNFLAGEDNVISQIQKQVKDLTFPGSAQEVDRLLNENKQSYFANAQPQRETRSQEIKHEHLSILGAF [SEQ ID 9]

20 PEPTIDE : RASSNLNLGFGINAE[SEQ ID 308]
 PEPTIDE : VTVNEGKGFEL[SEQ ID 309]
 PEPTIDE : VRASSNLNLGFGINAE[SEQ ID 310]
 PEPTIDE : VRASSNLNLGFG[SEQ ID 311]
 PEPTIDE : HPVAVRASSNLNLGFG[SEQ ID 312]
 PEPTIDE : TKNQVQSYKAKLTPGD[SEQ ID 313]
 25 PEPTIDE : HPVAVRASSNLNLG[SEQ ID 314]
 PEPTIDE : KAKLTPGDVFPVAG[SEQ ID 315]
 PEPTIDE : DLTFPGSAQEVDRLLNENK[SEQ ID 316]
 PEPTIDE : PAGHPVAVR[SEQ ID 317]
 PEPTIDE : AKLTPGDVFPVAGHPVA[SEQ ID 318]
 30 PEPTIDE : SYKAKLTPGDVFPVAGHPVA[SEQ ID 319]
 PEPTIDE : LTPGDVFPVAGHPVAVR[SEQ ID 320]
 PEPTIDE : VQSYKAKLTPGDVFPVAG[SEQ ID 321]
 PEPTIDE : YKAKLTPGDVFPVAGHPVA[SEQ ID 322]
 PEPTIDE : FVIPAGHPVAVR[SEQ ID 323]
 PEPTIDE : YKAKLTPGDVFPVAG[SEQ ID 324]
 35 PEPTIDE : DLTFPGSAQEVDR[SEQ ID 325]
 PEPTIDE : AKLTPGDVFPVAGHPVAVR[SEQ ID 326]
 PEPTIDE : LTPGDVFPVAG[SEQ ID 327]
 PEPTIDE : SYKAKLTPGDVFPVAG[SEQ ID 328]
 PEPTIDE : SYKAKLTPGDVFPVAGHPVAVR[SEQ ID 329]
 40 PEPTIDE : VIPAGHPVAVR[SEQ ID 330]
 PEPTIDE : QVQSYKAKLTPGDVFPVAG[SEQ ID 331]
 PEPTIDE : AKLTPGDVFPVAG[SEQ ID 332]
 PEPTIDE : HPVAVRASSNLNLGFGINAE[SEQ ID 333]
 PEPTIDE : YKAKLTPGDVFPVAGHPVAVR[SEQ ID 334]
 45 PEPTIDE : TKNQVQSYKAKLTPGDVFPVAG[SEQ ID 335]
 PEPTIDE : PFNLKSSDPIYS[SEQ ID 336]
 PEPTIDE : IEKILLEE[SEQ ID 337]
 PEPTIDE : SRSEPFNLKSSDPIYS[SEQ ID 338]
 50 PEPTIDE : HPVAVRASSNLNL[SEQ ID 339]

PROTEIN : D3VNE1 - 5 – PEA

55 MAATPIKPLMLLAIASVCSSRSQENPFIFKSNRFQTLTENENGHIRLLQKFDKRSKIFENLQNYRLLYKSKPRTLFLPQYTDADFILVVLG
 KATLTVLKSNDNRNSFNLERGDTIKLPAGTIAYLANRDDNEDLRVLDLTPVKNKPGQLQSFLSGTQNPQLSGFSKNILEAAFNTNYEEIEKVLL
 QQEQEPQHRRSLKDRRQEIENENVIVKVSREQIEELSKNAKSSSKSVSSSGPFNLRSRNPISNKFQKFFEITPEKNQQLQDLDFVNSVDIKE
 GSLLLPNYNSRAIVIVTVTEGKGFELVQQRNENQKQKENDKEEQEETSKQVQLYRAKLSPGDVFPVAGHPVAVAINASSDLNLGFGINAENN
 ERNFLAGEDNVISQVERPVKELAFPGSSHEVDRLLKNQKQSYFANAQPLQRE [SEQ ID 10]

60 PEPTIDE : TFLPQYTDADFILVVLGK[SEQ ID 340]

PROTEIN : P07728 - 1 – RICE

MASINRPIVFFTVCLFLLCNGSLAQQLLGQSTSQWQSSRRGSPRECRFDRLQAFEPISVRSQAGTTEFFDVSNEQFQCTGVSVVRRVIEPRGL
 LLPHYTNGASLVYIIQGRGITGPTFPGPESYQQFQQSGQAQLTESQSQSKFKDEHQKIHRFRQGDVIALPAGVAHWCYNDGEVPVVAIY
 VTDLNNGANQLDPRQRDFLLAGNKRNPQAYRREVEERSQNIFSGFSTELLSEALGVSSQVARQLQCQNDQRGEIVRVEHGLSLLQPYASLQE
 5 QEQQGVQSRERYQEGGYQQSQYSGSGCSNGLDETFTCLRVQRNIDNPNRADTYNPRAGRVTNLNTQNFPILSLVQMSAVKVNLYQNALLSP
 FWNINAHSVVYITQGRARVQVNNNGKTVFNGELRRGQLLIIPQHYAVVKAQREGCAYIAFKTNPNMSMVSHIAGKSSIFRALPNDVLANAY
 RISREEAQRLKHNRGDEFGAFTPIQYKSYQDVYNAAESS [SEQ ID 11]

10 PEPTIDE : EVEERSQNIF[SEQ ID 341]
 PEPTIDE : VEERSQNIFSGF[SEQ ID 342]
 PEPTIDE : ASLQEQQEGGVQ[SEQ ID 343]
 PEPTIDE : QEQQGVQSR[SEQ ID 344]
 PEPTIDE : ASLQEQQGVQSR[SEQ ID 345]
 PEPTIDE : EVEERSQNIFSGF[SEQ ID 346]
 15 PEPTIDE : VTDLNNGANQLDPRQRD[SEQ ID 347]
 PEPTIDE : VEHGLSLLQPYASL[SEQ ID 348]
 PEPTIDE : IYVTDLNNGANQLDPRQRDFL[SEQ ID 349]
 PEPTIDE : VTDLNNGANQLDPRQRDFL[SEQ ID 350]
 PEPTIDE : VEHGLSLLQPYASLQEQQGVQSR[SEQ ID 351]
 20 PEPTIDE : VTDLNNGANQLDPR[SEQ ID 352]
 PEPTIDE : IYVTDLNNGANQLDPRQRD[SEQ ID 353]
 PEPTIDE : YVTDLNNGANQLDPRQRDFL[SEQ ID 354]
 PEPTIDE : YVTDLNNGANQLDPR[SEQ ID 355]
 PEPTIDE : STELLSEALGVSSQVAR[SEQ ID 356]
 25 PEPTIDE : HGLSLLQPYASLQEQQ[SEQ ID 357]
 PEPTIDE : SGFSTELLSEALGVSSQVAR[SEQ ID 358]

PROTEIN : P07730 - 2 - RICE

30 MASINRPIVFFTVCLFLLCDGSLAQQLLGQSTSQWQSSRRGSPRGCRFDRLQAFEPISVRSQAGTTEFFDVSNELFQCTGVSVVRRVIEPRGLL
 LPHYTNGASLVYIIQGRGITGPTFPGPETYQQFQQSGQAQLTESQSQSHKFKDEHQKIHRFRQGDVIALPAGVAHWCYNDGEVPVVAIYV
 TDINNGANQLDPRQRDFLLAGNKRNPQAYRREVEEWSQNIFSGFSTELLSEAFGISNQVARQLQCQNDQRGEIVRVERGLSLLQPYASLQE
 EQGQMQRREHYQEGGYQQSQYSGGCPNGLDETFTCMRVQRNIDNPNRADTYNPRAGRVTNLNSQNFPIILNLVQMSAVKVNLYQNALLSP
 FWNINAHSIVYITQGRAVQVNNNGKTVFNGELRRGQLLIVPQHYVVVKAQREGCAYIAFKTNPNMSMVSHIAGKSSIFRALPTDVLANAYR
 35 ISREEAQRLKHNRGDEFGAFTPLQYKSYQDVYNVAESS [SEQ ID 12]

40 PEPTIDE : GAFTPLQYKSYQD[SEQ ID 359]
 PEPTIDE : GLLPHYTNGASLVY[SEQ ID 360]
 PEPTIDE : FLLAGNKRNPQAYRRE[SEQ ID 361]
 PEPTIDE : ALPTDVLANAYR[SEQ ID 362]
 PEPTIDE : DFLAGNK[SEQ ID 363]
 PEPTIDE : DVLANAYR[SEQ ID 364]
 PEPTIDE : GAFTPLQYK[SEQ ID 365]
 PEPTIDE : QGDVIALPAGVAHW[SEQ ID 366]
 45 PEPTIDE : FGAFPLQYKSY[SEQ ID 367]
 PEPTIDE : FLLAGNKRNPQAYR[SEQ ID 368]
 PEPTIDE : FGAFPLQYKSYQ[SEQ ID 369]
 PEPTIDE : GLSLLQPYASLQEQQ[SEQ ID 370]
 PEPTIDE : AFTPLQYK[SEQ ID 371]
 PEPTIDE : FGAFPLQYKSYQD[SEQ ID 372]
 50 PEPTIDE : GDEFGAFTPLQYK[SEQ ID 373]
 PEPTIDE : FGAFPLQYKSYQDV[SEQ ID 374]
 PEPTIDE : FGAFPLQYK[SEQ ID 375]
 PEPTIDE : FGAFPLQYKS[SEQ ID 376]
 PEPTIDE : VYIIQGRGITGPTF[SEQ ID 377]
 55 PEPTIDE : YIIQGRGITGPTF[SEQ ID 378]
 PEPTIDE : KTNPNMSMVSHIAGK[SEQ ID 379]
 PEPTIDE : TNPNSMVSHIAGK[SEQ ID 380]
 PEPTIDE : PNSMVSHIAGKS[SEQ ID 381]
 60 PEPTIDE : NIDNPNRADTYNPRAGRVTN[SEQ ID 382]
 PEPTIDE : QRDFLLAGNKR[SEQ ID 383]
 PEPTIDE : LLQPYASLQEQQ[SEQ ID 384]
 PEPTIDE : QRDFLLAGNK[SEQ ID 385]

	PEPTIDE : QEQEQGQMQR[SEQ ID 386]
	PEPTIDE : SLLQPYASLQEQE[SEQ ID 387]
	PEPTIDE : ASLQEQEQGQM[SEQ ID 388]
5	PEPTIDE : ASLQEQEQGQMQR[SEQ ID 389]
	PEPTIDE : DFLAGNKR[SEQ ID 390]
	PEPTIDE : QAFEPISVRSQAGTTEF[SEQ ID 391]
	PEPTIDE : KTNPNMVSISHAGKSSIF[SEQ ID 392]
	PEPTIDE : VRRVIEPRGLLLPHYTINGASL[SEQ ID 393]
10	PEPTIDE : FGAFPLQYKSYQDVYN[SEQ ID 394]
	PEPTIDE : IALPAGVAHW[SEQ ID 395]
	PEPTIDE : RVRQNIDNPNRADTYNPRAGRVTNL[SEQ ID 396]
	PEPTIDE : NIDNPNRADTYNPRAGRVTNL[SEQ ID 397]
	PEPTIDE : GAFTPLQYKSYQDVYN[SEQ ID 398]
15	PEPTIDE : PNSMVSHIAGKSSIFR[SEQ ID 399]
	PEPTIDE : RLQAFEPISVRSQAGTTE[SEQ ID 400]
	PEPTIDE : TNPNSMVSHIAGKSSIFR[SEQ ID 401]
20	PROTEIN : Q0D7S0 - 3 - RICE
	MASNKVVSFVLLAVVSVLAATATMAEYHHQDQVVYTPGPLCQPGMGYPMYPLPRCRALVKRQCVRGTAAAAEQVRRDCCRQLAAVDD
	SWCRCEAISHMLGGIYRELGAPDVGHMSEVFRGCRGDLERAAASLPFCNVDPNGGGGVCYWLARSGY [SEQ ID 13]
25	PEPTIDE : ELGAPDVGHM[SEQ ID 402]
	PEPTIDE : LGAPDVGHM[SEQ ID 403]
	PEPTIDE : ELGAPDVGHMSEVF[SEQ ID 404]
	PEPTIDE : ELGAPDVGHMSE[SEQ ID 405]
	PEPTIDE : ELGAPDVGHMSEVFR[SEQ ID 406]
	PEPTIDE : ELGAPDVGHMSEV[SEQ ID 407]
30	PEPTIDE : ELGAPDVGHMSE[SEQ ID 408]
	PEPTIDE : LGAPDVGHMSE[SEQ ID 409]
	PEPTIDE : YRELGAPDVGHMSE[SEQ ID 410]
	PEPTIDE : LGAPDVGHMSEV[SEQ ID 411]
	PEPTIDE : RELGAPDVGHMSE[SEQ ID 412]
35	ADDITIONAL PEPTIDES (AND SOURCE PROTEIN)
	HPRPPKPDAPR [SEQ ID 452] - Q0D9DO
	LQQAPPPQR [SEQ ID 453] - Q6AVS5
40	VGWGEQPWSPY [SEQ ID 454] - Q8H920
	FHMPP [SEQ ID 455] - O49927
	FRRP [SEQ ID 456] - P29835
	FWM [SEQ ID 457] - P15838
	HMPPS [SEQ ID 458] - O49927
	PVEMPTLLYPS [SEQ ID 459]
45	HMPSS [SEQ ID 460] - O49927
	HRFR [SEQ ID 461] - Q712V4
	HRRS [SEQ ID 462] - P13918
	HSPR [SEQ ID 463] - P14323
	HWF [SEQ ID 464] - P14323
50	MFRR [SEQ ID 465] - Q41000
	MFRRP [SEQ ID 466] - P29835
	MPPS [SEQ ID 467] - O49927
	MPRR [SEQ ID 468] - P15838
	NMPS [SEQ ID 469] - P20698
55	PHMP [SEQ ID 470] - O49927
	PHMPS [SEQ ID 471] - O49927
	PRRF [SEQ ID 472] - P15838
	WMK [SEQ ID 473] - O04434
	DSINALEPDHR [SEQ ID 474] - P05692
60	ELTFPGSVQ [SEQ ID 475] - Q9M3X6
	ELTFPGSVQE [SEQ ID 476] - Q9M3X6
	IFEDAITIPGR [SEQ ID 477] - P09886
	LDALEPDNRIESE [SEQ ID 478] - P02857

KTLDYWPSLR [SEQ ID 479] – P08688
 RHGEWGPSY [SEQ ID 480]
 ILVDGSHDIER [SEQ ID 481] – Q5N725
 LVSHPIAAHEGR [SEQ ID 482] – P14614
 5 NLAQAPAQALL [SEQ ID 483] – Q0DJ38
 FLPQHTD [SEQ ID 484] – P13918
 LEPDNR [SEQ ID 485] – P15838
 LQSQND [SEQ ID 486] – P14323
 LQSQNDQRGEI [SEQ ID 487] – P14323
 10 QSQNDQRGEIIHVK [SEQ ID 488] – P14323
 RGEIIHVK [SEQ ID 489] – P14323
 RLQSQNDQ [SEQ ID 490] - P14323
 RLQSQNDQRG [SEQ ID 491] - P14323
 RLQSQNDQRGEIIH [SEQ ID 492] - P14323
 15 VFDGVLPRG [SEQ ID 493] - P14323
 HNPR [SEQ ID 494] – P14614
 HPMS [SEQ ID 495] – Q0D7S0
 HPSF [SEQ ID 496] – Q0DEV5
 MPMP [SEQ ID 497] – P29835
 20 PMPL [SEQ ID 498] – P29835
 PNSM [SEQ ID 499] – P07728
 WDP [SEQ ID 500] – B5A8N6
 LRGFSK [SEQ ID 501] – Q9M3X6
 RSQNIF [SEQ ID 502] – P07728
 25 YLRGFS [SEQ ID 503] – Q9M3X6
 GALMLPHYN [SEQ ID 504] – Q9M3X6
 GALMLPHYNSR [SEQ ID 505] – Q9M3X6
 KNPQLQDLDFVNYVEIK [SEQ ID 700] P02855
 PGQLQSFLLSGNQNNYLSGFSK [SEQ ID 701] P13918
 30 RGPQQYAEWQINEK [SEQ ID 702] Q6K7K6
 VLDLAIPVNRPGQL [SEQ ID 703] Q6K508
 GYVGLTFFGCPATHQQQLFEQR [SEQ ID 704] P09918
 LDVTPLSLGL [SEQ ID 717]
 EEGIQLVAEAI [SEQ ID 718]
 35 YSLKPLVPR [SEQ ID 719]
 WHT [SEQ ID 720]
 WHN [SEQ ID 721]
 NNPF [SEQ ID 722]
 MRFR [SEQ ID 723]
 40 MPPSS [SEQ ID 724]
 HMPS [SEQ ID 725]
 HMPPS [SEQ ID 726]
 GHPM [SEQ ID 727]
 FWN [SEQ ID 728]
 45 FHMP [SEQ ID 729]
 WTIVQGLPIDE [SEQ ID 730]
 GYPMYPLPR [SEQ ID 731]
 HGGEGGRPY [SEQ ID 732]
 LRGFSK
 50 GALMLPHYN
 GALMLPHYNSR
 VFDGVLPRG
 LQSQND
 LQSQNDQRGEI
 55 QSQNDQRGEIIHVK
 RGEIIHVK [SEQ ID 740]
 RLQSQNDQ
 RLQSQNDQRG
 RLQSQNDQRGEIIH
 60 MPMP
 PMPL
 LEPDNR
 GIARLAGTSSVIN

RSQNIF
 PNSM
 GHPM [SEQ ID 750]
 HPMS
 5 FLPQHTD
 EWQINEK
 GPQQYAEWQINEK
 PQQYAEWQ
 RGPQQYA
 10 HNPR
 WHN
 WDP
 HPSF [SEQ ID 760]
 PGQLQSFLLSGNQNNQNYLSGF
 15 QLQSFLLSGNQNNQNYLSGFSK
 QSFLLSGNQNNQ
 PGQLQSFLLSGN
 QSFLLSGNQ
 QNNQNYLSGFSK
 20 YLRGFS
 PVEMPTLLYP
 RGPQQYAEWQINE
 GYVGLTFPGCPATHQQQFQLFEQR[SEQ ID 770]
 KNPQLQDLDFVNYVEIK
 25 PGQLQSFLLSGNQNNQNYLSGFSK
 RGPQQYAEWQINEK
 VLDLAIPVNRPGQL
 RGPQQYAEWQINEK [SEQ ID 775]
 30
 PROTEIN P02855 [SEQ ID 546-552]
 PEPTIDE : SRAIVIVTVNE
 PEPTIDE : AKLTPGDV
 PEPTIDE : IVIVTVNEGK
 35 PEPTIDE : LDALEPDNRIESEGGL (also in P02857)
 PEPTIDE : RPYYSNAPQE (also in P02857)
 PEPTIDE : LDALEPDNRIESEGLIETWNPNNK (also in P02857)
 PEPTIDE : AIVIVTVNEGK (also in P13918)
 40 PROTEIN P02857 [SEQ ID 553-565]
 PEPTIDE : LQVVNCNGNTVFDGEL
 PEPTIDE : QVVNCNGNTVFDGEL
 PEPTIDE : IIAVPTGIVF
 PEPTIDE : GRRYRDRHQKVNRFRE
 45 PEPTIDE : RPYYSNAPQE
 PEPTIDE : RLDALPDNRIE
 PEPTIDE : RLDALPDNRIESE
 PEPTIDE : LDALEPDNRIESEGLIETW
 PEPTIDE : LDALEPDNRIE
 50 PEPTIDE : LDALEPDNRIESEGLIE
 PEPTIDE : LDALEPDNRIESEGGL (also in P02855)
 PEPTIDE : RPYYSNAPQE (also in P02857)
 PEPTIDE : LDALEPDNRIESEGLIETWNPNNK (also in P02855)
 55 PROTEIN P07728 [SEQ ID 566-609]
 PEPTIDE : VEHGLSLLQPYASLQEQEQGQVQSRER
 PEPTIDE : RSQNIFSGF
 PEPTIDE : GITGPTFPGCPEY
 PEPTIDE : CNGS
 60 PEPTIDE : SPREC
 PEPTIDE : PREC
 PEPTIDE : PRECR
 PEPTIDE : CPES

	PEPTIDE : SGCS
	PEPTIDE : CSNG
	PEPTIDE : RSQNIFSGFSTE
5	PEPTIDE : VEEWSQNIFSGFST
	PEPTIDE : WSQNIFSGFSTEL
	PEPTIDE : WSQNIFSGFSTE
	PEPTIDE : STSQWQSSRR
	PEPTIDE : NRPI
10	PEPTIDE : CDGS
	PEPTIDE : PRGC
	PEPTIDE : PRGCR
	PEPTIDE : RGCR
	PEPTIDE : GCRF
15	PEPTIDE : PTFP
	PEPTIDE : PGCPE
	PEPTIDE : GCPE
	PEPTIDE : CPET
	PEPTIDE : AHCW
20	PEPTIDE : HWCY
	PEPTIDE : SGCP
	PEPTIDE : SGCPN
	PEPTIDE : GCPN
	PEPTIDE : CPNG
25	PEPTIDE : TFCTM
	PEPTIDE : FCTM
	PEPTIDE : FCTMR
	PEPTIDE : CTMR
	PEPTIDE : EGCA
30	PEPTIDE : SQNIFSGFSTELL
	PEPTIDE : SQNIFSGFSTE
	PEPTIDE : QNDQRGEIVR
	PEPTIDE : SQNIFSGFSTEL (also in P07730)
	PEPTIDE : QLQCQNDQRGEI (also in P07730)
	PEPTIDE : LGQSTSQWQSSR (also in P07730)
35	PEPTIDE : QQLLGQSTSQWQSSR (also in P07730)
	PEPTIDE : LLGQSTSQWQSSR (also in P07730)
	PROTEIN P07730 [SEQ ID 610-619]
40	PEPTIDE : NDQRGEIVR
	PEPTIDE : GQSTSQWQSSR
	PEPTIDE : STSQWQSSR
	PEPTIDE : GITGPTFPGPCPET
	PEPTIDE : GITGPTFPGPCPETY
45	PEPTIDE : SQNIFSGFSTEL (also in P07728)
	PEPTIDE : QLQCQNDQRGEI (also in P07728)
	PEPTIDE : LGQSTSQWQSSR (also in P07728)
	PEPTIDE : QQLLGQSTSQWQSSR (also in P07728)
	PEPTIDE : LLGQSTSQWQSSR (also in P07728)
50	PROTEIN P09918 [620-630]
	PEPTIDE : IFFANQTYL
	PEPTIDE : EHLEPNLEGLTVEE
	PEPTIDE : IFFANQTYLPSETPAPLVHYREEELNNLRGDTGER
	PEPTIDE : IHFEWDDDMGIPGAFYIK
55	PEPTIDE : IFFANQTYLPSETPAPLVHYREEELNNLR
	PEPTIDE : TEQALPADLIK
	PEPTIDE : EHLEPNLEGLTVEEAIQNK
	PEPTIDE : ISKEHLEPNLEGLTVEEAIQNK
60	PEPTIDE : LSLPHQGDHGAHSVY
	PEPTIDE : ISKEHLEPNLEGLTVEEAIQNK
	PEPTIDE : EHLEPNLEGLTVEEAIQNK
	PROTEIN POC1U8 [SEQ ID 631]

PEPTIDE : LSTTGNSGSPVFNEKNE

PROTEIN P13918 [SEQ ID 632-639]

5 PEPTIDE : QSFLSGNQNNQNYLSG
 PEPTIDE : VLDLAIPVNRPGQLQS
 PEPTIDE : VLDLAIPVNRPGQLQSFL
 PEPTIDE : FLLSGNQNNQNYLSG
 PEPTIDE : FLLSGNQNNQNYLSGFSK
 PEPTIDE : DPQNPFIKSNKFQTLFE
 10 PEPTIDE : ELAFPGSAQEVDRILENQK
 PEPTIDE : AIVIVTVNEGK (also in P02855)

PROTEIN P14323 [SEQ ID 640-667]

15 PEPTIDE : INAVAAKRLQSQNDQRGE
 PEPTIDE : NRAQQQVYGSSIE
 PEPTIDE : PSTNPWHSPR
 PEPTIDE : CHGS
 PEPTIDE : CHGSM
 PEPTIDE : PWHS
 20 PEPTIDE : FREC
 PEPTIDE : RECR
 PEPTIDE : ECRF
 PEPTIDE : CRFD
 PEPTIDE : CRFDR
 25 PEPTIDE : CTGT
 PEPTIDE : FPGC
 PEPTIDE : FPGCP
 PEPTIDE : PGCP
 PEPTIDE : PGCPA
 30 PEPTIDE : PGCPAT
 PEPTIDE : GCPA
 PEPTIDE : CPAT
 PEPTIDE : ENFC
 PEPTIDE : NFCT
 35 PEPTIDE : NFCTI
 PEPTIDE : FCTI
 PEPTIDE : AQQQQVYGSSIEQH
 PEPTIDE : AQQQQVYGSSIEQHSGQNIFSGF
 PEPTIDE : AAKRLQSQNDQRGE
 40 PEPTIDE : QARSLKNNRGEE (also in P14614)
 PEPTIDE : FNPSTNPWHSPRQGS (also in Q0DEV5)

PROTEIN P14614 [SEQ ID 668]

45 PEPTIDE : QARSLKNNRGEE (also in P14323)

PROTEIN Q0D7S0 [SEQ ID 669]

PEPTIDE : AAASLPFCNVDPNGGGGVICYWLAR

PROTEIN Q0DEV5 [SEQ ID 670-680]

50 PEPTIDE : VAGSAPGIEGDEIAPLAK
 PEPTIDE : LGVAGSAPGIEGDEIAPLAKEN
 PEPTIDE : GSAPGIEGDEIAPLAK
 PEPTIDE : VAGSAPGIEGDEIAP
 PEPTIDE : GVAGSAPGIEGDEIAPLAK
 55 PEPTIDE : GVAGSAPGIEGDEIAPLAKEN
 PEPTIDE : VAGSAPGIEGDEIAPLAKEN
 PEPTIDE : SAPGIEGDEIAPLAK
 PEPTIDE : GSAPGIEGDEIAPLAK
 PEPTIDE : SAPGIEGDEIAPLAKEN
 60 PEPTIDE : FNPSTNPWHSPRQGS (also in P14323)

PROTEIN Q9M3X6 [SEQ ID 681-699]

PEPTIDE : VDLVIPVNGPGK

76

Pea protein : Q41000

5 MFRRATSTFLSRASATRRFSTDVATPATNSSFVEAWRKVSPNIDPPKTPLEFLKTRPPVP
STIPTKLTVNFVLPYSSQLAAKEVDSVIIPATTGEMGVLPGHVATIAELKPGVLTVQEGT
DTTKYFVSSGFRFIHANSVADIHAVEAVPVNQLDRDLVQKGLQEFTQKLNSATTDLEKRE
AQIGIDVDSALNSALTG [SEQ ID 709]

10 Rice Protein : P20698

MKIIFFFALLAIAACSASAFDAVTQVYRQYQLQPHMLQQQMLSPCGEFVRQQCSTVAT
PFFQSPVFLRNCQVMQQQCCQLRMIAQQSHCQAISSVQAIVQQLRLQQFASVYFDQSQ
AQAQAMLALNMPICGIYPSYNTAPCSIPTVGGIWI [SEQ ID 710]

15 Pea Protein : O04434

MQDSSTMKFSPLDLMTAIIKGFNPSNDSSQAPASIIFENREFVMILTTSIAVLIGCVVV
LIWRRSNSNKSQIEVPKLVIKLPELDVDDGKKKVTVFFGTQTGTAEGFKAIAEEAKA
20 RYEKAKFRVVDMDYYAADDDEYLEKLRKRETMALFFLATYGDGEPTDNAARFYKWFTEEYE
GEEDSFKNLSYGVFGLGNRQYEHFNKVAKVVDKLLLEQGGKRLVPVGLGDDDDQCIEDDFT
AWKEELWPALDQLLRDEDDTPVATPYTAAVSEYRVVIHDPDATVDEKRRHNVNGHAVVD
AQHPVRANVAVRRELHTPASDRSCTHLEFDISGTGVVYETGDHVGVCENLSDTVEEAER
ILGLSPDTYLSIHTDDEEGKPLGGSSLPFPFPCTLRALT KYADLLSSPKKSALVALAA
HASDPSEADRLRLASPAKGDEYAEWVISSQSRSLLEVMAEFSSAKPPIGVFFAAVAPRLQ
25 PRYISISSPRMAPSRIHVTCALVHDKMPTGRIHKGVCSTWMKNSVPLEKNQDCSWAPIF
VRQSNFRLPADNKVPVIMIGPGTGLAPFRGFLQERLALKEDGAELGPSVLFFGCRNRQVD
YIYEDELNHFVNGGALSELIVAFSRDGPTKEYVQHKKMMEKASDIWNMISQGAYVYVCGDA
KGMARDVHRTLHTILQEQQSLDSSKTESMVKNLQMTGRYL RDVW [SEQ ID 711]

30 Rice Protein : Q5N725 MSAYCGKYKDELIKNAAYIGTPGKGILAADESTGTIGKRFASINVENVEENRRSLRELF
TTPGALQHLSGVILFEETLYQKTKDGKPFVDVLKEGGVLPGIKVDKGTVEVAGTNKETTT
QGHDDLKGRCAKYIEAGARFAKWRVAVLKIGPNEPSQLSIDLNAQGLARYAIIQCENGLVP
IVEPEILVDGSHDIERCAYVTEKVLAAACYKALNEHHVLLEGSLKPNMVTGSESKKVSP
35 QLIAEYTVRALQRTVPAAPVAVFLSGGQSEEEATVNLNAMNKLSTKKPWALSFSFGRAL
QQSTLKAWGGKTENVVKAQKAFITRCKANSEATLGTYQGDAVLGEGASESLHV KDYKY
[SEQ ID 712]

40 Pea Protein: B5A8N6

MASLQTMISFYAIFLSILLTILFFKVNSTETTSFLITKFSPDQQLIFQGDGYTTKEK
LTLTKAVKNTVGRALYSPIHIWDRETGNVANFVTSFTFVINAPNSYNVADGFTFFIAPV
DTKPQTGGGYLGVFNSEA YDKTTQTVAVEFDTFYNAAWDPNSNRDRHIGIDVNSIKSVNTK
SWKLQNGEEANVVIAFNAATNVLTSLTYPNSLEEENVTSYTLSDVVSLKDVVPEWVRIG
45 FSATTGAEYAAHEVLSWSFHSLSGTSSSKQAADA [SEQ ID 713]

Rice Protein: Q6K508

MATTTSLSSCLCALLPLFSQGVDAWESRQGASRQCRFDRLQAFEPLRKVRSEAGDTE
50 YFDERNEQFRCAQFVIRRVIEPQGLVVPYRNTPALAYIIQKGYYVGLTFPGCPATHQQ
QFQLFEQRQSDQAHKFRDEHQIHEFRQGDVVALPASVAHWFYNGGDTPAVVVYVYDIKS
FANQLEPRQKEFLLAGNNQRGQQIFEHSIFQHSGQNIFSGFNTEVLSEALGINTEASKRL
QSQNDQRGDIIRVKHGLQLLKPTLTQRQEEHRQYQQVQYREGQYNGLDENFCTIKARVNI
ENPSRADYYNPRAGRITLLNNQKFPIILNIGMGAARVNLYQNALLSPFWNINAHSVVYII
55 QGSVRVQVANNQGRSVFNGVLHQGQLLIIPQNHAVIKKAEHNGCQYVAIKTISDPTVSWV
AGKNSILRALPVDVIANAYRISRDEARRLKNNRADEIGPFTPRFPQKSQRGYQLTEGLS
LIGM [SEQ ID 714]

PEA PROTEIN : Q712V4
 QKAPRKQLATKAARKSAPATGGVKKPHRFRPGTVLREIRKYQKSTELLIRKLPFQRLVR
 EIAQDFKTDLRFQSSAVSALQEAAYLVGLFEDTNLCAIHAKRVTIMPKDIQLARRIRG
 ERA [SEQ ID 715]

5

Pea Protein: P09886
 MAQSVSLSTIASPILSQKPGSSVKSTPPCMASFPLRRQLPRLGLRNVRAQAGGDNDKDN
 SVEVHRVKNDDQGTAVERKPRSSIDISPFGLDPWSPMRSMRQMLDMDRIFEDAITIP
 GRNIGGGEIRVPWEIKDEEHEIRMRFDMPGVSKEDVKVSVEDDVLVIKSDHREENGEDC
 WSRKSYSCYDTRLKLPDNCEKEKVKAEKDGVLVITIPKTIERTVIDVQIQ [SEQ ID 716]

10

Examples of homologs for each protein

15

P13918 (Pea)

>gi|137584|sp|P08438.1|VCL_VICFA RecName: Full=Vicilin; Flags: Precursor [Vicia faba] >gi|22057|emb|CAA68559.1|
 vicilin [Vicia faba var. minor] >gi|383931031|gb|AFH56916.1| vicilin [**Vicia faba**]

20

MAATTLKDSFLLTLLGIAFLASVCLSSRSDQDNPFVFESNRFTLFENENGHIRLLQKFDQHSKLLNLQNYRLLEYKSKPHTIFLPQQTADDFIL
 VVLSGKAILTVLLPNDRNSFSLERGDITIKLPAGTIGYLVNRDDEEDLRVLDLIPVNRPGEPQSFLLSGNQNPQSILSGFSKNILEASFNTDYKEIEK
 VLLEEHGKEKYHRRGLKDRRQRQGEENVIVKISRKQIEELNKNKSSSKSTSSSEPFNLRSREPIYSNKFGEFFETPKRNPQLQDLNIFVNYVEI
 NEGSLLLPHYNSRAIVIVTVNEGKGDFELVGQRNENQQGLREEYDEEKEQGEIEIRKQVQNYKAKLSPGDVLVIPAGYPVAIKASSNLNLVGFGI
 NAENNQRYFLAGEEDNVISQIHKPVKELAFPGSAQEVDLTLENQKQSHFANAQPRERERGSQEIKDHLYSILGSF [SEQ ID 506]

25

>gi|502105533|ref|XP_004492829.1| PREDICTED: vicilin-like isoform X1 [**Cicer arietinum**] **ChickPea**

30

MAIKARFPLLVLGIVFLASVCAKSDKENPFFKSNNCQTLFENENGHVRLLRFDKRSQLFENLQNYRLMEYNSKPHTLFLPQHNDADFILVVL
 RGRAILTVLPNDRNTFKLERGDITIKLPAGTIAYLANRDDNEDLRVLDLIPVNRPGQFQSFLSGNENQQSYFQGFSGSKILEASFNSDYEEIERV
 LLEEQEQKPEQRGRHKGRRQSQSETDVIVKISREQIEELSKNAKSNCKSVSSESEPFNLRSRSPISNRFNGNFFETPEKNPQLKDLDFVNSVEIK
 EGSLLLPHFNRSRATVILVVNEGKGEVELVGLRNENEQENKKEDEEEEDRNVQVQRFSKLSSGDVVVIPASHPFSINASSDLFLLGFGINAQN
 NQRNFLAGEDNVISQIQRPVKEVAFPGSAEEVDRLLNQKQSHFANAQPPQKRGKSQRIRSPF [SEQ ID 507]

35

>gi|29539109|emb|CAD87730.1| allergen Len c 1.0101 [**Lens culinaris**] **Lentil**

SRSDQENPFIFKSNRFQTIYENENGHIRLLQRFDKRSKIFENLQNYRLLEYKSKPHTIFLPQFTDADDFILVVLGKAILTVLNSNDRNSFNLERGDTI
 KLPAGTIAYLANRDDNEDLRVLDLIPVNRPGQLQSFLSGTQNPQSFLSGFSKNILEAAFNTYEEIEKVLLEEQEQKSQHRRSLDRKQEITNE
 DVIVKVSREQIEELSKNAKSSSKSVSSESEPFNLRSRNPISNKFGEFFETPEKNPQLQDLDFVNSVEIEGSLLLPNYNSRAIVIVTVNEGKGDF
 ELVGQRNENQQEQREENDEEEGQEEETTKVQRYRRLSPGDVLVIPAGHPVAINASSDLNLIGFGINAKNNQRNFLAGEDNVISQIQRPV
 KELAFPGSSREVDRLTNQKQSHFANAQPLQIE [SEQ ID 508]

40

Q9M3X6 (Pea)

>gi|164512526|emb|CAP06312.1| cvc [Pisum abyssinicum]

45

MATTVESRFPPLLFPGLIFLASVCVTYANYDEGSETRVPGQRRERGRQEGEKEEKHGEWRPSYEKEEDEEEKQKYRYQREKEDEEEKQKYRYQR
 EKKEEKEVQPGRRERWEREEDEEQVDEEWGRSQRRQDPEERARLRHREERTKDRRRHKREGEEERSSESQEQRNPFKSNKFLTLFENENG
 HIRRLQRFDKRSDLFENLQNYRLVEYRAKPHITFLPQHIDADLILVVLNGKAILTVLSPNDRNSYNLERGDTIKIPAGTTSYLVNQDDEEDLRVVD
 FVIPVNRPGKFEAFGLSENKNQYLRGFSKNILEASLNTKYETIEKVLLEEQEKPPQQLRDRKRRQGGGERDAIIVKVSREQIEELRKLAKSSSKSLPS
 EFEPFNLRSKPEYSNKFGLFEITPEKKYPQLQDLILVSCVEINKGALMLPHYNSRAIVVLLVNEGKGNLELLGLKNEQQEREDRKERNNEVQ
 RYEARLSPGDVVIIIPAGHPVAISASSNLNLLGFGTNAENNQRNFLSGSDDN [SEQ ID 509]

>gi|164512538|emb|CAP06318.1| cvc [Lathyrus annuus]

MATTIKSRFPLLLLLGIIFLASVCVTWANYDEGSEPRVPGQRERGRQEGEKEEKHRHGEWRPSYEEYDEGLEPKVPGKRERGRQEGEKEEKRHE
 EWRPSYEKEEDEEEKQKYNQYQREKKEHKEVQPGRRERWERKQDEKQVEEDEEPGEEQWRGSKRHEDPEERARLRHREEKTKSYVEDNEETSS
 KEGRNPFLLKSNKFLTLFENENGHIRRLQRFDERSDIFENLQNYRLVEYRAKPHTMFLPQHIDADLILVVLNGKAILTVLSPNDRNSYNLERGDT
 VKLPAGTTSYLVNQDDEEDLRVVDLAIPVNRPGKFEAFGLSANKNQYLRGFSKNILEASLNTKYETIEKVLLEERRDQKGRQQGQETNAIVKVS
 5 EQIEELRLKAKSSSKSLSESEPLNLSQNPYSNKFGEFFETPQKKYPQLQDLVDSISCVIEINKGALLPHYNSRSIGILLVNEGKGNLELVGFKN
 EQQRQRENEETNKKLQRYEARLSSGDVVVIPEGHPVAISSNLNLLGFGINAANNQRNFLTGSDDN[SEQ ID 510]

>gi|164512558|emb|CAP06328.1| cvc [Vicia villosa]

MATTIKSRFPVLLLLGIIFLTSVCVTYANYDEGREPSVPGQRERGRQEGEKEEKHRHGEWRPSEDEEEKYKYEGRVPGQRERGRQEGEKEEK
 10 HGKWRPSEDEEEKYRYEEGSEPRGPGQRETGRQEGEKEKQPEREPSYEKEEDEEEKQYQYHREKKEQREVPRGRERFERHEDEEQWRG
 IQRHEDPEERARERYRAEIAKRQVEEEREERDIPHEREQRNPFLLKSNKFQTLFQNGYIRRLQRFDKRSDLFENLQNYRLVEYRAKPHTIFLPQ
 HIDADLIIVLSGRAILTVLSPDDNSYNLERGDTIKLPAGTTSYLVNQDDEEDLRVVDLAIPVNRPGKVESFLLSGNKNQYLRGFSKNILEASNT
 NYETIERVLLLEEQDKESQQSIGQKRRSQRQETNALVKVSREQLEDLRLAKSSSQEGLSSQFEPINLSQNPYSNKFGEFFETPQKKYPQLQDL
 15 DLFVSSVDIKEGALMLPHYNSRAIVLLVNEGRGNLELVGLKNEQQEQREKEDEQQRNNQVQRYEARLSPGDVVIIIPAGHPVAVRASSDLNL
 LAFGINAENNQRNFLAGSDDN[SEQ ID 511]

P09918 (Pea)

>gi|357454557|ref|XP_003597559.1| Seed lipoxygenase-3 [Medicago truncatula] >gi|355486607|gb|AES67810.1| seed
 linoleate 9S-lipoxygenase [Medicago truncatula]

MFSGVTGILNRGHKIKGTVVLNRKNVDINSLSVGGVIGQGFDILGSTLDNLTAFLGRSVSLQLISATKPDANGKGLGKATFLEGIITSLPTLG
 AGQSFAKIHFEWDDMGIPGAFYIKNFMQTEFFLVSLTLEDIPNHGSIYFVCNSWIYNAKHHKLDRIFFANKAYLPSETAPLVHYREEELNLR
 GDGTGERKEWERIYDYVNDLGNPEKGDHARPVLGGSDTYPYPRRGRTGRKPNPKDPKSESRSDFVYLPRDEAFGLHKSDFLTLYGLKAVS
 QNVVPALESVIFDLNFTPNFDSFDEVHGLYEGGIKLPDVLKISPLVLKEIFRTDGEQFLKYPKPKVQVRSWMTDEEFAREMLAGVNP
 VICCLQEPFRSKLDSQVYGDHTSKITKEHLEPNLEGLTVDEAIQNKLFLLDHDHSIMPYLRINSTPTKAYATRTILFLSSDKTLKPLAIELSLPH
 25 DGDEHGAVSHVYQPALEGVESTIWLLAKAYVVVNDSCYHQLVSHWLNTHAVVEPFVIATNRHLSYLHPIYKLLPHYRDTMNNISLARQSLVN
 DGGIIEKTLWGRYSMEMSSKYKNWTLPGQALPADLIKRGMAIEPSSPCGVKLVVEDYPYAHDGLEIWAAIKTWVQDYVSLYTTDDILRQ
 DSELQAWWKELVEVGHGDKKNEPWPKMQAREELVEVCTTVIWIASALHAAVNFGQYSYGGILNRPRLSRRFMPEKGSAYEYELVKSQ
 KAYLKTITPKFQTLIDLSVIEILSRHASDEVYLGERDNPWNWTSOTRALEAFKFGNKLAEIEKNLAQRNDEKLRHRLGPVQMPYTLHPSSSEGL
 TFRGIPNSISI[SEQ ID 512]

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>gi|734403888|gb|KHN32710.1| Seed linoleate 9S-lipoxygenase-3 [Glycine soja]

MLGGLLRHGHKIKGTVVLNRKNVDVNSVTSVGGIIGQGLDLVGSTLDLTAFGRSVSLQLISATKADANGKGLGKATFLEGIITSLPTLGAG
 QSAKINFWDGSGIPGAFYIKNFMQTEFFLVSLTLEDIPNHGSIHFCNSWIYNAKLFKSDRIFFANQTYLPSETAPLVKYREEELHNLRGD
 TGERKEWERIYDYVNDLGDGPKGENHARPVLGGNDTFYPRRGRTGRKPTRKDPNSESRSNDVYLPRDEAFGLHKSDFLTLYGLKSQV
 35 VLPLLQSAFDLNFPTREFDSFDEVHGLYSGGIKLPDVLKISPLVLKEIFRTDGEQALKFPPKVIQVKSASWMTDEEFAREMLAGVNP
 KDFPPRSKLDSDQVYGDHTSQITKEHLEPNLEGLTVDEAIQNKRLFLLDHDHDPIMPYLRINATSTKAYATRTILFLKNDGTLRPLAIELSLPHQGD
 QSGAFSQVFLPADEGVESIWLLAKAYVVVNDSCYHQLVSHWLNTHAVVEPFIIATNRHLSVHPHYKLLHPHYRDTMNINGLARLSLVNDGG
 VIEQTLWGRYSVEMSAVVYKDWVFTDQALPADLIKRGMAIEDPSCPHGIRLVIEDYPYAVDGLIEWDAIKTWVHEYVFLYKSDDTLREDPEL
 QACWKELVEVGHGDKKNEPWPKMQTREELVESCAIIWTSALHAAVNFGQYPYGGILNRPRLSRRFMPEKGSAYEYELRKNPQKAYLKT
 40 ITPKFQTLIDLSVIEILSRHASDEVYLGERDNPWNWTSOTRALEAFKRFGNKLAQIENKLSERNNDEKLRNRCGPVQMPYTLPLPSSKEGLTFRGIP
 NSISI[SEQ ID 513]

>gi|593700103|ref|XP_007150490.1| hypothetical protein PHAVU_005G157000g [Phaseolus vulgaris]

>gi|561023754|gb|ESW22484.1| hypothetical protein PHAVU_005G157000g [Phaseolus vulgaris]

MFSGVSLINRGHLKGTVVLNRKNVDVNSVTSVGGIVGQGLDILGSTVDNLTAFLGRSVSLQLISATKPDANGKGLGKATFLEGIITSLPTL
 GAGQSFAKIHFEWDDMGIPGAFYIKNFMQTEFFLVSLTLEDIPNHGSLHFCNSWIYNAKHFKNDRIFVNIQYLPSETAPLVKYREEELVN
 MRGDGTGERKEWDRIYDYVNDLGDGPKGENNARPILGGSDTLPYPRRGRTGRPRTRKDPKSESRSDDIYLPRDEAFGLHKSDFLTLYGLKS
 VSQNFLPALQSAFDLNFPTNEFDSFEVHGLYSGGIKLPDVLKISPLVLKEIFRTDGEQTLKFPKPKVVQDSKASWMTDEEFAREMICGVNP
 45 NLIRLLQDFPPQSKLDSQVYGDHTSQITKENLEPNLEGLTVDEAIQSKRLFLLDHDHSIMPYLRINATSSKAYATRTILFLKKDRTLKPLAIELSLP

HPGGDKSGVVSQVFLPADEGVESVWLLAKSYVIVNDSSYHQLVSHWLNTHAVVEPFVIATNRHLSVVHPIYKLLHPHYRDTMNINALARGD
LVNHGGIIEKTFVWGRYSMEMSAVIYKDWVFTDQALPADLIKRIATEDPECPHGLRLFIEDYPYAVDGLIWDIAIKTWVHEYVFLYYKSDDTL
KEDPELQAWWKELVEVGHGDKKNEPWWPKMQTREELVEACSIWWTASALHAAVNFGQYPYGGILNRPRLSRFRMPPEEGSAEYEEELKKSP
QKALLKTITPKFQTLVDLSVIEILSRHASDEVYLGERNPNWTSOTRALEAFKRFKKLSEIEKKLSQRNNDEKLRNRYGPVMMPTLLFPSSDE
GLTFRGIPNSISI[SEQ ID 514]

P02857 (Pea)

>gi|483449|emb|CAA83677.1| legumin A [Vicia sativa]

MAKLLALSLSFCFLLFSSCFALREQSQQNECQLERINALEPDNRIESEGGLIETWNPNNRQFRCARVALSRATLQRNALRRPYSNAPQEIIYQQ
GNGYFGMVFPGPCPETHEEPQQSEQEGRRYRDSHQKVNRFREGDIIAVPTGIAFWMYNDQDTPVIAISLTDGSSNNQLDQMPRRFYLAG
NQEQEFLRYQHQQGKGQEQDNDGNIFSGFKRDFLEDALNVNRHIVDRLQGRNEDEEKGAIVKVKGGLSIIPPERQARHERGSRQEEDED
EKEERQPSHHKSRDEDEDDKSRHSQKQSRQGDNGLEETVCTAKLRANIGSSPSPIYNPQAGRIKTVTSLDLPVLRWLKLSAEHGSLSHK
NAMFVPHYNLNANSVIYALKGRARLQVNCNGNTVFDGELEAGRALTPQNYAVAAKSLSERFTYVAFKTDADRASIARLAGTSSVIDDLPLDV
VAATFNMQRNEARQLKSNNPFKFLVPPRQSEMRASA[SEQ ID 515]

>gi|600108|emb|CAA86824.1| legumin A precursor [Vicia narbonensis]

MAKLLALSLSLCFLFNSFALREQSQQNECQLERLDALEPDNRIESEGGLIETWNPNNRQFRCAGVALSRVTLQRNALRRPYSNAPQEIIYQQ
GNGYFGVVFPGCPETFEPEQSEQRERRRYRDSHQKVNRFREGDIIAVPTGVVFWMFNDQDTPVIAISLTDGSSNNQLDQIPRRFYLAGN
EQEFLRYQREQGGKQEQENDGNIFSGFKRDFLEDALNVNRHIVDRLQGRNEDEEKGAIVKVKGGLSIITPPERQGRSRQEEDEDEKEERQPS
RRRDESQKGESRRHGDNGLEETVCTAKLRVNISSPSPIYNPQAGRINTVTSLDLPVLRWLKLSAEHGSRLKRNALIVPHYNRNANSVIYALKG
RARLQVNCNGNTVFDGELEAGRALTPQNYAVAAKSLSERFTYVAFKTDNRDGIARLAGTSSVINDLPLDVVAATFNLRNEARQLKSNNP
FKLLVPPRESEKRASA[SEQ ID 516]

>gi|502110016|ref|XP_004493779.1| PREDICTED: legumin-like [Cicer arietinum]

MAKLLALSLSFCFLFGSCFALRDQPEQNECQLEHLNALEPDNRIKSEGGLIETWNPNSNKQFRCAGVALSRATLQPNLSRRPFYTNAPEIFIQQ
GNGYFGMVFPVCVETFEPRESEQEGSKFRDSHQKVNRFREGDIIAVPTGVVFWMFNDQDTPVIAVSLIDTSSFQNLQDQMPRRFYLAGN
HEXXXXXXXXXQEGSEEEENEGGNIFSGFKRDFLEDALNVNRHIVNKLQGRNEDEEKGAIVKVKGGLSIITPEKEPRQKGRSRQEEDEDEDEK
RQPHRHSRQDEDEDEKQPRRHSRGGSKSRDNGFEETICTARLHQNIGSSPSPIYNPQAGRIKTVTSFDLPALRFLKLSAEFGSLHKNAMFV
PHYNLNANSILYALKGRARLQVNCNGNSVFDGELEAGRALIVPQNFIAAKSLSDRFSYVAFKTDNRAAIGRLLGASSLINGMPEEVVAAAFN
MERNEARQLKFNSPFSFLVPPRSDSDNKA[SEQ ID 517]

P02855 (Pea)

>gi|164512536|emb|CAP06317.1| cvc [Lathyrus hirsutus]

MAIIKSRFPLLLLGIIFLASVCATWANYDEGSEPRVPGQRRERGRQEGEKAESHEKWRPSYEEYDEGSEPRVPGKRERGRQEGEKEEKRHGE
WRPSHEEYDEGSEPRVPTHGERGRQEGEKEEKRHEEWRPSYEKEEDEEKEKYKYQREKKEQKEVQPGREKWERKQDEKHVEEDEDQEEE
QWRGSKRRREDPEERARLRYREERTKSNVEETEERRNPFLFSKNKFLTLFENENGHIRRLQRFDRSDIFENLQNYRLVEYKAKPHTMFLPQHID
ADLIIVVLNGKAILTVLSPNDRNSYNLREGDTIKLPAGTTSYLVNQDDEEDLRVVDLAIPVNRPGKFEAFGLSANKNQYLRGFSKNILEAFLNTKY
ETIEKVLLEEQERRDRKGRQQGQETNAIVKVSREQIEELRLAKSSSKSLLSESEPINLRSQNPKYSNKFGLFEITPEKKYPQLQDLVVISCEI
NEGAPLLPHYNSRAIVLLLVNEGKGNLELVGFKNEQQRQRENEERNKKVQRYEARLSPGDVVVIPAGHPVAISASLNLNLVGFVNAENNR
NFLTGSDDN[SEQ ID 518]

>gi|164512542|emb|CAP06320.1| cvc [Lathyrus cicera]

MATIIKSRFPLLLLGIIFLASVCVTLANYDEGSEPRVPAQRERGRQEGEKEEKRHGEWRPSHEKEYDEGSEPRVPGRRERGRQEGEKEEKRHGE
WRPSYEKEYDEGSEPRVPGRRERGRQEGEKEEKRHGEWRPSYEKEYDEEKKYQYEREKEEQKEVQPGRRERWERKEDEEKEEDQWRGSG
RHEDPEERARLRYRKERTKKYVEEDTEETSSSQGRNPFLFSKNKFLTLFENENGYIRRLQRFDRSDIFENLQNYRLVEYRAKPHTIFLPQHIDA
DLILVILNGKAILTVLSPNDRNSYNLREGDTIKLPAGTTSYLVNEDDEEDLRVVDLIVPVRNPGKFEAFDLNQYLGFGFSKSVLEASLNTKYETIEKVL
LEEQQKQGQETNAIVKVSREQIEELRLAKSSSKSLLSELEPVNLRSHSPKYSNKFGLFEITPEKKYPQLQDLVVISCEINEGALLPHYNSRA

IVVVLVNEGKGNLELLGVQNEDEQKERKERNKEVQRYEARLSPGDVVIIPSGHPVAVSASSNLNLLGFGINAENNQRNFLSGSDDN[SEQ ID 519]

>gi|164512544|emb|CAP06321.1| convicilin [Lathyrus sativus]

- 5 MATIISRFPLLLLLGIIFLASVCVTYANYDEGSEPRVPAQRERGRQEGEKEEKHGEWRPSSEKEYDEGSEPRVPGRERGRQEGEKEEKHGE
WRPSYEKEYDEEEKQKYQYEREKKEQKEVEPGRERWERKEDEEKEEDQWRGSQRHEDPEERARLRYRKERTKKYVEEDTEETSSSQGRNP
FLFKSNKFLTLFENENGYIRRLQRFDERSDLFENLQNYRLVEYRAKPHTIFLPQHIDADLILVILNGKAILTVLSPNDRNSYNLERGDTIKLPAGTTS
YLVNEDDEEDLRVVDLVIPVNRPGKFEAFDLNQYLGGSFSLKASLNTKYETIEKVLLLEEQQKQGOETNAIVKVSREQIEELRLAKSSSKSLLS
ELEPVNLRSHSPKYSNKGKFFEITPEKKYPQLQDLVDVISCVEINEGALLPHYNSRAIVLLVNEGKGNLELLGVQDEDEQKERKRNKEVQRY
10 EARLSPSDVVIIPAGHPVAVSASSNLNLLGFGINAENNERNFLSGSDDN[SEQ ID 520]

D3VNE1 (Pea)

>gi|357507721|ref|XP_003624149.1| Provicilin [Medicago truncatula] >gi|87162569|gb|ABD28364.1| Cupin, RmlC-type
[Medicago truncatula] >gi|355499164|gb|AES80367.1| vicilin 47 kDa protein [Medicago truncatula]

- 15 MAIKAPFQLMLLGIIFLASVCSSRRDRHDQENPFFFNANHFQTLFENENGHIRLLQRFDKRSKIFENLQNYRLLEYHSPHTFLFPQHNDAD
FILAVLSGKAILTVLNPDRNSFNLERGDTIKLPAGSIAYLANRDDNEDLRVLDLAIPVNRPGKFQSFSLSGSQNQSQFFSGFSKNILEAAFNANY
EEIERVLIEEHEQEPQHRRGLRKDRRQSQDSNVIVKVSREQIEELSRHAKSSSRSGSESAPFNLSREPIYSNEFGNFFEITPEKNPQLKDLIDL
VNYAEIREGSLLLPHFNSRATVIVVDEGKGEFELVGQRNENQQEQREDEQEQEERSQQVQRYRARLSPGDVVIIPAGHPTVVSASSDLSLL
GFGINAENNERNFLAGEEDNVISQIERPVKEVAFPGSAQDVESLLKNQRQSYFANAQPQQREREGRSQRQRELISSILGVF[SEQ ID 521]

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>gi|164512560|emb|CAP06329.1| convicilin [Vicia peregrina]

- MATTFKSRLFLLLLGIIFLAFVCVTCANYDEGSEPRVPGQRRERGRQEGEKEEQSRERHPQREPSREKEEDEEEKQKYDEGTEPRVPGQRRERGR
QEGEKEEQRRERHPGQREPSQEEDEREESDRRQEGSSKSEEQRNPFLLFKSNKFLTLFQNGNGHIRLLQRFDKRSDLFENLQNYRLLEYRAKPH
TIFLPQHIDADLILVVLSGRAILTVLSPDDRNSYNLERGDTIKLPAGTTSYPLNQDDEEDLRVVDLAISVNRPGKVESFNLSGNKNQYLRGFSENIL
25 EASFNTKYETIEKVLLLEEQDKESQQPRGRLQRLQETNALVKVSREQVEELKRLARTSSKKGSSEFEPFNLRSHGPKYSNKGKFFEITPEKKYPQ
LQDLDISVSSVEINEGALFLPHYNSRAIVVVLVDEGKGNLELVGFKNEQQEQREKEDEQEERNKQVQRYEAKLSPGDVVIIPAGHPVAVSASSN
LNLGFGINAENNQRNFLTGSDDN[SEQ ID 522]

>gi|164512562|emb|CAP06330.1| convicilin [Vicia lutea]

- 30 MATTIKLRFPLLLLLGVILLASVCVTCANYDEGSEPRVPGRPEGEKEEKHGRGLRPSYEKEEDEGEKQRYHYEKEQKEAQPRREKKEQKEEEKQ
VEESRESQRYEDPGERARERYRAEIIKQVEKEREEDRRHQREGEEEGSSKSRNPFLFKSNFLTLFENENGHIRLLQRFDKRSDLFENLQNY
RLVEYRAKPHTIFLPQHIDADLILVVLSGKAILTVLSPNNRNSYNLKRGTIKLPAGTTSYLLNSDDEEDLRMVDLAISVNRPGKVESFNLSGNKN
QYLRGFSKNILEASFNTKYETIEKVLLLEEQDKESQQSIGQKRISQRQETNALVKVSREQIEEPKRLARSSSRKGSSEFEPINLSRQPKYSNKGK
YEISPEKKYPQLQDLVDVSSVEINEGALLPHYNSRAIVTVLVNEGKGNLELIGFQNEQQGQREKEDEQQHERNKQVQRYDARLSSGDVVIIP
35 AGHPVAVSASSNLDLLGFGINAENSQRNFLTGSDDN[SEQ ID 523]

P07728 (Rice)

>gi|531874314|gb|AGT59174.1| glutelin, partial [Oryza sativa Indica Group]

- 40 CRFDRLQAFEPISVRSQAGTTEFFDVSNEQFQCTGVSAVRRVIEPRGLLLPHYTNASLVYIIQGRGITGPTFPGPCESYQQQFQQSGQAQLT
ESQSQSHKFKDEHQIHRFRQGDVIALPAGVAHWCYNDGEVPVVAIYVTDLNNGANQLDPRQRDFLLAGNKRNPQAYRREVEERSQNIFSG
FSTELLSEALGVSSQVARQLQCQNDQRGEIVRVEHGLSLLQPYASLQEQEQGQVQSRERYQEGQYQQSQYSGSGCSNGLDETFTCMKVRQNI
DNPNRADTYNPRAGRVTNLNTQNFILNLVQMSAVKVNLYQNALLSPFWNINAHSVVYITQGRARVQVNNNGKTVFNGELRRGQLLIIPQ
HYAVVKKAREGCAYIAFKTNPNMSMVSHIAGKSSIFRALPNDVLANAYRISREEAQRLLKHNRGDEFGAFTPIQYKSYQDVYNAEASS[SEQ ID
524]

45

>gi|109894635|gb|ABG47337.1| glutelin precursor [Zizania latifolia]

MNMATINGPTIFFTVCLFLLCHGSLAQLLGQSTSQWQSSHRGSSRQCRFDRLQAFEPVRSVRSQAGTTEFFDASNELFQCAGVSIVRRIIEPRG
 LLLPQYTNGATIMYIIQGRGITGQTFPGCPESYQQFQQSMQAQLTGSQSQSQKFKDEHQINRFRQGDVIALPAGVAHWVCYNDGEVPVVA
 IYVIDINNAANQLDPRQRDFLLAGNMRSPPAYRREVENQSQNIFSGFSAELLSEALGISTGVARQLQCQNDQRGEIVRVEHGLSLLQPYASLQE
 5 QEQQEQPRERYQVTQHQQSQYGGGCSNGLDETFCAMRIWQNIIDNPNLADTYNPRAGRVTNLNSQKFPILNLIQMSAVKVNLYQNALLSP
 FWNINSHSVVYVTQGCARVQVNNNGKTVFNGELRRGQLLIIPQHYVVVKKAREGCAYIAFKTNPNSMVSHIVGKSSIFRALPTDVLANAY
 RISREDAQRLKHNRGDELGAFTPLQYKSYQDVSSVAASS[SEQ ID 525]

>gi|472867|emb|CAA52764.1| 11S globulin [Avena sativa]

10 MATTSFSPMLFYFCIFLLFHGSMAQLFGQSSTPWQSSRQGGLRGCRFDRLQAFELRQVRSQAGITEYFDEQNEQFRCTGVSIVRRVIEPQGL
 VLPQYHNAPALVYILQGRGFTGLTFPGCPATFQQFQPFQDQSQFAQGQRQSQTIKDEHQVRVQRFKQGDVVALPAGIVHWCYNDGDAPIVA
 IYVFDVNNANQLEPRQKEFLLAGNNKREQQSGNNIFSGLSVQLLSEALGISQQAQRIQSQNDQRGEIIRVSQGLQFLKPIVSQQVPGEQQV
 YQPIQTQEGQATQYQVGQSTQYQVGKSTPYQGGQSSQYQAGQSWDQSFNGLEENFCSLEARKNIENPQHADTYNPRAGRITRLNSKNFPIL
 NIVQMSATRVNLYQNAILSPFWNINAHSVIYMIQGHARVQVNNNGQTVFNDILRRGQLLIVPQHFFVLKKAEREGCQYISFKTNPNSMVSH
 15 IAGKSSILRALPIDVLANAYRISRQEARLNKNNRGEEFGAFTPKLTQKGFQSYQDIEEGSSSPVRASE[SEQ ID 526]

P14614 (Rice)

>gi|115445309|ref|NP_001046434.1| Os02g0248800 [Oryza sativa Japonica Group] >gi|37993738|gb|AAR06952.1|
 glutelin type-B [Oryza sativa Japonica Group] >gi|47497729|dbj|BAD19794.1| glutelin type-B [Oryza sativa Japonica
 20 Group] >gi|113535965|dbj|BAF08348.1| Os02g0248800 [Oryza sativa Japonica Group] >gi|215768942|dbj|BAH01171.1|
 unnamed protein product [Oryza sativa Japonica Group] >gi|284431772|gb|ADB84627.1| glutelin [Oryza sativa Japonica
 Group]

MTISVFSRFSIYFCVLLLCNGSMAQLFDPATNQWQTHRQGSFRECRFERLQAFELQNVRSSEAGVTEYFDETNELFQCTGTGTVIRRVIQPQGLL
 IPRYANTPGMVYIIQGRGSMGLTFPGCPATYQQQSQQFLFQGESQSQKFIDEHQKIHQFRQGDIVVLPTGVAHWFYNDGDTVPVALYVYDI
 25 NNSANQLEPRHREFLLAGNNRVQVYGRSIQHSQGNIFNGFSVEPLSEALNINTVTTKRLQSQNDQRGEIIRVKNGLQLLKPTLTQRQE
 QAQYQEVQYSEKPTSSRWNGLEENLCTIKTRLNIENPSRADSYDPRAGRITSLDSQKFPILNIIQMSATRVNLYQNAILTPFWNVNAHSLMYV
 IRGRARVQVVSNGKTVFDGVLRLPEQLLIIPQNYVVLKKAHEGCQYIAINTNANAFVSHLAGVDSVFHALPVDVIANAYCISREEARLNKNNR
 GDEYGFPPRLQQQIYPEFSNESKGETSE[SEQ ID 527]

30 >gi|428674402|gb|AFZ41188.1| glutelin, partial [Oryza sativa Japonica Group]

LLCHGSMAQIFSLGINPWQNPRQGGRECRFDRLQAFELRKRVRHEAGVTEYFDEKNEQFQCTGTLVIRRIEPQGLLPRYSNTPGLVYIIQGT
 GVLGLTFPGCPATYQKQFRHFGLEGGSQRQGGKLRDENQKIHQFRQGDVVALPSGIPHWFYNEGDTVPVALFVFDVNNANQLEPRQKEFL
 LAGNNIEQQVSNPSINKHSGQNIENGFNKLLSEALGVNIEVTRRLQSQNDRRGDIIRVKNGLRLIKPTITQQQEQTQDQYQQIQYHREQRSTS
 KYNGLDENFAIRARLNENPNHADTYNPRAGRITNLNSQKFSILNLVQMSATRVNLYQNAILSPFWNINAHSLVYTIQGRARVQVVSNGHKA
 35 VFNGVLRPGQLLIIPQNYVVMKKALEGFQFIAFKTNPAMVNHIAGKNSVLRAMPVDVIANAYRISRQEARSLKNNRGEEIGAFTPRYQQQ
 KIHQEYSNPNESETQ[SEQ ID 528]

>gi|226510|prf||1515394A seed storage globulin

MATTRFPSLLFYSCIFLLCNGSMAQLFGQSFTPWQSSRQGGLRGCRFDRLQAFELRQVRSQAGITEYFDEQNEQFRCAGVSIVRRVIEPQGLL
 LPQYHNAPGLVYILQGRGFTGLTFPGCPATFQQFQPFQDQARFAQGQSKSNLKDQHQVRVHHIKQGDVVALPAGIVHWCYNDGDAPIVAV
 40 YVFDVNNANQLEPRQKEFLLAGNNKREQQFGQNIIFSGFSVQLLSEALGISQQAQKIQSQNDQRGEIIRVSQGLQFLKPFVSQQGPVEHQA
 YQPIQSQQEQSTQYQVGQSPQYQEGQSTQYQSGQSWDQSFNGLEENFCSLEARQNIENPKRADTYNPRAGRITHLNSKNFPTLNLVQMSA
 TRVNLYQNAILSPYWNINAHSMHMIQGRARVQVNNHNGQTVFNDILRRGQLLIIPQHYVVLKKAEREGCQYISFKTTPNSMVSYIAGKTSIL
 RALPVDVLANAYRISRQESQNLKNNRGEEFGAFTPKFAQTGSQSYQDEGESSSTEKASE[SEQ ID 529]

45

P07730 (Rice)

>gi|225959|prf||1404367A glutelin

MASTNRPIVFFTVCLFLLCDGSLAQQLLGQSTSQWQSSRRGSPRGCRFDRLQAFEPISVRSQAGTTEFFDVSNELFQCTGVSVVRVIEPRGL
 LLPHYTNGASLVYIIQGRGITGPTFGPCPETYQQQFQQSGQAGLTESQSQSHKFKDEHQKIHRFRQGDVIALPAGVAHWYNDCEVPVVAIYV
 TDINNGANQLDPRQRDFLLAGNKRNPQAYRREVEEWSQNIFFSGFSTELLSEAFGISNQVARQLQCQNDQKGEIVRVERGLSLLQPYASLQEQ
 EQGQMQRSEHYQEGGYQQSQYSGSCPNGLDETFCVNKVRQNIDNPNRADTYNPRAGRVTNLSQNFILNLVQMSAVKVNLYQNTDTWIS
 5 MGQEEENALLSPFWNINAHSIVYITQGRAQVQLRRGQLLIVPQHVVVVKKAQREGCAYIAFKTNPNMSMVSHIAGKSSIFRALPTDVLNAYRIS
 REEAQRLKHNRGDEFGAFTPLQYKSYQDVYNVAESS[SEQ ID 530]

>gi|573943558|ref|XP_006654150.1| PREDICTED: glutelin type-A 3-like [Oryza brachyantha]

10 MKSSIVFSTICLVLLCHGSLAQLLSQSTSQWQSSRRGSPRQCRFDQLQAFEPVRTVRSQAGVTEFYDVSNELFQCTGVSVVRVIEPRGLLPHY
 SNGATLVYIIQGRGITGPTFGPCPETYQQQFQQSGEAPFEGQSHKFRDEHQKIHRFRQGDVVALPAGVAHWYNDGEVPIVAIYVTDIYNS
 ANQLDPRHRDFFLAGNNKVAQQLYRSEARENSKNIFGGFVSELLSEALGISRGVARQLQCQNDQKGEIVRVEHGLALLQPYASVQEQQEQV
 QSRDYEQTQYQQKQPQSGSCNGLDETFCMRLQNIDNPNLADTYNPKAGRITYLNGQKFPILNLVQMSAVKVNLYQNAVLSPFWNINAHS
 VVYITQGRARVQVNNNGKTVFDGELRQGQLLIIPQHVVVLKKAQREGCSYIALKTNPNMSIVSHIAGKNSIFRALPGDVVTNAYRISREEAKRIK
 HNRGDESGVFAPSHAYRSYQDMSVAA[SEQ ID 531]

15 >gi|721641733|ref|XP_010231907.1| PREDICTED: 12S seed storage globulin 1-like [Brachypodium distachyon]

20 MAHTSFSSFLSYFCLFLLFHGSMACVLGQVSTWQSSRQGGSRDCSFDRLQAIPTVTVRSQAGLTEYFDEQNEQFRCAGVFVIRRVIEPRGLL
 LPRYHNTPLGLVYLQGNQFVGLTFPGPCPETFREQFQQFRQTQSTLGQSQCQSQKLGDVHQRVHQFTQGDVVALPTGVAHWIYNGGDAPVV
 IVYVFDVNNNANQLEPRQKEFLGNGYNGVLQYQGNIFSGFNAQLLSQAFGINEQTSQRIQNQNDGRGDIIRDVNDGLQFLKPVVTQQQPEQ
 PFMPIQHQTGQSSRNGLEENFCSLEPRQNIEDPNRADTYNPRAGSITRLNGQNFILNLVQMSATRVNLQKNAILSPFWNINAHSVVYVIQ
 HALVQVNNQGHNVFNGLLHRGQLLIIPQNYVVLKKAEGYQYIAFKTNANSMVSHIAGKNSILRALPVDVIANAYRISRQEAQNLKNNRGE
 ETGLTPNFQSQTCSYQTEDVQSLRPMHSE[SEQ ID 532]

Q0D7S0 (Rice)

25 >gi|169244463|gb|ACA50505.1| seed allergenic protein RAG2 [Oryza sativa Japonica Group]

MASNKVVFSALLIIVSVLAATATMADHHKDQVVYSLGERCQPGMGYPMSLPRCRAVVKRQCVGHGAPGGAVDEQLRQDCCRQLAAVD
 DSWCRCSALNHMVGGIYRELGATDVGHMPMAXVFPGCRRGDLERAAASLPFCNVDPNGTGGVCYWLGYPRTPRTGH[SEQ ID 533]

>gi|5777592|emb|CAA44001.1| low molecular weight globulin [Oryza sativa]

30 MASNKVVFSALLIIVSVLRRDGTADHHKDQVVYSLGERCQPGMGYPMSLPRCRAVVKRQCVGHGAPGAVDEQLRQDCCRQLAAVDD
 SWCRCSALNHMVGGIYRELGATDVGHMPMAEVFPGCRRGDLERAAASLPFCNVDPNGTGGVCYWLGYPRTPRTGH[SEQ ID 534]

>gi|115471175|ref|NP_001059186.1| Os07g0214600 [Oryza sativa Japonica Group] >gi|23616954|dbj|BAC20657.1|
 allergen RA16 [Oryza sativa Japonica Group] >gi|113610722|dbj|BAF21100.1| Os07g0214600 [Oryza sativa Japonica
 35 Group] >gi|125557687|gb|EAZ03223.1| hypothetical protein Osl_25372 [Oryza sativa Indica Group]

MASNKVVISALLVVVSVLAATTTMADHHQEQQVYTPGQLCQPGIGYPTYPLRCRAVVKRQCVAPGTVDQVRRGCCRLAAIDSSWCRC
 DALNHMLRIIYRESGAADAGHPMAEVFRGCRRGDIERAAASLPFCNVDPNGVGGVCYWLPGTGY[SEQ ID 535]

Q0DEV5 (Rice)

40 >gi|83375868|gb|ABC17777.1| waxy [Oryza rufipogon]

MSALTTSQLATSATGFGIADRSAPSSLLRHGFGQLKPRSPAGGDATSLSVTTSARATPKQQRSVQRGSRFPVSVVYATGAGMNVVFGAEM
 APWSKTGGLGDVLGGLPPAMAANGHRVMVISPRYDQYKDAWDTSVVAEIKVADRYERVRFFHCYKRGVDRVFDHPSFLEKVGWGTGEKI
 YGPD TGVDYKDNQMRFSLLCAPRILNLLLLNPNYFKGTGVEDVVFVNDWHTGPLASYLKNNYQPNGIYRNAKVAFCIHNIYSYQGRFAFEDYP
 ELNLSEFRSSFDIDGYDTPVEGRKINWMKAGILEADRVLTSPYYAEELISGIARGCELDNIMRLTGITGIVNGMDVSEWDPKDKYITAKYD
 45 ATTAIEAKALNKEALQAEAGLPVDRKIPLIAFIGRLEEQKGPDMVMAAAIPELMQEDVQVLLGTGKKKFEKLLKSMEEKYPGKVRVAVVKFNAPLA

HLIMAGADVLAVPSRFPCGLIQLQGMRYGTPCACASTGGLVDTVIEGKTGFHMGRLSVDCKVVEPSDVKKVAATLKRAIKVVGTPAYEEMV
RNCNMNDLSWKGPKNWENVLLGLGVAGSAPGIEGDEIAPLAKENVAAP[SEQ ID 536]

>gi|297614332|gb|ADI48504.1| glycogen synthetase [Oryza officinalis]

5 MSALTTSQLATSATGFGIADRSAPSSLLRHGFQGLKPRSPAGGDASSLSVTTSARATPKQQRSVQRGSRFPSSVVVYATGAGMNVFVGAEM
APWSKTGGLGDLVGLPPAMAANGHRVMVISPRHDQYKDAWDTSVVAEIKVADRYERVFFHCYKRGVDRVIDHPSFLEKVVWGKTGEKI
YGPDTGVDYKDNQMRFSLLCQAALAPRILNLNPNPYFKGTGVEDVVFVNCNDWHTGPLPSYLNKNYQPNGIYRNAKVAFCIHNIYQGRFAF
EDYPELNLSEFRSSFDIDGYDTPVEGRKINWMKAGILESDRVLTVSPYAEELISGIARGCELDNIMRLTGITGIVNGMDVSEWDPSKDKYIA
10 AKYDATTAEAKALNKEALQAEAGLPVDRKIPLIAFIGRLEEQKGPDMVMAAIPELMQENVQIVLLGTGKKKFEKLLKSMEEKYPGKVRVAVKF
NAPLAHLIMAGADVLAVPSRFPCGLIQLQGMRYGTPCACASTGGLVDTVIEGKTGFHMGRLSVDCKVVEPSDVQKVATTLKRAIKIVGTPAY
NEMVRNCMNDLSWKGPKNWENVLLGLGVAGSAPGVEGEEIAPLAKENVAAP[SEQ ID 537]

>gi|389620054|gb|AFK93486.1| granule-bound starch synthase [Hordeum vulgare subsp. vulgare]

15 MAALATSQLATSGTVLGVTDTRFRPPGFQGLRPRNPADAALGMRTIGASAAKQSRKAHRGSRCLSVVRATGSGMNLVFGAEMAPWS
KTGGLGDLVGLPPAMAANGHRVMVSPRYDQYKDAWDTSVISEIKVADEYERVFFHCYKRGVDRVIDHVPWFLEKVRGKTKEKIYGPDA
GTDYEDNQRFSLCQAALAPRILNLNPNPYFSGPYGEDVVFVNCNDWHTGLLACYLKSNYQSNGIYRTAKVAFCIHNIYQGRFSFDDFAQL
NLPDRFKSSFDFIDGYDKPVEGRKINWMKAGILQADKVLTVSPYAEELISDEARGCELDNIMRLTGITGIVNGMDVSEWDPTKDKFLAVNYDI
TTALEAKALNKEALQAEVGLPVDRKVPVAFIGRLEEQKGPDMVMAAIPILKEEDVQIILLGTGKKKFEKLLKSMEEFPGKVRVAVRFNAPLAH
20 QMMAGADLLAVTSRFPCGLIQLQGMRYGTPCVCASTGGLVDTVIEGKTGFHMGRLSVDENVVPEADVKKVATTLKRAVAVVGTPAYQEM
VKNCMIQDLSWKGPKNWEDVLELGVGESEPGIVGEEIAPLAMENVAAP[SEQ ID 538]

P14323 (Rice)

>gi|573918992|ref|XP_006647120.1| PREDICTED: glutelin type-B 2-like [Oryza brachyantha]

25 MATTVFSRFSTYFCVLLLCHGSMALFNPSTNPWHNPRQGSSRECRFDRLQPFELRKRSEAGVTEYFDEKNELFQCTGTFFVIRRVIPQGLL
VPRYTNPAGLVYIIQGRGSLTFPGCPATYQQQFQQFLPQEQQSQKFRDEHQKIHQFRQGDIVLPAGVAHWFYNDGDAPVAVVYVDV
KNSANQLEPRQREFLLGNNMRAQQVYGSSAEQHSRQNIFFSGFVEILSEALGISTVTTKRLQSQNDQRGEIHHVKNGLQFLKPTLTQQQEQA
QAQYQEVQYSEQQQTSSRWGLDENFCTIKARMNIENSTRADTYNPRAGRITSLNSQKFPILNLVQMSATRVNLYQNAILSTFWNVNAHSL
VYTIQGRARVQVVSNGKTVFDELPGQLLIIPQHYVVLKKAQREGFRYIAIKTNANAFVSQVLGKNSVFRSLPVDVIANVYRISREQARSLKN
NRGEEHGAFAFRSQQSYPGFSNQSESE[SEQ ID 539]

30

>gi|573919041|ref|XP_006647142.1| PREDICTED: glutelin type-B 4-like [Oryza brachyantha]

35 MATTTFSRFSIYFCVLLLCHGSMALFSPTLNPWHSSRRGGSRDCRFDRQLQAFELRRVRSEAGVTEYFDERNEQFQCTGTFFVIRRVIEPQGLL
VPRYTNPAGLVYIIMQGRGSMGLTFPGCPATYQQQFQQFLPEGQSQSQKFRDEHQKIHQFRQGDIVLPAGVAHWFYNEGDPVVALYVFD
INNSANQLEPRQKDFLLAGNNNREQQVYGRSIEKHSQNIFFSGFNHELLSEALGISTLAARKLQGGQNDHRGEIIRVRNGLQLLKPTFTQQQEQA
AQSQYQVQYSEKQESTRCNGLDENFCTINARLNENPSRADTYNPRAGRITHLNNQKFPILNLVQMSATRVNLYQNAILSPYWNVNAHSLV
YMQVGHARVQVVSNGKTVFNSVLRPGQLLIIPQHYVVLKKAEREGCQYIAFKTNANSIVSQLAGKNSILRAMPVDVAVANAYRISREQARDLK
NNRGEELGAFTPKFEQSYPGLSNESESE[SEQ ID 540]

>gi|109894635|gb|ABG47337.1| glutelin precursor [Zizania latifolia]

40 MNMATINGPTIFFTVCLLCHGSLAQLLGQSTSQWQSSHRGSSRQCRFDRQLQAFEPVRSVRSQAGTTEFFDASNELFQCAGVSIVRRIIEPRG
LLLQPYTNGATIMYIIQGRGITGQTFPGCPESYQQQFQQSMQAQLTGSSQSQSQKFRDEHQKINRFRQGDIVLPAGVAHWFYNDGEVPVVA
IYVIDINNAANQLDPRQRDFLLAGNNMRSPQAYRREVENQSQNIFFSGFSAELLSEALGISTGVARQLQCQNDQRGEIVRVEHGLSLLQPYASLQE
QEQQEQPRERYQVTQHQQSYGGGCSNGLDETFCAMRIWQNIIDNPNLADTYNPRAGRVTNLNSQKFPILNLQMSAVKVNLYQNALLSP
FWNINSHSVVYVTVGQCARVQVNNNGKTVFNGELRRGQLLIIPQHYVVVKKAQREGCAYIAFKTNPNMSMVSHIVGKSSIFRALPTDVLANAY
45 RISREDAQLKHNRGDELGAFTPLQKSYQDVSSVAASS[SEQ ID 541]

P29835 (Rice)

>gi|226508602|ref|NP_001152635.1| globulin precursor [Zea mays] >gi|195658363|gb|ACG48649.1| globulin precursor [Zea mays]

5 MAKIAAAAAAAAAALCFAALVAVAVCQGEVERQRLRLDLQCWQEVQESPLDACRQVLDRQLTGGGVGGPFRWGTGLRMRCCQLQDVSRE
CRCAAIRSMVRGYEAMPPELGWWPWGRQQQPPPGGGGGGGGGYYYPCSRAGEGYQTQMYPPCRPGTTGPRIGRVRLTKAREYAAGL
PMMCRLSEPQECISFGGDQY[SEQ ID 542]

>gi|242090997|ref|XP_002441331.1| hypothetical protein SORBIDRAFT_09g024570 [Sorghum bicolor]

>gi|241946616|gb|EES19761.1| hypothetical protein SORBI DRAFT_09g024570 [Sorghum bicolor]

10 MAKIAAVAATAALCLALVAVAVGQGVVERQLKDLQCWQEVQENPLGACRQVLDRQLTGGMRYGIGPFRWGTGLMRCCQQLQDVSR
ECRCIAIRSMVRGYEETMPPLEKGWVGQPPQPGYDYPSCQAGEGYGESGQQQMYPPCRPGTGQKIARVKLTARQYAAGMPMMCR
LSEPQECSVFSGGDQYY[SEQ ID 543]

>gi|514748428|ref|XP_004961615.1| PREDICTED: 19 kDa globulin-like [Setaria italica]

15 MAKFVVAATAALCLAALVAMAAGQSGFERQLRLDRCQREVEENPLWACRQVLDRQLTGGMRYGVGPFRWGTGLRMCCQQLQDVS
RECRCSAVRRMVRYEEMPPLEEGPYGYGGEQGEYYGGEGEGEYLFPFPRRIGRVRLTKARQYAAGLPMCMCRLEPQECVSFSGDQYK[
SEQ ID 544]

POC1U8 (Bacterial) GLUC (Staphylococcus aureus)

20 >gi|446599182|ref|WP_000676528.1| glutamyl endopeptidase [Staphylococcus aureus] >gi|253729369|gb|EES98098.1| trypsin [Staphylococcus aureus subsp. aureus TCH130] >gi|341844549|gb|EGS85761.1| glutamyl endopeptidase [Staphylococcus aureus subsp. aureus 21259] >gi|537390486|gb|AGU61109.1| Glutamyl endopeptidase precursor [Staphylococcus aureus subsp. aureus CN1] >gi|564714561|gb|ETD14665.1| glutamyl endopeptidase [Staphylococcus aureus subsp. aureus KPL1845] >gi|577466329|gb|EUG79766.1| glutamyl endopeptidase [Staphylococcus aureus M0139]

25 >gi|580560623|gb|EVF84961.1| glutamyl endopeptidase [Staphylococcus aureus COAS6020]
>gi|580687002|gb|EVH10169.1| glutamyl endopeptidase [Staphylococcus aureus UCIM6080]
>gi|751815683|gb|KIN24957.1| glutamyl endopeptidase [Staphylococcus aureus MRSA_CVM43477]
>gi|781884797|dbj|BAR08486.1| glutamyl endopeptidase precursor [Staphylococcus aureus subsp. aureus]
>gi|781887762|dbj|BAR11210.1| glutamyl endopeptidase precursor [Staphylococcus aureus subsp. aureus]

30 MKGKFLKVSSLFVATLTATLVSSPAANALSSKAMDNPQQSQSSKQQTPKIQKGGNLKPLEQREHANVILPNNDRHQITDTTNGHYAPVTY
QVEAPTGTFTIASGVVVGKDTLLTNKHVV DATHGDPHALKAFPSAINQDNPNGGFTAEQITKYSGEGDLAIVKFPSPNEQNKHIGEVVVKPATMS
NNAETQVNQNITVTGYPGDKPVATMWESKGKITYLKGEAMQYDLSTTGGNSGSPVFNEKNEVIGIHWGGVPNEFGAVFINENVRNFLKQ
NIEDIHFANDDQPPNPDNPDPNPNPDNPNNPDNPNNPDNPDPNGDNNNSDNPDA[SEQ ID 545]

35

Claims

1. A natural peptide having 7 to 50 amino acids, and comprising a fragment of a protein of SEQUENCE ID NO's: 1 selected from SEQUENCE ID NO's:74 and 85.
- 5 2. A natural peptide according to Claim 1, wherein the peptide is a growth promoting peptide.
3. A variant of a natural peptide of Claim 1, having at least 70% sequence homology with the natural growth promoting peptide, wherein the variant is a growth promoting peptide.
- 10 4 A composition comprising a natural peptide according to any of Claims 1 to 2.
5. A composition comprising a variant according to Claim 3.
- 15 6. A composition according to any of Claims 4 or 5 formulated for application to the skin of a human.
7. A composition according to Claim 6 in the form of a gel, cream, lotion, serum or ointment.
- 20 8. A non-therapeutic method of preventing or inhibiting ageing of the human skin comprising a step of topically administering to the skin a natural peptide of any of Claims 1 to 3.
9. A non-therapeutic method of Claim 8, in which a composition comprising the natural peptide is administered to the skin, wherein the composition is formulated for topical application to the skin.
- 25 10. A non-therapeutic method of maintaining gut health in a mammal comprising a step of orally administering to the mammal a natural peptide of any of Claims 1 to 3
- 30 11. A non-therapeutic method of Claim 10, in which a composition comprising the natural peptide is orally administered to the mammal, wherein the composition is selected from a food or beverage, food supplement, or food for special medicinal purpose.

12. A natural growth promoting peptide of any of Claims 2 to 3, **for use in** treating a disease or condition characterised by damaged skin or damaged epithelial cells or tissue.

5 13. A natural growth promoting peptide of any of Claims 2 to 3, for use of Claim 12, in which the disease or condition characterised by damaged epithelial cells or tissue is selected from gut trauma, cancer of the gastrointestinal tract, damage caused by drugs, or gut surgery.

14. A natural growth promoting peptide of any of Claims 2 to 3, for use in treating a wound, wherein the natural peptide is applied topically to the wound.

10

15. A natural growth promoting peptide of Claim 2 to 3, for use of Claim 2, wherein a composition comprising the natural peptide is topically administered to the mammal, wherein the composition is selected from a powder, gel, cream, lotion or ointment.

15 16. A wound dressing comprising a growth promoting peptide of any of Claims 2 to 3.

17. A wound dressing according to Claim 16 selected from a bandage, plaster or dressing.

20 18. A method of growing cells comprising a step of incubating the cells in a cell growth medium comprising a natural growth promoting peptide of any of Claims 1 to 3.

19. A method according to Claim 18, in which the cells are skin cells or epithelial cells.

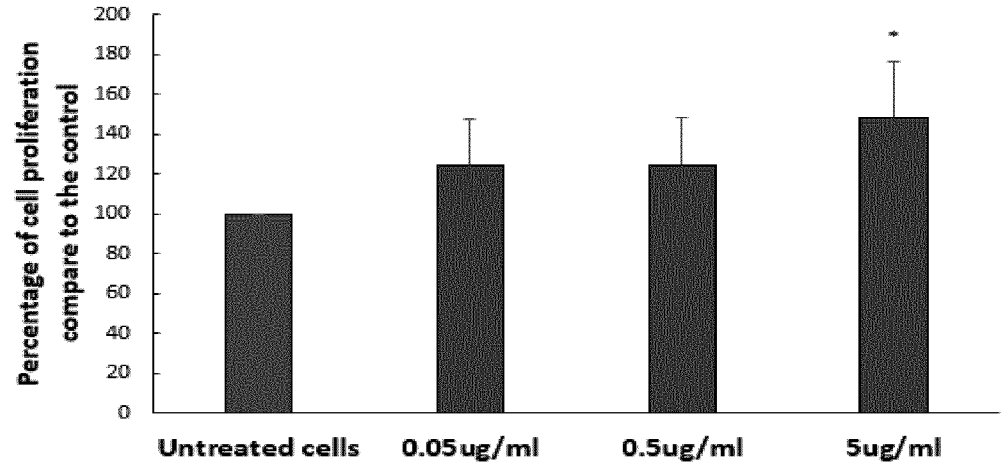


FIGURE 1

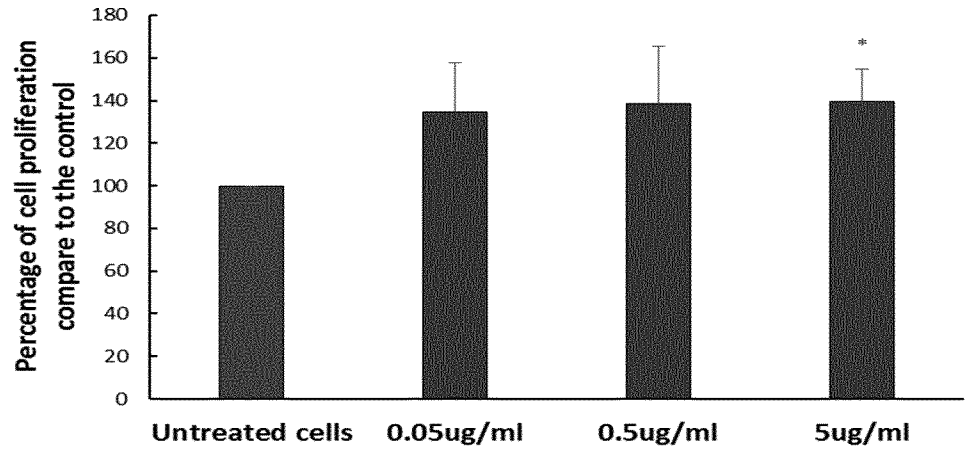


FIGURE 2

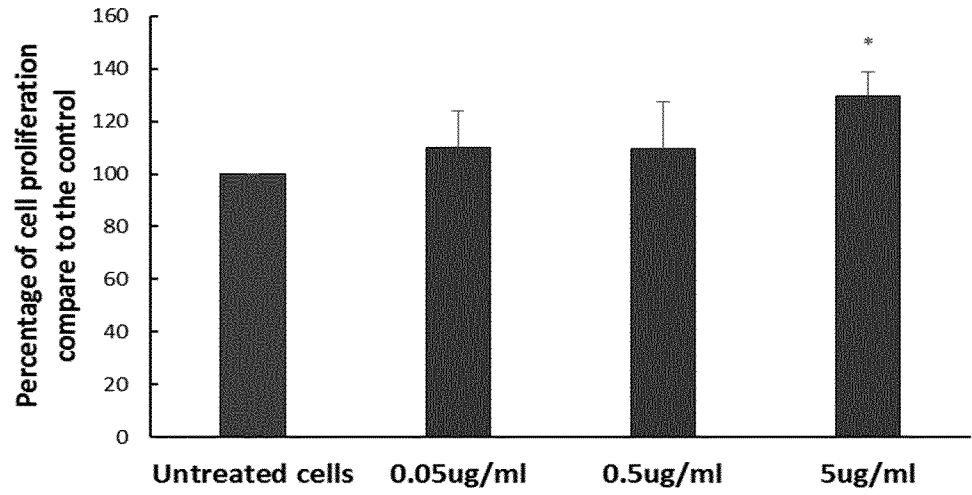


FIGURE 3

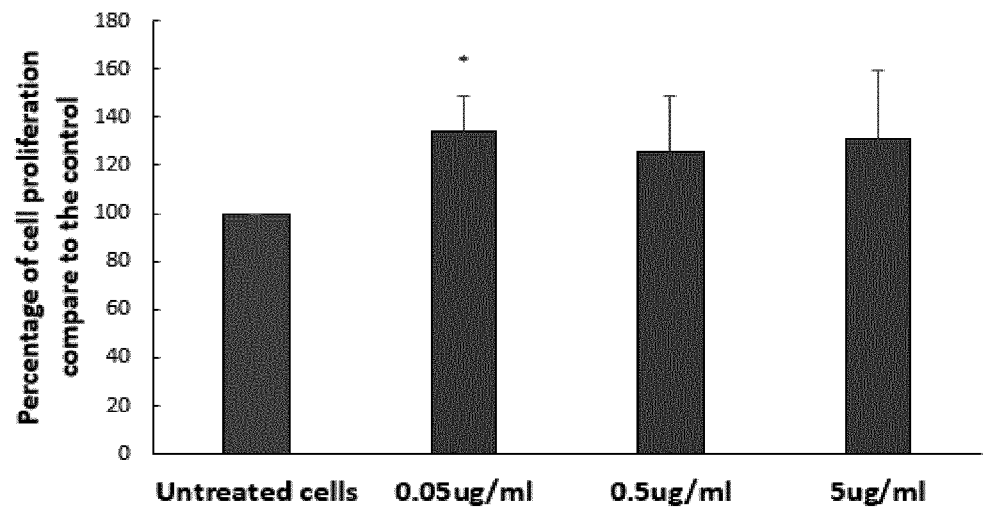


FIGURE 4

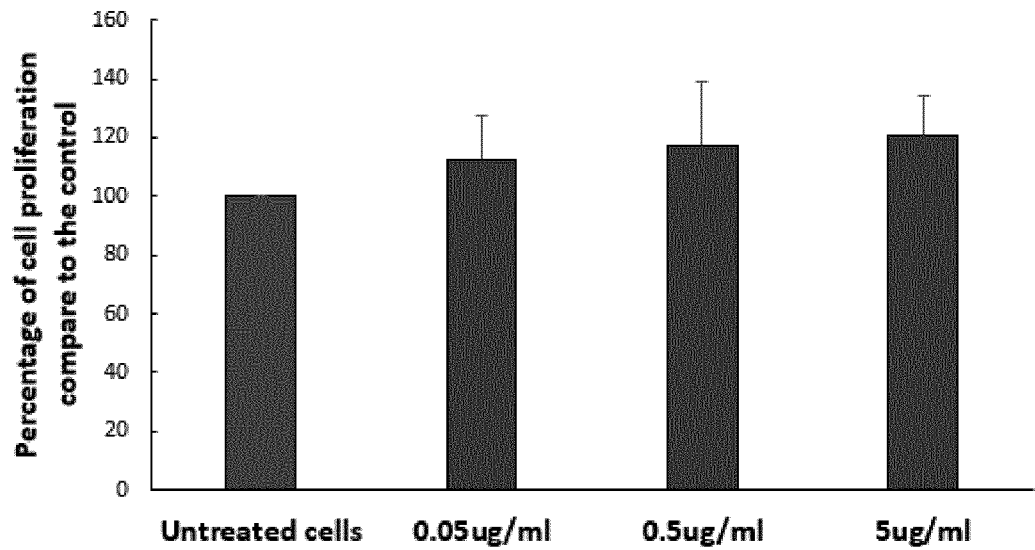


FIGURE 5

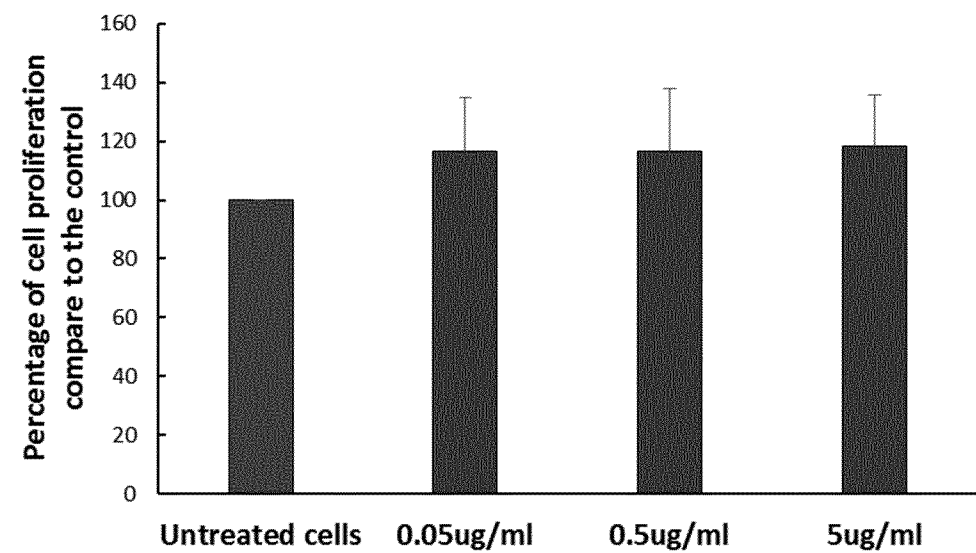
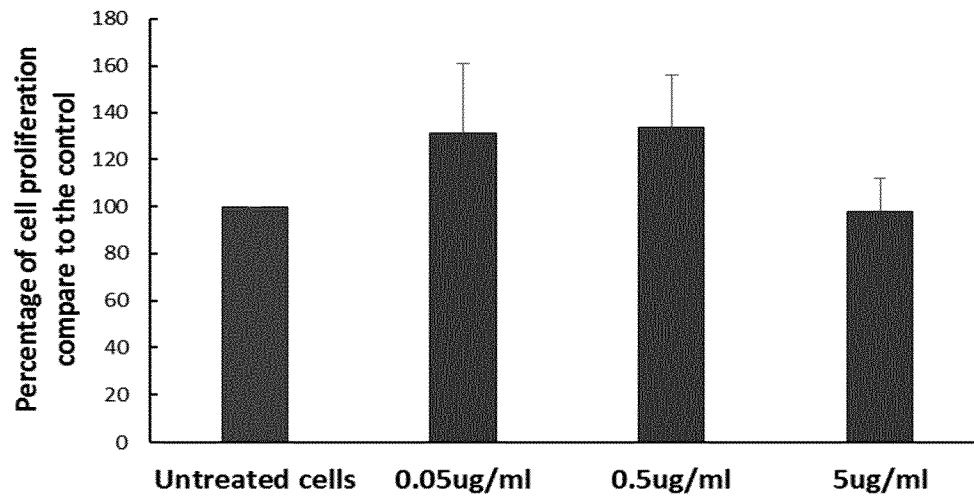
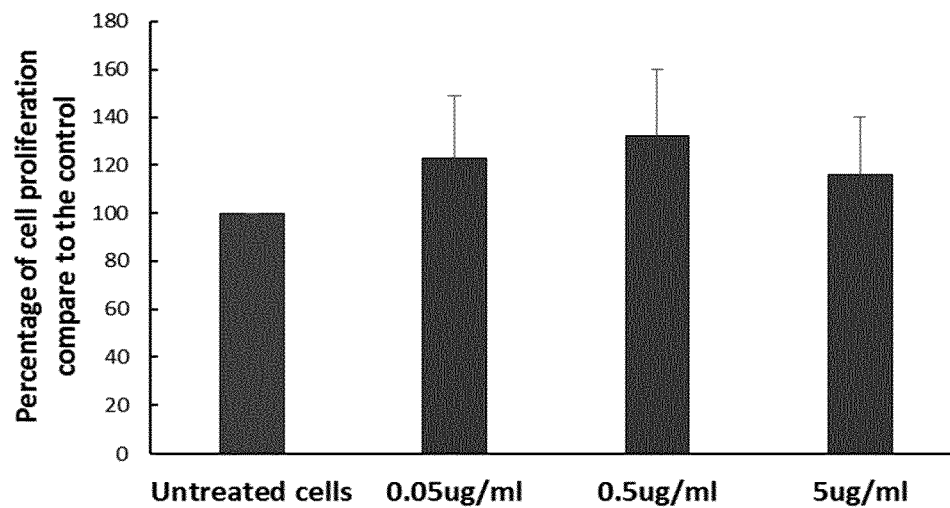
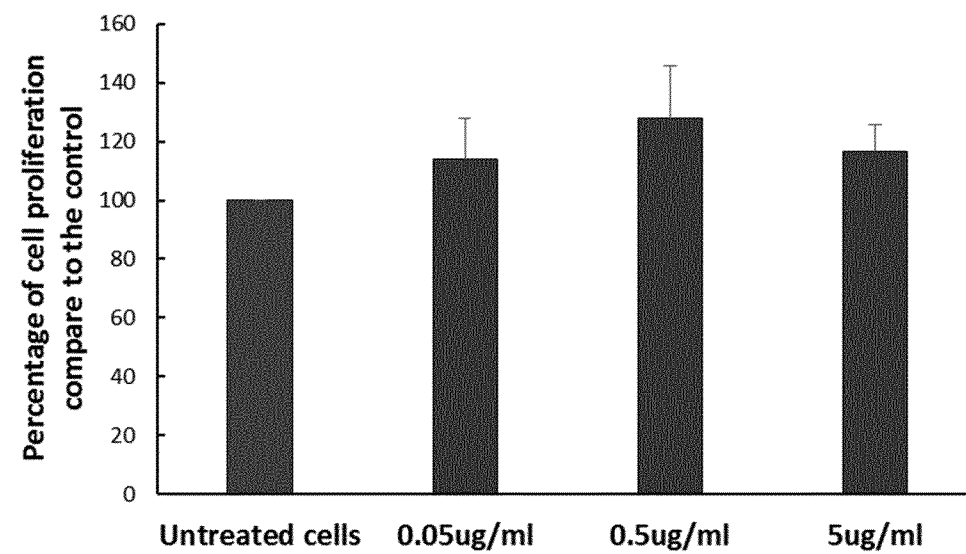


FIGURE 6

**FIGURE 7****FIGURE 8****FIGURE 9**

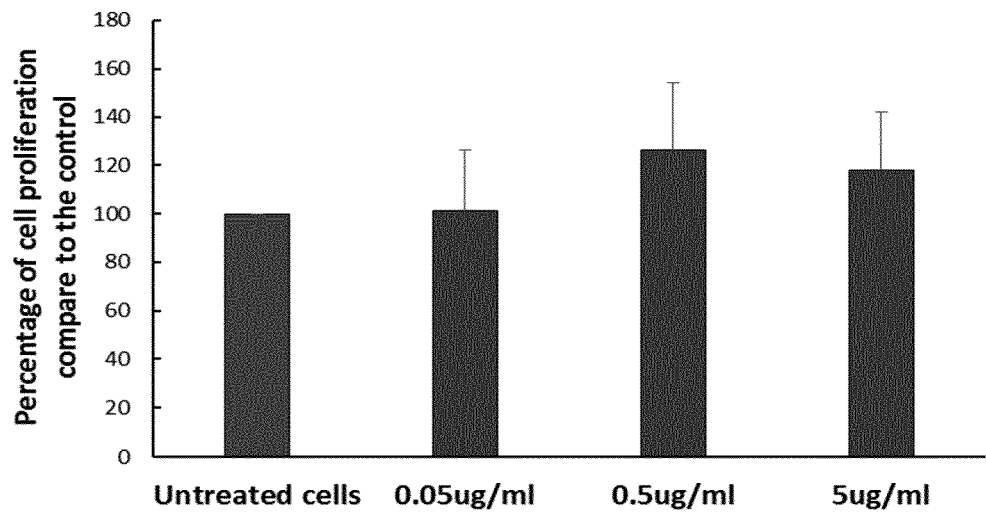


FIGURE 10

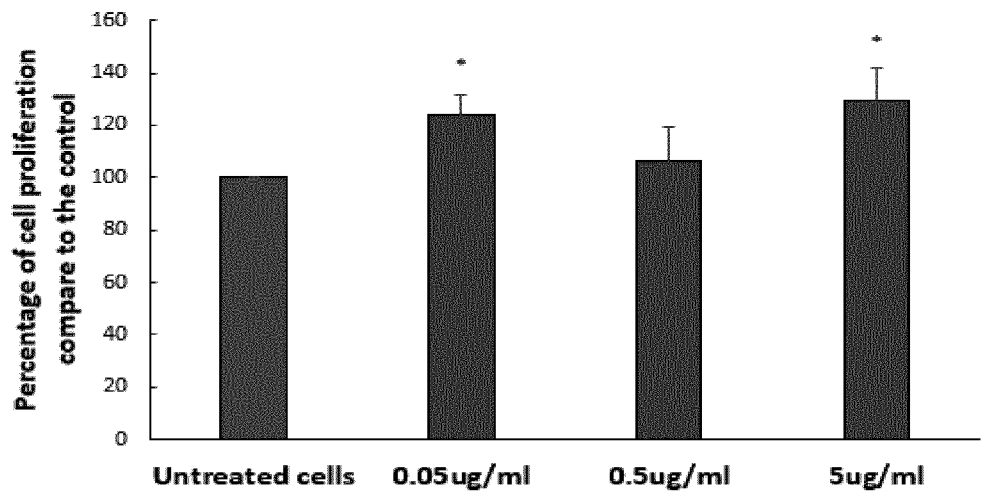


FIGURE 11

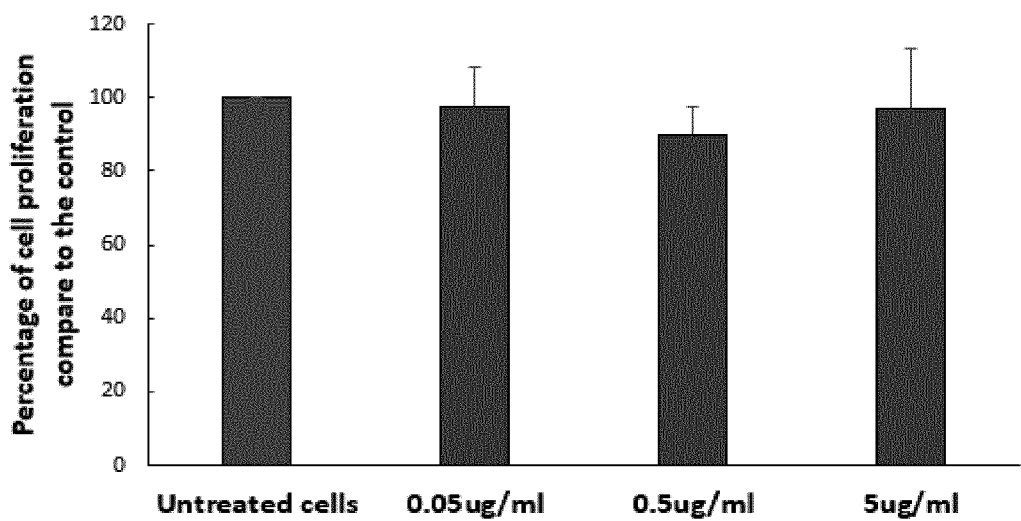


FIGURE 12

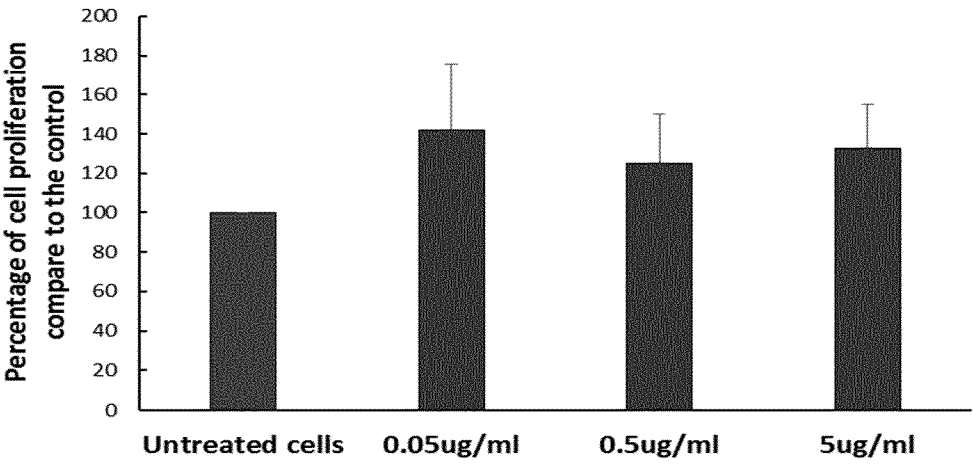


FIGURE 13

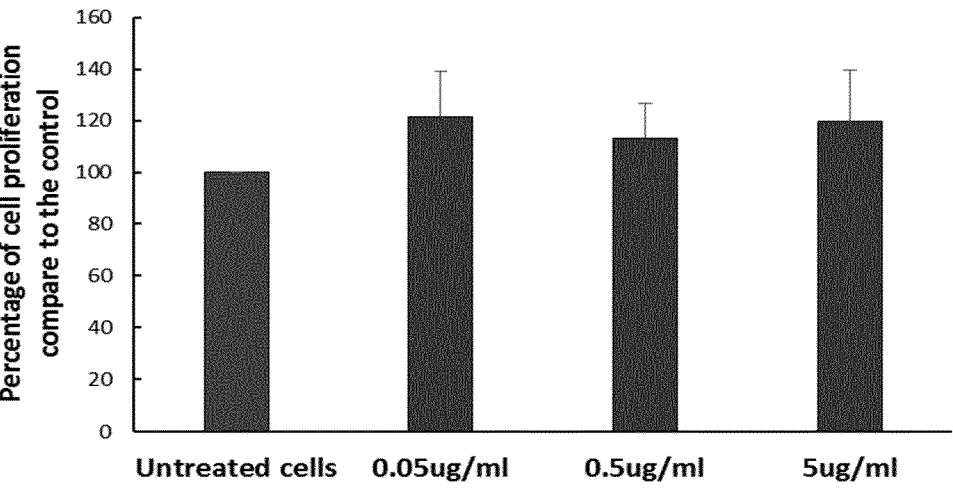


FIGURE 14

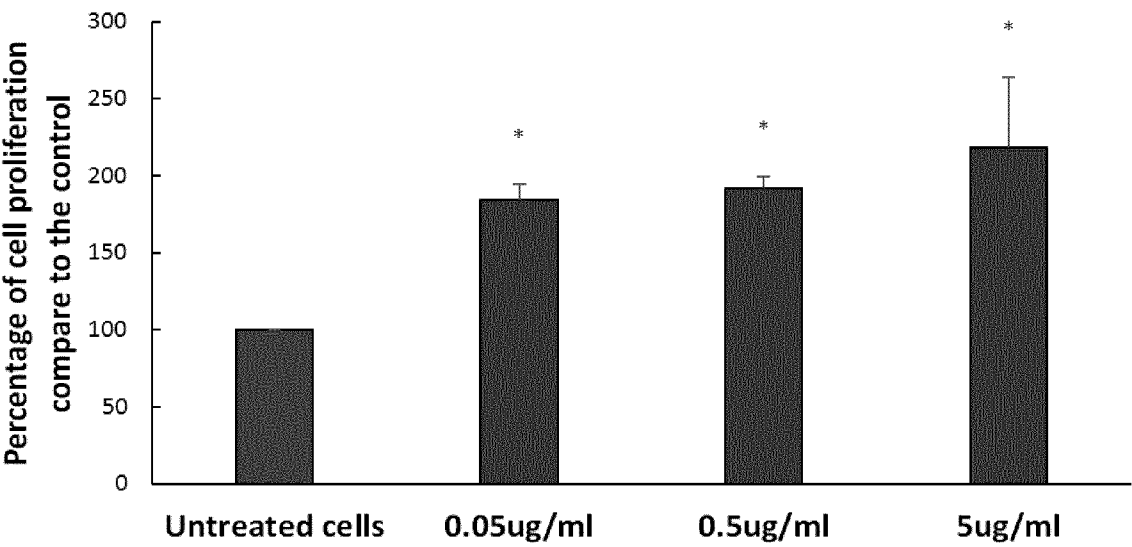
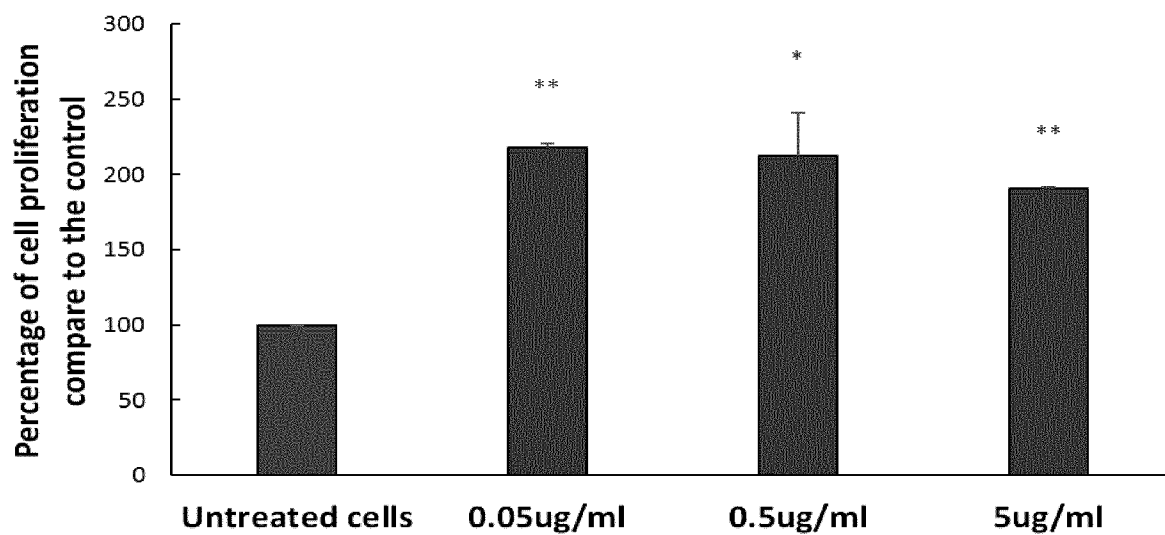
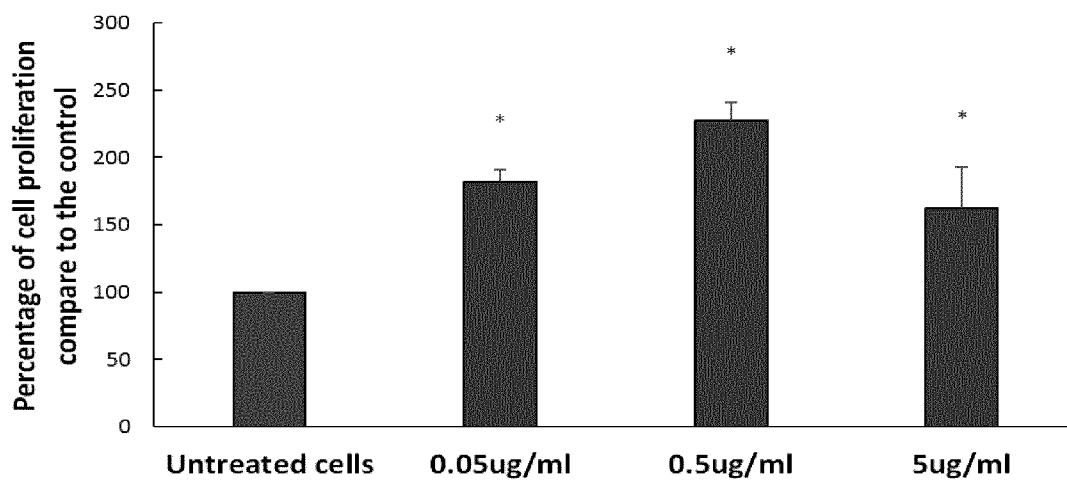
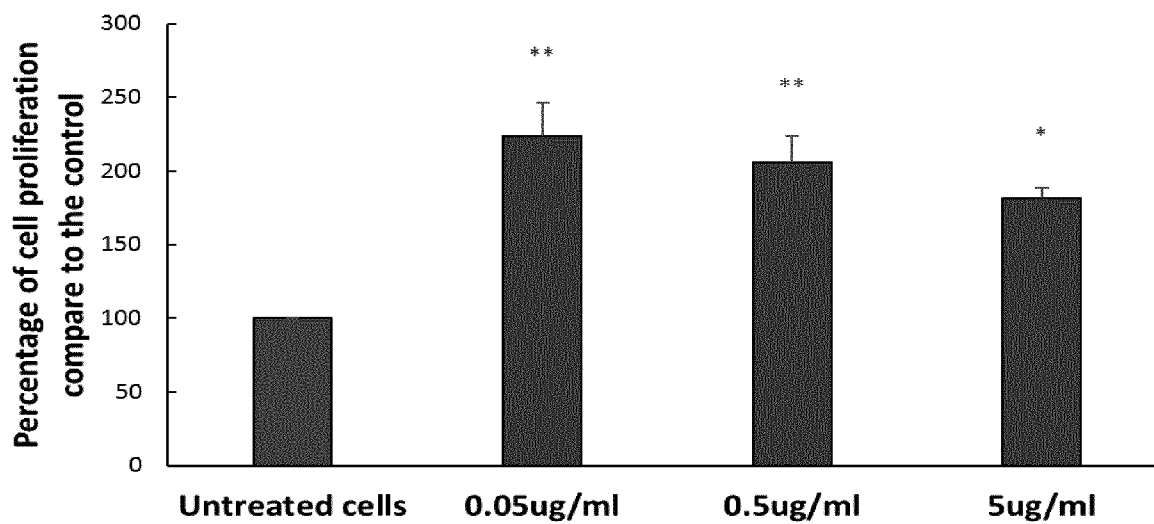


FIGURE 15

**FIGURE 16****FIGURE 17****FIGURE 18**

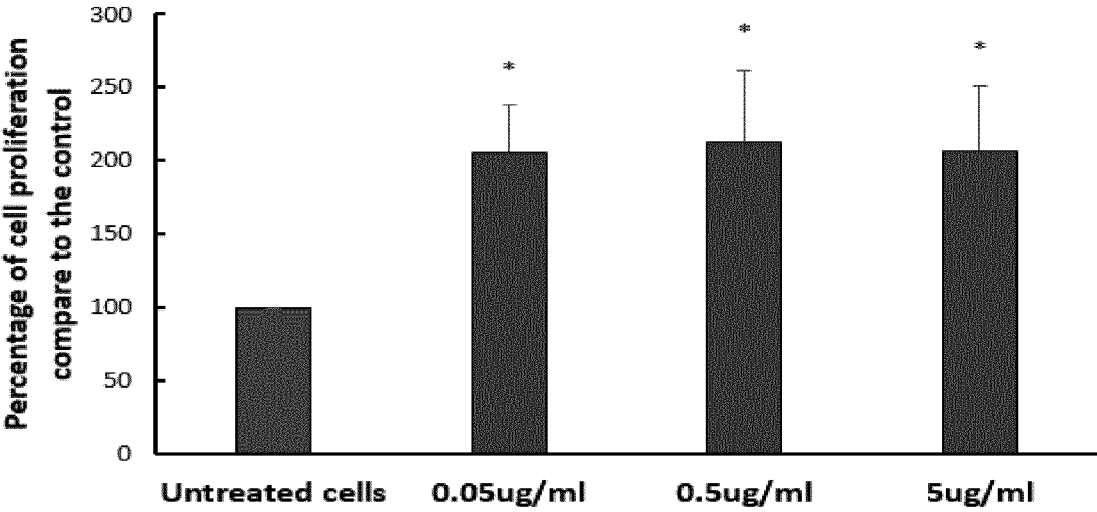


FIGURE 19

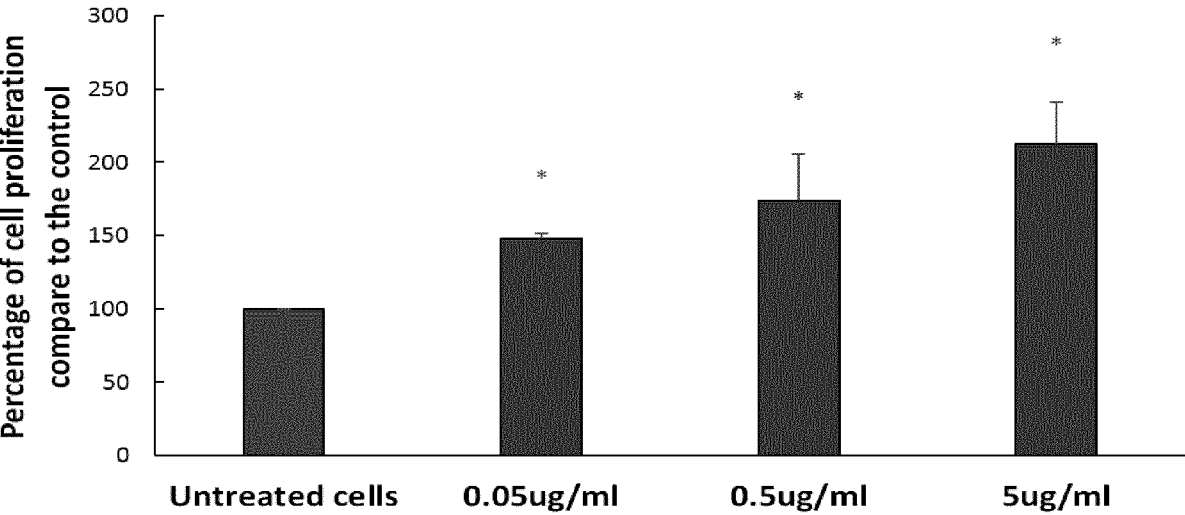


FIGURE 20

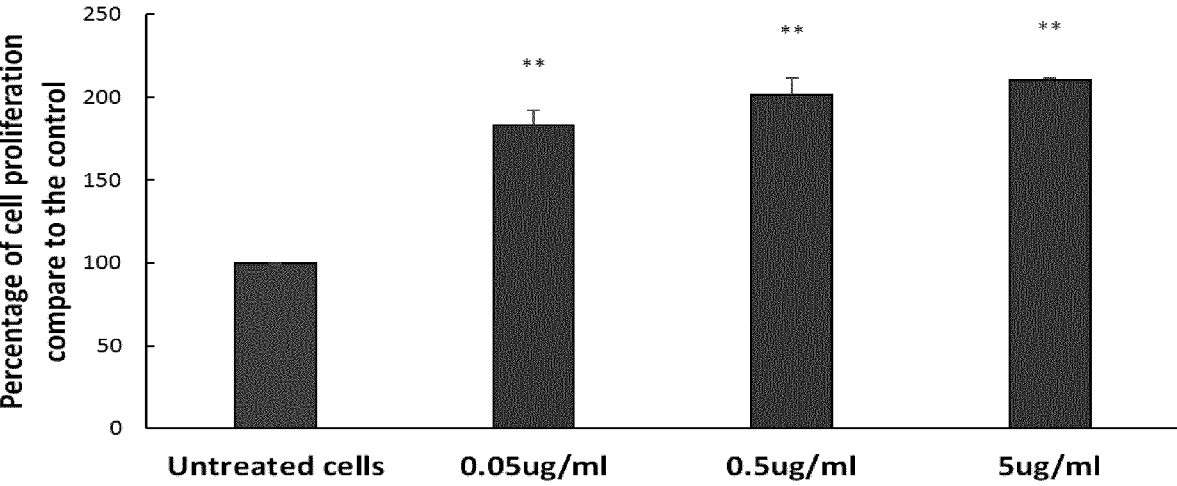


FIGURE 21

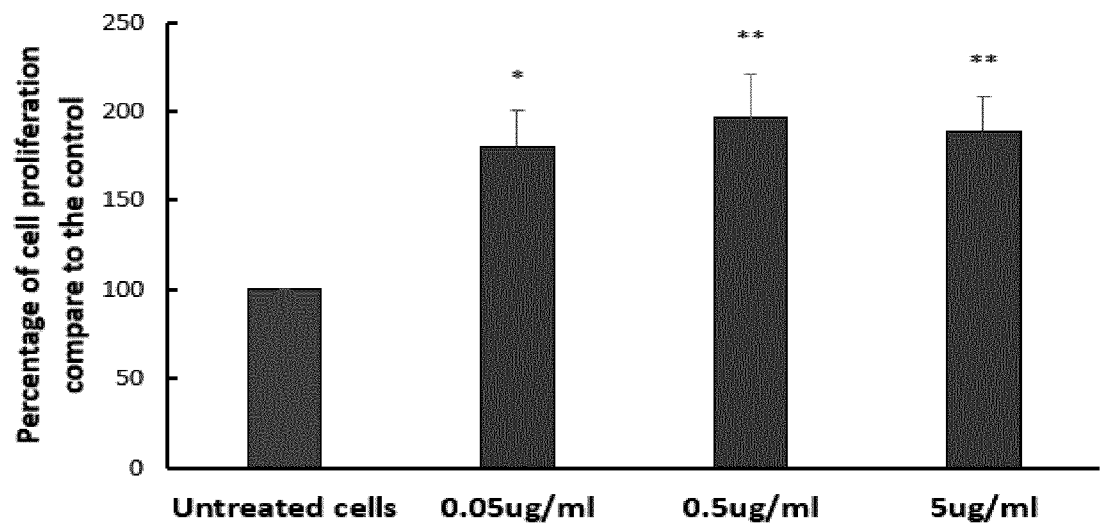


FIGURE 22

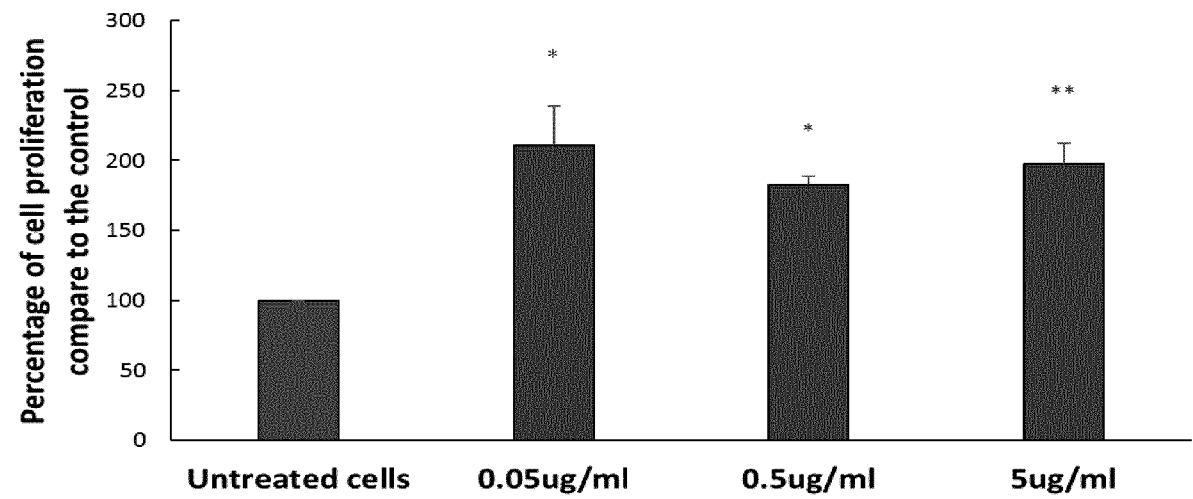


FIGURE 23

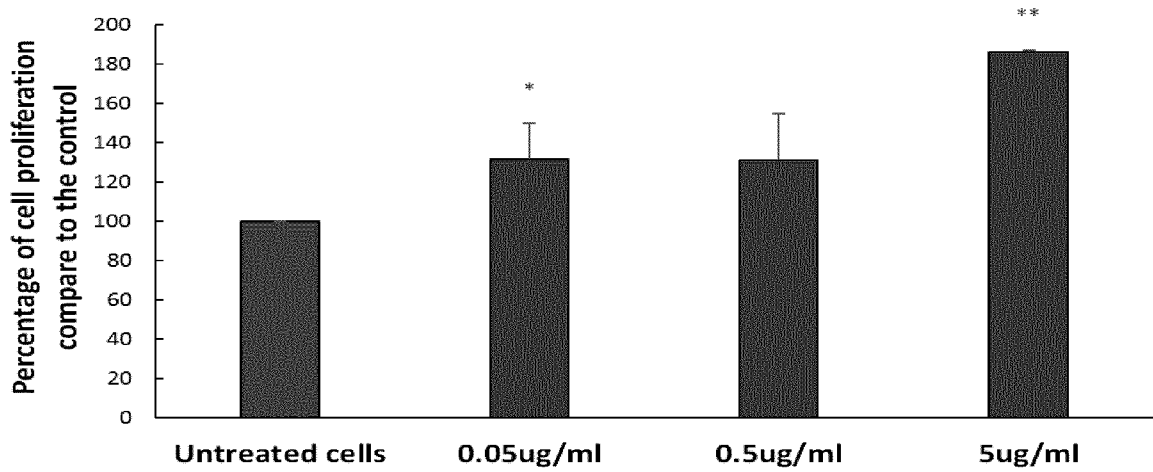


FIGURE 24

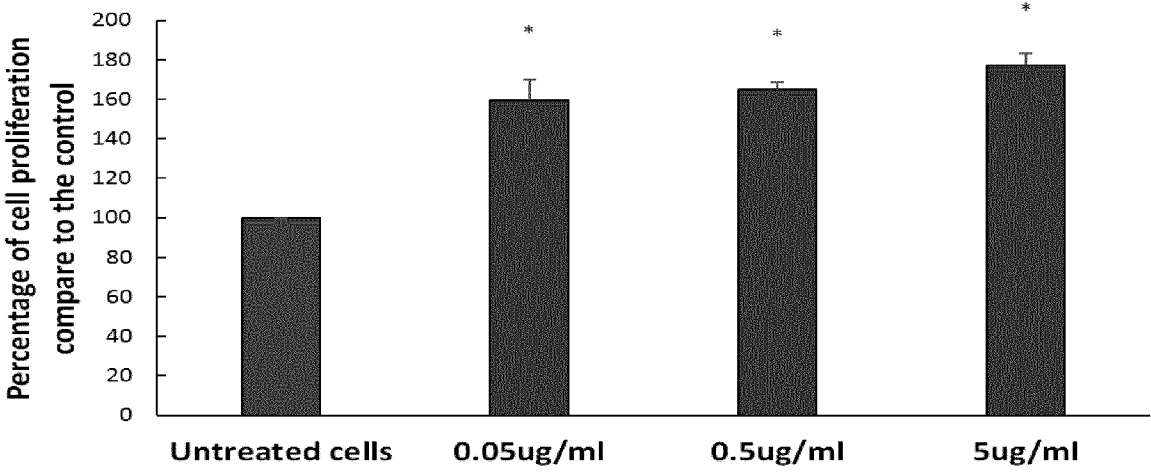


FIGURE 25

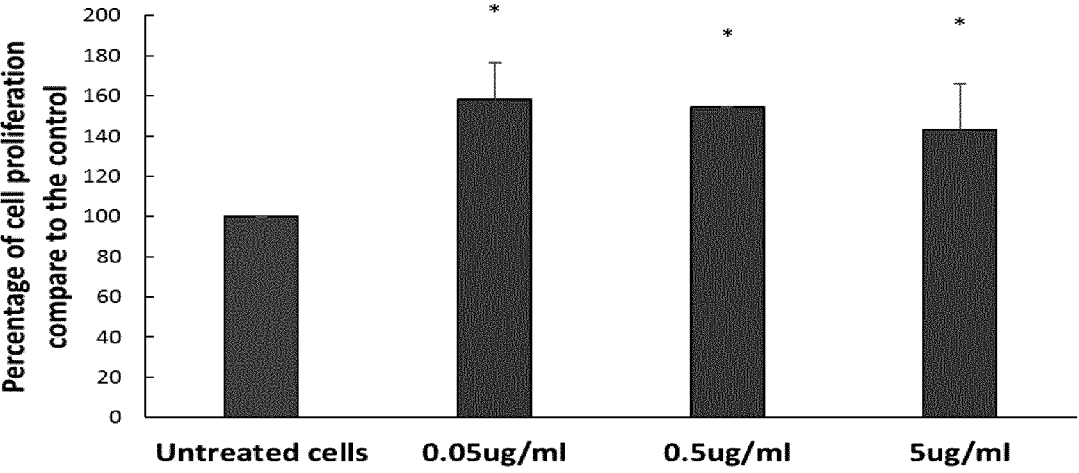


FIGURE 26

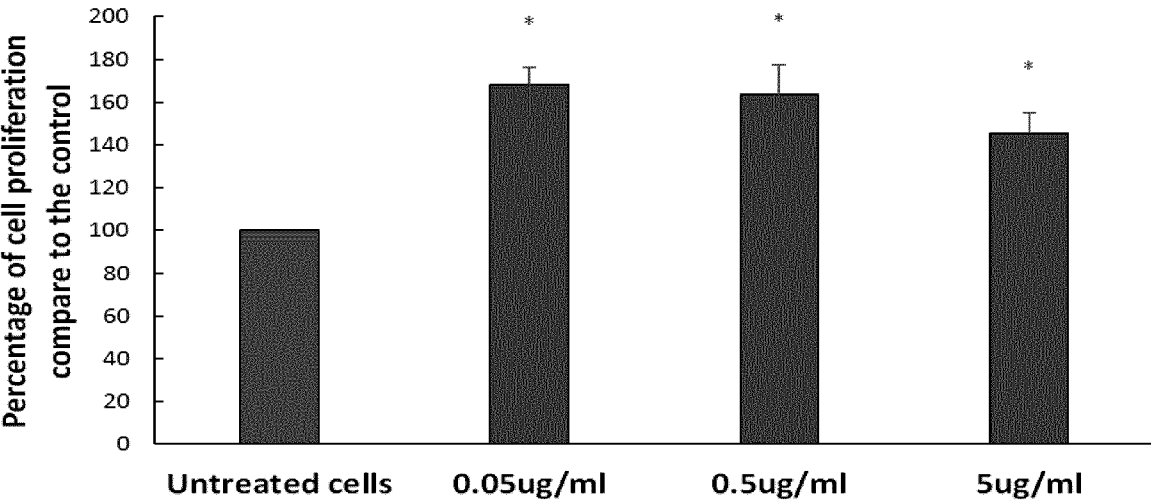


FIGURE 27

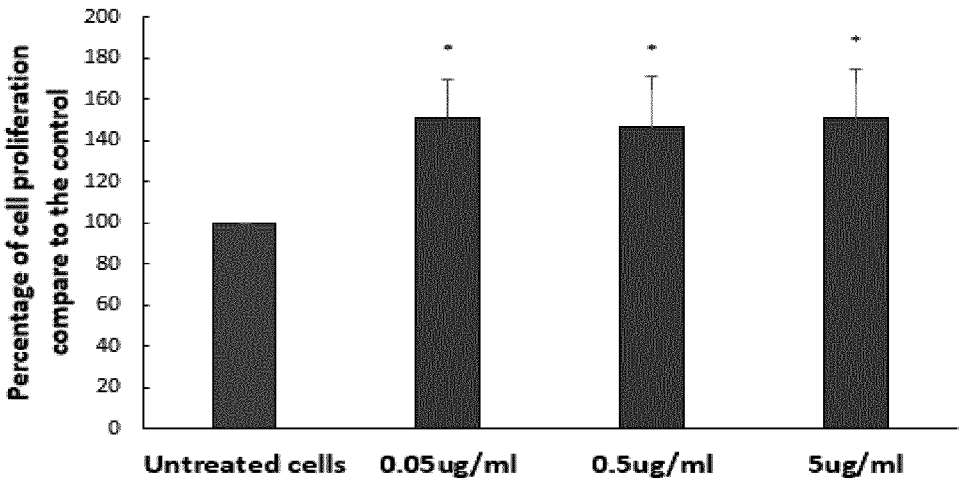


FIGURE 28

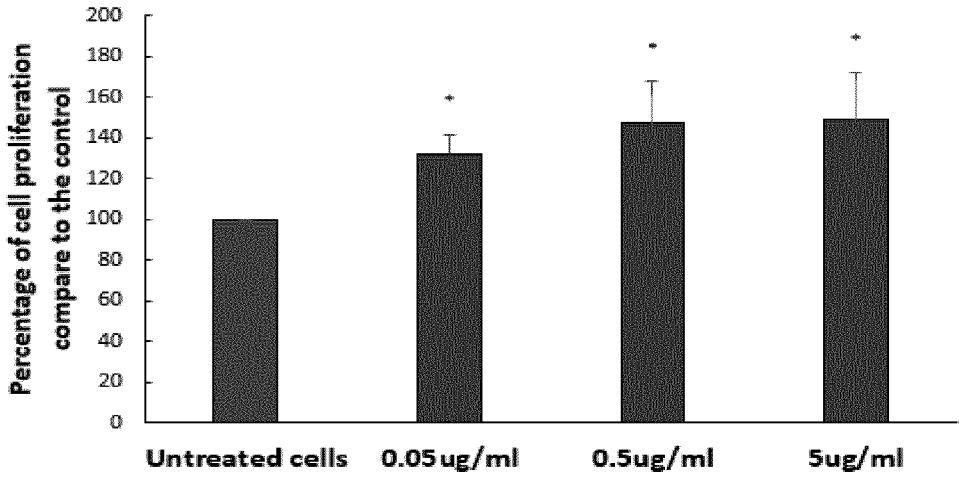


FIGURE 29

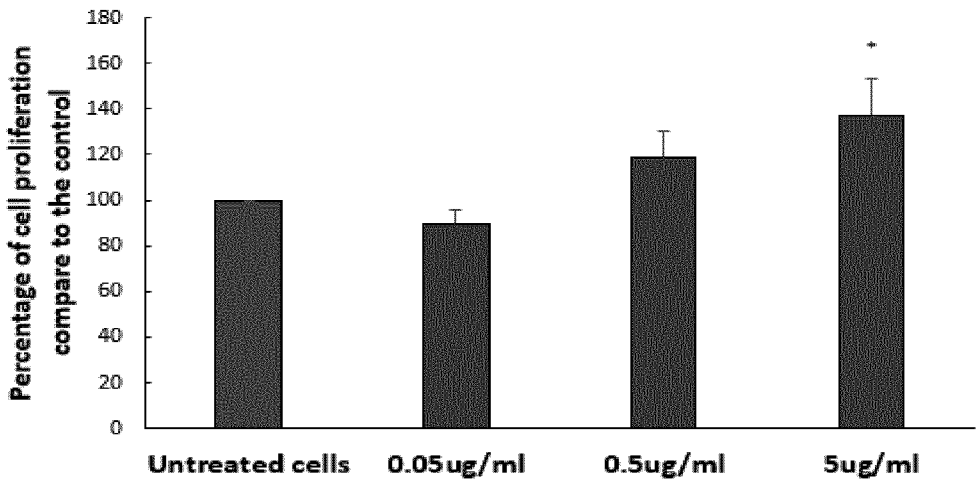
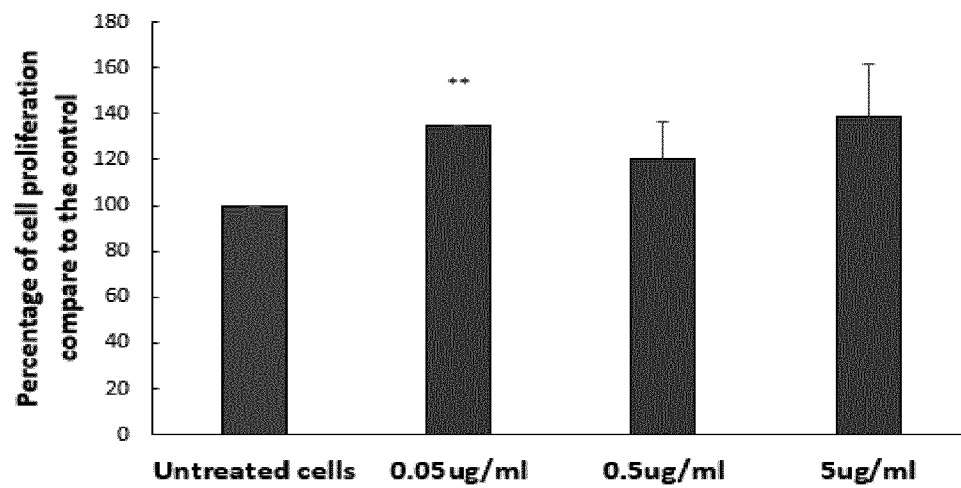
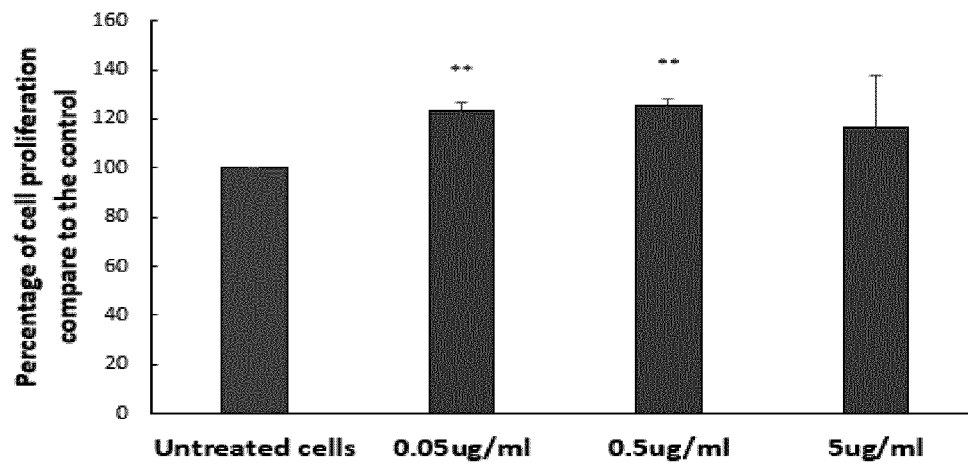
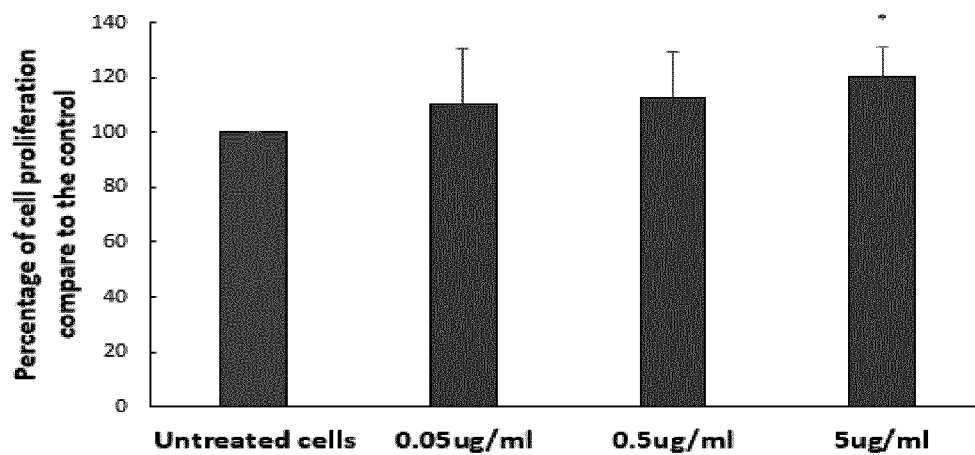
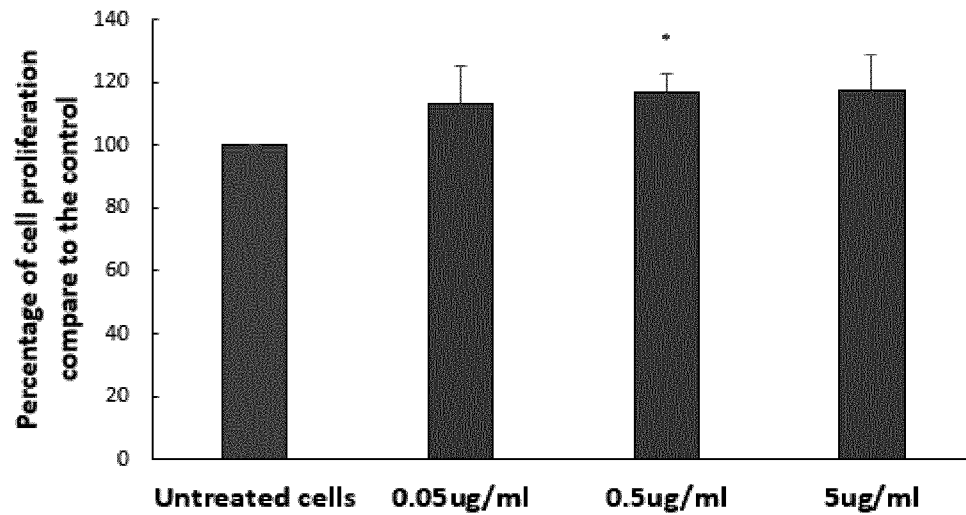
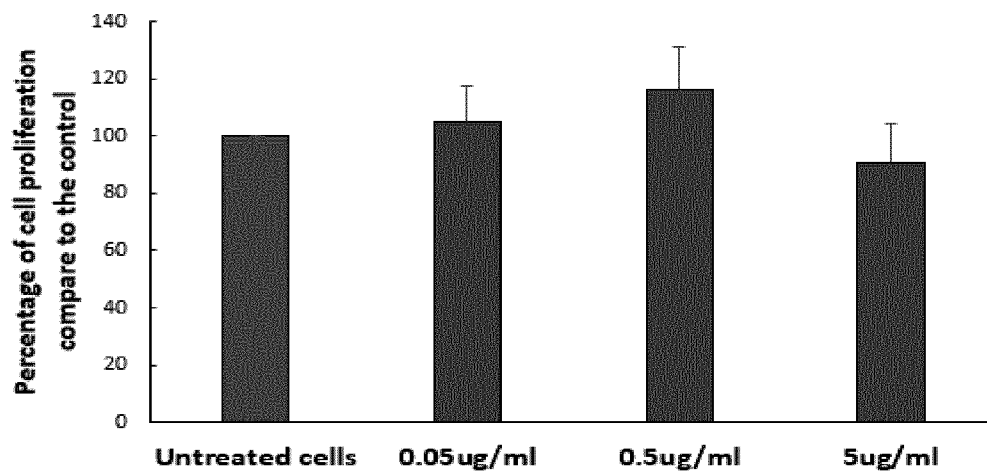
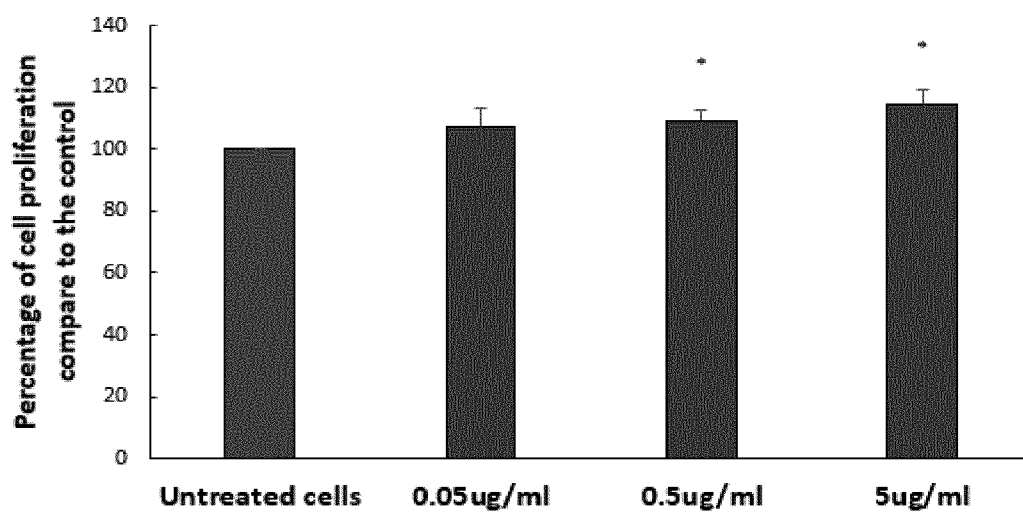
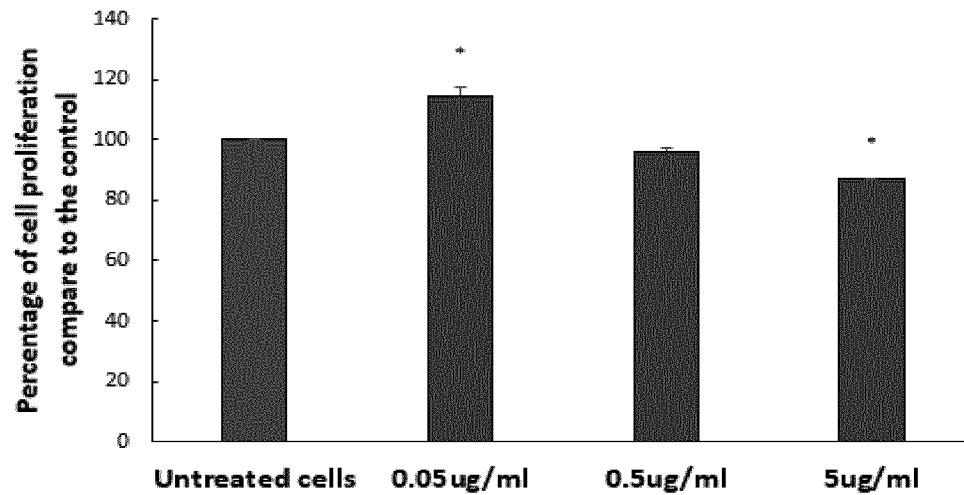
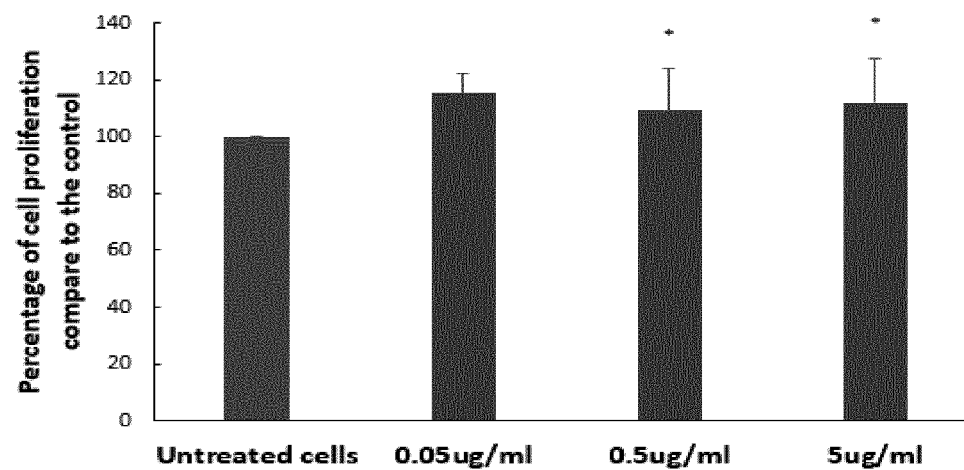
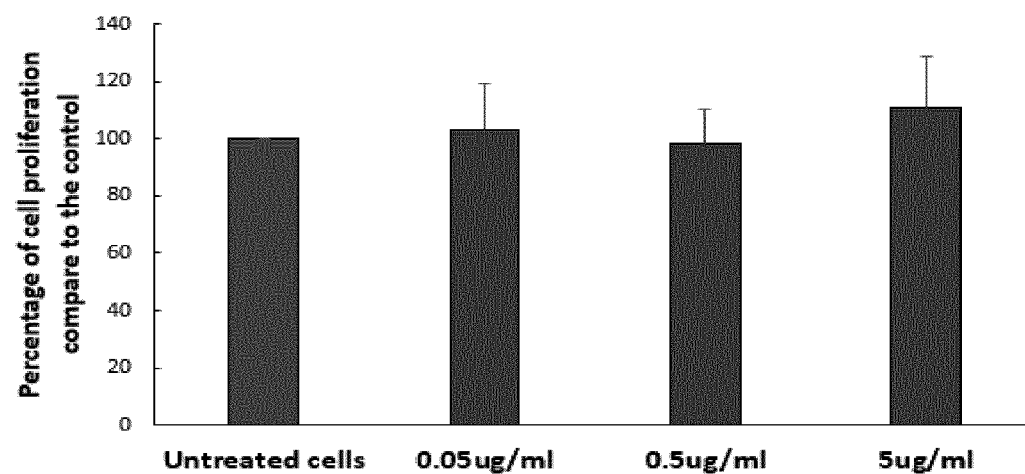


FIGURE 30

**FIGURE 31****FIGURE 32****FIGURE 33**

**FIGURE 34****FIGURE 35****FIGURE 36**

**FIGURE 37****FIGURE 38****FIGURE 39**

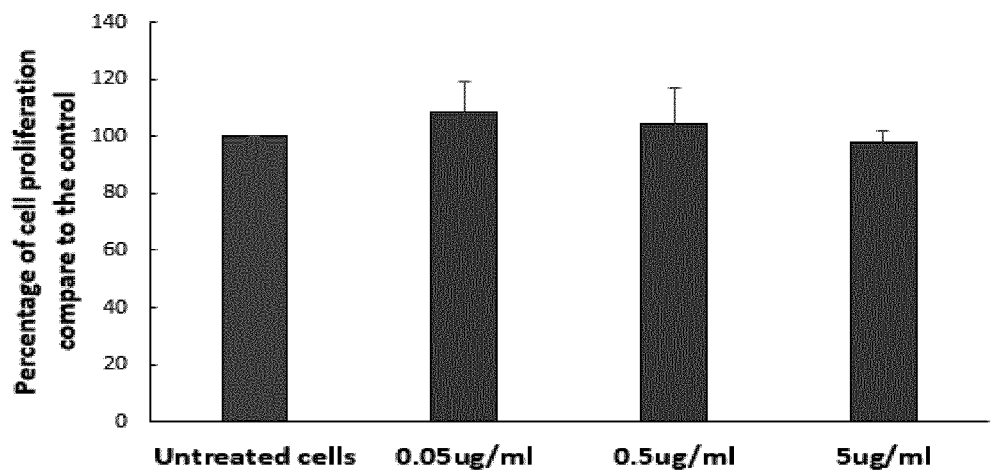


FIGURE 40

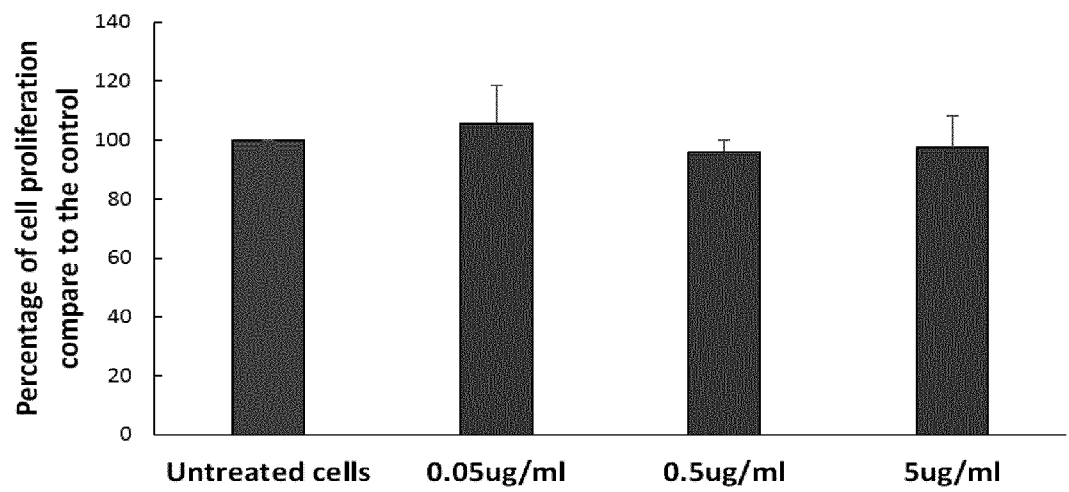


FIGURE 41

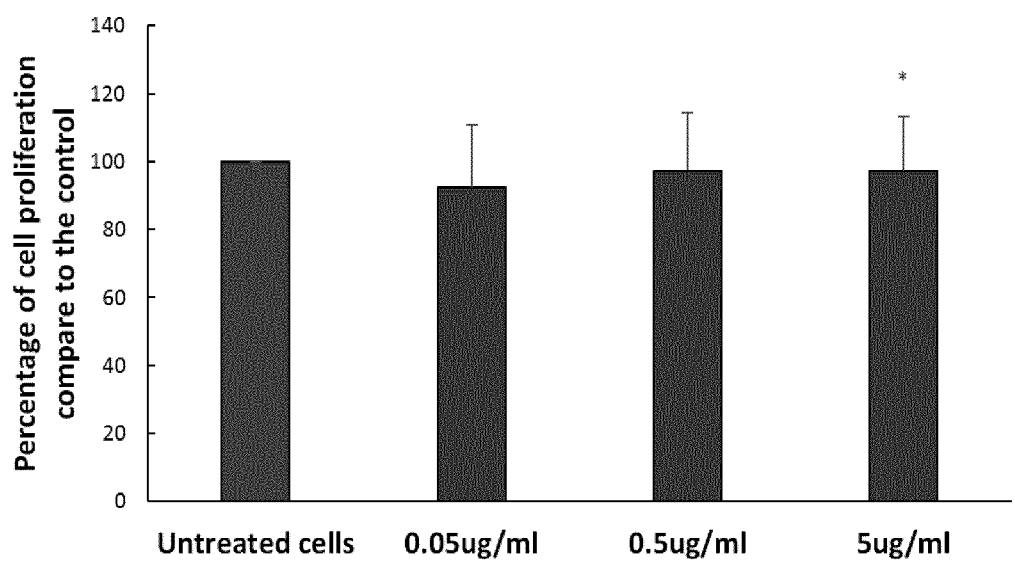


FIGURE 42

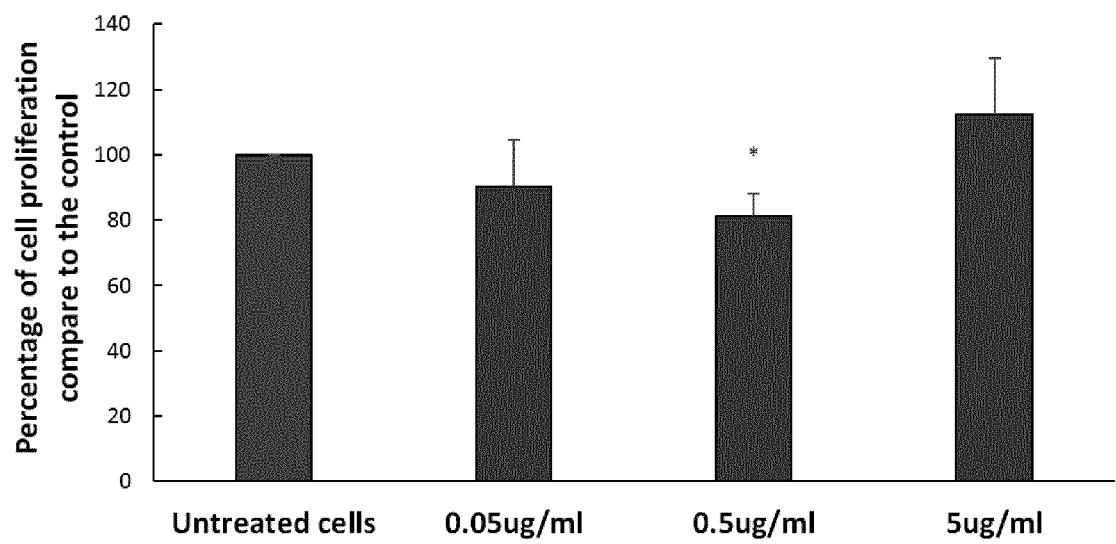


FIGURE 43

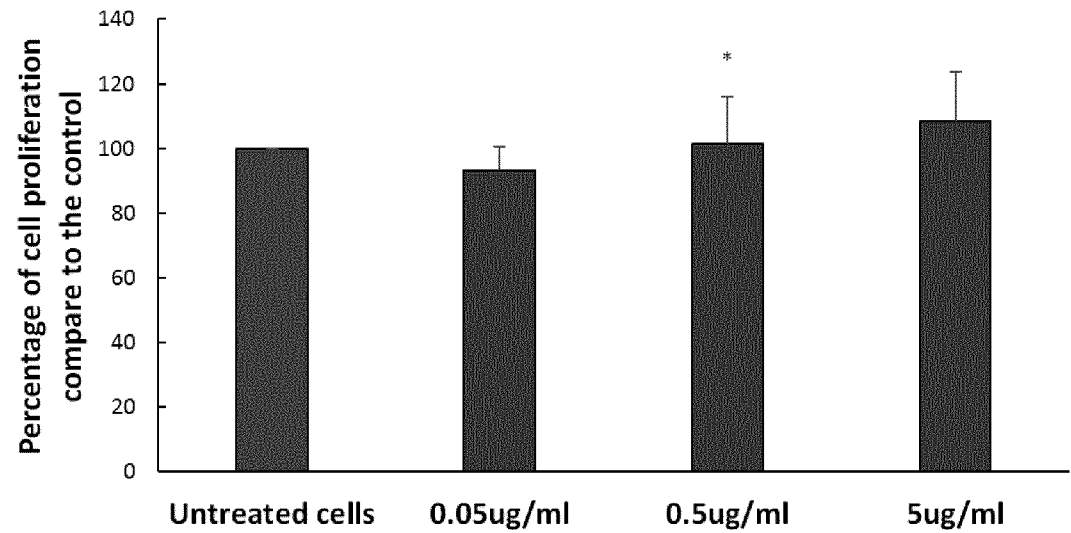


FIGURE 44

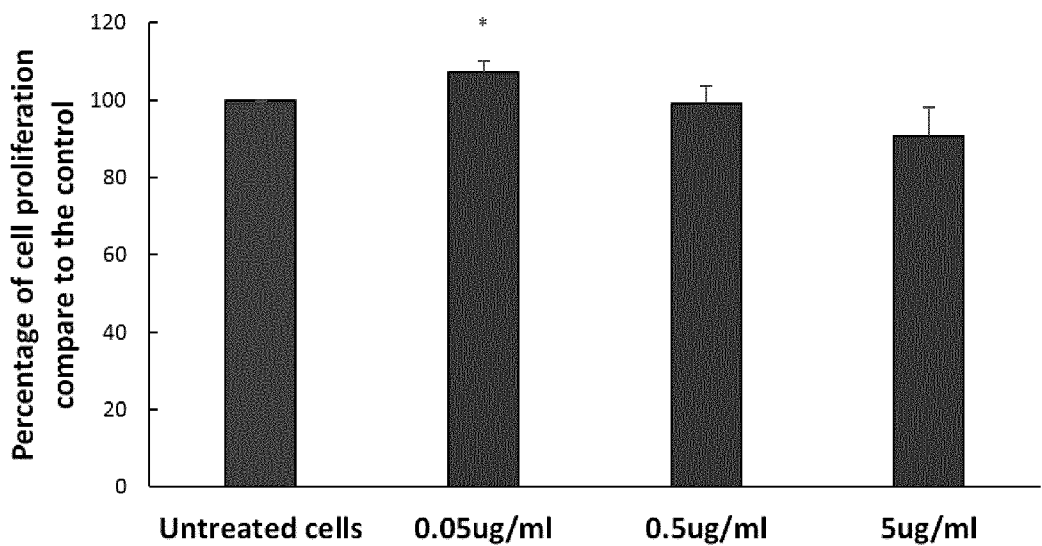
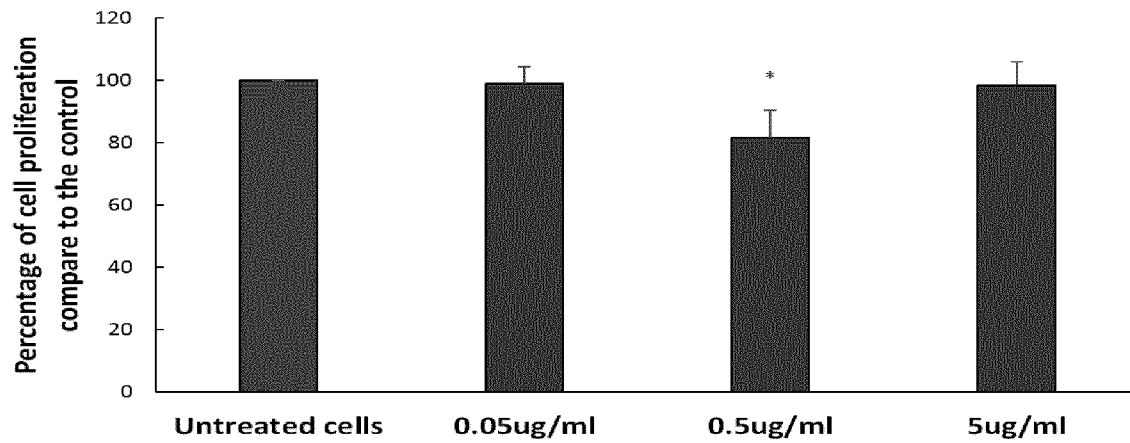
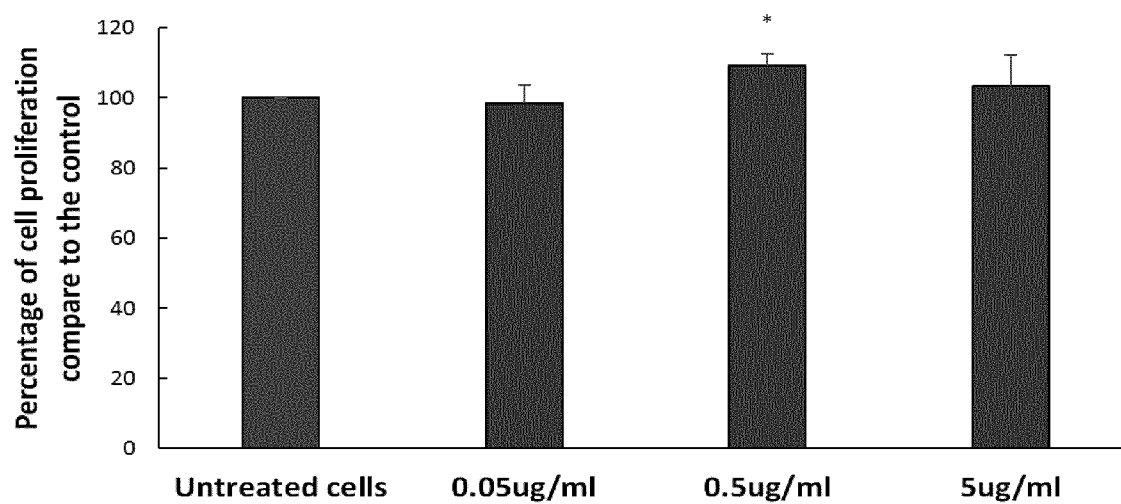
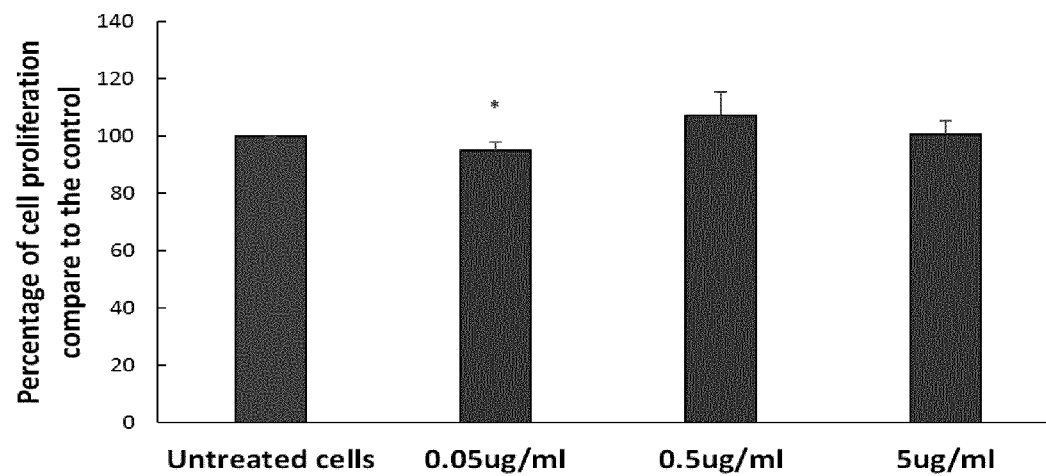


FIGURE 45

**FIGURE 46****FIGURE 47****FIGURE 48**

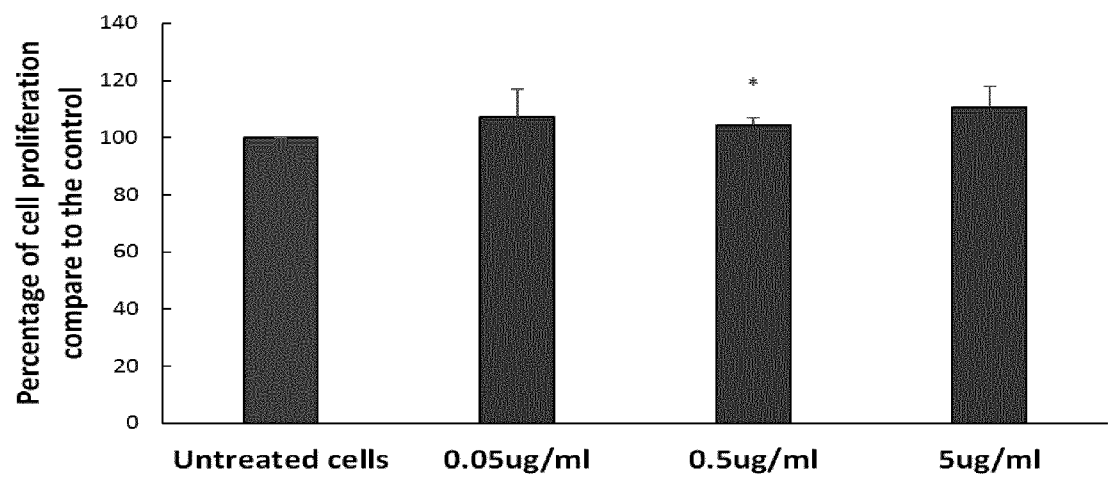


FIGURE 49

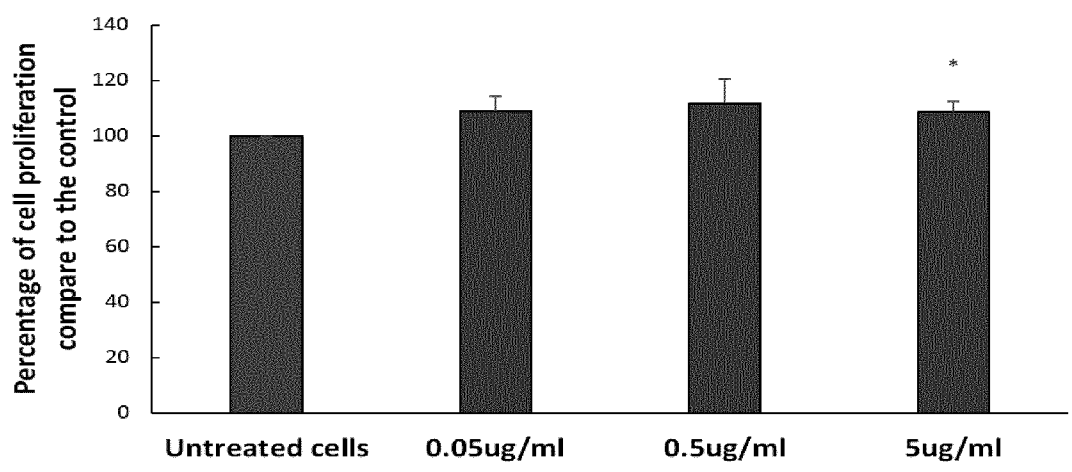


FIGURE 50

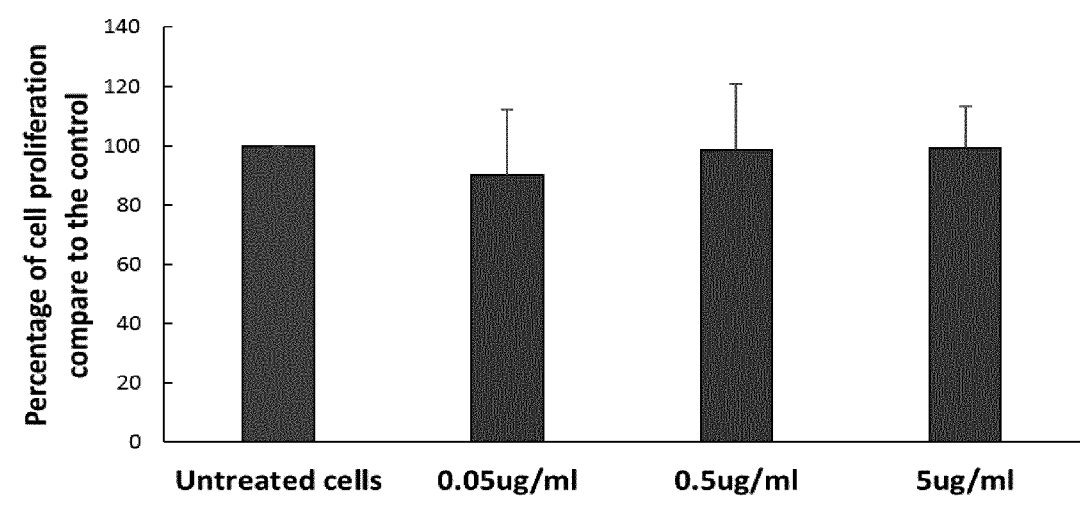
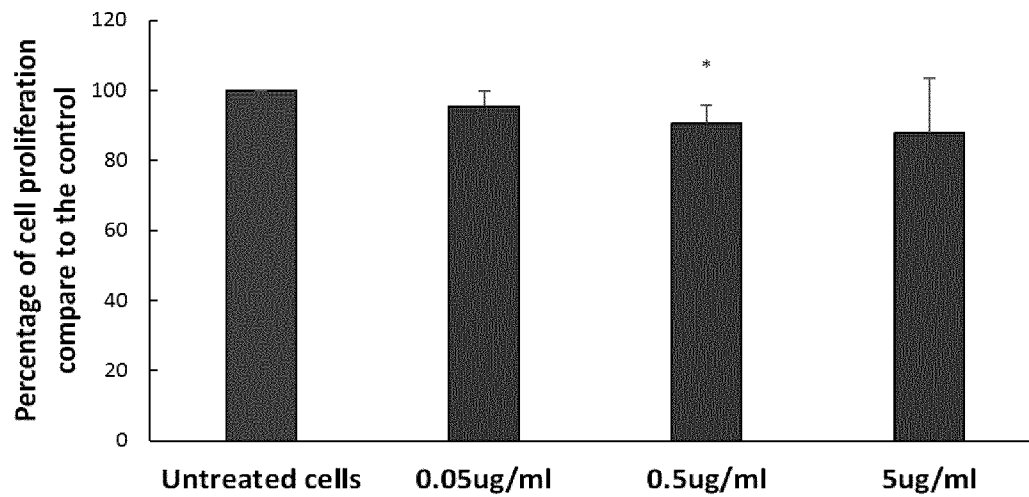
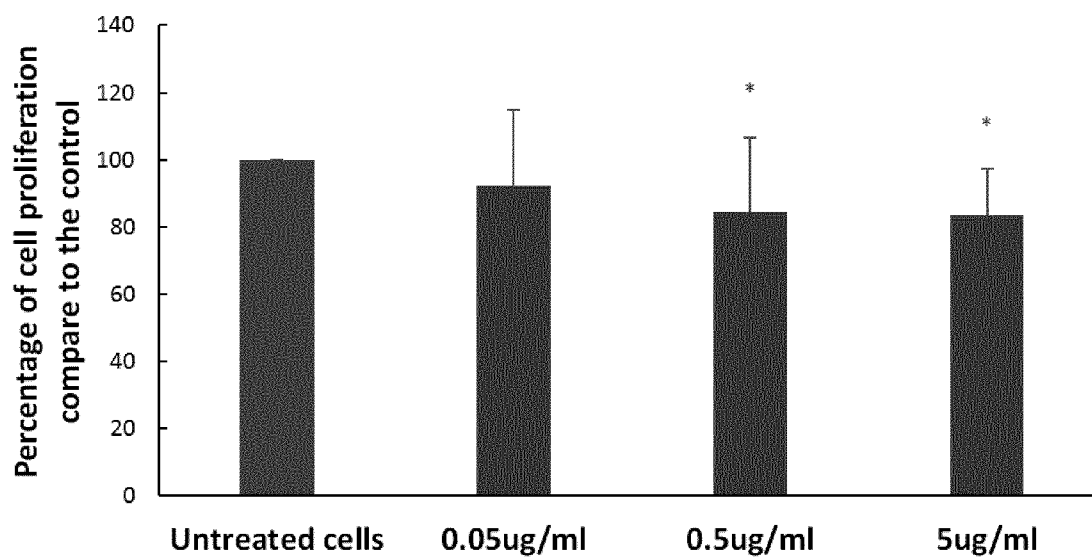
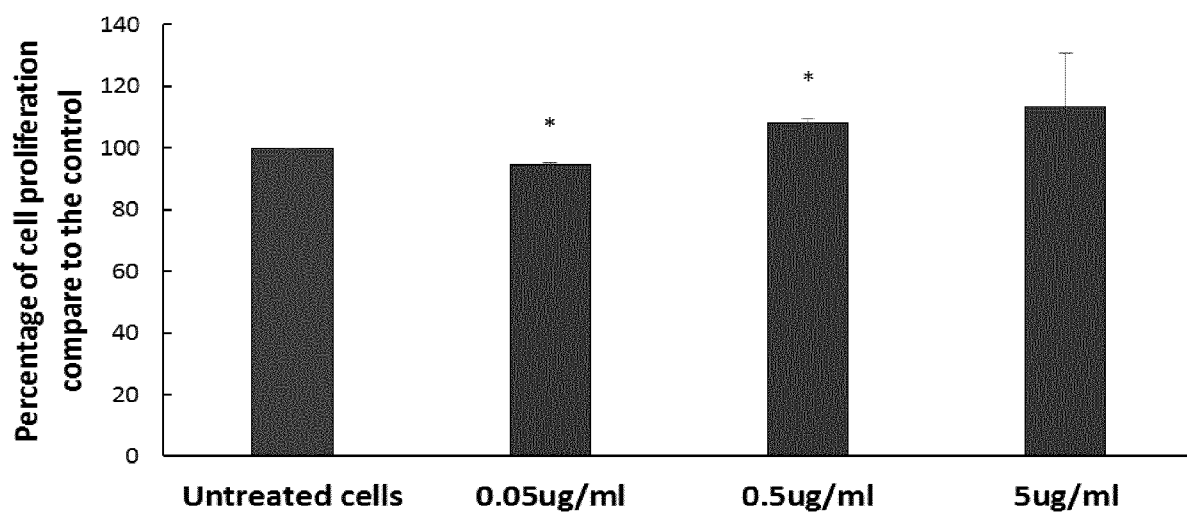


FIGURE 51

**FIGURE 52****FIGURE 53****FIGURE 54**

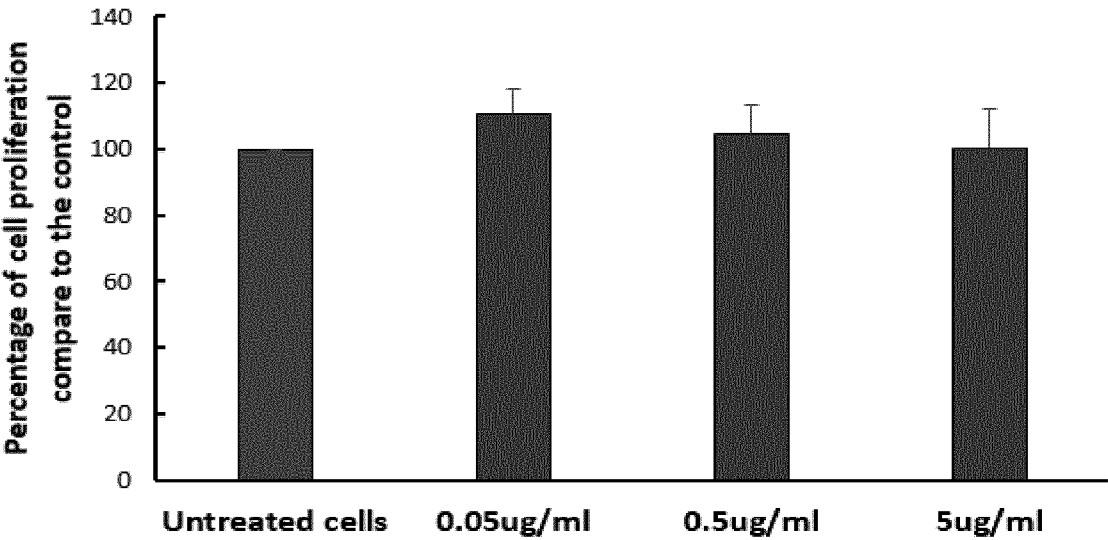


FIGURE 55

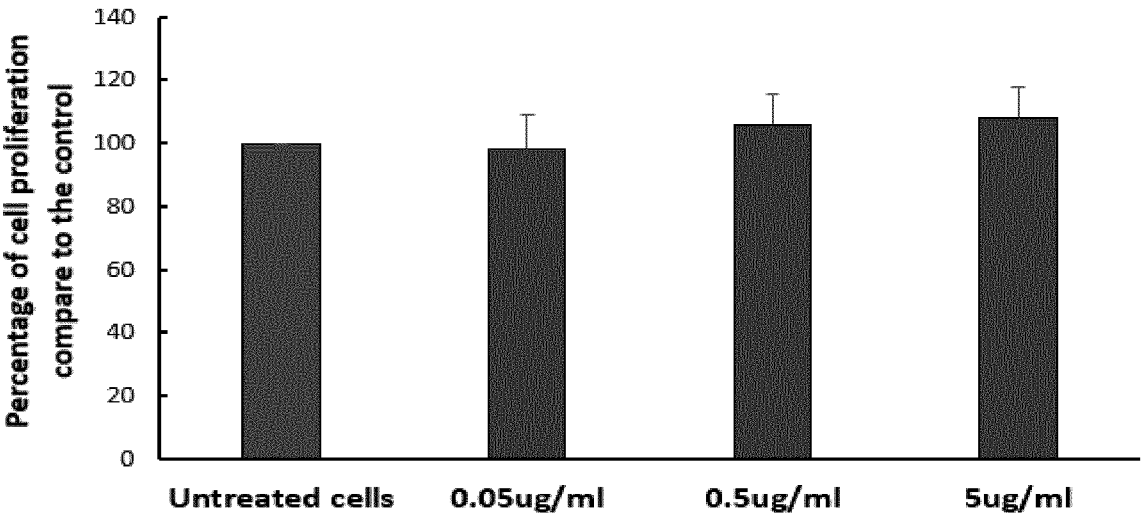


FIGURE 56

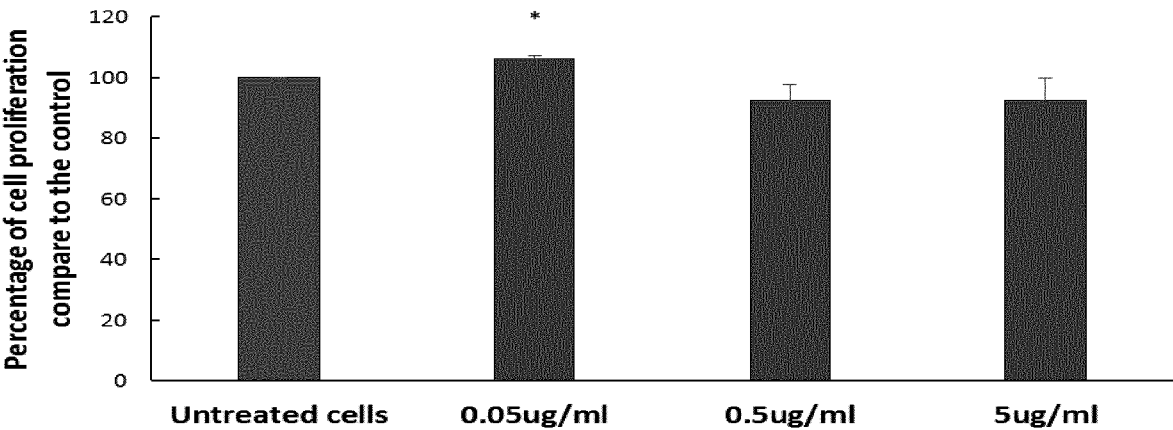


FIGURE 57

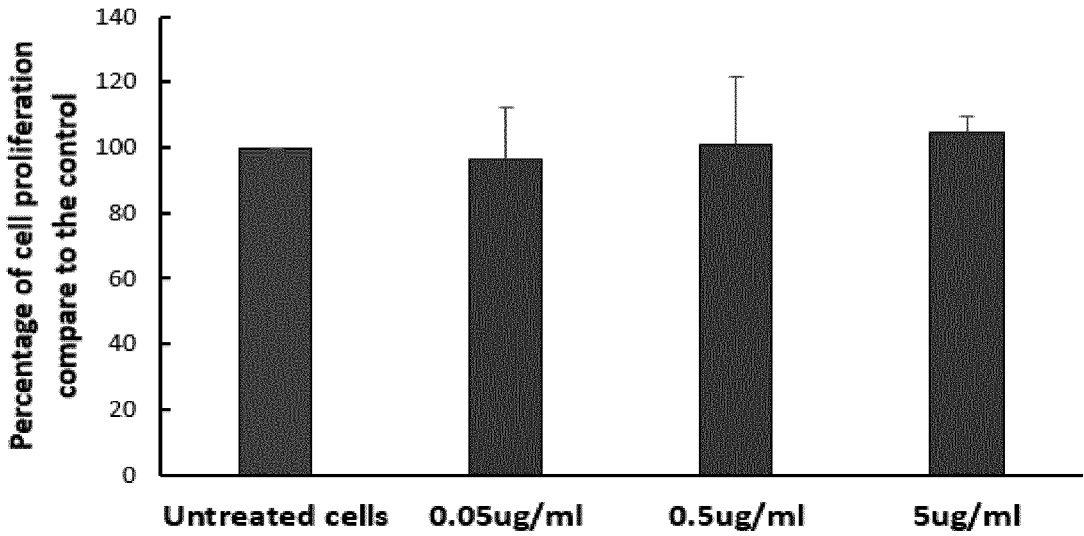


FIGURE 58

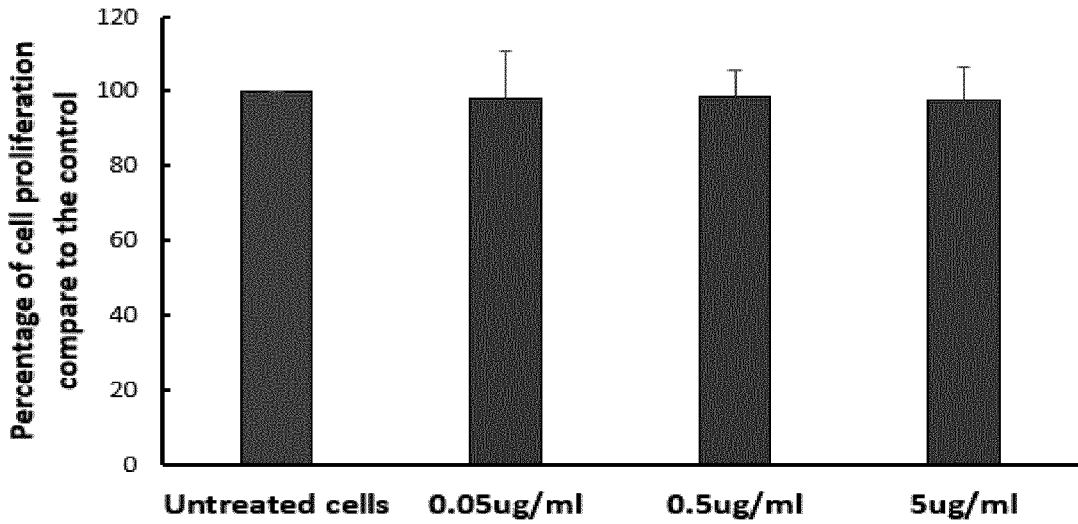


FIGURE 59

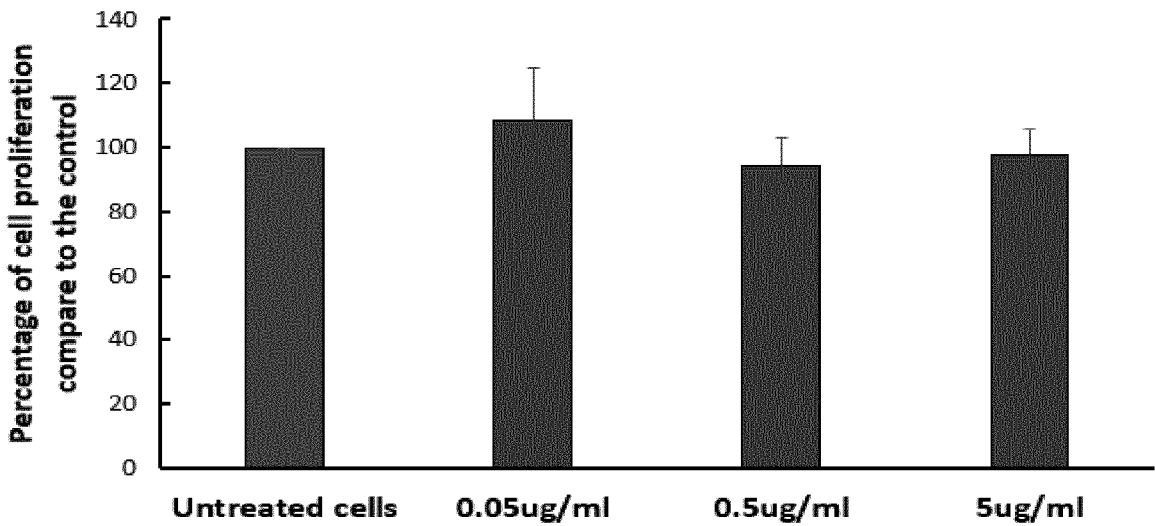
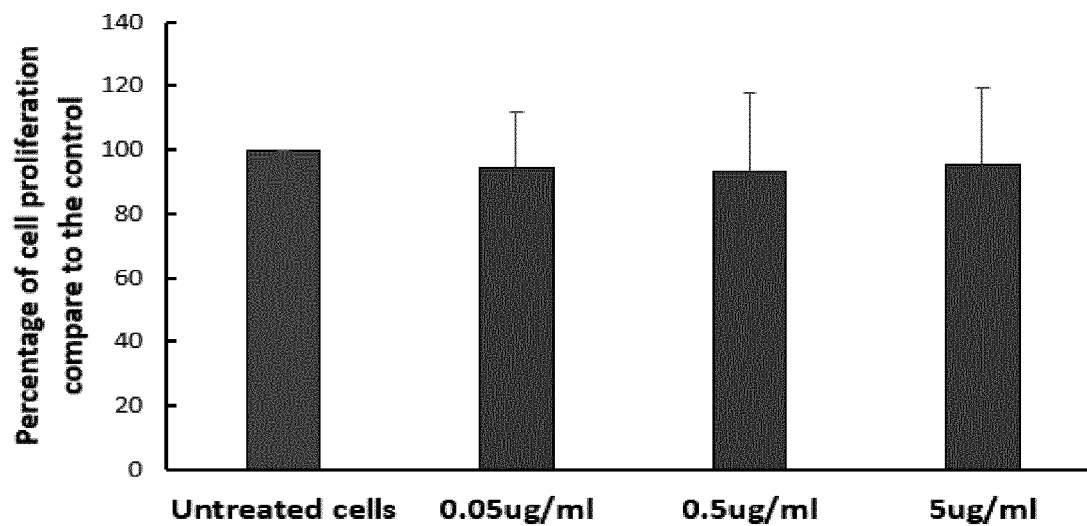
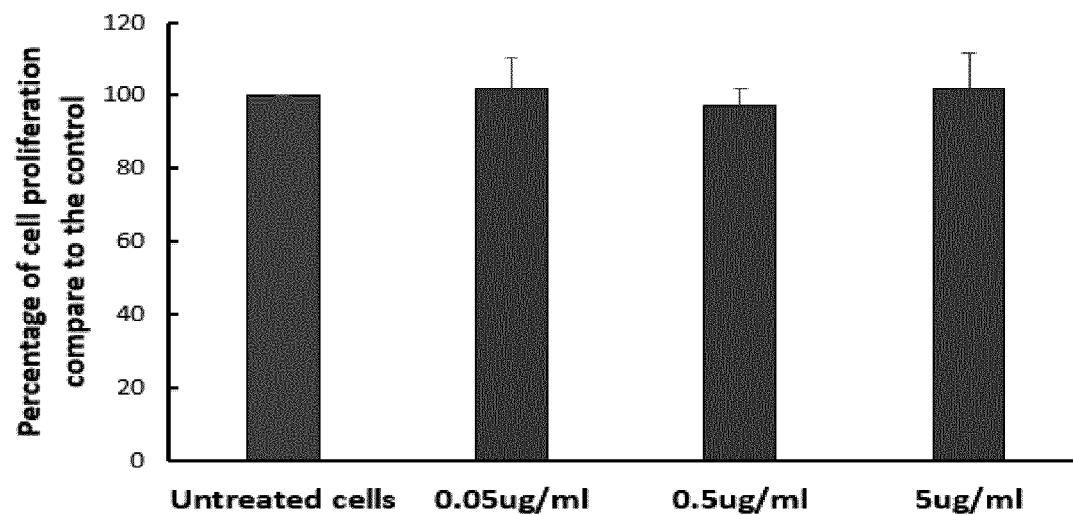
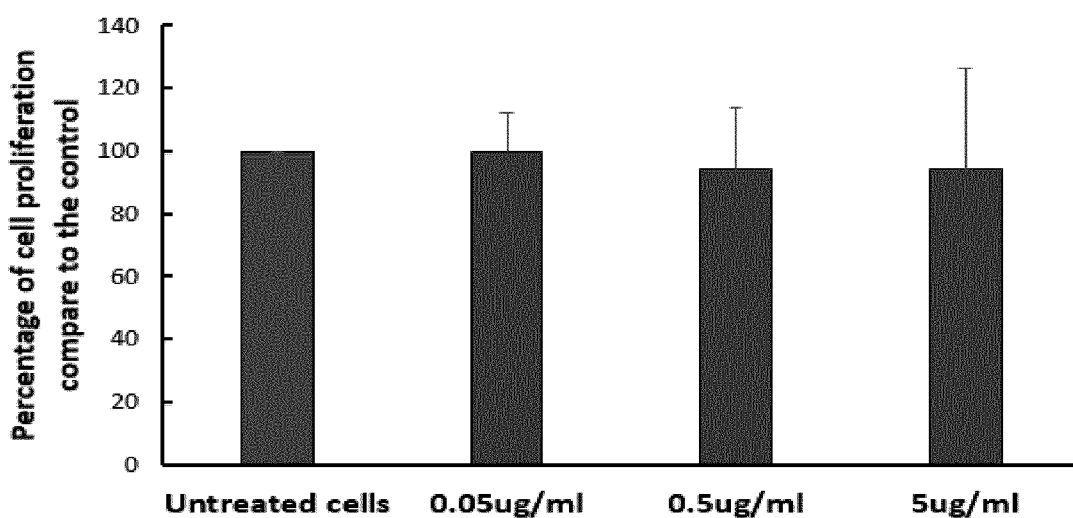


FIGURE 60

**FIGURE 61****FIGURE 62****FIGURE 63**

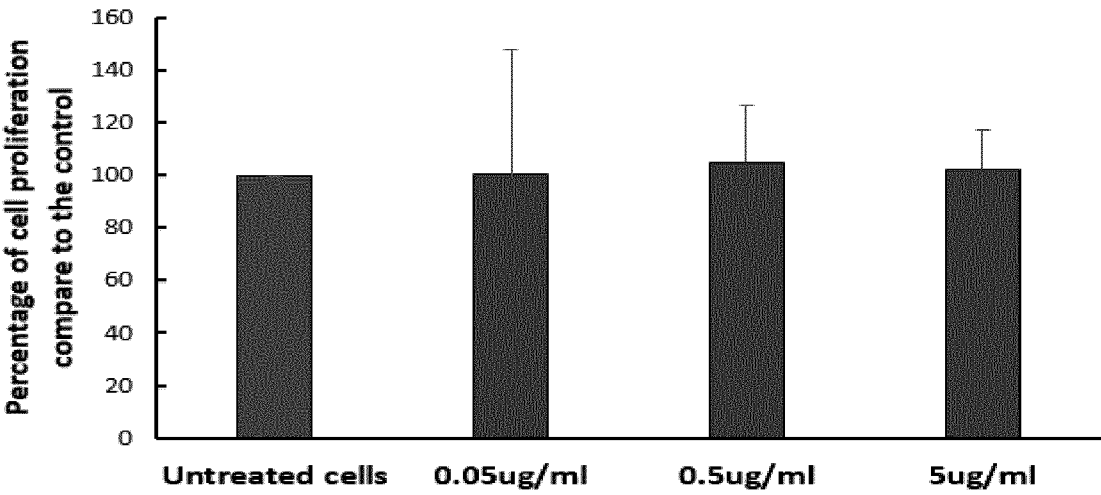


FIGURE 64

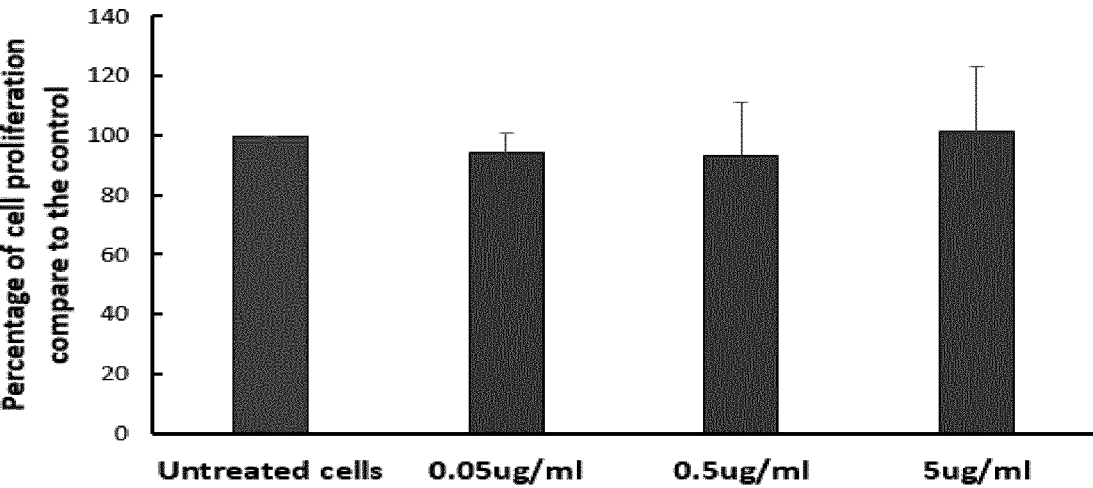


FIGURE 65

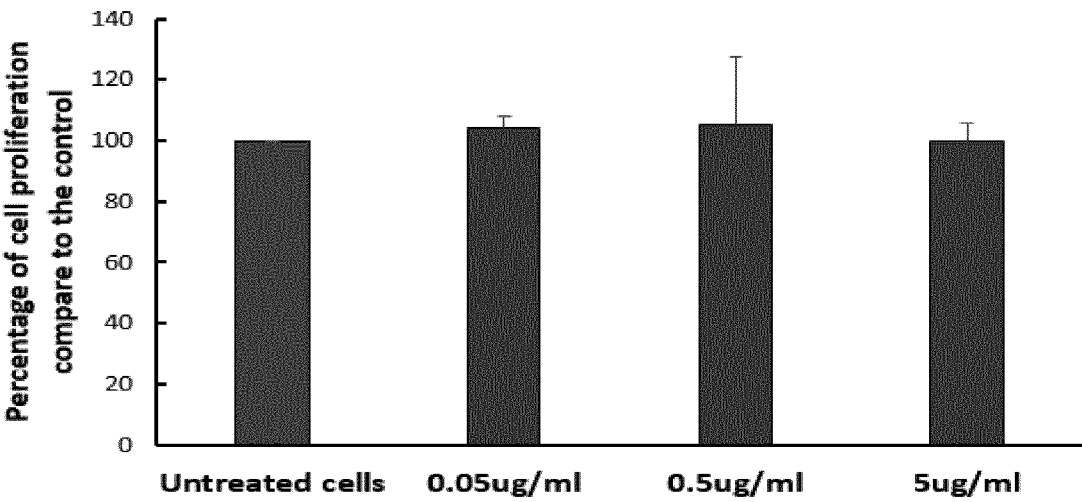


FIGURE 66

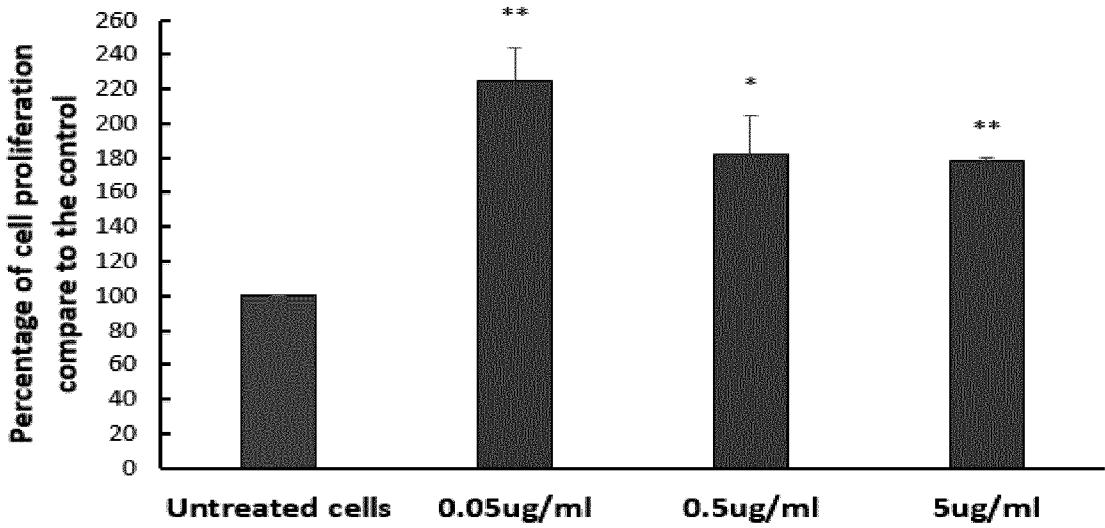


FIGURE 67

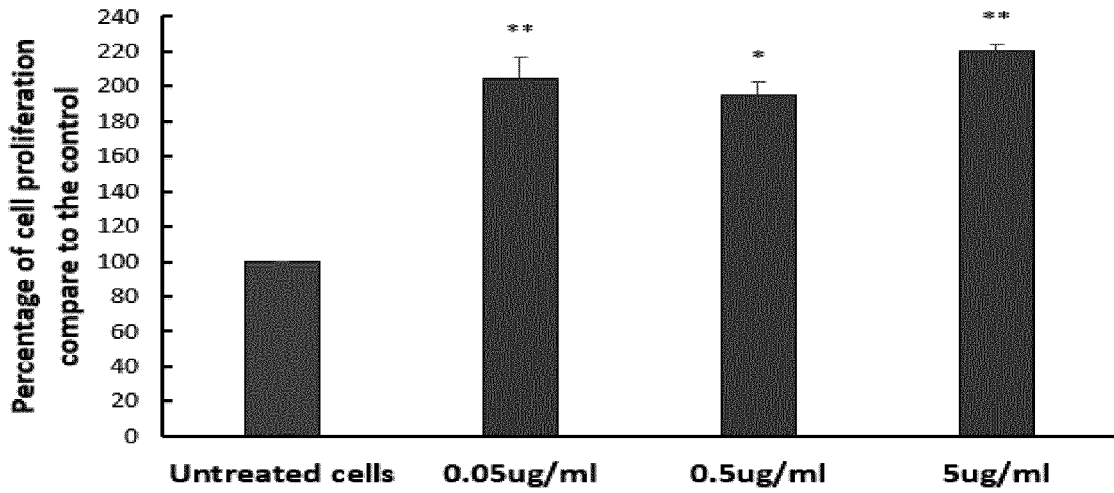


FIGURE 68

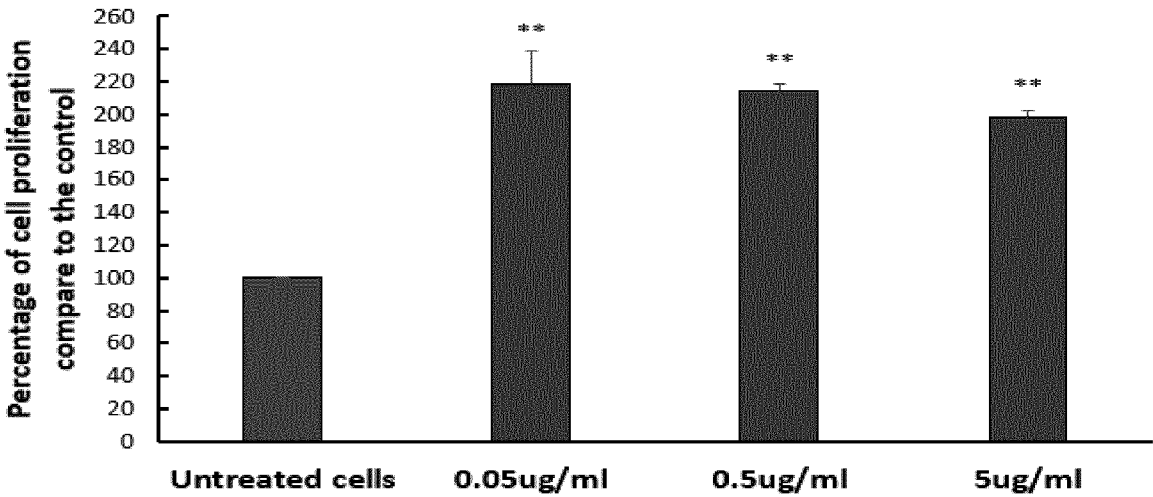


FIGURE 69

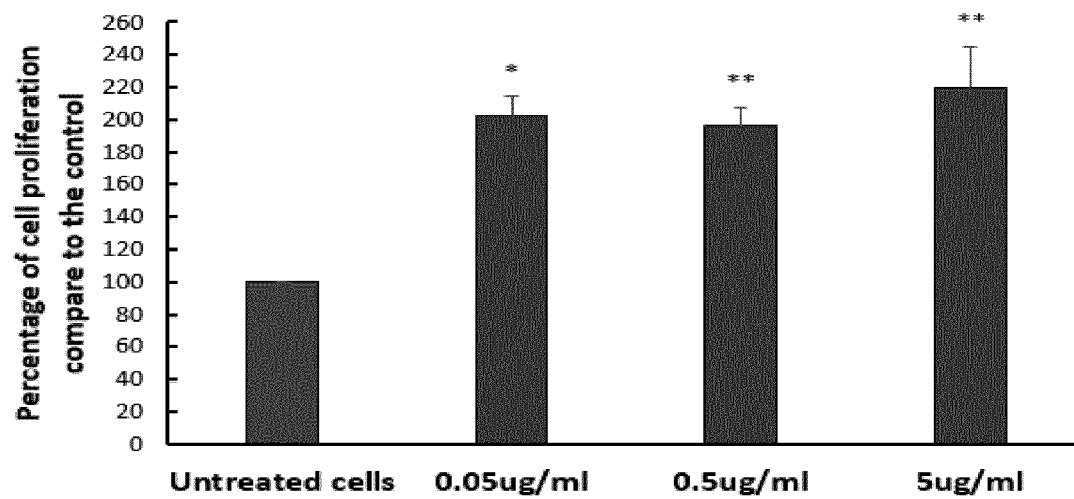


FIGURE 70

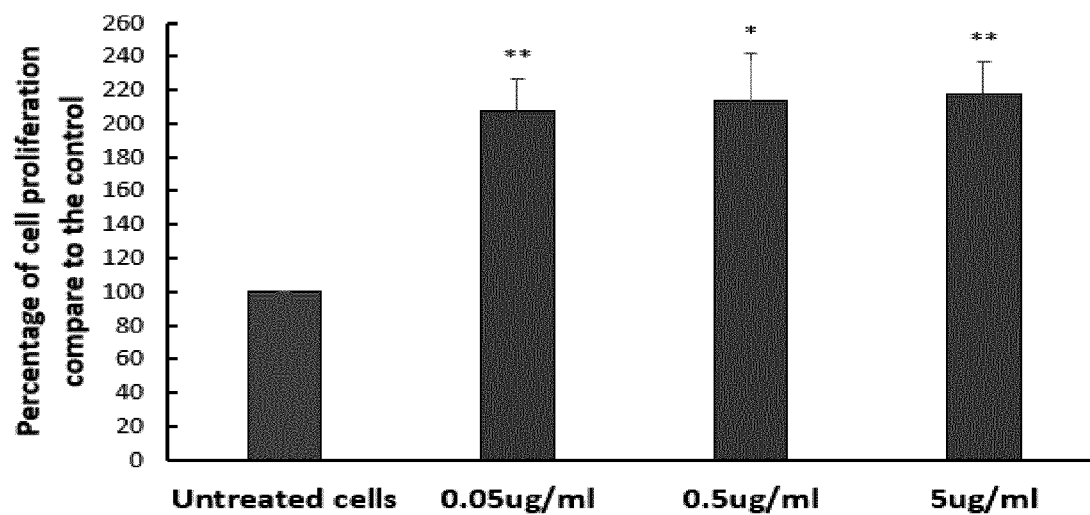


FIGURE 71

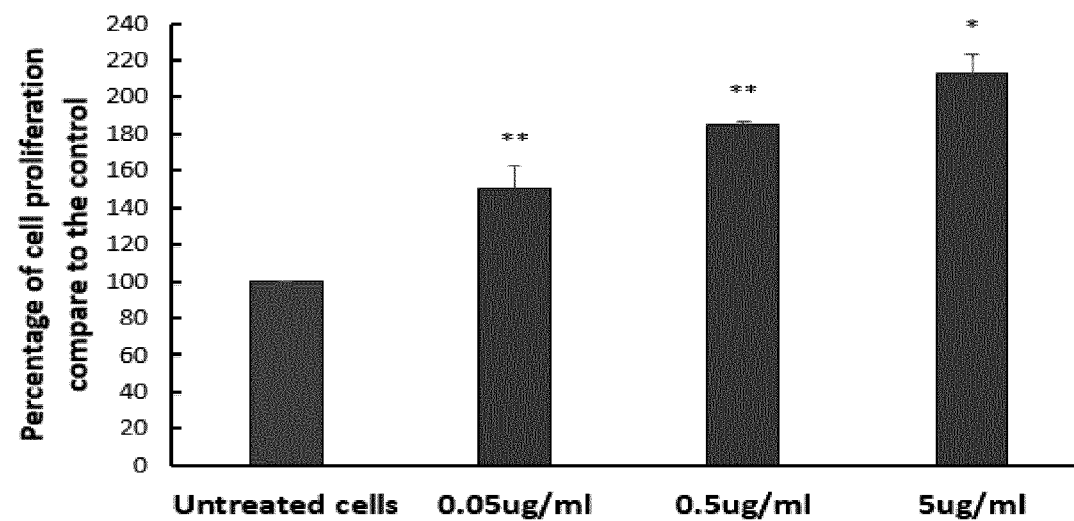


FIGURE 72

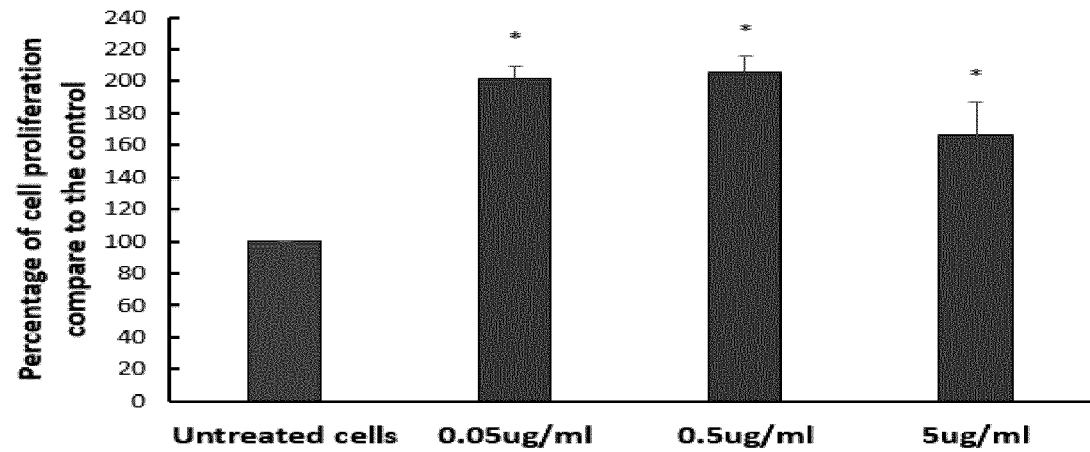


FIGURE 73

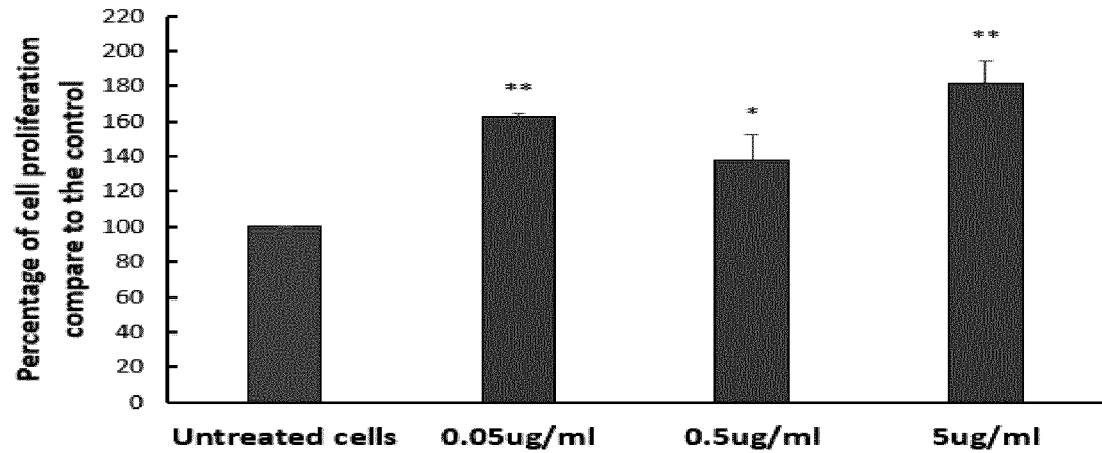


FIGURE 74

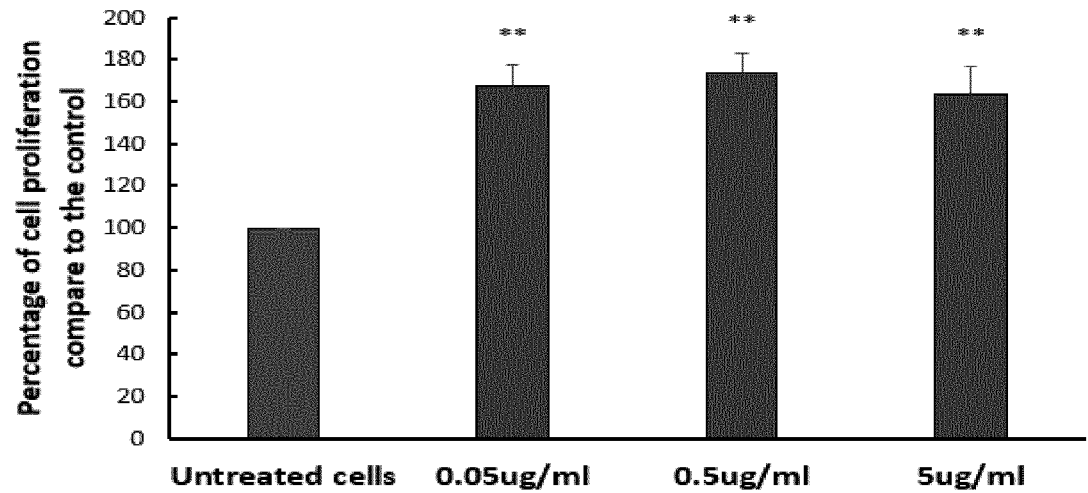


FIGURE 75

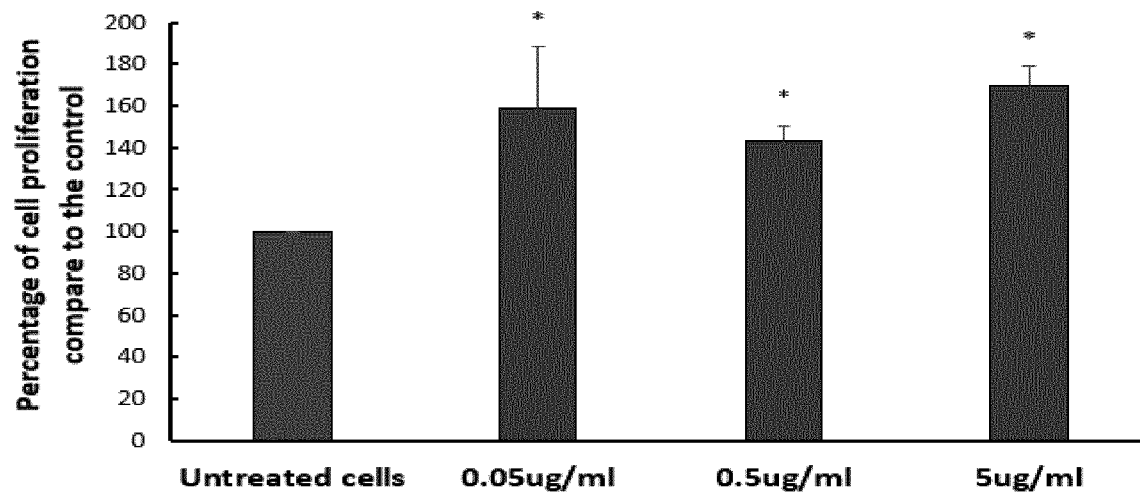


FIGURE 76

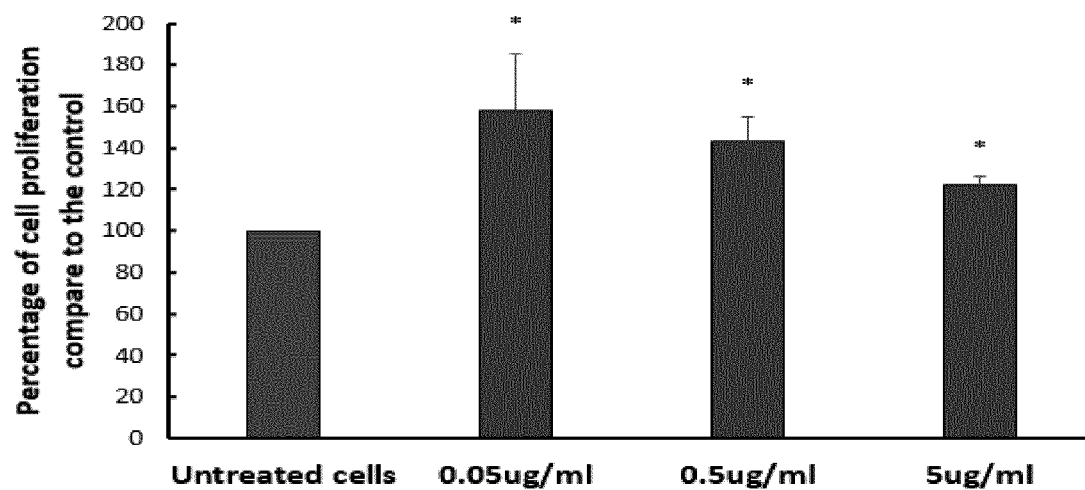


FIGURE 77

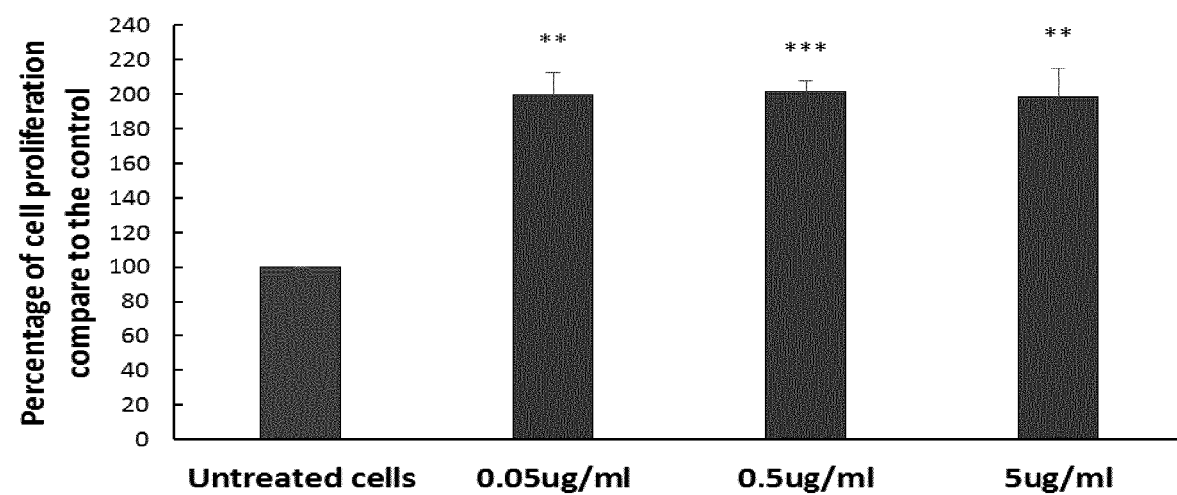


FIGURE 78

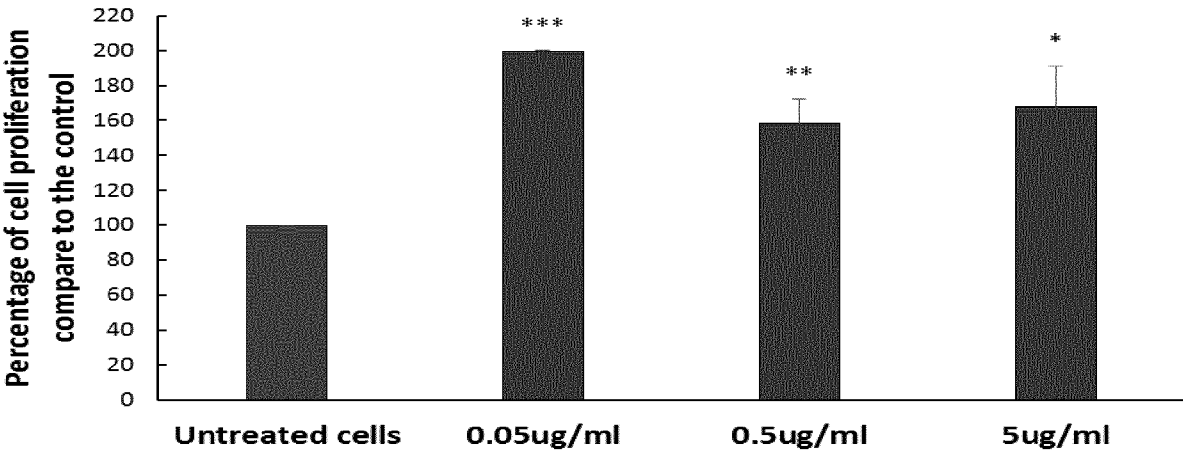


FIGURE 79

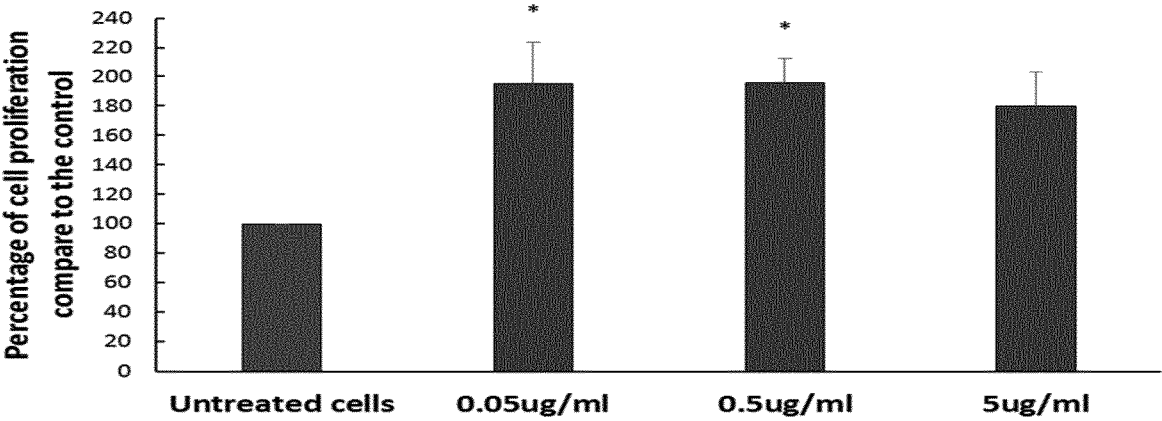


FIGURE 80

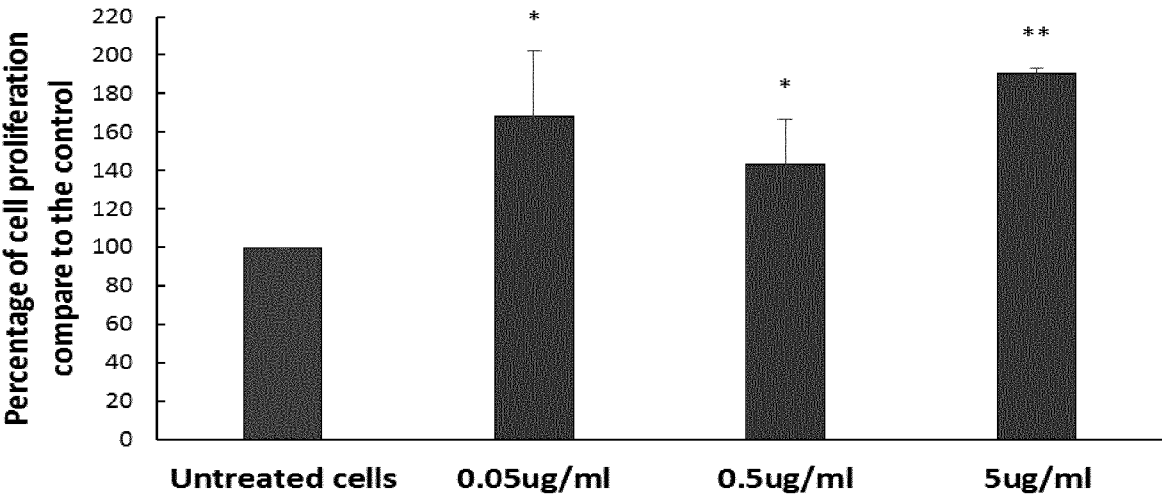
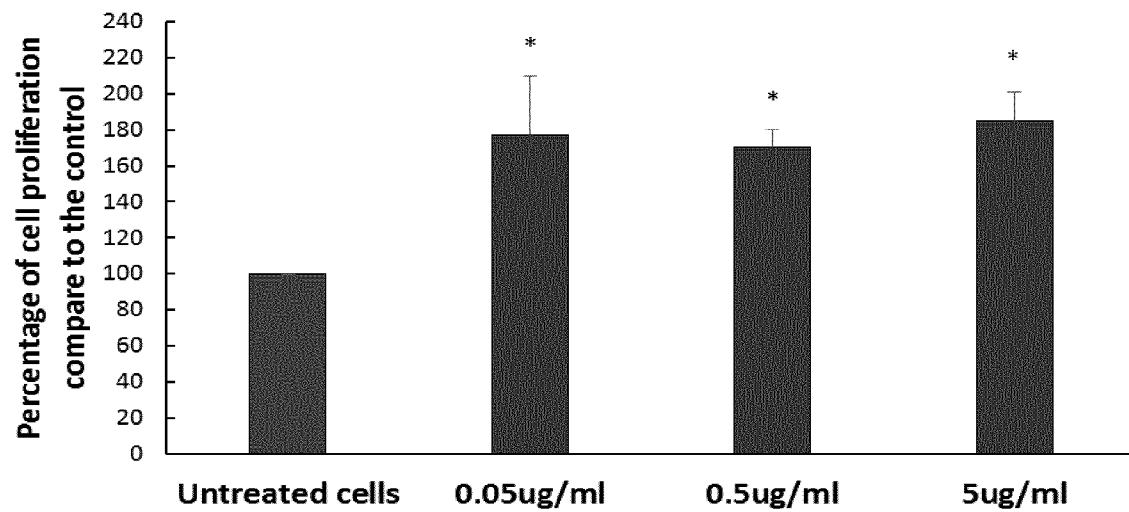
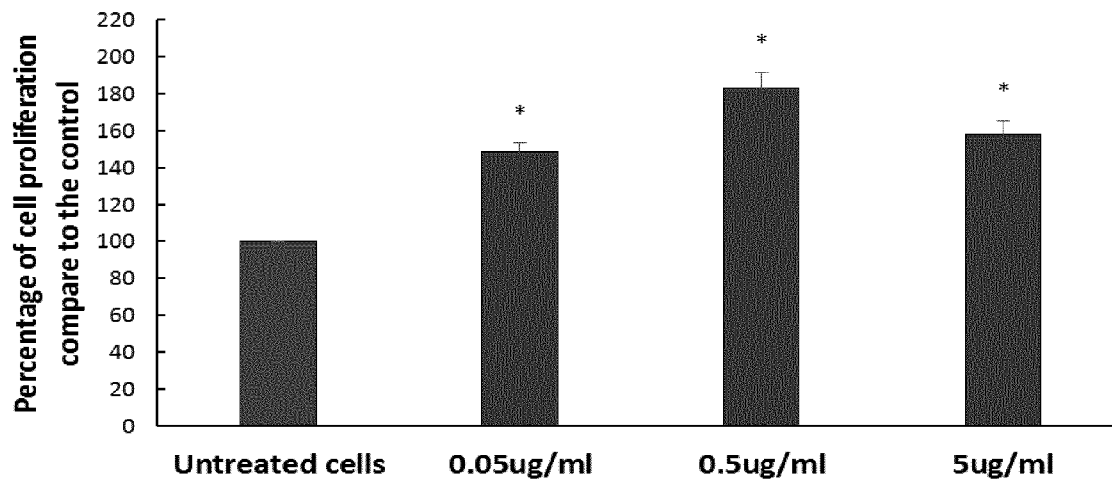
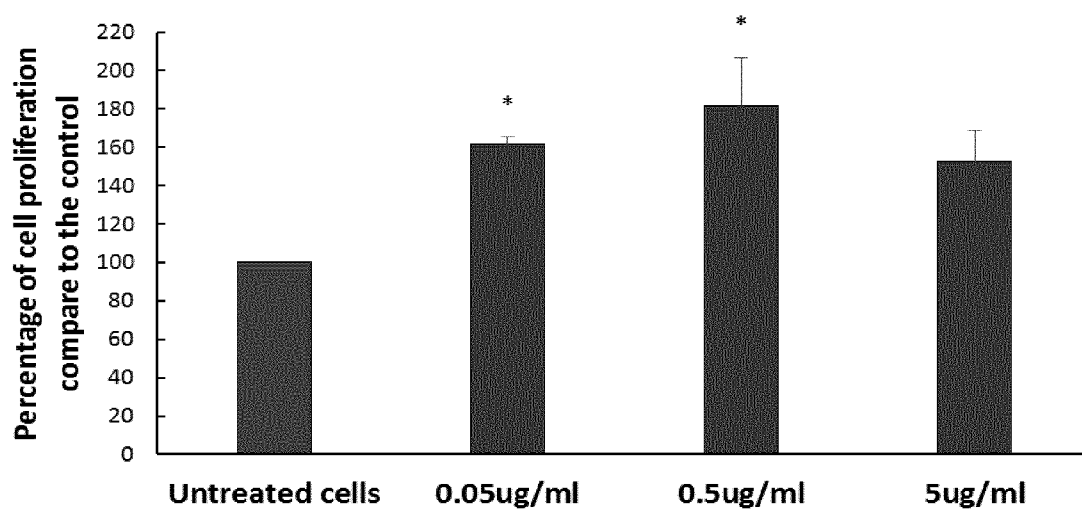


FIGURE 81

**FIGURE 82****FIGURE 83****FIGURE 84**

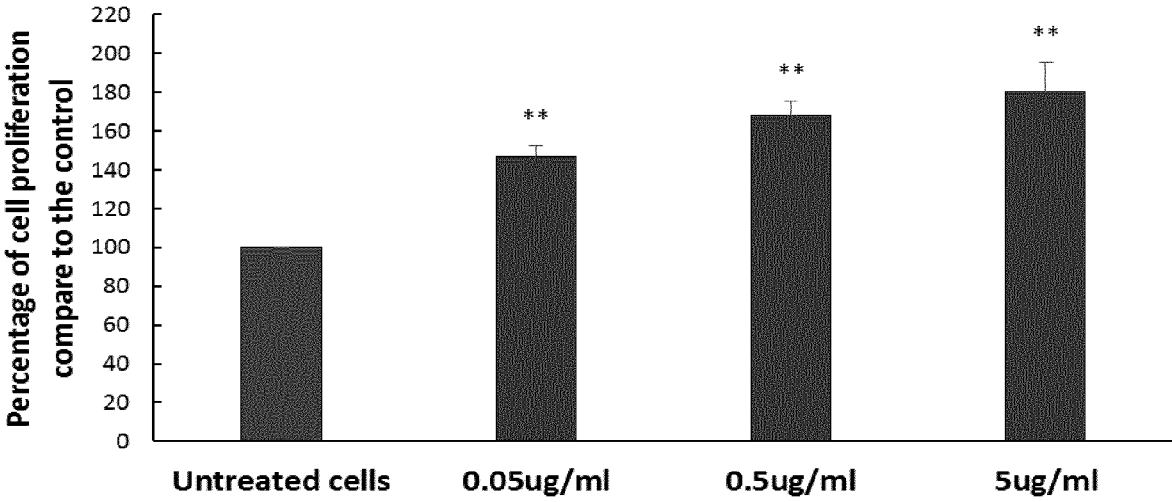


FIGURE 85

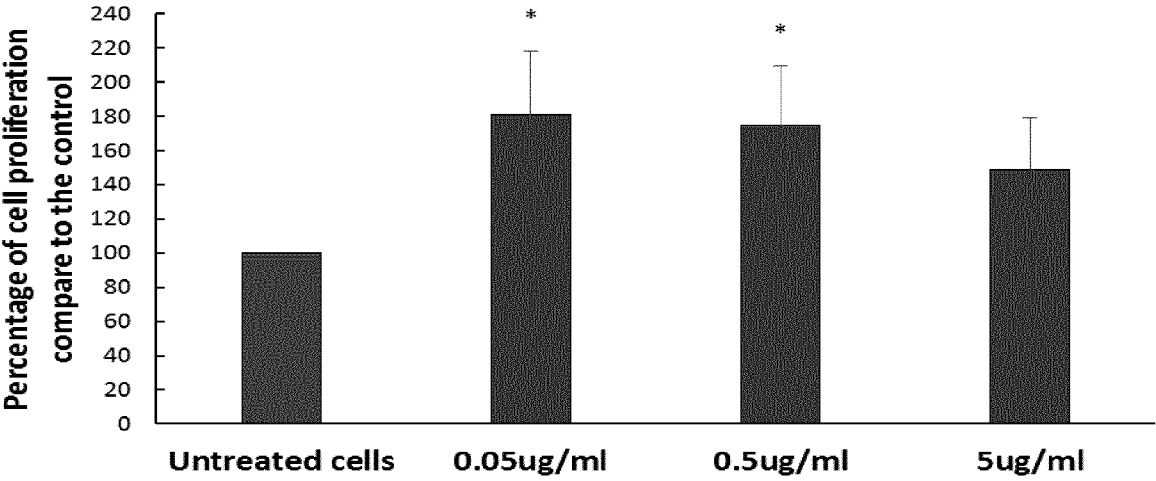


FIGURE 86

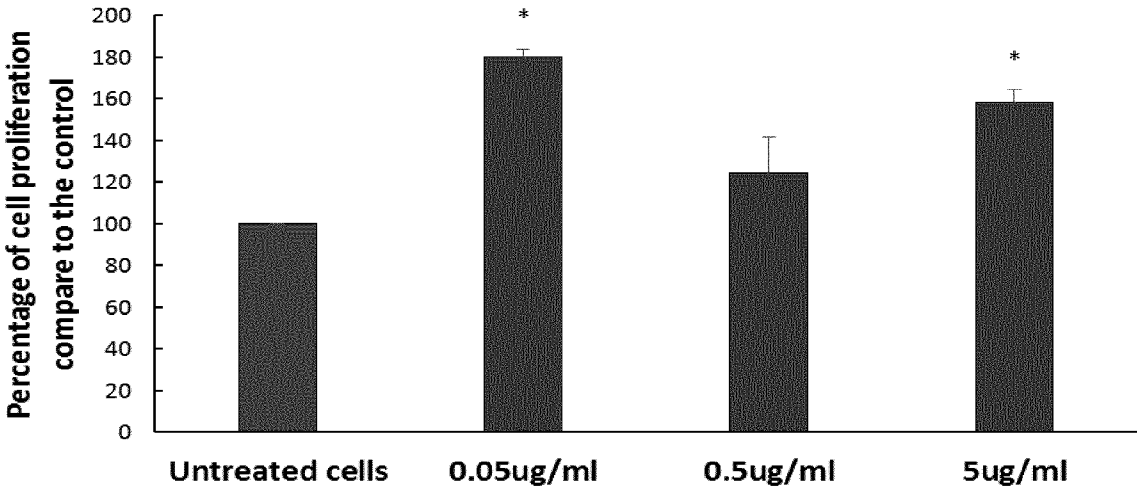
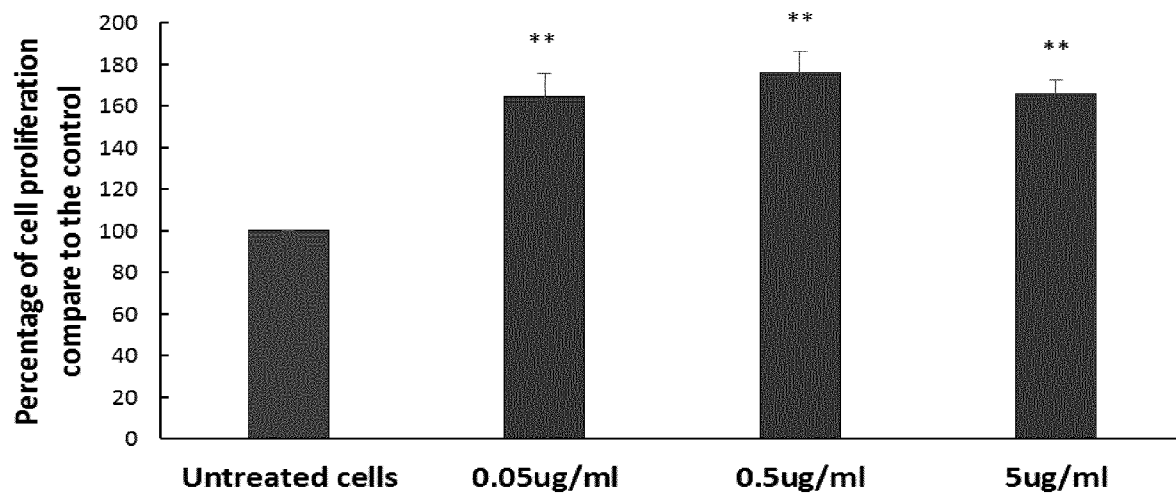
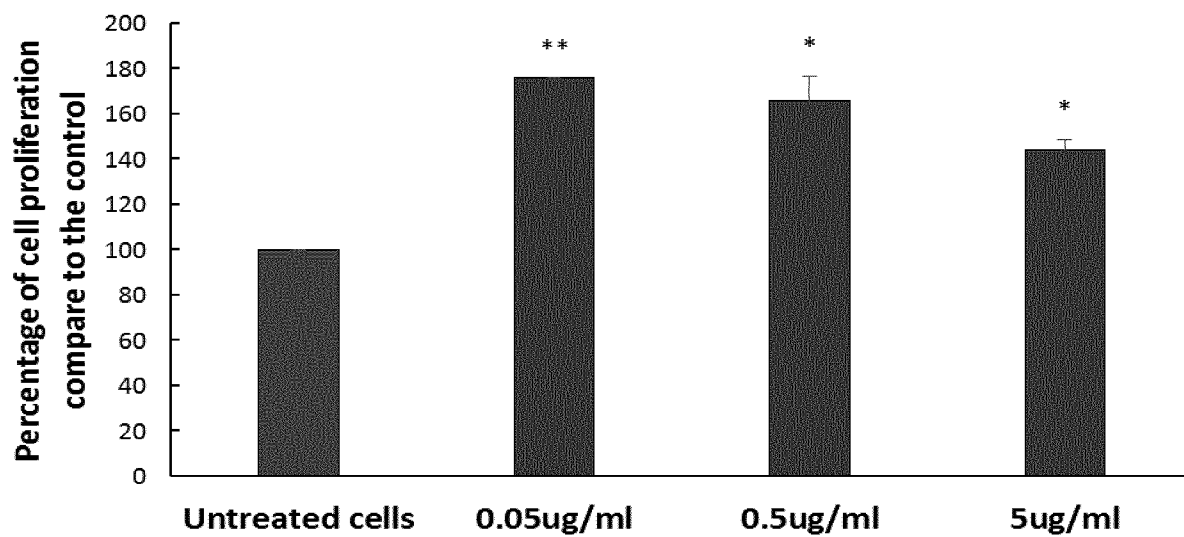
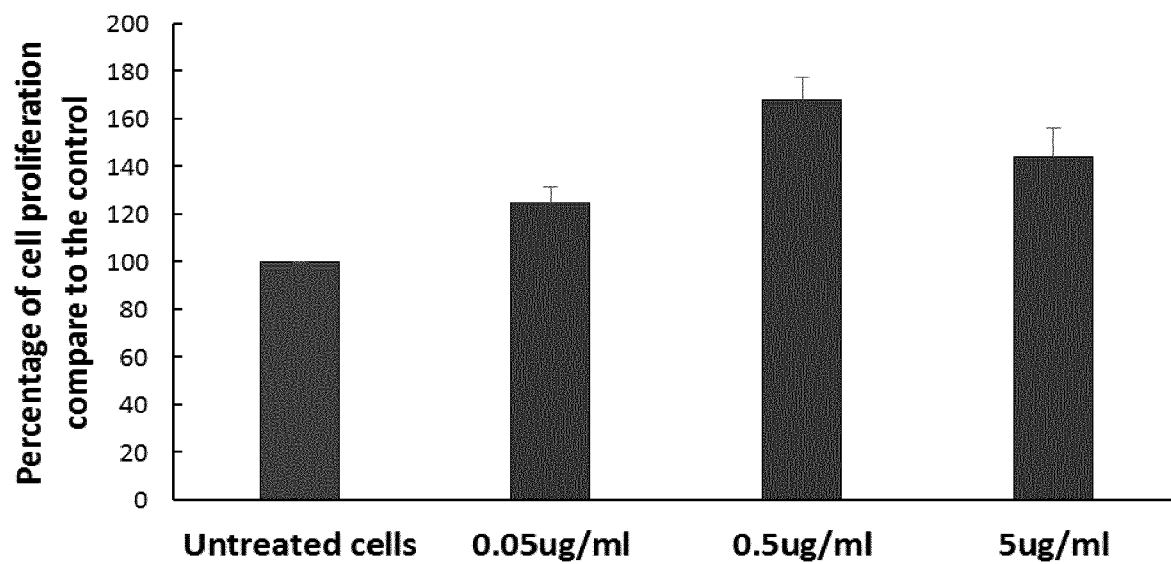
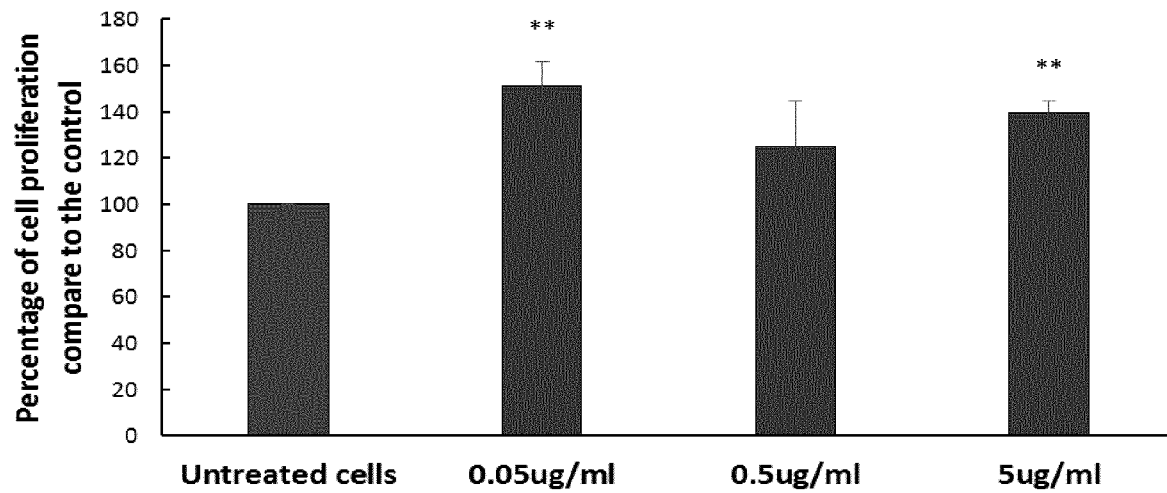
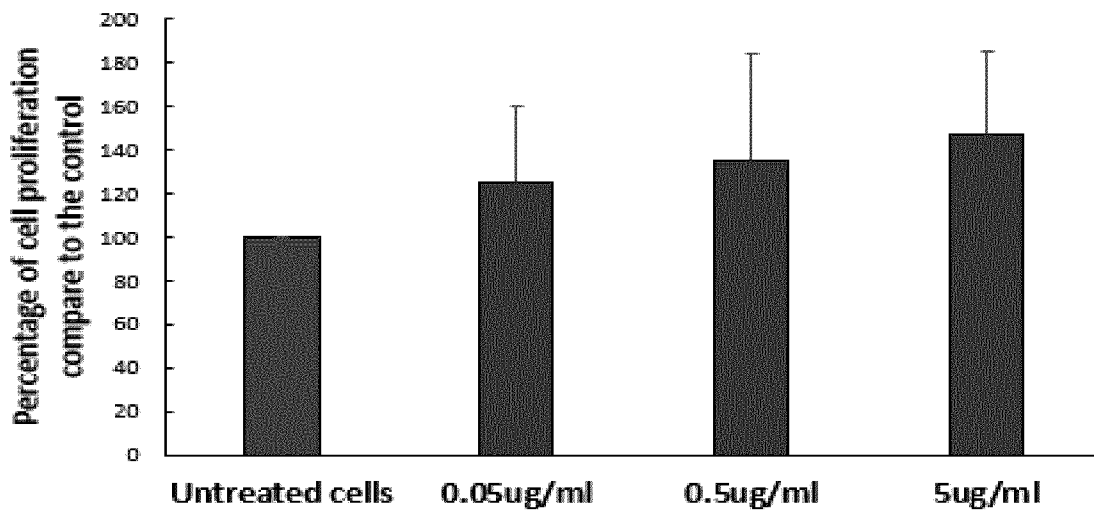
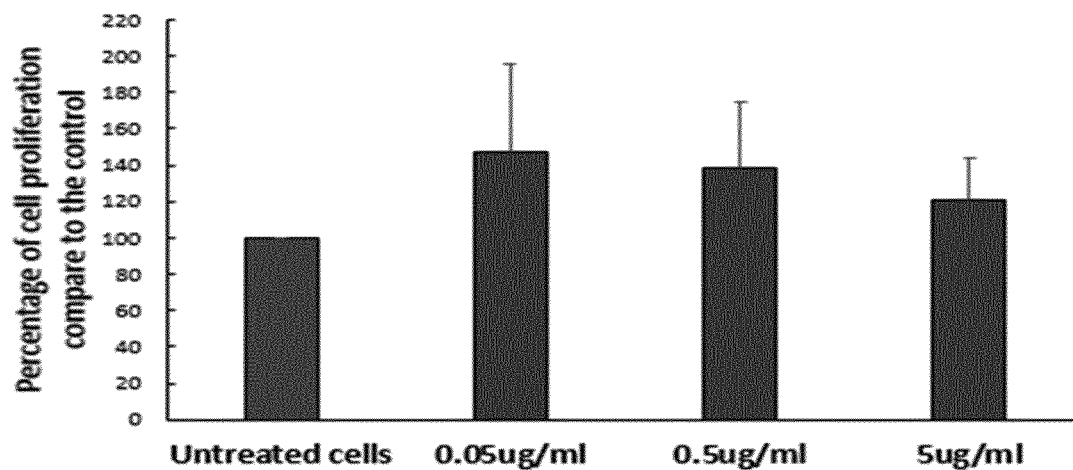


FIGURE 87

**FIGURE 88****FIGURE 89****FIGURE 90**

**FIGURE 91****FIGURE 92****FIGURE 93**

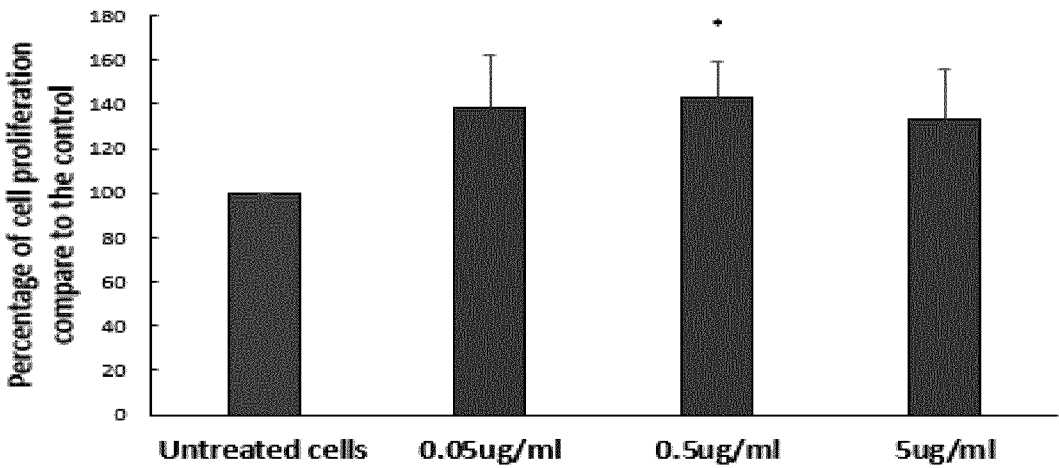


FIGURE 94

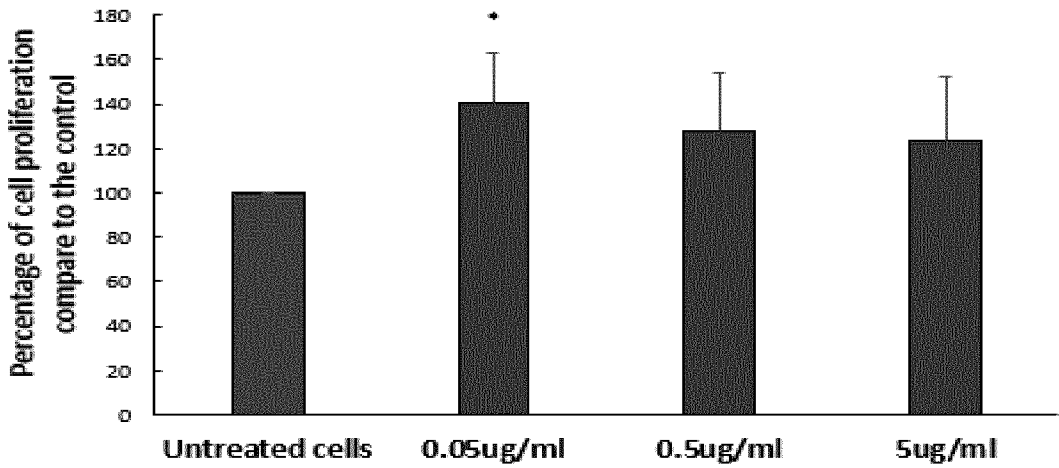


FIGURE 95

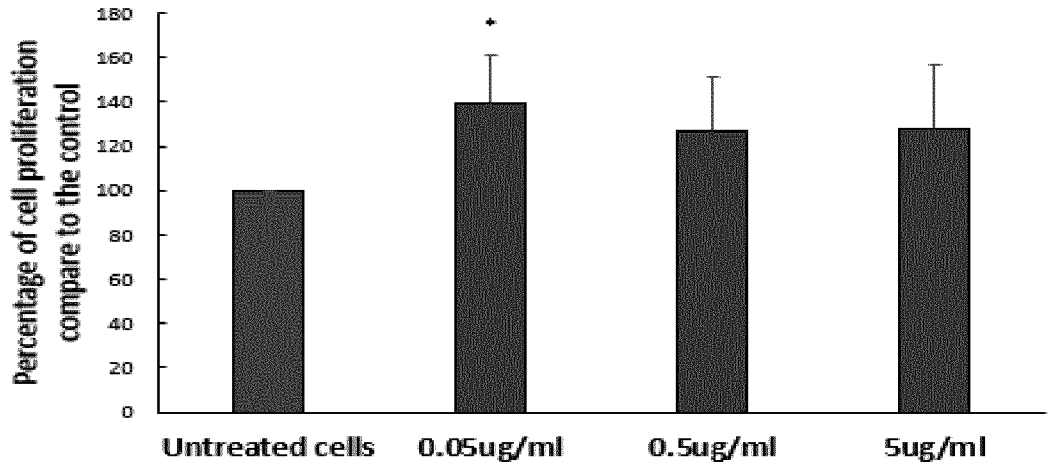


FIGURE 96

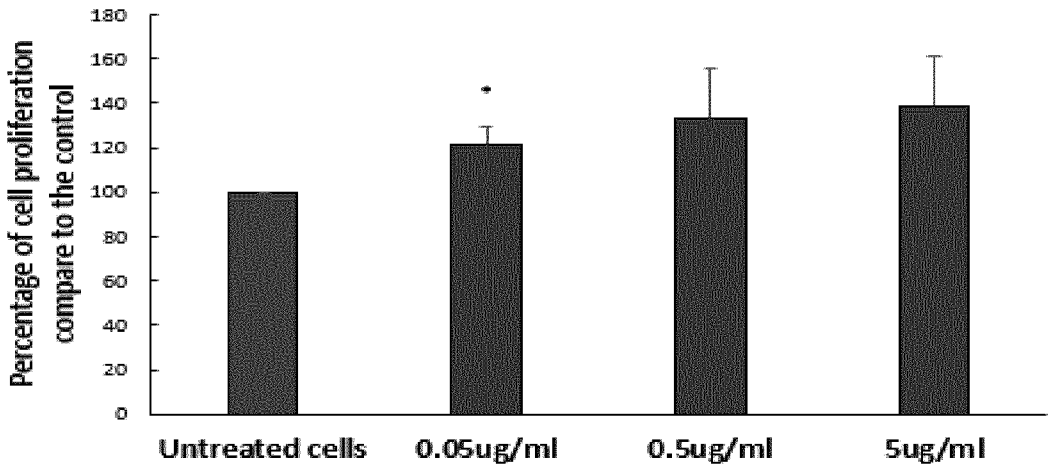


FIGURE 97

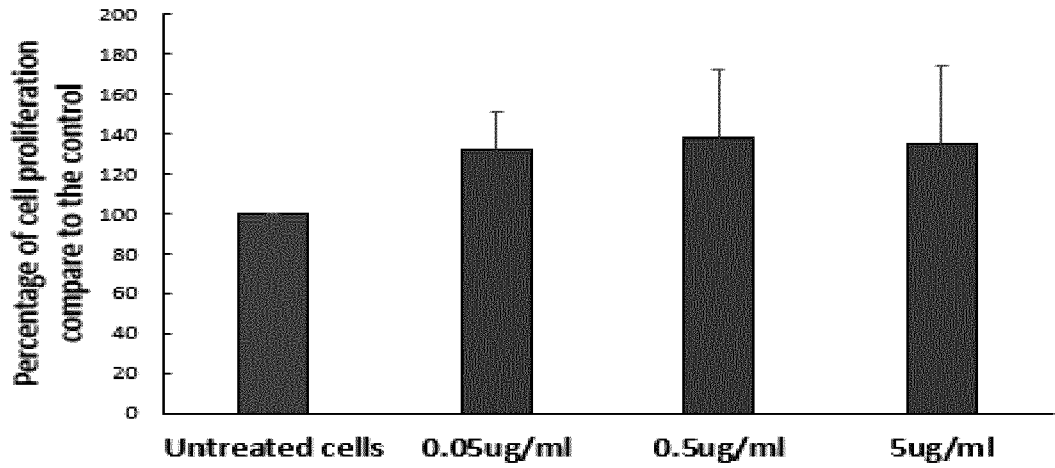


FIGURE 98

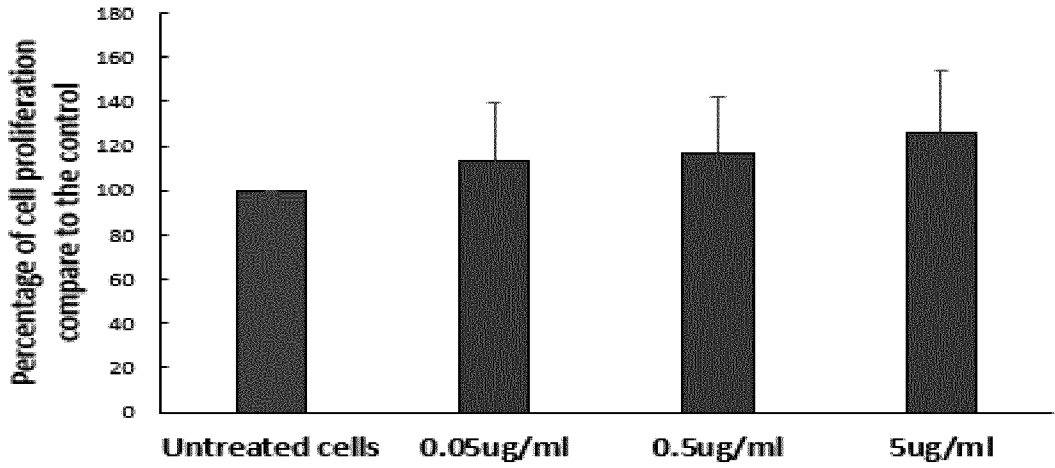
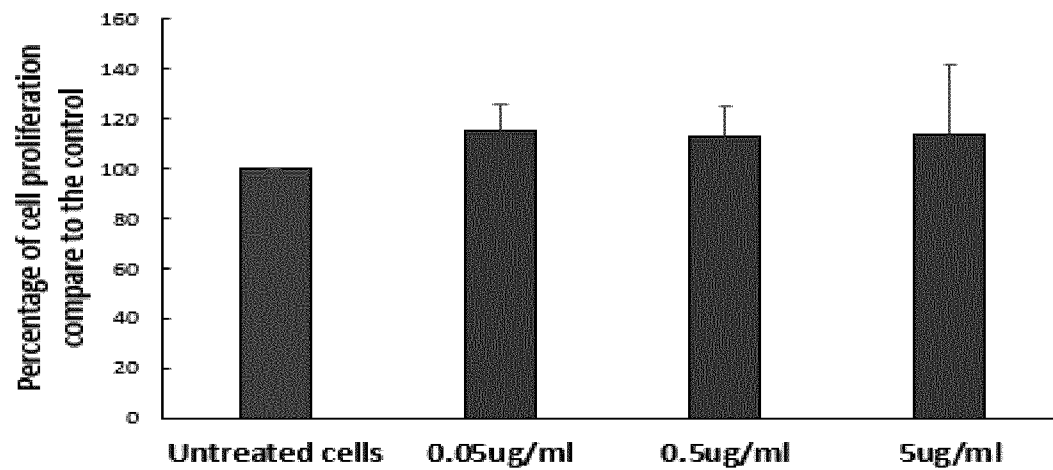
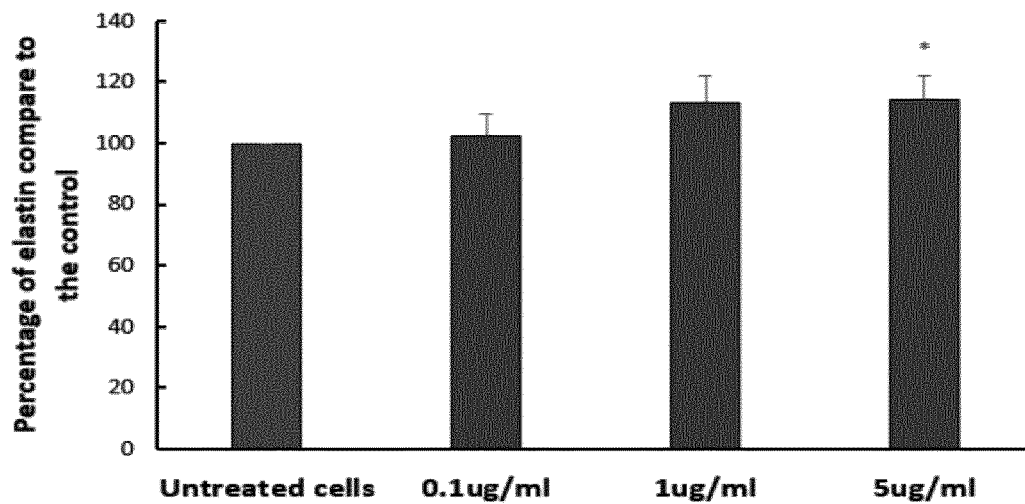
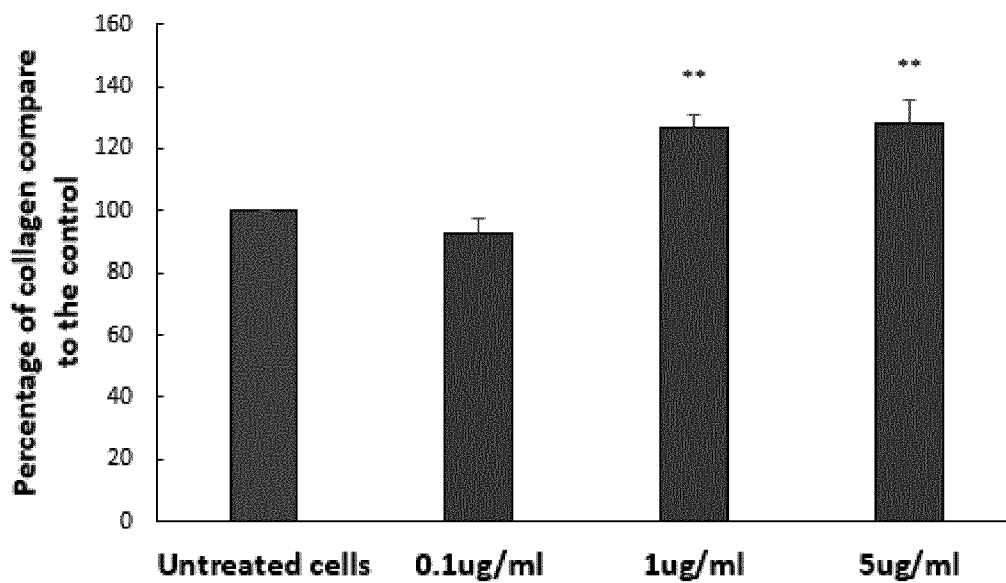


FIGURE 99

**FIGURE 100****FIGURE 101****FIGURE 102**

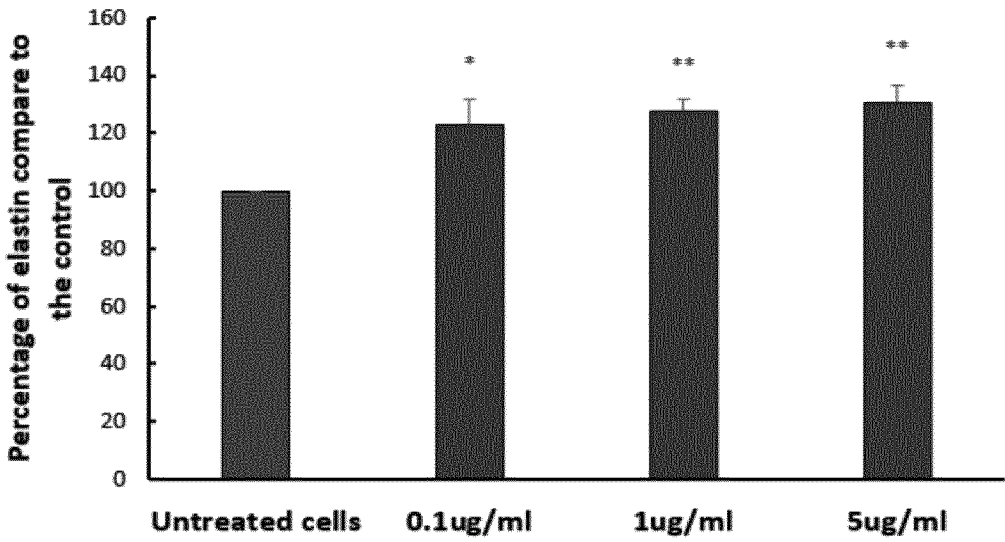


FIGURE 103

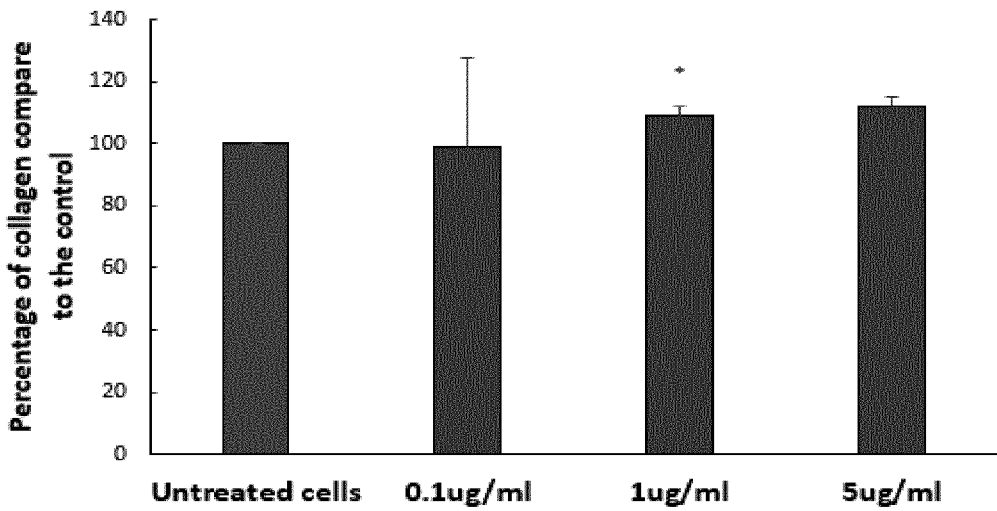


FIGURE 104

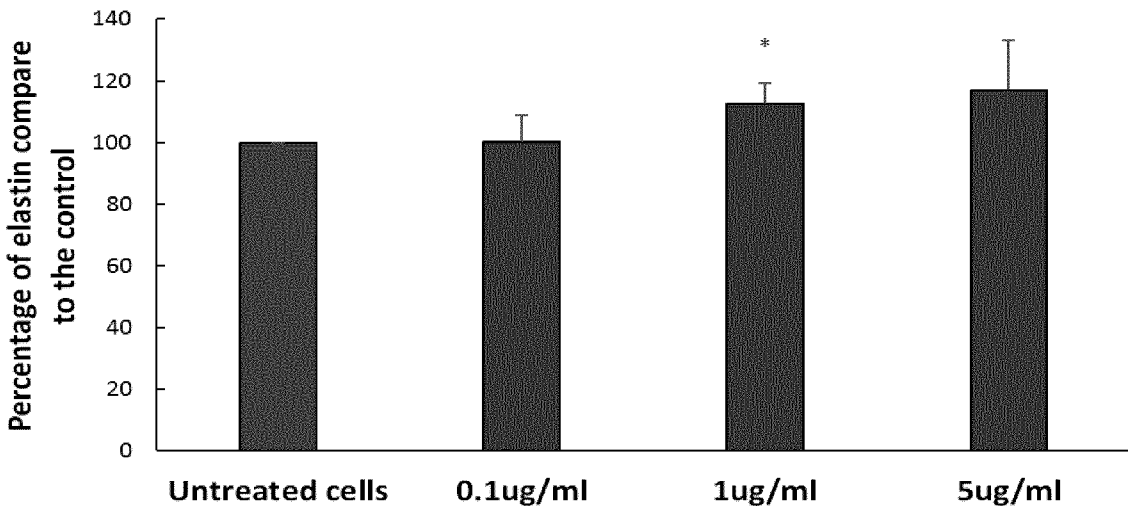
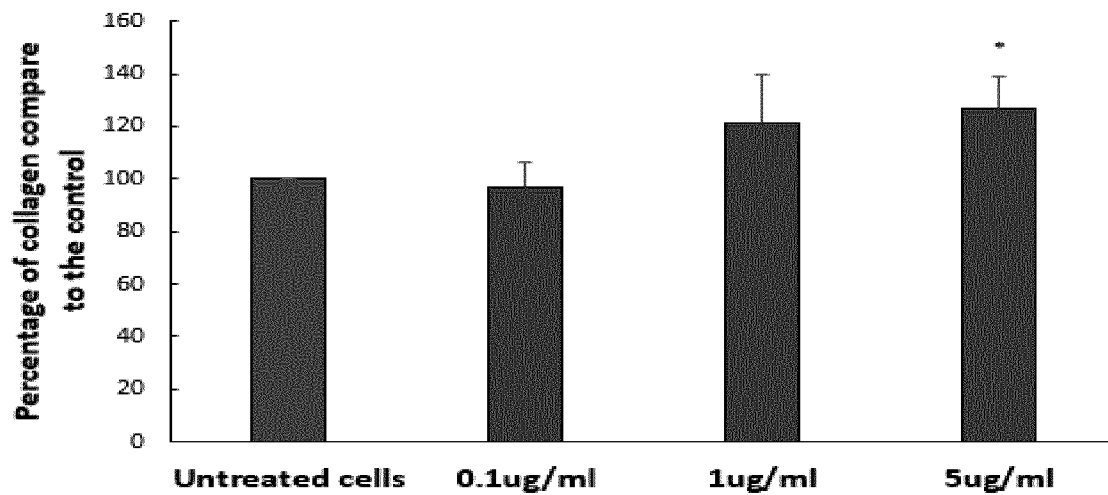
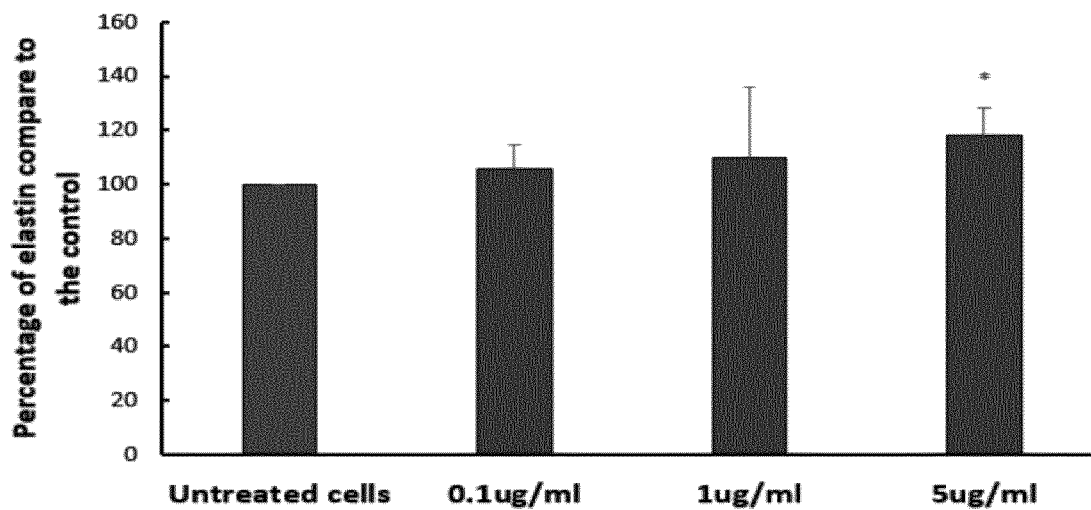
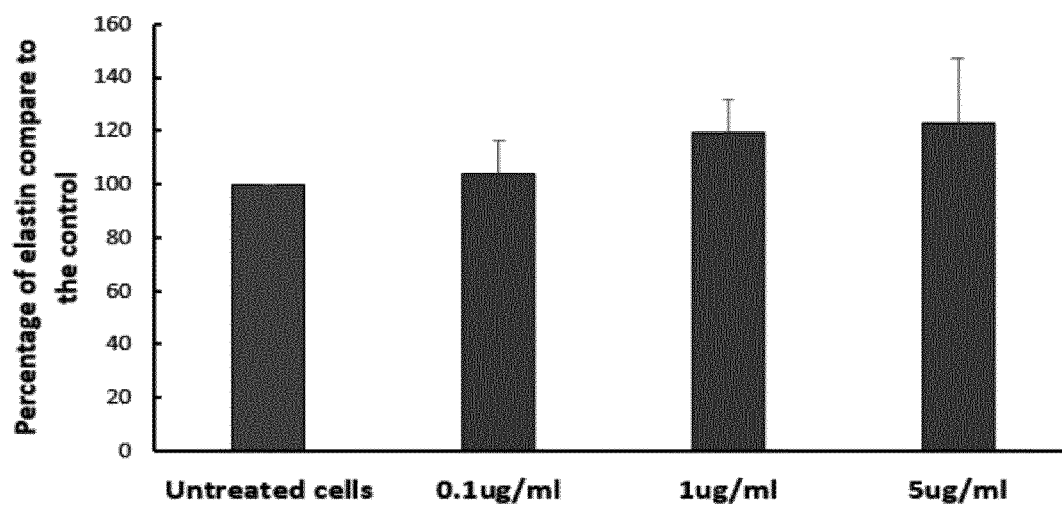
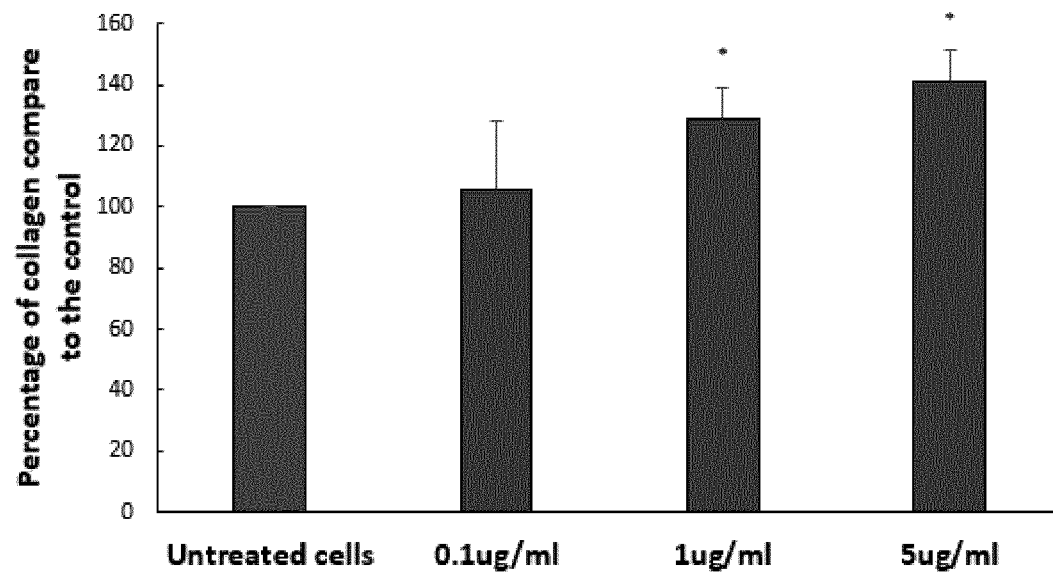
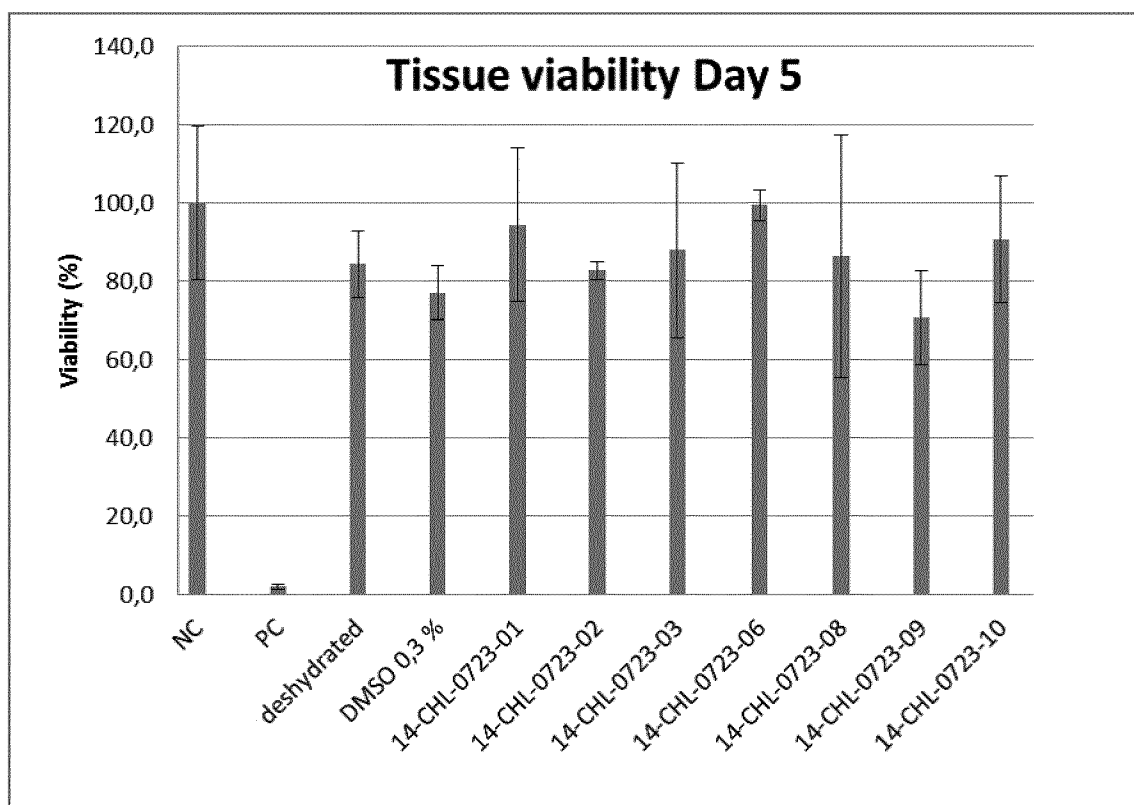


FIGURE 105

**FIGURE 106****FIGURE 107****FIGURE 108**

**FIGURE 109****FIGURE 110**

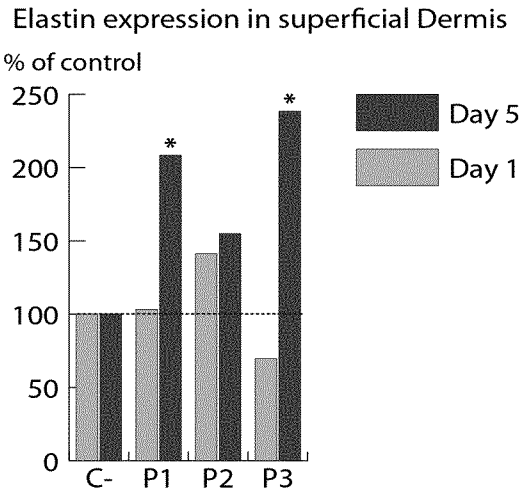


FIGURE 111

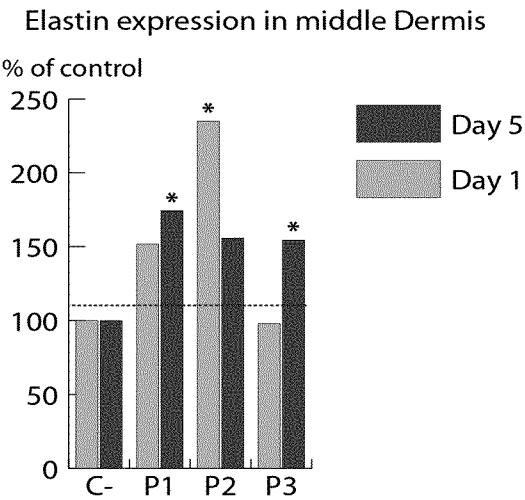


FIGURE 112

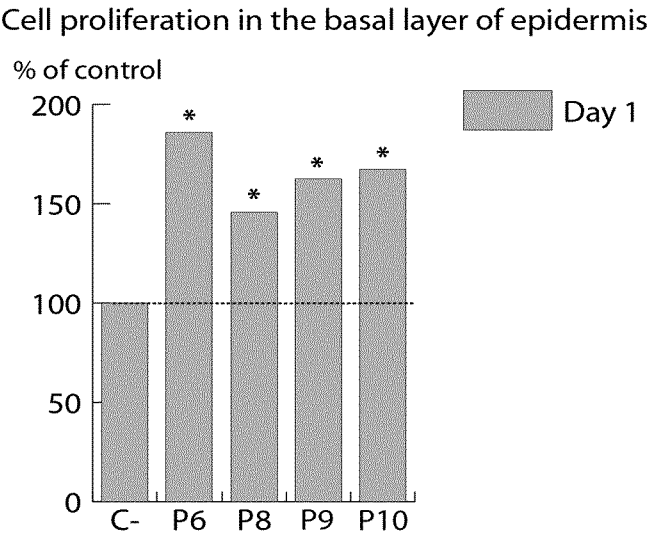
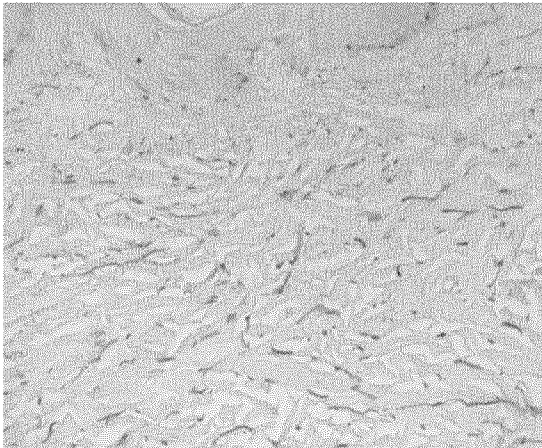
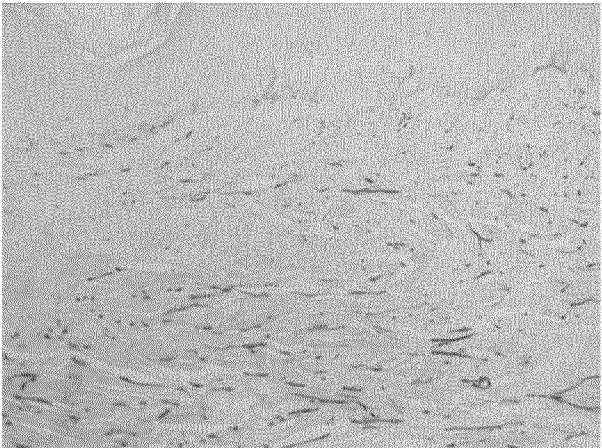
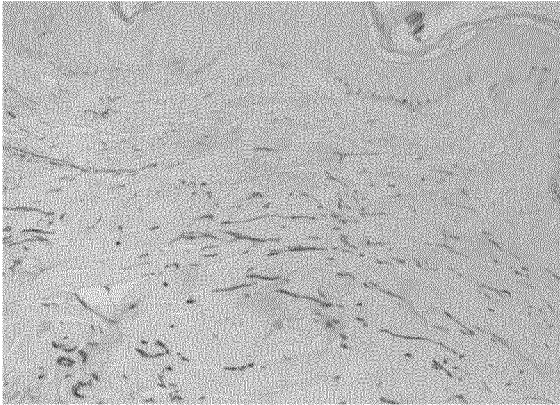
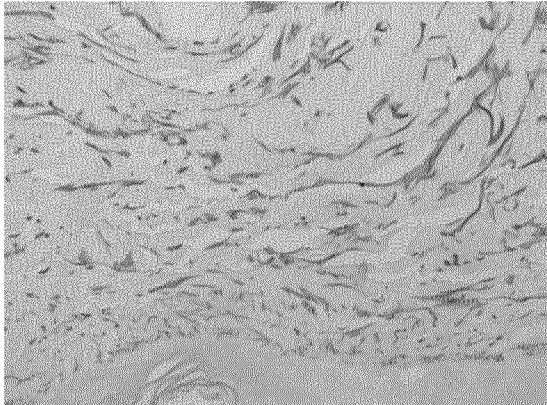
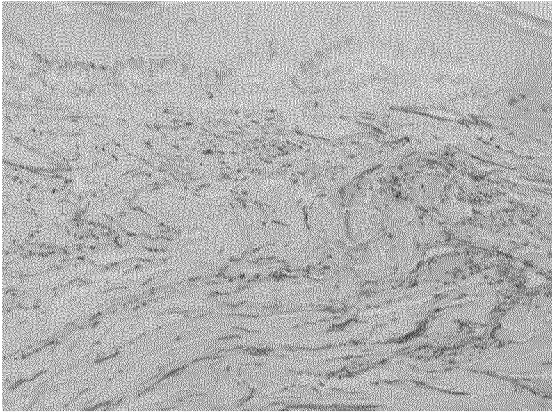
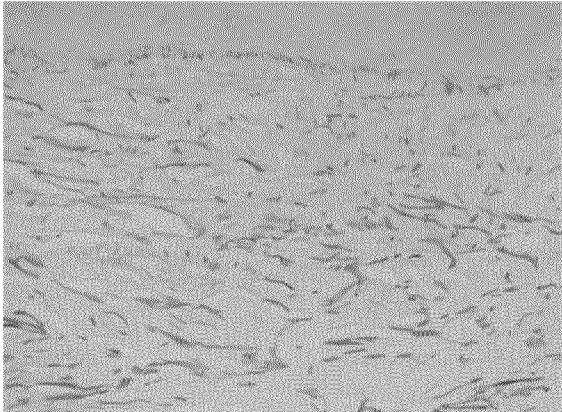


FIGURE 113

FIGURE 114

Day 1	Day 5
 Water	 Water
 0723-01	 0723-01
 0723-02	 0723-02

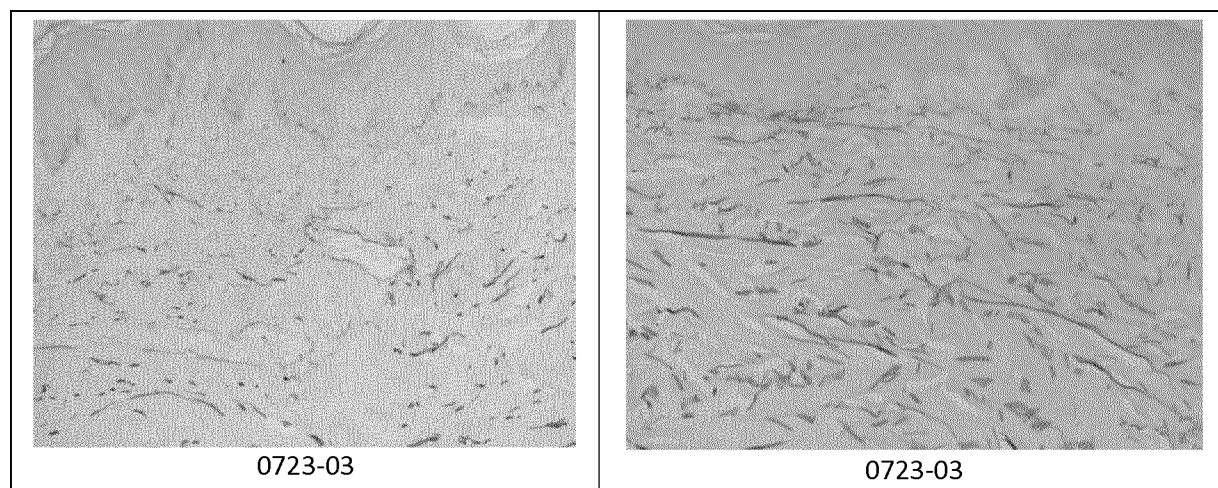
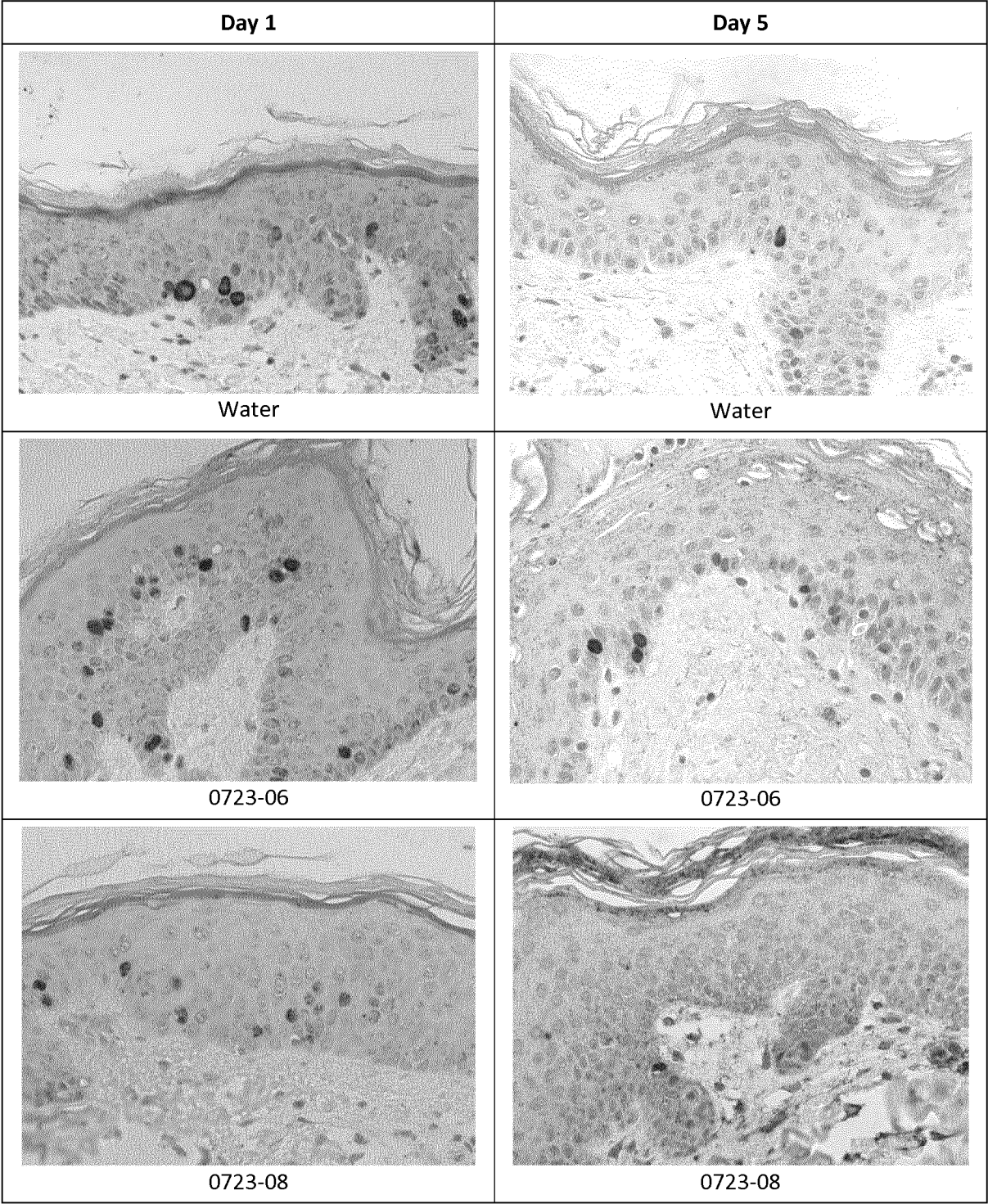


FIGURE 114 (CONTD.)

FIGURE 115



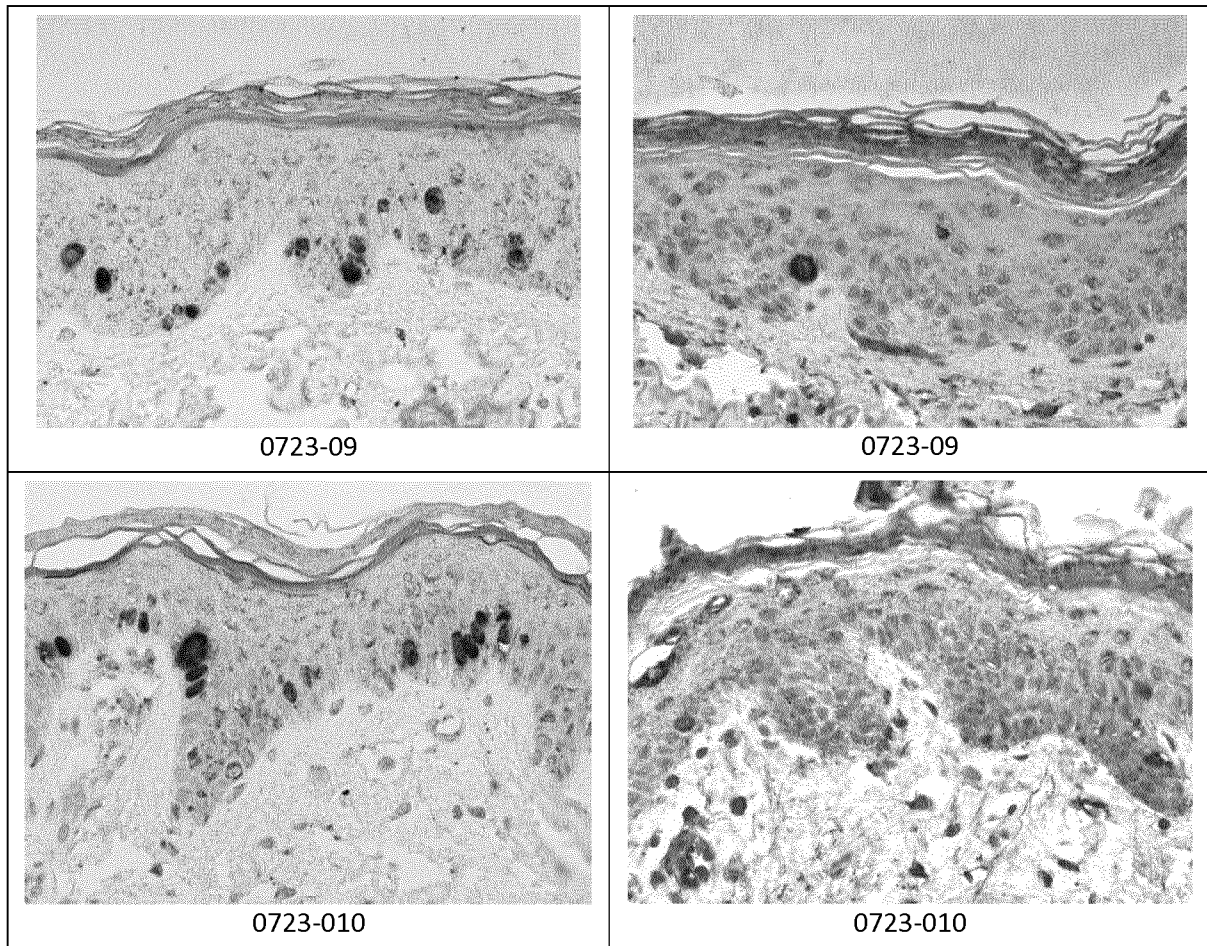


FIGURE 115 (CONTD)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/067097

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K38/01 C07K14/415
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data, Sequence Search, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE Geneseq [Online] 6 November 2001 (2001-11-06), "Human polypeptide SEQ ID NO 19579 from W0200164835", XP002764287, retrieved from EBI accession no. GSP:AA005687 Database accession no. AA005687 sequence	1-19
X	----- JP 2001 335596 A (SAKAMOTO KENJI; NAGOSHI HIDEO) 4 December 2001 (2001-12-04) sequence 21 -/--	1-19



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See patent family annex.

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Date of the actual completion of the international search

16 November 2016

Date of mailing of the international search report

05/12/2016

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Authorized officer

Niebuhr-Ebel, K

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/067097

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/067097

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 2007094570	A1	23-08-2007	KR 20070082785 A
			22-08-2007
			WO 2007094570 A1
			23-08-2007
