and the one adopted will depend on the character, area and amount of hair growth, as well as on the patient's age, underlying disease or condition and their personal preference as well as possible side effects of the treatment of choice.

Of course, it is also recognised that healthy individual may wish to inhibit hair growth on selected areas of their body for purely cosmetic reasons.

Treatment options for removing excess hair are limited and can vary in effectiveness, the degree of discomfort, and cost. Current methods for removing this unwanted hair include such over-the-counter methods as plucking, waxing (including the sugar forms), depilatories, shaving, and home electrolysis. Hair removal methods that could take place in a doctor's office include laser removal and intense pulsed light (IPL). An additional modality is a topical cream that inhibits hair growth: eflornithine 13.9% cream (*Vaniqa*®, Shire Pharmaceuticals).

These methods are temporary with the time of regrowth ranging from a few days to a few months. For hirsutism associated with PCOS, treatments include oral contraceptives and/or anti-androgens, such as spironolactone, cyproterone acetate, flutamide and finasteride.

Accordingly, there is a need for new treatments for inhibiting hair growth, suitable for use in both medical and cosmetic applications.

Summary

In one aspect of the present disclosure, there is provided a use of a composition in the manufacture of a medicament for treatment and/or prevention of a disease or disorder associated with unwanted and/or excessive hair growth in a human, wherein the composition comprises:

(a) a polypeptide comprising or consisting of an amino acid sequence of SEQ ID NO:1

VDTYDGDISVVYGLR **SEQ ID NO:1**

or a fragment or variant thereof which retains an inhibitory activity on mammalian hair production; and

(b) a pharmaceutically acceptable and/or cosmetically acceptable excipient, carrier, adjuvant or diluent

wherein the polypeptide is between 5 and 50 amino acids in length.

In a further aspect of the present disclosure, there is provided a use of a composition as defined herein, for cosmetic hair removal in a human.

In yet another aspect of the present disclosure, there is provided a use of a polypeptide as defined herein, wherein the polypeptide is for *ex vivo* or *in vitro* inhibiting hair production.

Description

A first aspect of the invention provides a composition for use in inhibiting hair production in a mammal comprising:

(a) a polypeptide comprising or consisting of an amino acid sequence of SEQ ID NO:1

VDTYDGDISVVYGLR **SEQ ID NO:1** ["FOL-005"]

or a fragment or variant thereof which retains an inhibitory activity on mammalian hair production; and

CLAIMS

1. Use of a composition in the manufacture of a medicament for treatment and/or prevention of a disease or disorder associated with unwanted and/or excessive hair growth in a human, wherein the composition comprises:

   (a) a polypeptide comprising or consisting of an amino acid sequence of SEQ ID NO:1

   VDTYDGDISVVYGLR **SEQ ID NO:1**

   or a fragment or variant thereof which retains an inhibitory activity on mammalian hair production; and

   (b) a pharmaceutically acceptable and/or cosmetically acceptable excipient, carrier, adjuvant or diluent

   wherein the polypeptide is between 5 and 50 amino acids in length.

2. The use according to Claim 1, wherein the composition is capable of inhibiting existing hair follicles, and/or inhibiting the formation of new hair follicles, or stem cells for producing the same.

3. The use according to Claim 1 or Claim 2, wherein the polypeptide is between 5 and 30 amino acids in length, for example between 5 and 20, between 5 and 20, between 8 and 20, between 8 and 16, or between 10 and 15 amino acids in length.

4. The use according to any one of the preceding claims, wherein the polypeptide consists of an amino acid sequence of SEQ ID NO:1, or wherein the polypeptide consists of a fragment of the amino acid sequence of SEQ ID NO: 1.

5. The use according to Claim 4, wherein the fragment comprises or consists of an amino acid sequence according to any one of SEQ ID NOs: 3 to 65

(a) 14-amino acid peptides:

VDTYDGDISVVYGL	**SEQ ID NO: 3**
DTYDGDISVVYGLR	**SEQ ID NO: 4**
TYDGDISVVYGLRS	**SEQ ID NO: 5**

(b) 13-amino acid peptides:

VDTYDGDISVVYG	**SEQ ID NO: 6**
DTYDGDISVVYGL	**SEQ ID NO: 7**
TYDGDISVVYGLR	**SEQ ID NO: 8**
YDGDISVVYGLRS	**SEQ ID NO: 9**

(c) 12-amino acid peptides:

VDTYDGDISVVY	**SEQ ID NO: 10**
DTYDGDISVVYG	**SEQ ID NO: 11**
TYDGDISVVYGL	**SEQ ID NO: 12**
YDGDISVVYGLR	**SEQ ID NO: 13**
DGDISVVYGLRS	**SEQ ID NO: 14**

(d) 11-amino acid peptides:

VDTYDGDISVV	**SEQ ID NO: 15**
DTYDGDISVVY	**SEQ ID NO: 16**
TYDGDISVVYG	**SEQ ID NO: 17**
YDGDISVVYGL	**SEQ ID NO: 18**
DGDISVVYGLR	**SEQ ID NO: 19**
GDISVVYGLRS	**SEQ ID NO: 20**

(e) 10-amino acid peptides:

VDTYDGDISV	**SEQ ID NO: 21**
DTYDGDISVV	**SEQ ID NO: 22**
TYDGDISVVY	**SEQ ID NO: 23**
YDGDISVVYG	**SEQ ID NO: 24**
DGDISVVYGL	**SEQ ID NO: 25**
GDISVVYGLR	**SEQ ID NO: 26**
DISVVYGLRS	**SEQ ID NO: 27**

SVVYG **SEQ ID NO: 65.**

6. The use according to Claim 5, wherein the fragment comprises or consists of an amino acid sequence of SEQ ID NO: 26.

7. The use according to any one of the preceding claims, wherein the polypeptide comprises or consists of a variant of the amino acid sequence of SEQ ID NO: 1, or of a fragment thereof, optionally wherein the polypeptide comprises or consists of an amino acid sequence of SEQ ID NO: 67, or of a fragment or variant thereof

VDTYDGRGDSVVYGLR **SEQ ID NO:67.**

8. The use according to any one of the preceding claims, wherein the polypeptide comprises or consists of the following amino acid sequence:

X1 - X2 - X3 - X4 - X5 - X6 - D - X8 - I - X10 - X11 - X12 - Y - G - X15 - X16 - X17

SEQ ID NO: 68

wherein

X1 is V, E, G or K;
X2 is D, E, S or P;
X3 is any amino acid;
X4 is Y, P, N or A;
X5 is D, N or E;
X6 is G or I;
X8 is G or absent;
X10 is S or E;
X11 is V or L;
X12 is V, A or T
X15 is L or I;
X16 is R or K; and
X17 is R, K or absent.

9. The use according to any one of Claim 7 or Claim 8, wherein the polypeptide comprises or consists of an amino acid sequence of SEQ ID NO:69 or 70, or of a fragment or variant thereof

VDVPNGDISLAYGLR	**SEQ ID NO:69**
DVPNGDISLAYGLRS	**SEQ ID NO:70.**

10. The use according to Claim 9, wherein the fragment comprises or consists of an amino acid sequence according to any one SEQ ID NOs: 71 to 133

(a) 14-amino acid peptides:

VDVPNGDISLAYGL	**SEQ ID NO: 71**
DVPNGDISLAYGLR	**SEQ ID NO: 72**
VPNGDISLAYGLRS	**SEQ ID NO: 73**

(b) 13-amino acid peptides:

VDVPNGDISLAYG	**SEQ ID NO: 74**
DVPNGDISLAYGL	**SEQ ID NO: 75**
VPNGDISLAYGLR	**SEQ ID NO: 76**
PNGDISLAYGLRS	**SEQ ID NO: 77**

(c) 12-amino acid peptides:

VDVPNGDISLAY	**SEQ ID NO: 78**
DVPNGDISLAYG	**SEQ ID NO: 79**
VPNGDISLAYGL	**SEQ ID NO: 80**
PNGDISLAYGLR	**SEQ ID NO: 81**
NGDISLAYGLRS	**SEQ ID NO: 82**

(d) 11-amino acid peptides:

VDVPNGDISLA	**SEQ ID NO: 83**
DVPNGDISLAY	**SEQ ID NO: 84**
VPNGDISLAYG	**SEQ ID NO: 85**
PNGDISLAYGL	**SEQ ID NO: 86**
NGDISLAYGLR	**SEQ ID NO: 87**
GDISLAYGLRS	**SEQ ID NO: 88**

(e) 10-amino acid peptides:

VDVPNGDISL	**SEQ ID NO: 89**
DVPNGDISLA	**SEQ ID NO: 91**
VPNGDISLAY	**SEQ ID NO: 91**
PNGDISLAYG	**SEQ ID NO: 92**
NGDISLAYGL	**SEQ ID NO: 93**
GDISLAYGLR	**SEQ ID NO: 94**
DISLAYGLRS	**SEQ ID NO: 95**

(f) 9-amino acid peptides:

VDVPNGDIS	**SEQ ID NO: 96**
DVPNGDISL	**SEQ ID NO: 97**
VPNGDISLA	**SEQ ID NO: 98**
PNGDISLAY	**SEQ ID NO: 99**
NGDISLAYG	**SEQ ID NO: 100**
GDISLAYGL	**SEQ ID NO: 101**
DISLAYGLR	**SEQ ID NO: 102**
ISLAYGLRS	**SEQ ID NO: 103**

(g) 8-amino acid peptides:

VDVPNGDI	**SEQ ID NO: 104**
DVPNGDIS	**SEQ ID NO: 105**
VPNGDISL	**SEQ ID NO: 106**
PNGDISLA	**SEQ ID NO: 107**
NGDISLAY	**SEQ ID NO: 108**
GDISLAYG	**SEQ ID NO: 109**
DISLAYGL	**SEQ ID NO: 110**
ISLAYGLR	**SEQ ID NO: 111**

(h) 7-amino acid peptides:

VDVPNGD	**SEQ ID NO: 112**
DVPNGDI	**SEQ ID NO: 113**
VPNGDIS	**SEQ ID NO: 114**
PNGDISL	**SEQ ID NO: 115**
NGDISLA	**SEQ ID NO: 116**
GDISLAY	**SEQ ID NO: 117**
DISLAYG	**SEQ ID NO: 118**
ISLAYGL	**SEQ ID NO: 119**

(i) 6-amino acid peptides:

DVPNGD	**SEQ ID NO: 120**
VPNGDI	**SEQ ID NO: 121**
PNGDIS	**SEQ ID NO: 122**
NGDISL	**SEQ ID NO: 123**
GDISLA	**SEQ ID NO: 124**
DISLAY	**SEQ ID NO: 125**
ISLAYG	**SEQ ID NO: 126**

(j) 5-amino acid peptides:

VPNGD	**SEQ ID NO: 127**
PNGDI	**SEQ ID NO: 128**
NGDIS	**SEQ ID NO: 129**
GDISL	**SEQ ID NO: 130**
DISLA	**SEQ ID NO: 131**
ISLAY	**SEQ ID NO: 132**
SLAYG	**SEQ ID NO: 133,**

optionally wherein the fragment comprises or consists of an amino acid sequence of SEQ ID NO:94

GDISLAYGLR	**SEQ ID NO:94.**

11. The use according to any one of the preceding claims, wherein the polypeptide is non-naturally occurring, and/or wherein the polypeptide comprises or consists of tandem repeats, and/or wherein the polypeptide is glycosylated at one or more amino acid positions.

12. The use according to any one of the preceding claims, wherein the composition is for topical administration, transdermal administration, and/or intracutaneous administration.

13. The use according to any of the preceding claims, wherein the disease or disorder associated with unwanted and/or excessive hair growth is selected from the groups consisting of hirsutism, ingrown hair, polycystic ovary syndrome (PCOS), congenital adrenal hyperplasia, Cushing's disease, growth hormone excess (acromegaly), tumours in the ovaries, adrenal gland cancer, Von Hippel–Lindau disease, insulin resistance, stromal hyperthecosis (SH),

porphyria cutanea tarda and hormonal disorders.

14. Use of a composition according to any of the preceding claims, for cosmetic hair removal in a human.

15. Use of a polypeptide as defined in any one of the preceding claims, wherein the polypeptide is for *ex vivo* or *in vitro* inhibiting hair production.

16. The use according to Claim 15 for inhibiting hair growth on a skin explant prior to grafting of the explant on to a mammal.

17. The use according to Claim 15 for inhibiting hair growth follicles (or stem cell precursors of the same) *in vitro*.