SEQUENCE LISTING

<110> F. Hoffmann-La Roche AG

<120> Transamidation reaction in deep eutectic solvents

<130> P33091

<150> EP15186955.9
<151> 2015-09-25

<150> EP16172623.7
<151> 2016-06-02

<160> 46

<170> PatentIn version 3.5

<210> 1
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> LPXTG sortase-motif

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> X can be any amino acid residue

<400> 1

Leu Pro Xaa Thr Gly
1 5

<210> 2
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> cystein sortase motif 1

<400> 2

Cys Gly Gly Gly
1

<210> 3
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> cystein sortase motif 2

<400> 3

Cys Ala Ala Ala
1

<210> 4
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> sortase motif

<400> 4

Leu Pro Glu Thr Gly
1 5

<210> 5
<211> 147
<212> PRT
<213> Artificial Sequence

<220>
<223> Staphylococcus aureus Sortase A shortened version N(1-59)

<400> 5

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

Ile Glu Ile Pro Asp Ala Asp Ile Lys Glu Pro Val Tyr Pro Gly Pro
20 25 30

```
Ala Thr Pro Glu Gln Leu Asn Arg Gly Val Ser Phe Ala Glu Glu Asn
        35                  40                  45

Glu Ser Leu Asp Asp Gln Asn Ile Ser Ile Ala Gly His Thr Phe Ile
    50                  55                  60

Asp Arg Pro Asn Tyr Gln Phe Thr Asn Leu Lys Ala Ala Lys Lys Gly
65                  70                  75                  80

Ser Met Val Tyr Phe Lys Val Gly Asn Glu Thr Arg Lys Tyr Lys Met
                85                  90                  95

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

Gln Lys Gly Lys Asp Lys Gln Leu Thr Leu Ile Thr Cys Asp Asp Tyr
        115                 120                 125

Asn Glu Lys Thr Gly Val Trp Glu Lys Arg Lys Ile Phe Val Ala Thr
    130                 135                 140

Glu Val Lys
145
```

<210>  6
<211>  168
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Streptococcus pyogenes Sortase A shortened version

<400>  6

```
Val Leu Gln Ala Gln Met Ala Ala Gln Gln Leu Pro Val Ile Gly Gly
1               5                   10                  15
```

```
Ile Ala Ile Pro Glu Leu Gly Ile Asn Leu Pro Ile Phe Lys Gly Leu
            20                  25                  30

Gly Asn Thr Glu Leu Ile Tyr Gly Ala Gly Thr Met Lys Glu Glu Gln
        35                  40                  45

Val Met Gly Gly Glu Asn Asn Tyr Ser Leu Ala Ser His His Ile Phe
    50                  55                  60

Gly Ile Thr Gly Ser Ser Gln Met Leu Phe Ser Pro Leu Glu Arg Ala
65                  70                  75                  80

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

Tyr Ile Ile Lys Asp Val Phe Thr Val Ala Pro Glu Arg Val Asp Val
            100                 105                 110

Ile Asp Asp Thr Ala Gly Leu Lys Glu Val Thr Leu Val Thr Cys Thr
        115                 120                 125

Asp Ile Glu Ala Thr Glu Arg Ile Ile Val Lys Gly Glu Leu Lys Thr
    130                 135                 140

Glu Tyr Asp Phe Asp Lys Ala Pro Ala Asp Val Leu Lys Ala Phe Asn
145                 150                 155                 160

His Ser Tyr Asn Gln Val Ser Thr
                165
```

<210>  7
<211>  5
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Arg-tag

<400> 7

Arg Arg Arg Arg Arg
1 5

<210> 8
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Arg-tag 2

<400> 8

Arg Arg Arg Arg Arg Arg
1 5

<210> 9
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> His-tag

<400> 9

His His His His His His
1 5

<210> 10
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 10

Lys Asp His Leu Ile His Asn Val His Lys Glu Phe His Ala His Ala
1 5 10 15

His Asn Lys

<210> 11
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 11

Asp Tyr Lys Asp Asp Asp Asp Lys
1 5

<210> 12
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 12

Asp Tyr Lys Asp His Asp Gly Asp Tyr Lys Asp His Asp Ile Asp Tyr
1 5 10 15

Lys Asp Asp Asp Asp Lys
20

<210> 13
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag#

<400> 13

Ala Trp Arg His Pro Gln Phe Gly Gly
1 5

<210> 14
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 14

Trp Ser His Pro Gln Phe Glu Lys
1 5

<210> 15
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 15

Met Asp Val Glu Ala Trp Leu Gly Ala Arg
1 5 10

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

<220>
<223> amino acid tag

<400> 16

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

<210> 17
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223>  amino acid tag

<400>  17

Met Asp Glu Lys Thr Thr Gly Trp Arg Gly Gly His Val Val Glu Gly
1               5                   10                  15

Leu Ala Gly Glu Leu Glu Gln Leu Arg Ala Arg Leu Glu His His Pro
            20                  25                  30

Gln Gly Gln Arg Glu Pro
        35

<210>  18
<211>  10
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  amino acid tag

<400>  18

Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu
1               5                   10

<210>  19
<211>  15
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  amino acid tag

<400>  19

Lys Glu Thr Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp Ser
1               5                   10                  15

<210>  20
<211>  26

<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 20

Lys Arg Arg Trp Lys Lys Asn Phe Ile Ala Val Ser Ala Ala Asn Arg
1 5 10 15

Phe Lys Lys Ile Ser Ser Ser Gly Ala Leu
20 25

<210> 21
<211> 47
<212> PRT
<213> Artificial Sequence

<220>
<223> amino acid tag

<400> 21

Pro Ala Thr Thr Thr Gly Ser Ser Pro Gly Pro Thr Gln Ser His Tyr
1 5 10 15

Gly Gln Cys Gly Gly Ile Gly Tyr Ser Gly Pro Thr Val Cys Ala Ser
20 25 30

Gly Thr Thr Cys Gln Val Leu Asn Pro Tyr Tyr Ser Gln Cys Leu
35 40 45

<210> 22
<211> 32
<212> PRT
<213> Butyrivibrio fibrisolvens

<400> 22

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

```
Ile Gln Gly Ala Gly Ser Val Gly Asn Val Ile Asp Ile Thr Val Glu
            20                  25                  30


<210>  23
<211>  51
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  chitin-binding-domain

<400>  23

Thr Asn Pro Gly Val Ser Ala Trp Gln Val Asn Thr Ala Tyr Thr Ala
1               5                   10                  15


Gly Gln Leu Val Thr Tyr Asn Gly Lys Thr Tyr Lys Cys Leu Gln Pro
            20                  25                  30


His Thr Ser Leu Ala Gly Trp Glu Pro Ser Asn Val Pro Ala Leu Trp
        35                  40                  45


Gln Leu Gln
    50


<210>  24
<211>  209
<212>  PRT
<213>  Chondrus crispus

<400>  24

Met Pro Glu Ile Lys Leu Thr Tyr Phe Asp Met Arg Gly Arg Ala Glu
1               5                   10                  15


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


Arg Val Val Phe Asp His Trp Lys Glu Ala Lys Pro Lys Thr Pro Tyr
        35                  40                  45
```

```
Ala Ala Leu Pro Met Leu Thr Val Asp Gly Met Gln Val Ala Gln Ser
    50                  55                  60

Asp Ala Ile Leu Arg Tyr Cys Gly Lys Leu Ala Gly Leu Tyr Pro Ser
65                  70                  75                  80

Asp Pro Leu Glu Ala Ala Lys Val Asp Glu Val Gly Gly Val Ile Asp
                85                  90                  95

Asp Val Thr His Ala Met Tyr Arg Tyr Arg Gly Asp Asp Lys Asp Lys
            100                 105                 110

Leu Arg Glu Glu Arg Asp Lys Phe Ser Lys Val Asp Val Pro Arg Tyr
        115                 120                 125

Val Gly Ala Leu Glu Lys Arg Leu Glu Ala Phe Gly Asp Gly Pro Trp
    130                 135                 140

Ala Val Gly Gly Asn Met Thr Ile Ala Asp Leu His Ile Cys His Leu
145                 150                 155                 160

Val Thr Asn Ile Arg Cys Gly Met Leu Asp Phe Val Asp Lys Asp Leu
                165                 170                 175

Leu Glu Gly Tyr Val Arg Ile Val Lys Ser Tyr Ser Ala Val Met Glu
            180                 185                 190

His Pro Lys Val Thr Glu Trp Tyr Glu Lys Lys Pro Val Lys Met Phe
        195                 200                 205

Ser
```

<210>  25
<211>  396

<212> PRT
<213> Escherichia coli

<400> 25

```
Met Lys Ile Lys Thr Gly Ala Arg Ile Leu Ala Leu Ser Ala Leu Thr
1               5                  10                  15


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


Leu Val Ile Trp Ile Asn Gly Asp Lys Gly Tyr Asn Gly Leu Ala Glu
        35                  40                  45


Val Gly Lys Lys Phe Glu Lys Asp Thr Gly Ile Lys Val Thr Val Glu
    50                  55                  60


His Pro Asp Lys Leu Glu Glu Lys Phe Pro Gln Val Ala Ala Thr Gly
65                  70                  75                  80


Asp Gly Pro Asp Ile Ile Phe Trp Ala His Asp Arg Phe Gly Gly Tyr
                85                  90                  95


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


Asp Lys Leu Tyr Pro Phe Thr Trp Asp Ala Val Arg Tyr Asn Gly Lys
        115                 120                 125


Leu Ile Ala Tyr Pro Ile Ala Val Glu Ala Leu Ser Leu Ile Tyr Asn
    130                 135                 140


Lys Asp Leu Leu Pro Asn Pro Pro Lys Thr Trp Glu Glu Ile Pro Ala
145                 150                 155                 160


Leu Asp Lys Glu Leu Lys Ala Lys Gly Lys Ser Ala Leu Met Phe Asn
                165                 170                 175
```

```
Leu Gln Glu Pro Tyr Phe Thr Trp Pro Leu Ile Ala Ala Asp Gly Gly
            180                 185                 190

Tyr Ala Phe Lys Tyr Glu Asn Gly Lys Tyr Asp Ile Lys Asp Val Gly
        195                 200                 205

Val Asp Asn Ala Gly Ala Lys Ala Gly Leu Thr Phe Leu Val Asp Leu
    210                 215                 220

Ile Lys Asn Lys His Met Asn Ala Asp Thr Asp Tyr Ser Ile Ala Glu
225                 230                 235                 240

Ala Ala Phe Asn Lys Gly Glu Thr Ala Met Thr Ile Asn Gly Pro Trp
                245                 250                 255

Ala Trp Ser Asn Ile Asp Thr Ser Lys Val Asn Tyr Gly Val Thr Val
            260                 265                 270

Leu Pro Thr Phe Lys Gly Gln Pro Ser Lys Pro Phe Val Gly Val Leu
        275                 280                 285

Ser Ala Gly Ile Asn Ala Ala Ser Pro Asn Lys Glu Leu Ala Lys Glu
    290                 295                 300

Phe Leu Glu Asn Tyr Leu Leu Thr Asp Glu Gly Leu Glu Ala Val Asn
305                 310                 315                 320

Lys Asp Lys Pro Leu Gly Ala Val Ala Leu Lys Ser Tyr Glu Glu Glu
                325                 330                 335

Leu Ala Lys Asp Pro Arg Ile Ala Ala Thr Met Glu Asn Ala Gln Lys
            340                 345                 350

Gly Glu Ile Met Pro Asn Ile Pro Gln Met Ser Ala Phe Trp Tyr Ala
        355                 360                 365
```

```
Val Arg Thr Ala Val Ile Asn Ala Ala Ser Gly Arg Gln Thr Val Asp
    370                 375                 380


Glu Ala Leu Lys Asp Ala Gln Thr Arg Ile Thr Lys
385                 390                 395


<210>  26
<211>  206
<212>  PRT
<213>  Staphylococcus aureus

<400>  26

Met Lys Lys Trp Thr Asn Arg Leu Met Thr Ile Ala Gly Val Val Leu
1               5                   10                  15


Ile Leu Val Ala Ala Tyr Leu Phe Ala Lys Pro His Ile Asp Asn Tyr
            20                  25                  30


Leu His Asp Lys Asp Lys Asp Glu Lys Ile Glu Gln Tyr Asp Lys Asn
        35                  40                  45


Val Lys Glu Gln Ala Ser Lys Asp Lys Lys Gln Gln Ala Lys Pro Gln
    50                  55                  60


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


Ala Asp Ile Lys Glu Pro Val Tyr Pro Gly Pro Ala Thr Pro Glu Gln
                85                  90                  95


Leu Asn Arg Gly Val Ser Phe Ala Glu Glu Asn Glu Ser Leu Asp Asp
            100                 105                 110


Gln Asn Ile Ser Ile Ala Gly His Thr Phe Ile Asp Arg Pro Asn Tyr
        115                 120                 125
```

```
Gln Phe Thr Asn Leu Lys Ala Ala Lys Lys Gly Ser Met Val Tyr Phe
    130                 135                 140

Lys Val Gly Asn Glu Thr Arg Lys Tyr Lys Met Thr Ser Ile Arg Asp
145                 150                 155                 160

Val Lys Pro Thr Asp Val Gly Val Leu Asp Glu Gln Lys Gly Lys Asp
                165                 170                 175

Lys Gln Leu Thr Leu Ile Thr Cys Asp Asp Tyr Asn Glu Lys Thr Gly
            180                 185                 190

Val Trp Glu Lys Arg Lys Ile Phe Val Ala Thr Glu Val Lys
        195                 200                 205
```

<210> 27
<211> 222
<212> PRT
<213> Listeria monocytogenes

<400> 27

```
Met Leu Lys Lys Thr Ile Ala Ala Ala Ala Leu Ala Ala Gly Leu Leu
1               5                   10                  15

Leu Ile Phe Ser Pro Phe Ile Lys Asn Gly Ile Val Lys Tyr Met Ser
            20                  25                  30

Gly His Glu Thr Ile Glu Gln Tyr Lys Ala Ser Asp Ile Lys Lys Asn
        35                  40                  45

Asn Glu Lys Asp Ala Thr Phe Asp Phe Glu Ser Val Gln Leu Pro Ser
    50                  55                  60

Met Thr Ser Val Ile Lys Gly Ala Ala Asn Tyr Asp Lys Asp Ala Val
65                  70                  75                  80

Val Gly Ser Ile Ala Val Pro Ser Val Asp Val Asn Leu Leu Val Phe
```

85 90 95

Lys Gly Thr Asn Thr Ala Asn Leu Leu Ala Gly Ala Thr Thr Met Arg
100 105 110

Ser Asp Gln Val Met Gly Lys Gly Asn Tyr Pro Leu Ala Gly His His
115 120 125

Met Arg Asp Glu Ser Met Leu Phe Gly Pro Ile Met Lys Val Lys Lys
130 135 140

Gly Asp Lys Ile Tyr Leu Thr Asp Leu Glu Asn Leu Tyr Glu Tyr Thr
145 150 155 160

Val Thr Glu Thr Lys Thr Ile Asp Glu Thr Glu Val Ser Val Ile Asp
165 170 175

Asn Thr Lys Asp Ala Arg Ile Thr Leu Ile Thr Cys Asp Lys Pro Thr
180 185 190

Glu Thr Thr Lys Arg Phe Val Ala Val Gly Glu Leu Glu Lys Thr Glu
195 200 205

Lys Leu Thr Lys Glu Leu Glu Asn Lys Tyr Phe Pro Ser Lys
210 215 220

<210> 28
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> oligogylcine

<400> 28

Gly Gly
1

<210>  29
<211>  3
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  oligoglycine

<400>  29

Gly Gly Gly
1

<210>  30
<211>  4
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  oligoglycine

<400>  30

Gly Gly Gly Gly
1

<210>  31
<211>  5
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  oligoglycine

<400>  31

Gly Gly Gly Gly Gly
1               5

<210>  32
<211>  12
<212>  PRT
<213>  Artificial Sequence

<220>
<223> hexa-histidine tag with linker

<400> 32

Met Arg Gly Ser His His His His His His Gly Ser
1 5 10

<210> 33
<211> 249
<212> PRT
<213> Streptococcus pyogenes

<400> 33

Met Val Lys Lys Gln Lys Arg Arg Lys Ile Lys Ser Met Ser Trp Ala
1 5 10 15

Arg Lys Leu Leu Ile Ala Val Leu Leu Ile Leu Gly Leu Ala Leu Leu
20 25 30

Phe Asn Lys Pro Ile Arg Asn Thr Leu Ile Ala Arg Asn Ser Asn Lys
35 40 45

Tyr Gln Val Thr Lys Val Ser Lys Lys Gln Ile Lys Lys Asn Lys Glu
50 55 60

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

Ser Val Leu Gln Ala Gln Met Ala Ala Gln Gln Leu Pro Val Ile Gly
85 90 95

Gly Ile Ala Ile Pro Glu Leu Gly Ile Asn Leu Pro Ile Phe Lys Gly
100 105 110

Leu Gly Asn Thr Glu Leu Ile Tyr Gly Ala Gly Thr Met Lys Glu Glu
115 120 125

```
Gln Val Met Gly Gly Glu Asn Asn Tyr Ser Leu Ala Ser His His Ile
    130                 135                 140

Phe Gly Ile Thr Gly Ser Ser Gln Met Leu Phe Ser Pro Leu Glu Arg
145                 150                 155                 160

Ala Gln Asn Gly Met Ser Ile Tyr Leu Thr Asp Lys Glu Lys Ile Tyr
                165                 170                 175

Glu Tyr Ile Ile Lys Asp Val Phe Thr Val Ala Pro Glu Arg Val Asp
            180                 185                 190

Val Ile Asp Asp Thr Ala Gly Leu Lys Glu Val Thr Leu Val Thr Cys
        195                 200                 205

Thr Asp Ile Glu Ala Thr Glu Arg Ile Ile Val Lys Gly Glu Leu Lys
    210                 215                 220

Thr Glu Tyr Asp Phe Asp Lys Ala Pro Ala Asp Val Leu Lys Ala Phe
225                 230                 235                 240

Asn His Ser Tyr Asn Gln Val Ser Thr
                245
```

<210>  34
<211>  178
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Staphylococcus aureus Sortase A shortened version N(2-29)

<400>  34

```
Met Asp Asn Tyr Leu His Asp Lys Asp Lys Asp Glu Lys Ile Glu Gln
1               5                   10                  15

Tyr Asp Lys Asn Val Lys Glu Gln Ala Ser Lys Asp Lys Lys Gln Gln
            20                  25                  30
```

```
Ala Lys Pro Gln Ile Pro Lys Asp Lys Ser Lys Val Ala Gly Tyr Ile
        35                  40                  45

Glu Ile Pro Asp Ala Asp Ile Lys Glu Pro Val Tyr Pro Gly Pro Ala
    50                  55                  60

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

Ser Leu Asp Asp Gln Asn Ile Ser Ile Ala Gly His Thr Phe Ile Asp
                85                  90                  95

Arg Pro Asn Tyr Gln Phe Thr Asn Leu Lys Ala Ala Lys Lys Gly Ser
            100                 105                 110

Met Val Tyr Phe Lys Val Gly Asn Glu Thr Arg Lys Tyr Lys Met Thr
        115                 120                 125

Ser Ile Arg Asp Val Lys Pro Thr Asp Val Gly Val Leu Asp Glu Gln
    130                 135                 140

Lys Gly Lys Asp Lys Gln Leu Thr Leu Ile Thr Cys Asp Asp Tyr Asn
145                 150                 155                 160

Glu Lys Thr Gly Val Trp Glu Lys Arg Lys Ile Phe Val Ala Thr Glu
                165                 170                 175

Val Lys
```

<210>  35
<211>  222
<212>  PRT
<213>  Listeria monocytogenes

<400>  35

```
Met Leu Lys Lys Thr Ile Ala Ala Ala Ala Leu Ala Ala Gly Leu Leu
1               5                   10                  15


Leu Ile Phe Ser Pro Phe Ile Lys Asn Gly Ile Val Lys Tyr Met Ser
            20                  25                  30


Gly His Glu Thr Ile Glu Gln Tyr Lys Ala Ser Asp Ile Lys Lys Asn
        35                  40                  45


Asn Glu Lys Asp Ala Thr Phe Asp Phe Glu Ser Val Gln Leu Pro Ser
    50                  55                  60


Met Thr Ser Val Ile Lys Gly Ala Ala Asn Tyr Asp Lys Asp Ala Val
65                  70                  75                  80


Val Gly Ser Ile Ala Val Pro Ser Val Asp Val Asn Leu Leu Val Phe
                85                  90                  95


Lys Gly Thr Asn Thr Ala Asn Leu Leu Ala Gly Ala Thr Thr Met Arg
            100                 105                 110


Ser Asp Gln Val Met Gly Lys Gly Asn Tyr Pro Leu Ala Gly His His
        115                 120                 125


Met Arg Asp Glu Ser Met Leu Phe Gly Pro Ile Met Lys Val Lys Lys
    130                 135                 140


Gly Asp Lys Ile Tyr Leu Thr Asp Leu Glu Asn Leu Tyr Glu Tyr Thr
145                 150                 155                 160


Val Thr Glu Thr Lys Thr Ile Asp Glu Thr Glu Val Ser Val Ile Asp
                165                 170                 175


Asp Thr Lys Asp Ala Arg Ile Thr Leu Ile Thr Cys Asp Lys Pro Thr
            180                 185                 190
```

```
Glu Thr Thr Lys Arg Phe Val Ala Val Gly Glu Leu Glu Lys Thr Glu
        195                 200                 205


Lys Leu Thr Lys Glu Leu Glu Asn Lys Tyr Phe Pro Ser Lys
    210                 215                 220


<210>  36
<211>  173
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Listeria monocytogenes Sortase A shortened variant A

<400>  36

Glu Lys Asp Ala Thr Phe Asp Phe Glu Ser Val Gln Leu Pro Ser Met
1               5                   10                  15


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


Gly Ser Ile Ala Val Pro Ser Val Asp Val Asn Leu Leu Val Phe Lys
        35                  40                  45


Gly Thr Asn Thr Ala Asn Leu Leu Ala Gly Ala Thr Thr Met Arg Ser
    50                  55                  60


Asp Gln Val Met Gly Lys Gly Asn Tyr Pro Leu Ala Gly His His Met
65                  70                  75                  80


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


Asp Lys Ile Tyr Leu Thr Asp Leu Glu Asn Leu Tyr Glu Tyr Thr Val
            100                 105                 110


Thr Glu Thr Lys Thr Ile Asp Glu Thr Glu Val Ser Val Ile Asp Asp
```

115 120 125

Thr Lys Asp Ala Arg Ile Thr Leu Ile Thr Cys Asp Lys Pro Thr Glu
130 135 140

Thr Thr Lys Arg Phe Val Ala Val Gly Glu Leu Glu Lys Thr Glu Lys
145 150 155 160

Leu Thr Lys Glu Leu Glu Asn Lys Tyr Phe Pro Ser Lys
165 170

<210> 37
<211> 156
<212> PRT
<213> Artificial Sequence

<220>
<223> Listeria monocytogenes Sortase A shortened variant B

<400> 37

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

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

Thr Asn Thr Ala Asn Leu Leu Ala Gly Ala Thr Thr Met Arg Ser Asp
35 40 45

Gln Val Met Gly Lys Gly Asn Tyr Pro Leu Ala Gly His His Met Arg
50 55 60

Asp Glu Ser Met Leu Phe Gly Pro Ile Met Lys Val Lys Lys Gly Asp
65 70 75 80

Lys Ile Tyr Leu Thr Asp Leu Glu Asn Leu Tyr Glu Tyr Thr Val Thr
85 90 95

```
Glu Thr Lys Thr Ile Asp Glu Thr Glu Val Ser Val Ile Asp Asp Thr
            100                 105                 110


Lys Asp Ala Arg Ile Thr Leu Ile Thr Cys Asp Lys Pro Thr Glu Thr
        115                 120                 125


Thr Lys Arg Phe Val Ala Val Gly Glu Leu Glu Lys Thr Glu Lys Leu
    130                 135                 140


Thr Lys Glu Leu Glu Asn Lys Tyr Phe Pro Ser Lys
145                 150                 155


<210>  38
<211>  150
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Listeria monocytogenes Sortase A shortened variant C

<400>  38

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


Val Asp Val Asn Leu Leu Val Phe Lys Gly Thr Asn Thr Ala Asn Leu
            20                  25                  30


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


Asn Tyr Pro Leu Ala Gly His His Met Arg Asp Glu Ser Met Leu Phe
    50                  55                  60


Gly Pro Ile Met Lys Val Lys Lys Gly Asp Lys Ile Tyr Leu Thr Asp
65                  70                  75                  80


Leu Glu Asn Leu Tyr Glu Tyr Thr Val Thr Glu Thr Lys Thr Ile Asp
```

85 90 95

Glu Thr Glu Val Ser Val Ile Asp Asp Thr Lys Asp Ala Arg Ile Thr
100 105 110

Leu Ile Thr Cys Asp Lys Pro Thr Glu Thr Thr Lys Arg Phe Val Ala
115 120 125

Val Gly Glu Leu Glu Lys Thr Glu Lys Leu Thr Lys Glu Leu Glu Asn
130 135 140

Lys Tyr Phe Pro Ser Lys
145 150

<210> 39
<211> 137
<212> PRT
<213> Artificial Sequence

<220>
<223> Listeria monocytogenes Sortase A shortened variant D

<400> 39

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

Val Asp Val Asn Leu Leu Val Phe Lys Gly Thr Asn Thr Ala Asn Leu
20 25 30

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

Asn Tyr Pro Leu Ala Gly His His Met Arg Asp Glu Ser Met Leu Phe
50 55 60

Gly Pro Ile Met Lys Val Lys Lys Gly Asp Lys Ile Tyr Leu Thr Asp
65 70 75 80

```
Leu Glu Asn Leu Tyr Glu Tyr Thr Val Thr Glu Thr Lys Thr Ile Asp
                85                  90                  95


Glu Thr Glu Val Ser Val Ile Asp Asp Thr Lys Asp Ala Arg Ile Thr
            100                 105                 110


Leu Ile Thr Cys Asp Lys Pro Thr Glu Thr Thr Lys Arg Phe Val Ala
        115                 120                 125


Val Gly Glu Leu Glu Lys Thr Glu Lys
    130                 135


<210>  40
<211>  141
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Listeria monocytogenes Sortase A shortened variant E

<400>  40

Gly Ser Ile Ala Val Pro Ser Val Asp Val Asn Leu Leu Val Phe Lys
1               5                   10                  15


Gly Thr Asn Thr Ala Asn Leu Leu Ala Gly Ala Thr Thr Met Arg Ser
            20                  25                  30


Asp Gln Val Met Gly Lys Gly Asn Tyr Pro Leu Ala Gly His His Met
        35                  40                  45


Arg Asp Glu Ser Met Leu Phe Gly Pro Ile Met Lys Val Lys Lys Gly
    50                  55                  60


Asp Lys Ile Tyr Leu Thr Asp Leu Glu Asn Leu Tyr Glu Tyr Thr Val
65                  70                  75                  80


Thr Glu Thr Lys Thr Ile Asp Glu Thr Glu Val Ser Val Ile Asp Asp
```

85 90 95

Thr Lys Asp Ala Arg Ile Thr Leu Ile Thr Cys Asp Lys Pro Thr Glu
100 105 110

Thr Thr Lys Arg Phe Val Ala Val Gly Glu Leu Glu Lys Thr Glu Lys
115 120 125

Leu Thr Lys Glu Leu Glu Asn Lys Tyr Phe Pro Ser Lys
130 135 140

<210> 41
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> LPXTA sortase-motif

<220>
<221> MISC_FEATURE
<222> (3)..(3)
<223> X can be any amino acid residue

<400> 41

Leu Pro Xaa Thr Ala
1 5

<210> 42
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> sortase-motif

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Gly Gly Gly Trp Trp
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