

# SEQUENCE LISTING

<110> Janssen Pharmaceuticals, Inc.  
AC Immune S.A.

<120> Compositions of phosphorylated tau peptides and uses thereof

<130> 689001-57W0

<150> US62/577,157

<151> 2017-10-25

<160> 44

<170> PatentIn version 3.5

<210> 1

<211> 21

<212> PRT

<213> Artificial Sequence

<220>

<223> phospho-tau peptide 7.1

<220>

<221> phosphorylated serine

<222> (8)..(8)

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<222> (11)..(11)

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<222> (14)..(14)

<400> 1

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Asp | Arg | Ser | Gly | Tyr | Ser | Ser | Pro | Gly | Ser | Pro | Gly | Thr | Pro | Gly |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |     |

|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| Ser | Arg | Ser | Arg | Thr |
|     |     |     |     | 20  |

<210> 2

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<223> phospho-tau peptide T3.5

<220>  
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<222> (4)..(4)

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<221> phosphorylated serine  
<222> (12)..(12)

<400> 2

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Tyr | Lys | Ser | Pro | Val | Val | Ser | Gly | Asp | Thr | Ser | Pro | Arg | His | Leu |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

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<220>  
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<222> (11)..(11)

<220>  
<221> phosphorylated threonine  
<222> (16)..(16)

<400> 3

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ser | Thr | Gly | Ser | Ile | Asp | Met | Val | Asp | Ser | Pro | Gln | Leu | Ala | Thr |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

Leu Ala

<210> 4  
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<220>  
<223> tau peptide

<400> 4

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Tyr | Lys | Ser | Pro | Val | Val | Ser | Gly | Asp | Thr | Ser | Pro | Arg | His | Leu |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

1 5 10 15

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<220>  
<221> phosphorylated serine  
<222> (18)..(18)

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<222> (26)..(26)

<400> 5

Arg Glu Asn Ala Lys Ala Lys Thr Asp His Gly Ala Glu Ile Val Tyr  
1 5 10 15

Lys Ser Pro Val Val Ser Gly Asp Thr Ser Pro Arg His Leu  
20 25 30

<210> 6  
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<220>  
<221> phosphorylated tyrosine  
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<400> 6

Arg Gln Glu Phe Glu Val Met Glu Asp His Ala Gly Thr Tyr Gly Leu  
1 5 10 15

<210> 7  
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<220>  
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<222> (9)..(9)

<400> 7

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Gly | Ser | Arg | Ser | Arg | Thr | Pro | Ser | Leu | Pro | Thr | Pro | Pro | Thr | Arg |
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<220>  
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<222> (7)..(7)

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<221> phosphorylated threonine  
<222> (10)..(10)

<400> 8

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Tyr | Ser | Ser | Pro | Gly | Ser | Pro | Gly | Thr | Pro | Gly | Ser | Arg | Ser | Arg |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

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<400> 9

Gly Asp Thr Ser Pro Arg His Leu Ser Asn Val Ser Ser Thr Gly Ser  
1 5 10 15

Ile Asp

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<220>  
<221> phosphorylated serine  
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<222> (13)..(13)

<220>  
<221> phosphorylated serine  
<222> (15)..(15)

<400> 10

Pro Gly Ser Pro Gly Thr Pro Gly Ser Arg Ser Arg Thr Pro Ser Leu  
1 5 10 15

Pro

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<220>  
<221> phosphorylated serine  
<222> (3)..(3)

<400> 11

His Leu Ser Asn Val Ser Ser Thr Gly Ser Ile Asp  
1 5 10

<210> 12  
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<220>  
<223> phospho-tau peptide

<220>  
<221> phosphorylated serine  
<222> (6)..(6)

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Val Ser Gly Asp Thr Ser Pro Arg His Leu  
1 5 10

<210> 13  
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<220>  
<223> T50 T cell epitope

<220>  
<221> C-terminal amide  
<222> (55)..(55)

<400> 13

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Val Val Arg  
1 5 10 15

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Val  
20 25 30

Val Arg Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys  
35 40 45

Val Ser Ala Ser His Leu Glu  
50 55

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<223> T46 T cell epitope

<220>  
<221> palmitoylated lysine  
<222> (54)..(54)

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<221> palmitoylated lysine  
<222> (55)..(55)

<220>  
<221> C-terminal amide  
<222> (55)..(55)

<400> 14

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Gly Ser Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Gly Ser  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu Lys Lys  
50 55

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<223> T48 helper T cell epitope

<220>  
<221> C-terminal amide  
<222> (75)..(75)

<400> 15

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Gly Ser Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Gly Ser  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu Gly Ser Leu Ile Asn Ser Thr Lys Ile Tyr Ser  
50 55 60

Tyr Phe Pro Ser Val Ile Ser Lys Val Asn Gln  
65 70 75

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<223> T51 helper T cell epitope

<220>  
<221> C-terminal amide  
<222> (53)..(53)

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Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Arg Arg Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Arg Arg  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser

35

40

45

Ala Ser His Leu Glu  
50

<210> 17  
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<223> T52 helper T cell epitope

<220>  
<221> C-terminal amide  
<222> (53)..(53)

<400> 17

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Arg Lys Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Arg Lys  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu  
50

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<223> CpG 2006

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<221> phosphorothioate (ps) internucleotide linkages  
<222> (1)..(24)

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tcgtcgtttt gtcgttttgt cggt

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<223> CpG 1018

<220>  
<221> phosphorothioate (ps) internucleotide linkages  
<222> (1)..(22)

<400> 19  
tgactgtgaa cggtcgagat ga 22

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<223> CpG 2395

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<222> (3)..(14)

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<221> phosphorothioate (ps) internucleotide linkages

<222> (14)..(20)

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gggggacgat cgtcgggggg

20

<210> 22

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<212> DNA

<213> Artificial Sequence

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<223> CpG 2336

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<221> phosphodiester (po) internucleotide linkages

<222> (4)..(15)

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<221> phosphorothioate (ps) internucleotide linkages

<222> (15)..(21)

<400> 22

ggggacgacg tcgtgggggg g

21

<210> 23

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<212> PRT

<213> Artificial Sequence

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<223> Pan DR epitope (PADRE) peptide

<400> 23

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala

1

5

10

<210> 24

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> P2

<400> 24

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu  
1 5 10 15

<210> 25  
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<212> PRT  
<213> Artificial Sequence

<220>  
<223> P30

<400> 25

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
1 5 10 15

Ala Ser His Leu Glu  
20

<210> 26  
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<212> PRT  
<213> Artificial Sequence

<220>  
<223> TT586-605

<400> 26

Leu Ile Asn Ser Thr Lys Ile Tyr Ser Tyr Phe Pro Ser Val Ile Ser  
1 5 10 15

Lys Val Asn Gln  
20

<210> 27  
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<220>  
<223> palmitoylated phospho-tau peptide (palmitoylated 7.1)

<220>  
<221> palmitoylated lysine  
<222> (1)..(1)

<220>  
 <221> palmitoylated lysine  
 <222> (2)..(2)  
  
 <220>  
 <221> phosphorylated serine  
 <222> (10)..(10)  
  
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 <221> phosphorylated serine  
 <222> (13)..(13)  
  
 <220>  
 <221> phosphorylated threonine  
 <222> (16)..(16)

<220>  
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 <222> (24)..(24)  
  
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 <221> palmitoylated lysine  
 <222> (25)..(25)

<400> 27

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Lys | Gly | Asp | Arg | Ser | Gly | Tyr | Ser | Ser | Pro | Gly | Ser | Pro | Gly | Thr |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

|     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Gly | Ser | Arg | Ser | Arg | Thr | Lys | Lys |
|     |     |     | 20  |     |     |     |     | 25  |

<210> 28  
 <211> 20  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> palmitoylated phospho-tau peptide (T3, palmitoylated T3.5)

<220>  
 <221> palmitoylated lysine  
 <222> (1)..(1)

<220>  
 <221> palmitoylated lysine  
 <222> (2)..(2)

<220>  
 <221> phosphorylated serine  
 <222> (6)..(6)

<220>  
<221> phosphorylated serine  
<222> (14)..(14)

<220>  
<221> palmitoylated lysine  
<222> (19)..(19)

<220>  
<221> palmitoylated lysine  
<222> (20)..(20)

<400> 28

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Lys | Val | Tyr | Lys | Ser | Pro | Val | Val | Ser | Gly | Asp | Thr | Ser | Pro | Arg |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

His Leu Lys Lys  
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<211> 22  
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<221> palmitoylated lysine  
<222> (1)..(1)

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<222> (2)..(2)

<220>  
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<222> (13)..(13)

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<222> (18)..(18)

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<221> palmitoylated lysine  
<222> (21)..(21)

<220>  
<221> palmitoylated lysine

<222> (22)..(22)

<400> 29

Lys Lys Ser Ser Thr Gly Ser Ile Asp Met Val Asp Ser Pro Gln Leu  
1 5 10 15

Ala Thr Leu Ala Lys Lys  
20

<210> 30

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> palmitoylated tau peptide

<220>

<221> palmitoylated lysine

<222> (1)..(1)

<220>

<221> palmitoylated lysine

<222> (2)..(2)

<220>

<221> palmitoylated lysine

<222> (19)..(19)

<220>

<221> palmitoylated lysine

<222> (20)..(20)

<400> 30

Lys Lys Val Tyr Lys Ser Pro Val Val Ser Gly Asp Thr Ser Pro Arg  
1 5 10 15

His Leu Lys Lys  
20

<210> 31

<211> 34

<212> PRT

<213> Artificial Sequence

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<223> palmitoylated phospho-tau peptide

<220>  
<221> palmitoylated lysine  
<222> (1)..(1)

<220>  
<221> palmitoylated lysine  
<222> (2)..(2)

<220>  
<221> phosphorylated serine  
<222> (20)..(20)

<220>  
<221> phosphorylated serine  
<222> (28)..(28)

<220>  
<221> palmitoylated lysine  
<222> (33)..(33)

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<221> palmitoylated lysine  
<222> (34)..(34)

<400> 31

Lys Lys Arg Glu Asn Ala Lys Ala Lys Thr Asp His Gly Ala Glu Ile  
1 5 10 15

Val Tyr Lys Ser Pro Val Val Ser Gly Asp Thr Ser Pro Arg His Leu  
20 25 30

Lys Lys

<210> 32  
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<212> PRT  
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<222> (19)..(19)

<220>  
<221> palmitoylated lysine  
<222> (20)..(20)

<400> 32

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Lys | Arg | Gln | Glu | Phe | Glu | Val | Met | Glu | Asp | His | Ala | Gly | Thr | Tyr |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

|     |     |     |     |
|-----|-----|-----|-----|
| Gly | Leu | Lys | Lys |
|     |     |     | 20  |

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<220>  
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<222> (2)..(2)

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<222> (9)..(9)

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<222> (11)..(11)

<220>  
<221> palmitoylated lysine  
<222> (19)..(19)

<220>  
<221> palmitoylated lysine  
<222> (20)..(20)

<400> 33

Lys Lys Pro Gly Ser Arg Ser Arg Thr Pro Ser Leu Pro Thr Pro Pro  
1 5 10 15

Thr Arg Lys Lys  
20

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<220>  
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<222> (2)..(2)

<220>  
<221> phosphorylated serine  
<222> (9)..(9)

<220>  
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<222> (12)..(12)

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<222> (19)..(19)

<220>  
<221> palmitoylated lysine  
<222> (20)..(20)

<400> 34

Lys Lys Gly Tyr Ser Ser Pro Gly Ser Pro Gly Thr Pro Gly Ser Arg  
1 5 10 15

Ser Arg Lys Lys

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<220>  
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<220>  
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 <222> (2)..(2)

<220>  
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 <222> (6)..(6)

<220>  
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 <222> (11)..(11)

<220>  
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 <222> (21)..(21)

<220>  
 <221> palmitoylated lysine  
 <222> (22)..(22)

<400> 35

Lys Lys Gly Asp Thr Ser Pro Arg His Leu Ser Asn Val Ser Ser Thr  
 1 5 10 15

Gly Ser Ile Asp Lys Lys  
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<210> 36  
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 <212> PRT  
 <213> Artificial Sequence

<220>  
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<220>  
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 <222> (1)..(1)  
  
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 <221> palmitoylated lysine  
 <222> (2)..(2)  
  
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 <222> (15)..(15)  
  
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 <221> phosphorylated serine  
 <222> (17)..(17)  
  
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 <222> (20)..(20)  
  
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 <221> palmitoylated lysine  
 <222> (21)..(21)

<400> 36

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Lys | Pro | Gly | Ser | Pro | Gly | Thr | Pro | Gly | Ser | Arg | Ser | Arg | Thr | Pro |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| Ser | Leu | Pro | Lys | Lys |
|     |     |     | 20  |     |

<210> 37  
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<220>  
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<220>  
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<222> (1)..(1)

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<222> (2)..(2)

<220>

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<222> (5)..(5)

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<222> (15)..(15)

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<222> (16)..(16)

<400> 37

Lys Lys His Leu Ser Asn Val Ser Ser Thr Gly Ser Ile Asp Lys Lys  
1 5 10 15

<210> 38

<211> 14

<212> PRT

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<223> palmitoylated phospho-tau peptide

<220>

<221> palmitoylated lysine

<222> (1)..(1)

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<221> palmitoylated lysine

<222> (2)..(2)

<220>

<221> phosphorylated serine

<222> (8)..(8)

<220>

<221> palmitoylated lysine

<222> (13)..(13)

<220>

<221> palmitoylated lysine

<222> (14)..(14)

<400> 38

Lys Lys Val Ser Gly Asp Thr Ser Pro Arg His Leu Lys Lys  
1 5 10

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<220>  
<223> T50 without the C-terminal amide

<400> 39

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Val Val Arg  
1 5 10 15

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Val  
20 25 30

Val Arg Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys  
35 40 45

Val Ser Ala Ser His Leu Glu  
50 55

<210> 40  
<211> 53  
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<213> Artificial Sequence

<220>  
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<400> 40

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Gly Ser Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Gly Ser  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu

50

<210> 41  
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<212> PRT  
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<220>  
<223> T48 without the C-terminal amide

<400> 41

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Gly Ser Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Gly Ser  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu Gly Ser Leu Ile Asn Ser Thr Lys Ile Tyr Ser  
50 55 60

Tyr Phe Pro Ser Val Ile Ser Lys Val Asn Gln  
65 70 75

<210> 42  
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<220>  
<223> T51 without the C-terminal amide

<400> 42

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Arg Arg Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Arg Arg  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu  
50

<210> 43  
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<220>  
<223> T52 without the C-terminal amide

<400> 43

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Arg Lys Gln  
1 5 10 15

Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Arg Lys  
20 25 30

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
35 40 45

Ala Ser His Leu Glu  
50

<210> 44  
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<220>  
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<220>  
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<222> (57)..(57)

<400> 44

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala Val Val Arg  
1 5 10 15

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Val  
20 25 30

Val Arg Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys  
35 40 45

Val Ser Ala Ser His Leu Glu Lys Lys  
50 55