

# SEQUENCE LISTING

<110> Pepperprint GmbH

<120> NS2b as marker for Zika virus infections

<130> U30830W0

<150> EP 17 209 651.3

<151> 2017-12-21

<160> 41

<170> PatentIn version 3.5

<210> 1

<211> 21

<212> PRT

<213> Flavivirus Zika

<400> 1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Asp | Ile | Thr | Trp | Glu | Lys | Asp | Ala | Glu | Val | Thr | Gly | Asn | Ser | Pro |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |

|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| Arg | Leu | Asp | Val | Ala |
|     |     |     | 20  |     |

<210> 2

<211> 15

<212> PRT

<213> Flavivirus Zika

<400> 2

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Asp | Ile | Thr | Trp | Glu | Lys | Asp | Ala | Glu | Val | Thr | Gly | Asn | Ser |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 3

<211> 15

<212> PRT

<213> Flavivirus Zika

<400> 3

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Asp | Ile | Thr | Trp | Glu | Lys | Asp | Ala | Glu | Ile | Thr | Gly | Asn | Ser |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 4  
<211> 15  
<212> PRT  
<213> Flavivirus Zika

<400> 4

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Trp | Glu | Lys | Asp | Ala | Glu | Val | Thr | Gly | Asn | Ser | Pro | Arg | Leu |
| 1   |     |     | 5   |     |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 5  
<211> 15  
<212> PRT  
<213> Flavivirus Zika

<400> 5

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Trp | Glu | Lys | Asp | Ala | Glu | Ile | Thr | Gly | Asn | Ser | Pro | Arg | Leu |
| 1   |     |     | 5   |     |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 6  
<211> 15  
<212> PRT  
<213> Flavivirus Zika

<400> 6

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Asp | Ala | Glu | Val | Thr | Gly | Asn | Ser | Pro | Arg | Leu | Asp | Val | Ala |
| 1   |     |     | 5   |     |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 7  
<211> 15  
<212> PRT  
<213> Flavivirus Zika

<400> 7

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Asp | Ala | Glu | Ile | Thr | Gly | Asn | Ser | Pro | Arg | Leu | Asp | Val | Ala |
| 1   |     |     | 5   |     |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 8  
<211> 21  
<212> PRT  
<213> Flavivirus Zika

<400> 8

Gly Asp Ile Thr Trp Glu Lys Asp Ala Glu Ile Thr Gly Asn Ser Pro  
1 5 10 15

Arg Leu Asp Val Ala  
20

<210> 9

<211> 15

<212> PRT

<213> Flavivirus Zika

<400> 9

Trp Glu Lys Asp Ala Glu Val Thr Gly Asn Ser Pro Arg Leu Asp  
1 5 10 15

<210> 10

<211> 9

<212> PRT

<213> Flavivirus Zika

<400> 10

Lys Asp Ala Glu Val Thr Gly Asn Ser  
1 5

<210> 11

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide with SEQ ID NO.9 substituted in position 9 and 11

<400> 11

Trp Glu Lys Asp Pro Glu Asp Thr Gly Asn Ser Pro Arg Leu Asp  
1 5 10 15

<210> 12

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide with SEQ ID NO.9 substituted in position 9

<400> 12

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Trp | Glu | Lys | Asp | Ala | Glu | Asp | Thr | Gly | Asn | Ser | Pro | Arg | Leu | Asp |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |

<210> 13

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide with SEQ ID NO.9 substituted in position 9, 11 and 15

<400> 13

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Trp | Glu | Lys | Asp | Pro | Glu | Asp | Thr | Gly | Asn | Lys | Pro | Arg | Leu | Asp |
| 1   |     |     |     | 5   |     |     |     | 10  |     |     |     |     | 15  |     |

<210> 14

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide with SEQ ID NO. 10 substituted in position 9 and 11

<400> 14

|     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Asp | Pro | Glu | Asp | Thr | Gly | Asn | Ser |
| 1   |     |     |     | 5   |     |     |     |     |

<210> 15

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide with SEQ ID NO. 10 substituted in position 9

<400> 15

|     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Asp | Ala | Glu | Asp | Thr | Gly | Asn | Ser |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|

1 5

<210> 16  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide with SEQ ID NO. 10 substituted in position 9, 11 and 15

<400> 16

Lys Asp Pro Glu Asp Thr Gly Asn Lys  
1 5

<210> 17  
<211> 130  
<212> PRT  
<213> Flavivirus Zika

<400> 17

Ser Trp Pro Pro Ser Glu Val Leu Thr Ala Val Gly Leu Ile Cys Ala  
1 5 10 15

Leu Ala Gly Gly Phe Ala Lys Ala Asp Ile Glu Met Ala Gly Pro Met  
20 25 30

Ala Ala Val Gly Leu Leu Ile Val Ser Tyr Val Val Ser Gly Lys Ser  
35 40 45

Val Asp Met Tyr Ile Glu Arg Ala Gly Asp Ile Thr Trp Glu Lys Asp  
50 55 60

Ala Glu Val Thr Gly Asn Ser Pro Arg Leu Asp Val Ala Leu Asp Glu  
65 70 75 80

Ser Gly Asp Phe Ser Leu Val Glu Glu Asp Gly Pro Pro Met Arg Glu  
85 90 95

Ile Ile Leu Lys Val Val Leu Met Ala Ile Cys Gly Met Asn Pro Ile  
100 105 110

Ala Ile Pro Phe Ala Ala Gly Ala Trp Tyr Val Tyr Val Lys Thr Gly  
115 120 125

Lys Arg  
130

<210> 18  
<211> 21  
<212> PRT  
<213> West Nile virus

<400> 18

Ala Asp Ile Thr Trp Glu Ser Asp Ala Glu Ile Thr Gly Ser Ser Glu  
1 5 10 15

Arg Val Asp Val Arg  
20

<210> 19  
<211> 131  
<212> PRT  
<213> West Nile virus

<400> 19

Gly Trp Pro Ala Thr Glu Val Met Thr Ala Val Gly Leu Met Phe Ala  
1 5 10 15

Ile Val Gly Gly Leu Ala Glu Leu Asp Ile Asp Ser Met Ala Ile Pro  
20 25 30

Met Thr Ile Ala Gly Leu Met Phe Ala Ala Phe Val Ile Ser Gly Lys  
35 40 45

Ser Thr Asp Met Trp Ile Glu Arg Thr Ala Asp Ile Thr Trp Glu Ser  
50 55 60

Asp Ala Glu Ile Thr Gly Ser Ser Glu Arg Val Asp Val Arg Leu Asp  
65 70 75 80

Asp Asp Gly Asn Phe Gln Leu Met Asn Asp Pro Gly Ala Pro Trp Lys  
85 90 95

Ile Trp Met Leu Arg Met Ala Cys Leu Ala Ile Ser Ala Tyr Thr Pro  
100 105 110

Trp Ala Ile Leu Pro Ser Val Ile Gly Phe Trp Ile Thr Leu Gln Tyr  
115 120 125

Thr Lys Arg  
130

<210> 20  
<211> 21  
<212> PRT  
<213> Dengue virus type 1

<400> 20

Ala Glu Val Ser Trp Glu Glu Glu Ala Glu His Ser Gly Ala Ser His  
1 5 10 15

Asn Ile Leu Val Glu  
20

<210> 21  
<211> 130  
<212> PRT  
<213> Dengue virus type 1

<400> 21

Ser Trp Pro Leu Asn Glu Gly Ile Met Ala Val Gly Ile Val Ser Ile  
1 5 10 15

Leu Leu Ser Ser Leu Leu Lys Asn Asp Val Pro Leu Ala Gly Pro Leu  
20 25 30

Ile Ala Gly Gly Met Leu Ile Ala Cys Tyr Val Ile Ser Gly Ser Ser  
35 40 45

Ala Asp Leu Ser Leu Glu Lys Ala Ala Glu Val Ser Trp Glu Glu Glu  
50 55 60

Ala Glu His Ser Gly Ala Ser His Asn Ile Leu Val Glu Val Gln Asp  
65 70 75 80

Asp Gly Thr Met Lys Ile Lys Asp Glu Glu Arg Asp Asp Thr Leu Thr  
85 90 95

Ile Leu Leu Lys Ala Thr Leu Leu Ala Ile Ser Gly Val Tyr Pro Met  
100 105 110

Ser Ile Pro Ala Thr Leu Phe Val Trp Tyr Phe Trp Gln Lys Lys Lys  
115 120 125

Gln Arg  
130

<210> 22  
<211> 21  
<212> PRT  
<213> Dengue virus type 2

<400> 22

Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser Gly Ser Ser Pro  
1 5 10 15

Ile Leu Ser Ile Thr  
20

<210> 23  
<211> 130  
<212> PRT  
<213> Dengue virus type 2

<400> 23

Ser Trp Pro Leu Asn Glu Ala Ile Met Ala Val Gly Met Val Ser Ile  
1 5 10 15

Leu Ala Ser Ser Leu Leu Lys Asn Asp Ile Pro Met Thr Gly Pro Leu  
20 25 30

Val Ala Gly Gly Pro Leu Thr Val Cys Tyr Val Leu Thr Gly Arg Ser  
35 40 45

Ala Asp Leu Glu Leu Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln  
50 55 60

Ala Glu Ile Ser Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu  
65 70 75 80

Asp Gly Ser Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr  
85 90 95

Ile Leu Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val  
100 105 110

Ser Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys  
115 120 125

Gln Arg  
130

<210> 24  
<211> 21  
<212> PRT  
<213> Dengue virus type 3

<400> 24

Pro Asp Val Thr Trp Glu Glu Glu Ala Glu Gln Thr Gly Val Ser His  
1 5 10 15

Asn Leu Met Ile Thr  
20

<210> 25

<211> 130  
<212> PRT  
<213> Dengue virus type 3

<400> 25

Ser Trp Pro Leu Asn Glu Gly Val Met Ala Val Gly Leu Val Ser Ile  
1 5 10 15

Leu Ala Ser Ser Leu Leu Arg Asn Asp Val Pro Met Ala Gly Pro Leu  
20 25 30

Val Ala Gly Gly Leu Leu Ile Ala Cys Tyr Val Ile Thr Gly Thr Ser  
35 40 45

Ala Asp Leu Thr Val Glu Lys Ala Pro Asp Val Thr Trp Glu Glu Glu  
50 55 60

Ala Glu Gln Thr Gly Val Ser His Asn Leu Met Ile Thr Val Asp Asp  
65 70 75 80

Asp Gly Thr Met Arg Ile Lys Asp Asp Glu Thr Glu Asn Ile Leu Thr  
85 90 95

Val Leu Leu Lys Thr Ala Leu Leu Ile Val Ser Gly Ile Phe Pro Tyr  
100 105 110

Ser Ile Pro Ala Thr Leu Leu Val Trp His Thr Trp Gln Lys Gln Thr  
115 120 125

Gln Arg  
130

<210> 26  
<211> 21  
<212> PRT  
<213> Yellow fever virus

<400> 26

Gly Glu Val Ser Trp Glu Glu Glu Ala Glu Ile Ser Gly Ser Ser Ala

1 5 10 15

Arg Tyr Asp Val Ala  
20

<210> 27  
<211> 130  
<212> PRT  
<213> Yellow fever virus

<400> 27

Ser Ile Pro Val Asn Glu Ala Leu Ala Ala Ala Gly Leu Val Gly Val  
1 5 10 15

Leu Ala Gly Leu Ala Phe Gln Glu Met Glu Asn Phe Leu Gly Pro Ile  
20 25 30

Ala Val Gly Gly Leu Leu Met Met Leu Val Ser Val Ala Gly Arg Val  
35 40 45

Asp Gly Leu Glu Leu Lys Lys Leu Gly Glu Val Ser Trp Glu Glu Glu  
50 55 60

Ala Glu Ile Ser Gly Ser Ser Ala Arg Tyr Asp Val Ala Leu Ser Glu  
65 70 75 80

Gln Gly Glu Phe Lys Leu Leu Ser Glu Glu Lys Val Pro Trp Asp Gln  
85 90 95

Val Val Met Thr Ser Leu Ala Leu Val Gly Ala Ala Leu His Pro Phe  
100 105 110

Ala Leu Leu Leu Val Leu Ala Gly Trp Leu Phe His Val Arg Gly Ala  
115 120 125

Arg Arg  
130

<210> 28  
<211> 21  
<212> PRT  
<213> Dengue virus type 4

<400> 28

Ala Asn Val Gln Trp Asp Glu Met Ala Asp Ile Thr Gly Ser Ser Pro  
1 5 10 15

Ile Ile Glu Val Lys  
20

<210> 29  
<211> 130  
<212> PRT  
<213> Dengue virus type 4

<400> 29

Ser Trp Pro Leu Asn Glu Gly Ile Met Ala Val Gly Leu Val Ser Leu  
1 5 10 15

Leu Gly Ser Ala Leu Leu Lys Asn Asp Val Pro Leu Ala Gly Pro Met  
20 25 30

Val Ala Gly Gly Leu Leu Leu Ala Ala Tyr Val Met Ser Gly Ser Ser  
35 40 45

Ala Asp Leu Ser Leu Glu Lys Ala Ala Asn Val Gln Trp Asp Glu Met  
50 55 60

Ala Asp Ile Thr Gly Ser Ser Pro Ile Ile Glu Val Lys Gln Asp Glu  
65 70 75 80

Asp Gly Ser Phe Ser Ile Arg Asp Val Glu Glu Thr Asn Met Ile Thr  
85 90 95

Leu Leu Val Lys Leu Ala Leu Ile Thr Val Ser Gly Leu Tyr Pro Leu  
100 105 110

Ala Ile Pro Val Thr Met Thr Leu Trp Tyr Met Trp Gln Val Lys Thr  
115 120 125

Gln Arg  
130

<210> 30  
<211> 21  
<212> PRT  
<213> Tick-borne encephalitis virus

<400> 30

Gly Cys Val Glu Trp Tyr Pro Glu Leu Val Asn Glu Gly Gly Glu Val  
1 5 10 15

Ser Leu Arg Val Arg  
20

<210> 31  
<211> 131  
<212> PRT  
<213> Tick-borne encephalitis virus

<400> 31

Ser Phe Ser Glu Pro Leu Thr Val Val Gly Val Met Leu Thr Leu Ala  
1 5 10 15

Ser Gly Met Met Arg His Thr Ser Gln Glu Ala Leu Cys Ala Leu Ala  
20 25 30

Val Ala Ser Phe Leu Leu Leu Met Leu Val Leu Gly Thr Arg Lys Met  
35 40 45

Gln Leu Val Ala Glu Trp Ser Gly Cys Val Glu Trp Tyr Pro Glu Leu  
50 55 60

Val Asn Glu Gly Gly Glu Val Ser Leu Arg Val Arg Gln Asp Ala Met  
65 70 75 80

Gly Asn Phe His Leu Thr Glu Leu Glu Lys Glu Glu Arg Met Met Ala  
85 90 95

Phe Trp Leu Ile Ala Gly Leu Ala Ala Ser Ala Ile His Trp Ser Gly  
100 105 110

Ile Leu Gly Val Met Gly Leu Trp Thr Leu Thr Glu Met Leu Arg Ser  
115 120 125

Ser Arg Arg  
130

<210> 32  
<211> 21  
<212> PRT  
<213> Japanese encephalitis virus

<400> 32

Ala Thr Asp Met Trp Leu Glu Arg Ala Ala Asp Ile Ser Trp Glu Met  
1 5 10 15

Asp Ala Ala Ile Thr  
20

<210> 33  
<211> 131  
<212> PRT  
<213> Japanese encephalitis virus

<400> 33

Gly Trp Pro Ala Thr Glu Phe Leu Ser Ala Val Gly Leu Met Phe Ala  
1 5 10 15

Ile Val Gly Gly Leu Ala Glu Leu Asp Ile Glu Ser Met Ser Ile Pro  
20 25 30

Phe Met Leu Ala Gly Leu Met Ala Val Ser Tyr Val Val Ser Gly Lys  
35 40 45

Ala Thr Asp Met Trp Leu Glu Arg Ala Ala Asp Ile Ser Trp Glu Met  
50 55 60

Asp Ala Ala Ile Thr Gly Ser Ser Arg Arg Leu Asp Val Lys Leu Asp  
65 70 75 80

Asp Asp Gly Asp Phe His Leu Ile Asp Asp Pro Gly Val Pro Trp Lys  
85 90 95

Val Trp Val Leu Arg Met Ser Cys Ile Gly Leu Ala Ala Leu Thr Pro  
100 105 110

Trp Ala Ile Val Pro Ala Ala Phe Gly Tyr Trp Leu Thr Leu Lys Thr  
115 120 125

Thr Lys Arg  
130

<210> 34  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide, derived from SEQ ID NO. 9, with K7 substitution, wherein  
X is any amino acid except K (lysine)

<220>  
<221> misc\_feature  
<222> (3)..(3)  
<223> Xaa can be any naturally occurring amino acid

<400> 34

Trp Glu Xaa Asp Ala Glu Val Thr Gly Asn Ser Pro Arg Leu Asp  
1 5 10 15

<210> 35  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide, derived from SEQ ID NO. 10, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>  
<221> misc\_feature  
<222> (1)..(1)  
<223> Xaa can be any naturally occurring amino acid

<400> 35

Xaa Asp Ala Glu Val Thr Gly Asn Ser  
1 5

<210> 36  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide, derived from SEQ ID NO. 11, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>  
<221> misc\_feature  
<222> (3)..(3)  
<223> Xaa can be any naturally occurring amino acid

<400> 36

Trp Glu Xaa Asp Pro Glu Asp Thr Gly Asn Ser Pro Arg Leu Asp  
1 5 10 15

<210> 37  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide, derived from SEQ ID NO. 12, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>  
<221> misc\_feature  
<222> (3)..(3)

<223> Xaa can be any naturally occurring amino acid

<400> 37

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Trp | Glu | Xaa | Asp | Ala | Glu | Asp | Thr | Gly | Asn | Ser | Pro | Arg | Leu | Asp |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 38

<211> 15

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide, derived from SEQ ID NO. 13, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>

<221> misc\_feature

<222> (3)..(3)

<223> Xaa can be any naturally occurring amino acid

<400> 38

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Trp | Glu | Xaa | Asp | Pro | Glu | Asp | Thr | Gly | Asn | Lys | Pro | Arg | Leu | Asp |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

<210> 39

<211> 9

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide, derived from SEQ ID NO. 14, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>

<221> misc\_feature

<222> (1)..(1)

<223> Xaa can be any naturally occurring amino acid

<400> 39

|     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Xaa | Asp | Pro | Glu | Asp | Thr | Gly | Asn | Ser |
| 1   |     |     |     | 5   |     |     |     |     |

<210> 40  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide, derived from SEQ ID NO. 15, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>  
<221> misc\_feature  
<222> (1)..(1)  
<223> Xaa can be any naturally occurring amino acid

<400> 40

Xaa Asp Ala Glu Asp Thr Gly Asn Ser  
1 5

<210> 41  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Peptide, derived from SEQ ID NO. 16, with K7 substitution,  
wherein X is any amino acid except K (lysine)

<220>  
<221> misc\_feature  
<222> (1)..(1)  
<223> Xaa can be any naturally occurring amino acid

<400> 41

Xaa Asp Pro Glu Asp Thr Gly Asn Lys  
1 5