

SEQUENCE LISTING

<110> National Defense Medical Center
 <120> ANTI-DENGUE VIRUS ANTIBODIES AND APPLICATIONS THEREOF
 <130> NDM0028SG
 <150> 16/006,000 filed on June 12, 2018
 <151> 2018-06-02
 <160> 90
 <170> PatentIn version 3.5
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 Ala
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 Gly Tyr Thr Phe Thr Ser Tyr Trp Ile His
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Trp Val Lys Glu Arg Pro Gly Gln Gly Leu Glu Trp Ile Gly
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Tyr Ile Thr Pro Asn Thr Gly Tyr Asn Glu Asn Ser Gln Lys Phe
 Arg
 1 5 10 15

Gly

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<400> 5

Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Asn Thr Ala Tyr Met
 Gln
 1 5 10 15

Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Phe Cys Val
 Arg
 20 25 30

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Arg Thr Tyr Glu Gly Tyr Leu Asp Val
 1 5

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Trp Gly Ala Gly Thr Thr Val Thr Val Ser Ser
1 5 10

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

Asp Gln Ala Ser Ile Ser Cys
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Arg Ser Ser Gln Asn Leu Val His Asn Asn Gly Asn Thr Tyr Leu
Glu
1 5 10 15

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<400> 10

Trp	Tyr	Leu	Gln	Lys	Pro	Gly	Gln	Ser	Pro	Lys	Leu	Leu	Ile	Tyr
1				5					10					15

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<400> 11

Lys	Val	Ser	Asn	Arg	Leu	Ser
1				5		

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Gly	Val	Pro	Asp	Arg	Phe	Ser	Gly	Ser	Gly	Ser	Gly	Thr	Asp	Phe
1				5				10						15

Leu	Asn	Ile	Ser	Arg	Val	Glu	Ala	Glu	Asp	Leu	Gly	Ile	Tyr	Tyr
Cys														
			20					25					30	

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Phe	Gln	Ala	Ser	His	Val	Pro	Arg	Thr
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Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
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<400> 15

Glu Val Gln Leu Gln Glu Ser Gly Ala Glu Leu Ala Lys Pro Gly
Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser
20 25

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<400> 16

Gly Tyr Thr Phe Thr Ser Tyr Trp Met His
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Trp Val Lys Gln Arg Pro Gly Gln Val Leu Glu Trp Ile Gly
1 5 10

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

Asp

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<400> 19

Lys Ala Thr Leu Thr Ala Val Lys Ser Ser Ser Thr Ala Tyr Ile
 Gln
 1 5 10 15

Leu Thr Ser Leu Thr Ser Asp Asp Ser Ala Val Tyr Tyr Cys Ala
 Arg
 20 25 30

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<400> 20

Glu Asn Tyr Arg Tyr Asp Gly Ala Met Asp Tyr
 1 5 10

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<400> 21

Trp	Gly	Gln	Gly	Thr	Ser	Val	Thr	Val	Ser	Ser
1				5					10	

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<400> 22

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

Asp	Arg	Val	Thr	Ile	Thr	Cys
			20			

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Ser	Val	Ser	Ser	Ser	Val	Ser	Ser	Ser	Asn	Leu	His
1				5					10		

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<400> 24

Trp	Tyr	Gln	Gln	Lys	Ser	Glu	Thr	Ser	Pro	Lys	Pro	Trp	Ile	Tyr
1				5					10					15

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<400> 25

Gly Thr Ser Thr Leu Ala Ser
1 5

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<400> 26

Gly Val Pro Val Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr
Ser
1 5 10 15

Leu Thr Ile Ser Ser Met Glu Ala Glu Asp Ala Ala Thr Tyr Tyr
Cys
20 25 30

<210> 27
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<400> 27

Gln Gln Trp Ser Ser Tyr Pro Leu Thr
1 5

<210> 28
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<400> 28

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg
1 5 10

<210> 29

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<400> 29

Gly Glu Leu Gln Glu Ser Gly Pro Gln Val Val Arg Pro Gly Thr
Ser
1 5 10 15

Val Lys Ile Ser Cys Lys Ala Ser
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<400> 30

Gly Tyr Ser Phe Ser Asn Tyr Trp Met His
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<400> 31

Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile Gly
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<400> 32

Val Ile Asp Pro Ser Asp Ser Glu Thr Arg Leu Asn Gln Lys Phe
Lys
1 5 10 15

Asp

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Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr Met
Gln
1 5 10 15

Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Ile Tyr Tyr Cys Ala
Arg
20 25 30

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<400> 34

Ser Gln Phe Gly Leu Arg Phe Ala Tyr
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<400> 35

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala
1 5 10

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<400> 36

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

Glu Lys Val Thr Met Ser Cys
20

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<400> 37

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

Thr

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<400> 38

Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Ser
1 5 10 15

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<400> 39

Trp Ala Ser Thr Arg Asp Ser
1 5

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<400> 40

Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe
Thr
1 5 10 15

Leu Thr Ile Asn Gly Val Gln Ala Glu Asp Leu Ala Val Tyr Phe
Cys
20 25 30

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<400> 41

Gln Asn Asp Tyr Asp Ser Pro Tyr Thr
1 5

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<400> 42

Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
1 5 10

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<400> 43

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly
Ala
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser
20 25

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<400> 44

Gly Tyr Thr Phe Thr Asp Tyr Asn Ile His
1 5 10

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<400> 45

Trp Val Lys Gln Ser Pro Gly Lys Ser Leu Glu Trp Ile Gly
1 5 10

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<400> 46

Tyr Ile Tyr Pro Asp Asn Gly Asp Thr Gly Tyr Asn Gln Ile Phe
Lys
1 5 10 15

Asn

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Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Ala Ala Tyr Met
Glu
1 5 10 15

Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys Val
Arg
20 25 30

<210> 48

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<400> 48

Arg Val Leu Leu Asp Ser
1 5

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<400> 49

Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser
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<400> 50

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu
Gly
1 5 10 15

Asp Arg Val Thr Ile Ser Cys
20

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<400> 51

Ser Ala Ser Gln Asp Ile Asn Asn Phe Leu Asn
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<400> 52

Trp Tyr Gln Gln Lys Pro Asp Gly Thr Ile Lys Leu Leu Ile Tyr
1 5 10 15

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<400> 53

Tyr Thr Ser Ser Leu Gln Ser

1 5

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<223> 4Ab VL FW3

<400> 54

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr
Ser

1 5 10 15

Leu Thr Ile Ser Asn Leu Glu Pro Glu Asp Ile Ala Thr Tyr Tyr
Cys

20 25 30

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<400> 55

Gln Gln Tyr Ser Lys Leu Pro Arg Thr

1 5

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<400> 56

Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg

1 5 10

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<400> 57

Glu Val Gln Leu Gln Gln Ser Gly Gly Gly Leu Val Gln Pro Gly
Gly
1 5 10 15

Ser Leu Lys Leu Ser Cys Ala Ala Ser
20 25

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<400> 58

Gly Phe Thr Phe Ser Asn Tyr Asp Met Ser
1 5 10

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<400> 59

Trp Ile Arg Gln Thr Pro Asp Lys Arg Leu Glu Met Val Ala
1 5 10

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<400> 60

Ala Ile Asn Ser Asn Gly Gly Ser Thr Tyr Tyr Pro Asp Ser Val
 Lys
 1 5 10 15

Gly

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<400> 61

Arg Phe Thr Ile Ser Arg Asp Lys Ala Lys Asn Thr Leu Tyr Leu
 Gln
 1 5 10 15

Met Ser Ser Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr Cys Ala
 Ser
 20 25 30

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<400> 62

Pro Asn Gly Tyr Gly Ala Met Asp Tyr
 1 5

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<400> 63

Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser
 1 5 10

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<400> 64

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

Gln Pro Ala Ser Ile Ser Cys
20

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<400> 65

Lys Ser Arg Gln Ser Leu Leu Asp Ser Asp Gly Lys Thr Tyr Leu
Asn
1 5 10 15

<210> 66
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<400> 66

Trp Leu Leu Gln Arg Pro Gly Glu Ser Pro Lys Leu Leu Ile Tyr
1 5 10 15

<210> 67
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<400> 67

Leu Val Ser Lys Leu Asp Ser
1 5

<210> 68

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<400> 68

Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe
Thr
1 5 10 15

Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr
Cys
20 25 30

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<400> 69

Leu Gln Ala Thr His Phe Pro Trp Thr
1 5

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Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg Ala
1 5 10

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<400> 71

Glu Val Lys Leu Gln Glu Ser Gly Ala Glu Leu Ala Lys Pro Gly
Ala
1 5 10 15

Ser Val Lys Met Ser Cys Arg Ala Ser Gly Tyr Thr Phe Thr Ser
Tyr
20 25 30

Trp Ile His Trp Val Lys Glu Arg Pro Gly Gln Gly Leu Glu Trp
Ile
35 40 45

Gly Tyr Ile Thr Pro Asn Thr Gly Tyr Asn Glu Asn Ser Gln Lys
Phe
50 55 60

Arg Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Asn Thr Ala
Tyr
65 70 75 80

Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Phe
Cys
85 90 95

Val Arg Arg Thr Tyr Glu Gly Tyr Leu Asp Val Trp Gly Ala Gly
Thr
100 105 110

Thr Val Thr Val Ser Ser
115

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Asp Ile Val Met Thr Gln Thr Pro Leu Ser Leu Pro Val Ser Leu

Gly
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 Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Asn Leu Val His
 Asn
 20 25 30

 Asn Gly Asn Thr Tyr Leu Glu Trp Tyr Leu Gln Lys Pro Gly Gln
 Ser
 35 40 45

 Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Leu Ser Gly Val
 Pro
 50 55 60

 Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Asn
 Ile
 65 70 75 80

 Ser Arg Val Glu Ala Glu Asp Leu Gly Ile Tyr Tyr Cys Phe Gln
 Ala
 85 90 95

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

Arg

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<400> 73

Glu Val Gln Leu Gln Glu Ser Gly Ala Glu Leu Ala Lys Pro Gly
 Ala
 1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser
 Tyr
 20 25 30

Trp Met His Trp Val Lys Gln Arg Pro Gly Gln Val Leu Glu Trp
 Ile
 35 40 45

Gly Tyr Ile Asn Pro Asn Thr Gly Phe Thr Glu Tyr Ser Gln Lys
 Phe
 50 55 60

Lys Asp Lys Ala Thr Leu Thr Ala Val Lys Ser Ser Ser Thr Ala
 Tyr
 65 70 75 80

Ile Gln Leu Thr Ser Leu Thr Ser Asp Asp Ser Ala Val Tyr Tyr
 Cys
 85 90 95

Ala Arg Glu Asn Tyr Arg Tyr Asp Gly Ala Met Asp Tyr Trp Gly
 Gln
 100 105 110

Gly Thr Ser Val Thr Val Ser Ser
 115 120

<210> 74
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<400> 74

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

Asp Arg Val Thr Ile Thr Cys Ser Val Ser Ser Ser Val Ser Ser
 Ser
 20 25 30

Asn Leu His Trp Tyr Gln Gln Lys Ser Glu Thr Ser Pro Lys Pro
 Trp
 35 40 45

Ile Tyr Gly Thr Ser Thr Leu Ala Ser Gly Val Pro Val Arg Phe
 Ser

50		55		60	
Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Met					
Glu					
65		70		75	80
Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Tyr					
Pro					
	85		90		95
Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg					
	100		105		
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Gly Glu Leu Gln Glu Ser Gly Pro Gln Val Val Arg Pro Gly Thr					
Ser					
1	5		10		15
Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ser Phe Ser Asn Tyr					
Trp					
	20		25		30
Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile					
Gly					
	35		40		45
Val Ile Asp Pro Ser Asp Ser Glu Thr Arg Leu Asn Gln Lys Phe					
Lys					
	50		55		60
Asp Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Ser Thr Ala Tyr					
Met					
65		70		75	80
Gln Leu Ser Ser Pro Thr Ser Glu Asp Ser Ala Ile Tyr Tyr Cys					
Ala					
	85		90		95

Arg Ser Gln Phe Gly Leu Arg Phe Ala Tyr Trp Gly Gln Gly Thr
 Leu
 100 105 110

Val Thr Val Ser Ala
 115

<210> 76
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<220>
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<400> 76

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

Glu Lys Val Thr Met Ser Cys Gln Ser Ser Gln Ser Leu Phe Asn
 Ser
 20 25 30

Gly Thr Gln Lys Asn Tyr Leu Thr Trp Tyr Gln Gln Lys Pro Gly
 Gln
 35 40 45

Pro Pro Lys Leu Leu Ile Ser Trp Ala Ser Thr Arg Asp Ser Gly
 Val
 50 55 60

Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu
 Thr
 65 70 75 80

Ile Asn Gly Val Gln Ala Glu Asp Leu Ala Val Tyr Phe Cys Gln
 Asn
 85 90 95

Asp Tyr Asp Ser Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu
 Ile
 100 105 110

Lys Arg

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<400> 77

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly
 Ala
 1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp
 Tyr
 20 25 30

Asn Ile His Trp Val Lys Gln Ser Pro Gly Lys Ser Leu Glu Trp
 Ile
 35 40 45

Gly Tyr Ile Tyr Pro Asp Asn Gly Asp Thr Gly Tyr Asn Gln Ile
 Phe
 50 55 60

Lys Asn Lys Ala Thr Leu Thr Val Asp Thr Ser Ser Ser Ala Ala
 Tyr
 65 70 75 80

Met Glu Leu Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr
 Cys
 85 90 95

Val Arg Arg Val Leu Leu Asp Ser Trp Gly Gln Gly Thr Ser Val
 Thr
 100 105 110

Val Ser Ser
 115

<210> 78
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<400> 78

Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu
Gly
1 5 10 15

Asp Arg Val Thr Ile Ser Cys Ser Ala Ser Gln Asp Ile Asn Asn
Phe
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Ile Lys Leu Leu
Ile
35 40 45

Tyr Tyr Thr Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser
Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu
Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Lys Leu Pro
Arg
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
100 105

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<400> 79

Glu Val Gln Leu Gln Gln Ser Gly Gly Gly Leu Val Gln Pro Gly
Gly
1 5 10 15

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

Asp Met Ser Trp Ile Arg Gln Thr Pro Asp Lys Arg Leu Glu Met
Val

35

40

45

Ala Ala Ile Asn Ser Asn Gly Gly Ser Thr Tyr Tyr Pro Asp Ser
Val

50

55

60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Lys Ala Lys Asn Thr Leu
Tyr

65

70

75

80

Leu Gln Met Ser Ser Leu Lys Ser Glu Asp Thr Ala Met Tyr Tyr
Cys

85

90

95

Ala Ser Pro Asn Gly Tyr Gly Ala Met Asp Tyr Trp Gly Gln Gly
Thr

100

105

110

Ser Val Thr Val Ser Ser

115

<210> 80

<211> 114

<212> PRT

<213> Artificial Sequence

<220>

<223> 5Ab VL

<400> 80

Asp Ile Val Ile Thr Gln Thr Pro Leu Thr Leu Ser Val Thr Ile
Gly

1

5

10

15

Gln Pro Ala Ser Ile Ser Cys Lys Ser Arg Gln Ser Leu Leu Asp
Ser

20

25

30

Asp Gly Lys Thr Tyr Leu Asn Trp Leu Leu Gln Arg Pro Gly Glu
Ser

35

40

45

Pro Lys Leu Leu Ile Tyr Leu Val Ser Lys Leu Asp Ser Gly Val
Pro

50

55

60

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

Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr Cys Leu Gln
 Ala
 85 90 95

Thr His Phe Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
 Lys
 100 105 110

Arg Ala

<210> 81
 <211> 354
 <212> DNA
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 gaaagagagg 120

cctggacagg gtctggaatg gattggatac attactccta atacaggtta
 taatgagaac 180

agtcagaagt tcaggggcaa ggccacattg actgcagaca aatcctccaa
 cacagcttat 240

atgcaactaa gcagcctgac atctgaggac tctgcagtct atttctgtgt
 aagaaggacg 300

tatgaggggt acctcgatgt ctggggcgca gggaccacgg tcaccgtctc ctca
 354

<210> 82
 <211> 339
 <212> DNA
 <213> Artificial Sequence

<220>
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tttagagtgg 120

tacctgcaga aaccaggcca gtctccaaag ctctgatct acaaagtttc
caaccgattg 180

tctggggctc cagacagggt cagtggcagt ggatccggga cagacttcac
actcaatatc 240

agcagagtgg aggctgagga tctgggaatt tattactgct ttcaggcttc
acatgttcct 300

cggacgttcg gtggaggcac caagctggaa atcaaacgg
339

<210> 83
<211> 360
<212> DNA
<213> Artificial Sequence

<220>
<223> 2Ab VH DNA

<400> 83
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agtgaagatg 60

tcctgcaagg cttctggcta cacctttact agctactgga tgcactgggt
aaaacagagg 120

cctggacagg ttctggaatg gattggatac attaataccta atactggttt
tactgaatat 180

agtcagaaat tcaaggacaa ggccacattg actgcagtca agtcctccag
cacagcctat 240

atacaactga ccagcctgac atctgatgac tctgcagtct attactgtgc
aagagagaac 300

tataggtacg acggggctat ggactactgg ggtcaaggaa cctcagtcac
cgtctcctca 360

<210> 84
<211> 327
<212> DNA
<213> Artificial Sequence

<220>
<223> 2Ab VL DNA

<400> 84

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cagggtcacc 60

atcacctgca gtgtcagctc aagtgttaagt tccagcaact tgcactggta
ccaacagaag 120

tcagaaacct cccccaaacc ctggatttat ggcacatcca ccctggcttc
tggagtcctt 180

gttcgcttca gtggcagtggt atctgggacc tcttattctc tcacaatcag
cagcatggag 240

gctgaagatg ctgccactta ttactgtcaa cagtggagta gttacccact
cacgttcggt 300

gctgggacca agctggagct gaaacgg
327

<210> 85

<211> 351

<212> DNA

<213> Artificial Sequence

<220>

<223> 3Ab VH DNA

<400> 85

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gaagatatcc 60

tgcaaggctt ctggttattc attttccaac tactggatgc actgggtgaa
gcagaggcct 120

ggacaaggtc ttgagtggat tggcgtgatt gatccttccg atagtgaaac
tagattaaat 180

cagaagttca aggacaaggc cacattgact gtagacaaat cctccagtac
agcctacatg 240

caactcagca gcccgacatc tgaggactct gcgatctatt attgtgcaag
atcacagttc 300

gggctacgtt ttgcttactg gggccaaggg actctgggtca ctgtctctgc a
351

<210> 86

<211> 342

<212> DNA

<213> Artificial Sequence

<220>

<223> 3Ab VL DNA

<400> 86

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 atgagctgcc agtccagtca gagtctattc aacagtggaa ctcaaaagaa
 ctacttgacc 120
 tggtagcagc agaaaccagg acagcctcct aaactgttga tctcctgggc
 atccactagg 180
 gattctgggg tccctgatcg cttcacaggc agtggatctg gaacagattt
 cactctcacc 240
 attaacggtg tgcaggctga agacctggca gtttatttct gtcagaatga
 ttatgattct 300
 ccgtacacgt tcggaggggg gacgaagctg gaaataaaac gg
 342

<210> 87
 <211> 345
 <212> DNA
 <213> Artificial Sequence

<220>
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<400> 87
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 tcttgcaagg cttctggata cacattcact gactacaaca tacactgggt
 gaaacagagc 120
 cctggaaaga gccttgagtg gattggatat atttatcctg acaatgggtg
 tactggctac 180
 aaccagattt tcaagaacaa ggccacattg actgtagaca cttcgtccag
 cgcagcctac 240
 atggaactcc gcagcctgac atctgaggac tctgcagtct attactgtgt
 aagacgggtc 300
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 345

<210> 88
 <211> 324
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> 4Ab VL DNA

<400> 88
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 cagagtcacc 60

atcagttgca gtgcaagtca ggacattaac aatTTTTTaa actggtatca
gcagaaacca 120

gatggaacta ttaaactcct gatctattac acatcaagtt tacagtcagg
agtcccgtca 180

aggttcagtg gcagtgggtc tgggacagat tattctctca ccatcagcaa
cctggaacct 240

gaagatattg ccacttacta ttgtcaacaa tatagtaaac ttcctcggac
gttcggtgga 300

ggcaccaagc tggaaatcaa acgg
324

<210> 89

<211> 354

<212> DNA

<213> Artificial Sequence

<220>

<223> 5Ab VH DNA

<400> 89

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tcctgtgcag cctctggatt cactttcagt aactatgaca tgtcttggat
tcgccagact 120

ccagacaaga ggctggagat ggtcgcagcc attaatagta atggtggtag
cacctattat 180

ccagacagtg tgaagggccg attcaccatc tccagagaca aagccaagaa
caccctatac 240

ctgcaaatga gcagtctgaa gtctgaggac acagccatgt attactgtgc
gagccctaatt 300

ggttacggag ctatggacta ctgggggtcaa ggaacctcag tcaccgtctc ctca
354

<210> 90

<211> 339

<212> DNA

<213> Artificial Sequence

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<223> 5Ab VL DNA

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accagcttcc 60

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tttaaattgg          120

ttattacaga ggccaggcga gtctccaaag ctctaatact atctggtgtc
taaactggac          180

tctggagtcc ctgacagggt cactggcagt ggatcaggga cagatttcac
actgaaaatc          240

agcagagtgg aggctgagga tttgggagtt tattactgct tgcaagctac
acattttccg          300

tggacgttcg gtggaggcac caagctggaa atcaaacgg
339

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