

SEQUENCE LISTING

<110> Universitätsklinikum Heidelberg

<120> Hydrophobic modified preS-derived peptides of hepatitis B virus (HBV) and their use as vehicles for the specific delivery of compounds to the liver

<130> U30197PCT

<150> US 61/062,347

<151> 2008-01-25

<160> 42

<170> PatentIn version 3.3

<210> 1

<211> 59

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 consensus sequence (positions (-11) to 48)

<400> 1

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

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
20 25 30

Ala Phe Arg Ala Asn Ser Asn Asn Pro Asp Trp Asp Phe Asn Pro Asn
35 40 45

Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
50 55

<210> 2

<211> 59

<212> PRT

<213> Hepatitis B virus

<400> 2

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

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
20 25 30

Ala Phe Gly Ala Asn Ser Asn Asn Pro Asp Trp Asp Phe Asn Pro Val
35 40 45

Lys Asp Asp Trp Pro Ala Ala Asn Gln Val Gly

50

55

<210> 3
 <211> 59
 <212> PRT
 <213> Hepatitis B virus

<400> 3

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

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
 20 25 30

Ala Phe Lys Ala Asn Ser Glu Asn Pro Asp Trp Asp Leu Asn Pro His
 35 40 45

Lys Asp Asn Trp Pro Asp Ala Asn Lys Val Gly
 50 55

<210> 4
 <211> 59
 <212> PRT
 <213> Artificial

<220>
 <223> HBV preS1 sequence positions (-11) to 48, corresponding to HBV
 genotype C, but Q46K

<400> 4

Met Gly Gly Trp Ser Ser Lys Pro Arg Gln Gly Met Gly Thr Asn Leu
 1 5 10 15

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
 20 25 30

Ala Phe Gly Ala Asn Ser Asn Asn Pro Asp Trp Asp Phe Asn Pro Asn
 35 40 45

Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
 50 55

<210> 5
 <211> 48
 <212> PRT
 <213> Hepatitis B virus

<400> 5

Met Gly Gln Asn Leu Ser Thr Ser Asn Pro Leu Gly Phe Phe Pro Asp
 1 5 10 15

His Gln Leu Asp Pro Ala Phe Arg Ala Asn Thr Ala Asn Pro Asp Trp
 20 25 30

Asp Phe Asn Pro Asn Lys Asp Thr Trp Pro Asp Ala Asn Lys Val Gly
 35 40 45

<210> 6
 <211> 58
 <212> PRT
 <213> Hepatitis B virus

<400> 6

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

Thr Thr Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro Ala
 20 25 30

Phe Arg Ala Asn Thr Arg Asn Pro Asp Trp Asp His Asn Pro Asn Lys
 35 40 45

Asp His Trp Thr Glu Ala Asn Lys Val Gly
 50 55

<210> 7
 <211> 59
 <212> PRT
 <213> Hepatitis B virus

<400> 7

Met Gly Ala Pro Leu Ser Thr Thr Arg Arg Gly Met Gly Gln Asn Leu
 1 5 10 15

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
 20 25 30

Leu Phe Arg Ala Asn Ser Ser Ser Pro Asp Trp Asp Phe Asn Thr Asn
 35 40 45

Lys Asp Ser Trp Pro Met Ala Asn Lys Val Gly
 50 55

<210> 8
 <211> 58
 <212> PRT
 <213> Hepatitis B virus

<400> 8

Met Gly Leu Ser Trp Thr Val Pro Leu Glu Trp Gly Lys Asn Leu Ser

1 5 10 15

Ala Ser Asn Pro Leu Gly Phe Leu Pro Asp His Gln Leu Asp Pro Ala
 20 25 30

Phe Arg Ala Asn Thr Asn Asn Pro Asp Trp Asp Phe Asn Pro Lys Lys
 35 40 45

Asp Pro Trp Pro Glu Ala Asn Lys Val Gly
 50 55

<210> 9
 <211> 59
 <212> PRT
 <213> Hepatitis B virus

<400> 9

Met Gly Ala Pro Leu Ser Thr Ala Arg Arg Gly Met Gly Gln Asn Leu
 1 5 10 15

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
 20 25 30

Leu Phe Arg Ala Asn Ser Ser Ser Pro Asp Trp Asp Phe Asn Thr Asn
 35 40 45

Lys Asp Asn Trp Pro Met Ala Asn Lys Val Gly
 50 55

<210> 10
 <211> 48
 <212> PRT
 <213> Woolly Monkey Hepatitis B virus

<400> 10

Met Gly Leu Asn Gln Ser Thr Phe Asn Pro Leu Gly Phe Phe Pro Ser
 1 5 10 15

His Gln Leu Asp Pro Leu Phe Lys Ala Asn Ala Gly Ser Ala Asp Trp
 20 25 30

Asp Lys Asn Pro Asn Lys Asp Pro Trp Pro Gln Ala His Asp Thr Ala
 35 40 45

<210> 11
 <211> 47
 <212> PRT
 <213> Artificial

<220>

<223> HBV preS1 consensus sequence (positions 2 to 48)

<400> 11

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

Gln Leu Asp Pro Ala Phe Arg Ala Asn Ser Asn Asn Pro Asp Trp Asp
20 25 30

Phe Asn Pro Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
35 40 45

<210> 12

<211> 20

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 consensus sequence (positions 2 to 21)

<400> 12

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

Gln Leu Asp Pro
20

<210> 13

<211> 47

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, corresponding to HBV
genotype C, but Q46K

<400> 13

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

Gln Leu Asp Pro Ala Phe Gly Ala Asn Ser Asn Asn Pro Asp Trp Asp
20 25 30

Phe Asn Pro Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
35 40 45

<210> 14

<211> 44

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 5 to 48, corresponding to HBV genotype C, but Q46K

<400> 14

Leu Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp
1 5 10 15

Pro Ala Phe Gly Ala Asn Ser Asn Asn Pro Asp Trp Asp Phe Asn Pro
20 25 30

Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
35 40

<210> 15

<211> 40

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 9 to 48, corresponding to HBV genotype C, but Q46K

<400> 15

Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro Ala Phe Gly
1 5 10 15

Ala Asn Ser Asn Asn Pro Asp Trp Asp Phe Asn Pro Asn Lys Asp His
20 25 30

Trp Pro Glu Ala Asn Lys Val Gly
35 40

<210> 16

<211> 20

<212> PRT

<213> Hepatitis B virus (positions 2 to 21, genotype C)

<400> 16

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

Gln Leu Asp Pro
20

<210> 17

<211> 17

<212> PRT

<213> Hepatitis B virus (positions 5 to 21, genotype C)

<400> 17

Leu Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp

1 5 10 15

Pro

```
<210> 18
<211> 13
<212> PRT
<213> Hepatitis B virus (positions 9 to 21, genotype C)
<400> 18
```

Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
1 5 10

```
<210> 19
<211> 14
<212> PRT
<213> Hepatitis B virus (positions 2 to 15, genotype C)
<400> 19
```

Gly Thr Asn Leu Ser Val Pro Asn Pro Leu Gly Phe Phe Pro
1 5 10

```
<210> 20
<211> 11
<212> PRT
<213> Hepatitis B virus (positions 5 to 15, genotype C)
<400> 20
```

Leu Ser Val Pro Asn Pro Leu Gly Phe Phe Pro
1 5 10

```
<210> 21
<211> 7
<212> PRT
<213> Hepatitis B virus (positions 9 to 15)
<400> 21
```

Asn Pro Leu Gly Phe Phe Pro
1 5

```
<210> 22
<211> 22
<212> PRT
<213> Hepatitis B virus (positions (-2) to 20, genotype C)
<400> 22
```

Gln Gly Met Gly Thr Asn Leu Ser Val Pro Asn Pro Leu Gly Phe Phe
1 5 10 15

Pro Asp His Gln Leu Asp

20

<210> 23
 <211> 47
 <212> PRT
 <213> Hepatitis B virus (positions 2 to 48, genotype D)

<400> 23

Gly Gln Asn Leu Ser Thr Ser Asn Pro Leu Gly Phe Phe Pro Asp His
 1 5 10 15

Gln Leu Asp Pro Ala Phe Arg Ala Asn Thr Ala Asn Pro Asp Trp Asp
 20 25 30

Phe Asn Pro Asn Lys Asp Thr Trp Pro Asp Ala Asn Lys Val Gly
 35 40 45

<210> 24
 <211> 44
 <212> PRT
 <213> Hepatitis B virus (positions 5 to 48, genotype D)

<400> 24

Leu Ser Thr Ser Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp
 1 5 10 15

Pro Ala Phe Arg Ala Asn Thr Ala Asn Pro Asp Trp Asp Phe Asn Pro
 20 25 30

Asn Lys Asp Thr Trp Pro Asp Ala Asn Lys Val Gly
 35 40

<210> 25
 <211> 40
 <212> PRT
 <213> Hepatitis B virus (positions 9 to 48, genotype D)

<400> 25

Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro Ala Phe Arg
 1 5 10 15

Ala Asn Thr Ala Asn Pro Asp Trp Asp Phe Asn Pro Asn Lys Asp Thr
 20 25 30

Trp Pro Asp Ala Asn Lys Val Gly
 35 40

<210> 26
 <211> 20
 <212> PRT

<213> Hepatitis B virus (positions 2 to 21, genotype D)

<400> 26

Gly	Gln	Asn	Leu	Ser	Thr	Ser	Asn	Pro	Leu	Gly	Phe	Phe	Pro	Asp	His
1				5					10					15	

Gln	Leu	Asp	Pro
			20

<210> 27

<211> 17

<212> PRT

<213> Hepatitis B virus (positions 5 to 21, genotype D)

<400> 27

Leu	Ser	Thr	Ser	Asn	Pro	Leu	Gly	Phe	Phe	Pro	Asp	His	Gln	Leu	Asp
1				5					10					15	

Pro

<210> 28

<211> 13

<212> PRT

<213> Hepatitis B virus (positions 9 to 21, genotype D)

<400> 28

Asn	Pro	Leu	Gly	Phe	Phe	Pro	Asp	His	Gln	Leu	Asp	Pro
1				5					10			

<210> 29

<211> 14

<212> PRT

<213> Hepatitis B virus (positions 2 to 15, genotype D)

<400> 29

Gly	Gln	Asn	Leu	Ser	Thr	Ser	Asn	Pro	Leu	Gly	Phe	Phe	Pro
1				5					10				

<210> 30

<211> 11

<212> PRT

<213> Hepatitis B virus (positions 5 to 15, genotype D)

<400> 30

Leu	Ser	Thr	Ser	Asn	Pro	Leu	Gly	Phe	Phe	Pro
1				5					10	

<210> 31

<211> 47

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, corresponding to genotype C (but Q46K), with Ala substitution in positions 21, 23, 29, 30

<400> 31

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

Gln Leu Asp Ala Ala Ala Gly Ala Asn Ser Asn Ala Ala Asp Trp Asp
20 25 30

Phe Asn Pro Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
35 40 45

<210> 32

<211> 59

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions (-11) to 48, corresponding to genotype C (but Q46K), D20A

<400> 32

Met Gly Gly Trp Ser Ser Lys Pro Arg Gln Gly Met Gly Thr Asn Leu
1 5 10 15

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Ala Pro
20 25 30

Ala Phe Gly Ala Asn Ser Asn Asn Pro Asp Trp Asp Phe Asn Pro Asn
35 40 45

Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
50 55

<210> 33

<211> 47

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, corresponding to genotype C (but Q46K), D20A

<400> 33

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

Gln Leu Ala Pro Ala Phe Gly Ala Asn Ser Asn Asn Pro Asp Trp Asp

20

25

30

Phe Asn Pro Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
 35 40 45

<210> 34
 <211> 59
 <212> PRT
 <213> Artificial

<220>
 <223> HBV preS1 sequence positions (-11) to 48, corresponding to
 genotype C (but Q46K), S27A, N29A

<400> 34

Met Gly Gly Trp Ser Ser Lys Pro Arg Gln Gly Met Gly Thr Asn Leu
 1 5 10 15

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro
 20 25 30

Ala Phe Gly Ala Asn Ala Asn Ala Pro Asp Trp Asp Phe Asn Pro Asn
 35 40 45

Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
 50 55

<210> 35
 <211> 47
 <212> PRT
 <213> Artificial

<220>
 <223> HBV preS1 sequence positions 2 to 48, corresponding to genotype C
 (but Q46K), S27A, N29A

<400> 35

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

Gln Leu Asp Pro Ala Phe Gly Ala Asn Ala Asn Ala Pro Asp Trp Asp
 20 25 30

Phe Asn Pro Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
 35 40 45

<210> 36
 <211> 59
 <212> PRT
 <213> Artificial

<220>

<223> HBV preS1 sequence positions (-11) to 48, corresponding to genotype C (but Q46K), D20A, S27A, N29A

<400> 36

Met Gly Gly Trp Ser Ser Lys Pro Arg Gln Gly Met Gly Thr Asn Leu
1 5 10 15

Ser Val Pro Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Ala Pro
20 25 30

Ala Phe Gly Ala Asn Ala Asn Ala Pro Asp Trp Asp Phe Asn Pro Asn
35 40 45

Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
50 55

<210> 37

<211> 47

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, corresponding to genotype C (but Q46K), D20A, S27A, N29A

<400> 37

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

Gln Leu Ala Pro Ala Phe Gly Ala Asn Ala Asn Ala Pro Asp Trp Asp
20 25 30

Phe Asn Pro Asn Lys Asp His Trp Pro Glu Ala Asn Lys Val Gly
35 40 45

<210> 38

<211> 19

<212> PRT

<213> Hepatitis B virus (positions 2 to 20, genotype D)

<400> 38

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

Gln Leu Asp

<210> 39

<211> 48

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, genotype C, plus K in position 49

<400> 39

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

Gln	Leu	Asp	Pro	Ala	Phe	Gly	Ala	Asn	Ser	Asn	Asn	Pro	Asp	Trp	Asp
			20					25					30		

Phe	Asn	Pro	Asn	Lys	Asp	His	Trp	Pro	Glu	Ala	Asn	Gln	Val	Gly	Lys
		35					40					45			

<210> 40

<211> 48

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, genotype C, plus K in position 49, positions L11 and F13 are D-amino acids

<400> 40

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

Gln	Leu	Asp	Pro	Ala	Phe	Gly	Ala	Asn	Ser	Asn	Asn	Pro	Asp	Trp	Asp
			20					25					30		

Phe	Asn	Pro	Asn	Lys	Asp	His	Trp	Pro	Glu	Ala	Asn	Gln	Val	Gly	Lys
		35					40					45			

<210> 41

<211> 48

<212> PRT

<213> Artificial

<220>

<223> HBV preS1 sequence positions 2 to 48, corresponding to genotype C (but Q46K), plus K in position 49

<400> 41

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

Gln	Leu	Asp	Pro	Ala	Phe	Gly	Ala	Asn	Ser	Asn	Asn	Pro	Asp	Trp	Asp
			20					25					30		

Phe	Asn	Pro	Asn	Lys	Asp	His	Trp	Pro	Glu	Ala	Asn	Lys	Val	Gly	Lys
		35					40					45			

<210> 42
 <211> 48
 <212> PRT
 <213> Artificial

<220>
 <223> HBV preS1 sequence positions 2 to 48, corresponding to genotype C
 (but Q46K), plus K in position 49, positions L11 and F13 are
 D-amino acids

<400> 42

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

Gln	Leu	Asp	Pro	Ala	Phe	Gly	Ala	Asn	Ser	Asn	Asn	Pro	Asp	Trp	Asp
			20					25					30		

Phe	Asn	Pro	Asn	Lys	Asp	His	Trp	Pro	Glu	Ala	Asn	Lys	Val	Gly	Lys
		35					40					45			