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<110> Pieris AG

<120> NOVEL SPECIFIC-BINDING POLYPEPTIDES AND USES THEREOF

<130> PIE15066PCT

<150> EP 14169488.5
<151> 2014-05-22

<160> 68

<170> PatentIn version 3.5

<210> 1
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<220>
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Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys
1 5 10 15

Ala Met Thr Val Asp Phe Trp Cys Ser Gly Ile His Glu Glu Ser Val
20 25 30

Thr Pro Met Thr Leu Thr Thr Leu Glu Gly Gly Asn Leu Glu Ala Lys
35 40 45

Val Thr Met Asp Ile Glu Gly Phe Leu Gln Glu Phe Lys Ala Val Leu
50 55 60

Glu Lys Thr Asp Glu Pro Gly Lys Tyr Thr Ala Asp Gly Gly Lys His
65 70 75 80

Val Ala Tyr Ile Ile Arg Ser Arg Val Lys Asp His Tyr Ile Phe Tyr
85 90 95

Ser Glu Gly Asp Cys Pro Gly Pro Val Pro Gly Val Trp Leu Val Gly
100 105 110

Arg Asp Pro Lys Asn Asn Leu Glu Ala Leu Glu Asp Phe Glu Lys Ala
115 120 125

Ala Gly Ala Arg Gly Leu Ser Thr Glu Ser Ile Leu Ile Pro Arg Gln
130 135 140

Ser Glu Thr Ser Ser Pro Gly
145 150

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<211> 178
<212> PRT
<213> artificial

<220>
<223> lipocalin mutein

<400> 2

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

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

Val Val Gly Glu Ala Gly Asn Leu Leu Leu Arg Glu Asp Lys Asp Pro
35 40 45

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

Asp Val Thr Arg Val Glu Phe Gly Ala Lys Thr Tyr Lys Tyr Gln Ile
65 70 75 80

Gly Thr Phe Val Pro Gly Ser Gln Pro Gly Glu Phe Thr Leu Gly Gly
85 90 95

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

Thr Asn Tyr Asn Gln His Ala Ile Val Phe Phe Lys Tyr Val Tyr Gln
115 120 125

Asn Arg Glu Tyr Phe Glu Ile Thr Leu Tyr Gly Arg Thr Lys Glu Leu
130 135 140

Thr Ser Glu Leu Lys Glu Asn Phe Ile Arg Phe Ser Lys Ser Leu Gly
145 150 155 160

Leu Pro Glu Asn His Ile Val Phe Pro Val Pro Ile Asp Gln Ala Ile
165 170 175

Asp Gly

<210> 3
<211> 351
<212> PRT
<213> artificial

<220>
<223> fusion protein

<400> 3

Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys
1 5 10 15

Ala Met Thr Val Asp Phe Trp Cys Ser Gly Ile His Glu Glu Ser Val
20 25 30

Thr Pro Met Thr Leu Thr Thr Leu Glu Gly Gly Asn Leu Glu Ala Lys
35 40 45

Val Thr Met Asp Ile Glu Gly Phe Leu Gln Glu Phe Lys Ala Val Leu
50 55 60

Glu Lys Thr Asp Glu Pro Gly Lys Tyr Thr Ala Asp Gly Gly Lys His
65 70 75 80

Val Ala Tyr Ile Ile Arg Ser Arg Val Lys Asp His Tyr Ile Phe Tyr
85 90 95

Ser Glu Gly Asp Cys Pro Gly Pro Val Pro Gly Val Trp Leu Val Gly
100 105 110

Arg Asp Pro Lys Asn Asn Leu Glu Ala Leu Glu Asp Phe Glu Lys Ala
115 120 125

Ala Gly Ala Arg Gly Leu Ser Thr Glu Ser Ile Leu Ile Pro Arg Gln
130 135 140

Ser Glu Thr Ser Ser Pro Gly Ser Asp Gly Gly Gly Gly Ser Gly Gly
145 150 155 160

Gly Gly Ser Gln Asp Ser Thr Ser Asp Leu Ile Pro Ala Pro Pro Leu
165 170 175

Ser Lys Val Pro Leu Gln Gln Asn Phe Gln Asp Asn Gln Phe His Gly
180 185 190

Lys Trp Tyr Val Val Gly Glu Ala Gly Asn Leu Leu Leu Arg Glu Asp
195 200 205

Lys Asp Pro Arg Lys Met Thr Ala Thr Ile Tyr Glu Leu Lys Glu Asp
210 215 220

Lys Ser Tyr Asp Val Thr Arg Val Glu Phe Gly Ala Lys Thr Tyr Lys
225 230 235 240

Tyr Gln Ile Gly Thr Phe Val Pro Gly Ser Gln Pro Gly Glu Phe Thr
245 250 255

Leu Gly Gly Ile Glu Ser Met Pro Gly Met Thr Ser Phe Leu Val Arg
260 265 270

Val Val Ser Thr Asn Tyr Asn Gln His Ala Ile Val Phe Phe Lys Tyr
275 280 285

Val Tyr Gln Asn Arg Glu Tyr Phe Glu Ile Thr Leu Tyr Gly Arg Thr
290 295 300

Lys Glu Leu Thr Ser Glu Leu Lys Glu Asn Phe Ile Arg Phe Ser Lys
305 310 315 320

Ser Leu Gly Leu Pro Glu Asn His Ile Val Phe Pro Val Pro Ile Asp
325 330 335

Gln Ala Ile Asp Gly Ser Ala Trp Ser His Pro Gln Phe Glu Lys
340 345 350

<210> 4
<211> 349
<212> PRT
<213> artificial

<220>
<223> fusion protein

<400> 4

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

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

Val Val Gly Glu Ala Gly Asn Leu Leu Leu Arg Glu Asp Lys Asp Pro
35 40 45

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

Asp Val Thr Arg Val Glu Phe Gly Ala Lys Thr Tyr Lys Tyr Gln Ile
65 70 75 80

Gly Thr Phe Val Pro Gly Ser Gln Pro Gly Glu Phe Thr Leu Gly Gly
85 90 95

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

Thr Asn Tyr Asn Gln His Ala Ile Val Phe Phe Lys Tyr Val Tyr Gln
115 120 125

Asn Arg Glu Tyr Phe Glu Ile Thr Leu Tyr Gly Arg Thr Lys Glu Leu
130 135 140

Thr Ser Glu Leu Lys Glu Asn Phe Ile Arg Phe Ser Lys Ser Leu Gly
145 150 155 160

Leu Pro Glu Asn His Ile Val Phe Pro Val Pro Ile Asp Gln Ala Ile
165 170 175

Asp Gly Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Ala Ser Asp Glu
180 185 190

Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys Ala Met Thr Val
195 200 205

Asp Phe Trp Cys Ser Gly Ile His Glu Glu Ser Val Thr Pro Met Thr
210 215 220

Leu Thr Thr Leu Glu Gly Gly Asn Leu Glu Ala Lys Val Thr Met Asp
225 230 235 240

Ile Glu Gly Phe Leu Gln Glu Phe Lys Ala Val Leu Glu Lys Thr Asp
245 250 255

Glu Pro Gly Lys Tyr Thr Ala Asp Gly Gly Lys His Val Ala Tyr Ile
260 265 270

Ile Arg Ser Arg Val Lys Asp His Tyr Ile Phe Tyr Ser Glu Gly Asp
275 280 285

Cys Pro Gly Pro Val Pro Gly Val Trp Leu Val Gly Arg Asp Pro Lys
290 295 300

Asn Asn Leu Glu Ala Leu Glu Asp Phe Glu Lys Ala Ala Gly Ala Arg
305 310 315 320

Gly Leu Ser Thr Glu Ser Ile Leu Ile Pro Arg Gln Ser Glu Thr Ser
325 330 335

Ser Pro Gly Ser Ala Trp Ser His Pro Gln Phe Glu Lys
340 345

<210> 5
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<212> PRT
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<220>
<223> fusion protein

<400> 5

Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys
1 5 10 15

Ala Met Thr Val Asp Phe Trp Cys Ser Gly Ile His Glu Glu Ser Val
20 25 30

Thr Pro Met Thr Leu Thr Thr Leu Glu Gly Gly Asn Leu Glu Ala Lys
35 40 45

Val Thr Met Asp Ile Glu Gly Phe Leu Gln Glu Phe Lys Ala Val Leu
50 55 60

Glu Lys Thr Asp Glu Pro Gly Lys Tyr Thr Ala Asp Gly Gly Lys His
65 70 75 80

Val Ala Tyr Ile Ile Arg Ser Arg Val Lys Asp His Tyr Ile Phe Tyr
85 90 95

Ser Glu Gly Asp Cys Pro Gly Pro Val Pro Gly Val Trp Leu Val Gly
100 105 110

Arg Asp Pro Lys Asn Asn Leu Glu Ala Leu Glu Asp Phe Glu Lys Ala
115 120 125

Ala Gly Ala Arg Gly Leu Ser Thr Glu Ser Ile Leu Ile Pro Arg Gln
130 135 140

Ser Glu Thr Ser Ser Pro Gly Ser Asp Gly Gly Gly Gly Ser Gly Gly
145 150 155 160

Gly Gly Ser Gln Asp Ser Thr Ser Asp Leu Ile Pro Ala Pro Pro Leu
165 170 175

Ser Lys Val Pro Leu Gln Gln Asn Phe Gln Asp Asn Gln Phe His Gly
180 185 190

Lys Trp Tyr Val Val Gly Glu Ala Gly Asn Leu Leu Leu Arg Glu Asp
195 200 205

Lys Asp Pro Arg Lys Met Thr Ala Thr Ile Tyr Glu Leu Lys Glu Asp
210 215 220

Lys Ser Tyr Asp Val Thr Arg Val Glu Phe Gly Ala Lys Thr Tyr Lys
225 230 235 240

Tyr Gln Ile Gly Thr Phe Val Pro Gly Ser Gln Pro Gly Glu Phe Thr
245 250 255

Leu Gly Gly Ile Glu Ser Met Pro Gly Met Thr Ser Phe Leu Val Arg
260 265 270

Val Val Ser Thr Asn Tyr Asn Gln His Ala Ile Val Phe Phe Lys Tyr
275 280 285

Val Tyr Gln Asn Arg Glu Tyr Phe Glu Ile Thr Leu Tyr Gly Arg Thr
290 295 300

Lys Glu Leu Thr Ser Glu Leu Lys Glu Asn Phe Ile Arg Phe Ser Lys
305 310 315 320

Ser Leu Gly Leu Pro Glu Asn His Ile Val Phe Pro Val Pro Ile Asp
325 330 335

Gln Ala Ile Asp Gly Ser Ala Gly Ala Val Asp Ala Asn Ser Leu Ala
340 345 350

Glu Ala Lys Val Leu Ala Asn Arg Glu Leu Asp Lys Tyr Gly Val Ser
355 360 365

Asp Tyr Tyr Lys Asn Leu Ile Asn Asn Ala Lys Thr Val Glu Gly Val
370 375 380

Lys Ala Leu Ile Asp Glu Ile Leu Ala Ala Leu Pro Ser Ala Trp Ser
385 390 395 400

His Pro Gln Phe Glu Lys
405

<210> 6
<211> 556
<212> PRT
<213> artificial

<220>
<223> fusion protein

<400> 6

Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys
1 5 10 15

Ala Met Thr Val Asp Phe Trp Cys Ser Gly Ile His Glu Glu Ser Val
20 25 30

Thr Pro Met Thr Leu Thr Thr Leu Glu Gly Gly Asn Leu Glu Ala Lys
35 40 45

Val Thr Met Asp Ile Glu Gly Phe Leu Gln Glu Phe Lys Ala Val Leu
50 55 60

Glu Lys Thr Asp Glu Pro Gly Lys Tyr Thr Ala Asp Gly Gly Lys His
65 70 75 80

Val Ala Tyr Ile Ile Arg Ser Arg Val Lys Asp His Tyr Ile Phe Tyr
85 90 95

Ser Glu Gly Asp Cys Pro Gly Pro Val Pro Gly Val Trp Leu Val Gly
100 105 110

Arg Asp Pro Lys Asn Asn Leu Glu Ala Leu Glu Asp Phe Glu Lys Ala
115 120 125

Ala Gly Ala Arg Gly Leu Ser Thr Glu Ser Ile Leu Ile Pro Arg Gln
130 135 140

Ser Glu Thr Ser Ser Pro Gly Ser Asp Gly Gly Gly Gly Ser Gly Gly
145 150 155 160

Gly Gly Ser Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp
165 170 175

Tyr Leu Lys Ala Met Thr Val Asp Phe Trp Cys Ser Gly Ile His Glu
180 185 190

Glu Ser Val Thr Pro Met Thr Leu Thr Thr Leu Glu Gly Gly Asn Leu
195 200 205

Glu Ala Lys Val Thr Met Asp Ile Glu Gly Phe Leu Gln Glu Phe Lys
210 215 220

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

Gly Lys His Val Ala Tyr Ile Ile Arg Ser Arg Val Lys Asp His Tyr
245 250 255

Ile Phe Tyr Ser Glu Gly Asp Cys Pro Gly Pro Val Pro Gly Val Trp
260 265 270

Leu Val Gly Arg Asp Pro Lys Asn Asn Leu Glu Ala Leu Glu Asp Phe
275 280 285

Glu Lys Ala Ala Gly Ala Arg Gly Leu Ser Thr Glu Ser Ile Leu Ile
290 295 300

Pro Arg Gln Ser Glu Thr Ser Ser Pro Gly Ser Asp Gly Gly Gly Gly
305 310 315 320

Ser Gly Gly Gly Gly Ser Gln Asp Ser Thr Ser Asp Leu Ile Pro Ala
325 330 335

Pro Pro Leu Ser Lys Val Pro Leu Gln Gln Asn Phe Gln Asp Asn Gln
340 345 350

Phe His Gly Lys Trp Tyr Val Val Gly Glu Ala Gly Asn Leu Leu Leu
355 360 365

Arg Glu Asp Lys Asp Pro Arg Lys Met Thr Ala Thr Ile Tyr Glu Leu
370 375 380

Lys Glu Asp Lys Ser Tyr Asp Val Thr Arg Val Glu Phe Gly Ala Lys
385 390 395 400

Thr Tyr Lys Tyr Gln Ile Gly Thr Phe Val Pro Gly Ser Gln Pro Gly
405 410 415

Glu Phe Thr Leu Gly Gly Ile Glu Ser Met Pro Gly Met Thr Ser Phe
420 425 430

Leu Val Arg Val Val Ser Thr Asn Tyr Asn Gln His Ala Ile Val Phe
435 440 445

Phe Lys Tyr Val Tyr Gln Asn Arg Glu Tyr Phe Glu Ile Thr Leu Tyr
450 455 460

Gly Arg Thr Lys Glu Leu Thr Ser Glu Leu Lys Glu Asn Phe Ile Arg
465 470 475 480

Phe Ser Lys Ser Leu Gly Leu Pro Glu Asn His Ile Val Phe Pro Val
485 490 495

Pro Ile Asp Gln Ala Ile Asp Gly Ser Gly Gly Gly Gly Ser Leu Ala
500 505 510

Glu Ala Lys Glu Ala Ala Asn Ala Glu Leu Asp Ser Tyr Gly Val Ser
515 520 525

Asp Phe Tyr Lys Arg Leu Ile Asp Lys Ala Lys Thr Val Glu Gly Val
530 535 540

Glu Ala Leu Lys Asp Ala Ile Leu Ala Ala Leu Pro
545 550 555

<210> 7
<211> 240
<212> PRT
<213> artificial

<220>
<223> fusion protein

<400> 7

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

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

Val Val Gly Glu Ala Gly Asn Leu Leu Leu Arg Glu Asp Lys Asp Pro
35 40 45

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

Asp Val Thr Arg Val Glu Phe Gly Ala Lys Thr Tyr Lys Tyr Gln Ile
65 70 75 80

Gly Thr Phe Val Pro Gly Ser Gln Pro Gly Glu Phe Thr Leu Gly Gly
85 90 95

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

Thr Asn Tyr Asn Gln His Ala Ile Val Phe Phe Lys Tyr Val Tyr Gln
115 120 125

Asn Arg Glu Tyr Phe Glu Ile Thr Leu Tyr Gly Arg Thr Lys Glu Leu
130 135 140

Thr Ser Glu Leu Lys Glu Asn Phe Ile Arg Phe Ser Lys Ser Leu Gly
145 150 155 160

Leu Pro Glu Asn His Ile Val Phe Pro Val Pro Ile Asp Gln Ala Ile
165 170 175

Asp Gly Ser Gly Gly Gly Gly Ser Leu Ala Glu Ala Lys Glu Ala Ala
180 185 190

Asn Ala Glu Leu Asp Ser Tyr Gly Val Ser Asp Phe Tyr Lys Arg Leu
195 200 205

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

Ile Leu Ala Ala Leu Pro Ser Ala Trp Ser His Pro Gln Phe Glu Lys
225 230 235 240

<210> 8
<211> 215
<212> PRT
<213> artificial

<220>
<223> fusion protein

<400> 8

Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys
1 5 10 15

Ala Met Thr Val Asp Phe Trp Cys Ser Gly Ile His Glu Glu Ser Val
20 25 30

Thr Pro Met Thr Leu Thr Thr Leu Glu Gly Gly Asn Leu Glu Ala Lys
35 40 45

Val Thr Met Asp Ile Glu Gly Phe Leu Gln Glu Phe Lys Ala Val Leu
50 55 60

Glu Lys Thr Asp Glu Pro Gly Lys Tyr Thr Ala Asp Gly Gly Lys His
65 70 75 80

Val Ala Tyr Ile Ile Arg Ser Arg Val Lys Asp His Tyr Ile Phe Tyr
85 90 95

Ser Glu Gly Asp Cys Pro Gly Pro Val Pro Gly Val Trp Leu Val Gly
100 105 110

Arg Asp Pro Lys Asn Asn Leu Glu Ala Leu Glu Asp Phe Glu Lys Ala
115 120 125

Ala Gly Ala Arg Gly Leu Ser Thr Glu Ser Ile Leu Ile Pro Arg Gln
130 135 140

Ser Glu Thr Ser Ser Pro Gly Ser Asp Ser Gly Gly Gly Gly Ser Leu
145 150 155 160

Ala Glu Ala Lys Glu Ala Ala Asn Ala Glu Leu Asp Ser Tyr Gly Val
165 170 175

Ser Asp Phe Tyr Lys Arg Leu Ile Asp Lys Ala Lys Thr Val Glu Gly
180 185 190

Val Glu Ala Leu Lys Asp Ala Ile Leu Ala Ala Leu Pro Ser Ala Trp
195 200 205

Ser His Pro Gln Phe Glu Lys
210 215

<210> 9
<211> 403
<212> PRT
<213> artificial

<220>
<223> fusion protein

<400> 9

Ala Ser Asp Glu Glu Ile Gln Asp Val Ser Gly Thr Trp Tyr Leu Lys
1 5 10 15