

# SEQUENCE LISTING

<110> Schering Plough, LTD  
Kirke, David F.  
Francis, Michael J.

<120> Vaccine Antigens from *Piscirickettsia Salmonis*

<130> AH06673

<150> 61/014,782

<151> 2007-12-19

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<170> PatentIn version 3.4

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<212> DNA

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Glu Ser Ile Glu Phe Asn Met Thr Ser Thr Thr Val Ala Pro Gly Glu  
35 40 45

His Thr Leu Val Ala Lys Ala Leu Pro Glu Gly Ser Asn Gln Gln Ile  
50 55 60

Arg Phe Ser Ile Gln Gly Ile Val Ser Gly Val Ser Ile Thr Gly Asp  
65 70 75 80

Lys Leu Asn Val Gly Asn Ala Val Glu Asp Gly Met Lys Phe Thr Val  
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Val Ala Thr Ser Val Tyr Asp Pro Thr Ile Arg Ala Thr Leu Glu Phe  
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Thr Val Val Asn Val Gly Val Glu Val Val Glu Ile Arg Thr Glu Glu  
115 120 125

Glu Leu Arg Ala Ile His Thr Asn Glu Gly Gly Leu Ser Leu Ser Tyr  
130 135 140

Val Leu Met Asn Asp Ile Glu Leu Thr Ala Pro Trp Thr Pro Ile Gly  
145 150 155 160

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

Phe Asn Gly Ile Phe Asn Gly Asn Gly Phe Thr Ile Ser Gly Ile Leu  
180 185 190

Val Glu Ser Glu Glu Pro Leu Phe Asn Ala Gly Phe Phe Ala Gln Ile  
195 200 205

Gly Ala Thr Ala Ile Val Lys Asn Thr Thr Phe Glu Gly Ile Val Asn  
210 215 220

Ala Thr Gly Trp Ser Gly Gly Ile Ala Gly Ile Asn Glu Gly Leu Ile  
225 230 235 240

Glu Asn Val Val Ser Asn Val Arg Val Thr Val Thr Gly Thr Ser Ala  
245 250 255

Gly Ser Leu Val Ser Val Asn Arg Gly Leu Ile Gln Tyr Ala Tyr Gly  
260 265 270

Ile Gly Lys Val Val Ser Glu Thr Asn Pro Asn Thr Ser Gly Arg Ser  
275 280 285

Ala Gly Leu Val Val Ala Asn Asp Gly Ser Met Ile Glu Val Tyr Gly  
290 295 300

Asp Tyr Gln Ala Leu Gly Thr Pro Asn Tyr Thr Ala Phe Ser Pro Ser  
305 310 315 320

Thr Asn Pro Met Tyr Met Leu Pro Thr Val Asp Met Lys Thr Ser Ser  
325 330 335

Thr Trp Ala Ser Phe Asp Ala Asp Val Trp Tyr Ile Glu Asn Gly Thr  
340 345 350

Tyr Pro Leu Leu Lys His Glu Gly Phe Val Pro Pro Val Ile Val Pro  
355 360 365

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

Val Ser Ser Glu Leu Gln Ile Asn Ala Glu Val Ile Asn Pro Glu Gly  
385 390 395 400

Ser Glu Val Ile Val Tyr Ala Leu Lys Glu Ala Val Ala Gly Val Ala  
405 410 415

Ile Ser Glu Thr Gly Leu Val Thr Phe Asp Ile Thr Thr Ile Ala Ala  
420 425 430

Asn Phe Ser Phe Thr Val Val Val Thr Ile Asp Gly Thr Glu Val Ser  
435 440 445

Ala Glu Lys Thr Phe Thr Gly Val Tyr Asn Pro Glu Ile Val Asp Asp  
450 455 460

Thr Val Tyr Ile Glu Thr Glu Thr Gln Leu Leu Asn Leu Leu Ala Gly  
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Gln Thr Asn Pro Asp Asn Leu Ser Lys Thr Phe Val Leu Leu Asn Asp  
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Ile Val Leu Thr Ser Asn Trp Thr Ala Ile Gly Ile Ala Pro Asn Glu  
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Asp Glu Gly Ile Val Gly Val Pro Phe Thr Gly Val Phe Asp Gly Gln  
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Gly Tyr Lys Ile Ser Gly Ile Ser Met Pro Gly Gly Gly Trp Asn Lys  
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Gly Phe Phe Gly Tyr Ile Gly Thr Thr Gly Val Val Lys Asn Thr His  
545 550 555 560

Phe Glu Gly Asn Leu Glu Ala Asn Ala Trp Ser Gly Ala Leu Ala Ala  
565 570 575

Asn Asn Ser Gly Thr Ile Gln Asp Val Val Val Asp Ile Glu Val Tyr  
580 585 590

Val Trp Gly Asn Asn Gly Gly Ala Ile Val Glu His Asn His Gly Leu  
595 600 605

Leu Lys Asn Ile Val Val Leu Gly Lys Ala Val Ser Asp Ser Gly Pro  
610 615 620

Thr Ala Val Gly Leu Val Val Thr Asn Phe Gly Thr Leu Glu Asn Val  
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Phe Ala Asn Ala Asp Thr Val Gly Thr Ala Asn Leu Val Ser Asn Gly  
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Ala Leu Ala Asp Asp Gly Lys His Ile Ile Ser Ala Gln Asp Phe Val  
660 665 670

Lys Ala Thr Thr Tyr Ala Asn Phe Asp Ser Ala Ile Trp Leu Ile Val  
675 680 685

Asp Gly Gln Val Pro Val Leu Ile Asn Glu Asp Thr Val Leu Pro Glu  
690 695 700

Thr Val Val Tyr Ile Glu Thr Glu Ala Glu Leu Leu Ser Leu Leu Ala  
705 710 715 720

Gly Gln Val Asp Pro Glu Ala Leu Ser Lys Thr Tyr Lys Leu Lys Asn  
725 730 735

Asp Ile Val Leu Thr Ser Asn Trp Thr Ala Ile Gly Ile Ala Pro Asn  
740 745 750

Glu Asp Glu Gly Ile Val Gly Val Pro Phe Thr Gly Val Phe Asp Gly  
755 760 765

Gln Gly Tyr Lys Ile Ser Gly Ile Ser Met Pro Gly Gly Gly Trp Asn  
770 775 780

Lys Gly Phe Phe Gly Tyr Ile Gly Thr Thr Gly Val Val Lys Asn Thr  
785 790 795 800

His Phe Glu Gly Asn Ile Glu Ala Asn Ala Trp Ser Gly Ala Leu Ala  
805 810 815

Ala Asn Asn Ser Gly Thr Ile Met Asp Val Val Val Asp Ile Glu Val  
820 825 830

Tyr Val Trp Gly Asn Asn Gly Gly Ala Ile Val Glu His Asn His Gly  
835 840 845

Leu Leu Lys Asn Ile Ile Val Leu Gly Lys Ala Val Ser Asp Gly Gly  
850 855 860

Pro Thr Val Val Gly Leu Val Val Thr Asn Phe Gly Thr Leu Glu Asp  
865 870 875 880

Val Tyr Ala Asn Val Asp Thr Val Gly Thr Leu Asn Leu Val Ser Phe  
885 890 895

Gly Ser Val Ala Asp Asp Gly Thr His Ile Ile Ser Ala Ser Asn Phe  
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Cys Val Glu Lys Glu Glu Pro Lys Phe Asp Pro Asp Lys Tyr Leu Asp  
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Leu Glu Asn Ile Val Phe Asp Asp Phe Asp Asn Gly Ile Asp Pro Asn  
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Met Trp Val Ile Gly Asn Ser Lys Trp Gly Val Gly Asn Gly Gly Val  
65 70 75 80

Ile Tyr Glu Asn Val His Tyr Thr Asn Asp Gly Ile Val Val Leu Gln  
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Thr Asn Gly Asp Leu Tyr Asp Gly Pro Leu Arg Gly Ile Gly Asn Thr  
100 105 110

His Gly Arg Arg Thr Gly Ala Met Ile Thr Thr Arg Glu Ala Leu Gly



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Ser Gly Tyr Val Leu Leu Glu Phe Tyr Pro Ala Glu Thr Gln Lys Ile  
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Asp Gln Tyr Met Ile Glu Phe Asn Ser Ser Asp Glu Asp Phe Ile Ala  
385 390 395 400

Asp Thr Phe Tyr Gly Lys Glu Phe Thr Phe Asn Val Pro Leu Gly Thr  
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Lys Arg Val Glu Val Ser Leu Ile Gly Gly Asp Ser Gly Ile Tyr Phe  
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Asp Asp Leu Phe Phe Asn Leu Thr Lys Lys Pro Arg Pro Glu Ile Val  
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Glu Glu Gly Asp Asp Val Gln Arg Leu Asn Ile Asp Phe Lys Asn Gly  
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Ile Asp Ser Asn Val Trp Ala Val Ala Asn Gln Arg Trp Gly Gly Thr  
465 470 475 480

His His Gly Gly Val Ile Phe Gln Asn Val His Tyr Thr Glu Glu Gly  
485 490 495

Asn Leu Leu Ile Gln Ala Asn Gly Asp Tyr Tyr Glu Gly Pro Leu Lys  
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Gly Val Glu Gln Asn Asn Gly Lys Arg Thr Gly Gly Ala Ile Tyr Thr  
515 520 525

Lys Glu Ala Phe Gly Pro Gly Ser Phe Glu Val Lys Ala Lys Ile Met  
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Pro Arg Phe Gly Ala Thr Thr Ala Phe Trp Thr Phe Asn Tyr Leu Asp  
545 550 555 560

Gly Ile Asn Ser Glu Ile Asp Phe Glu Phe Asn Val Gly Asn Asp Phe  
565 570 575

Ser Thr Val Trp Leu Thr Asn Trp Leu Thr Glu Thr Asn Tyr Asn Asn  
580 585 590

Tyr Thr His Gln Met Asp Ser Phe His Asn Asp Gly Asn Trp His Ile  
595 600 605

Tyr Arg Phe Glu Trp His Thr Leu Pro Thr Pro His Ile Lys Tyr Phe  
610 615 620

Ile Asp Gly Lys Leu Ala Tyr Thr Glu His Thr Lys Val Pro Thr Met  
625 630 635 640

Ser Ala Arg Tyr Trp Ile Gly Val Trp Phe Pro Asn Asn Trp Ala Gly  
645 650 655

Asp Pro Asn Phe Glu Thr Asp Tyr Leu Glu Val Glu Tyr Phe Lys Tyr  
660 665 670

Glu Ser Phe Pro Asp His Pro Tyr Val Val Gly Pro Thr Gly Ala Ser  
675 680 685

Ser Pro Thr Ala Phe Tyr Pro Thr Ala Pro Ile Lys Lys Pro Val Ser  
690 695 700

Asn Leu Leu Pro His Gly Asn Leu Asp Tyr Glu Thr Gly Tyr Met Leu  
705 710 715 720

Thr Gly Asp Ala Val Ile Ser Asn Gly Glu Leu Lys Thr Gly Leu Leu  
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Gly Ser Ala Glu Ser Leu Ile Thr Gly Leu Asn Asp Ala Phe Glu Leu  
740 745 750

Thr Leu Lys Leu Lys Ala Lys Ala Ser Asn Asn Ala Thr Val Arg Ile  
755 760 765

Glu Tyr Leu Asp Lys Asp Leu Asn Val Ile Ser Gly Glu Asp Ile Ile  
770 775 780

Val Ser Asn Leu Asn Ala Asn Thr Phe Thr Asn Phe Thr Ser Val Ile  
785 790 795 800

Asn Leu Val Glu Gly Thr Arg Ala Ile Asn Val Ile Phe Glu Gly Thr  
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Asn Ile Thr Tyr Asp Asp Leu Phe Ile Asn Leu Thr His Lys Val Asn  
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 <212> DNA  
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<210> 7  
 <211> 438  
 <212> PRT  
 <213> Piscirickettsia salmonis  
 <400> 7

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

Ala Thr Ala Ala Asn Ala Ala Asp Asn Gly Lys Leu Gln Leu Gln Ile  
 20 25 30

Asn Gln Leu Lys Ala Gln His Thr Gln Leu Gln Gln Gln Val Ala Asn  
 35 40 45

Leu Gln Gly Gln Gly Gln Thr Thr Gly Ala Val His Val Gly Ala Val  
 50 55 60

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

Leu Leu Lys Ser Leu Ala Lys Ala Gly Ser Asn Ala Pro Leu Leu Thr  
 85 90 95

Ile Gly Gly Thr Leu Glu Ala Asp Ala Gln Met Asn Arg Asn Gly Asn  
 100 105 110

Val Gly Ser Gly Ser Thr Ser Gly Asp Pro Ser Gly Leu Asn Tyr Thr  
 115 120 125

Asp Gly Thr Ser Ser Ser Ala Phe Tyr Leu Asp Thr Ala Arg Ile Asp  
 130 135 140

Ile Leu Ala His Val Asn Asp Trp Val Asn Gly Glu Ile Ser Tyr Asp  
 145 150 155 160

Leu Asn Gly Asp Ser Gly Leu His Thr Gly Ser Leu Leu Val Gly Asn  
 165 170 175

Leu Asn Gln Leu Pro Val Tyr Gly Gln Ile Gly Lys Phe Tyr Pro Asp  
 180 185 190

Ala Gly Leu Phe Glu Leu Ala Ser Asp Asp Val Tyr Ser Ser Ser Leu

195

200

205

Val Lys Arg Tyr Phe Arg Pro Asp Ala Gln Asn Gly Ala Ser Val Gly  
 210 215 220

Phe Tyr Lys Ala Gly Leu His Thr Ser Leu Thr Ala Phe Lys Thr Ser  
 225 230 235 240

Ala Pro Gln Ala Asn Ala Ala Asn Tyr Asn Gln Ala Thr Ser Asp Trp  
 245 250 255

Ser Ala Gln Ala Asp Tyr Thr Phe Asn Ala Gly Gln Val Asn Ala Thr  
 260 265 270

Ile Gly Ala Gly Tyr Leu Ser Asn Met Val Asn Thr Asn Asp Ser Phe  
 275 280 285

Thr Ala Thr Gly Ala Gly Thr Gly Thr Gln Lys Asp Arg Leu Pro Met  
 290 295 300

Ala Asn Val Ser Ala Lys Ile Gly Phe Gly Pro Phe Glu Ala Leu Ala  
 305 310 315 320

Thr Tyr Ala Gln Thr Leu Lys Gly Leu Ala Asn Thr Thr Gly Gly Thr  
 325 330 335

Thr Lys Leu Lys Ala Phe Asp Leu Glu Gly Ala Tyr His Phe Gln Ala  
 340 345 350

Val Lys Pro Met Thr Val Met Leu Gly Tyr Ser Arg Thr Tyr Gly Phe  
 355 360 365

Asp Lys Val Gly Pro Val Asp Gln Phe Ile Asp Gly Asn Thr Ala Ile  
 370 375 380

Thr Ile Asn Asn Lys Lys Asp Gln Trp Leu Leu Gly Val Asn Ser Glu  
 385 390 395 400

Val Phe Lys Asn Thr Thr Val Gly Leu Glu Tyr Ala Arg Val Gly Gln  
 405 410 415

Leu Asp Ser Thr Gly Thr Asp Thr Asn Arg Tyr Asn Val Leu Thr Ala  
 420 425 430

Asp Met Thr Val Lys Phe  
 435



<210> 8  
<211> 416  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 8

Ala Asp Asn Gly Lys Leu Gln Leu Gln Ile Asn Gln Leu Lys Ala Gln  
1 5 10 15

His Thr Gln Leu Gln Gln Gln Val Ala Asn Leu Gln Gly Gln Gly Gln  
20 25 30

Thr Thr Gly Ala Val His Val Gly Ala Val Gly Gly Glu Leu Ile Ser  
35 40 45

Glu Asn Asn Tyr Asp Gly Arg Gly Leu Asp Leu Leu Lys Ser Leu Ala  
50 55 60

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

Ala Asp Ala Gln Met Asn Arg Asn Gly Asn Val Gly Ser Gly Ser Thr  
85 90 95

Ser Gly Asp Pro Ser Gly Leu Asn Tyr Thr Asp Gly Thr Ser Ser Ser  
100 105 110

Ala Phe Tyr Leu Asp Thr Ala Arg Ile Asp Ile Leu Ala His Val Asn  
115 120 125

Asp Trp Val Asn Gly Glu Ile Ser Tyr Asp Leu Asn Gly Asp Ser Gly  
130 135 140

Leu His Thr Gly Ser Leu Leu Val Gly Asn Leu Asn Gln Leu Pro Val  
145 150 155 160

Tyr Gly Gln Ile Gly Lys Phe Tyr Pro Asp Ala Gly Leu Phe Glu Leu  
165 170 175

Ala Ser Asp Asp Val Tyr Ser Ser Ser Leu Val Lys Arg Tyr Phe Arg  
180 185 190

Pro Asp Ala Gln Asn Gly Ala Ser Val Gly Phe Tyr Lys Ala Gly Leu  
195 200 205

His Thr Ser Leu Thr Ala Phe Lys Thr Ser Ala Pro Gln Ala Asn Ala  
210 215 220

Ala Asn Tyr Asn Gln Ala Thr Ser Asp Trp Ser Ala Gln Ala Asp Tyr  
225 230 235 240

Thr Phe Asn Ala Gly Gln Val Asn Ala Thr Ile Gly Ala Gly Tyr Leu  
245 250 255

Ser Asn Met Val Asn Thr Asn Asp Ser Phe Thr Ala Thr Gly Ala Gly  
260 265 270

Thr Gly Thr Gln Lys Asp Arg Leu Pro Met Ala Asn Val Ser Ala Lys  
275 280 285

Ile Gly Phe Gly Pro Phe Glu Ala Leu Ala Thr Tyr Ala Gln Thr Leu  
290 295 300

Lys Gly Leu Ala Asn Thr Thr Gly Gly Thr Thr Lys Leu Lys Ala Phe  
305 310 315 320

Asp Leu Glu Gly Ala Tyr His Phe Gln Ala Val Lys Pro Met Thr Val  
325 330 335

Met Leu Gly Tyr Ser Arg Thr Tyr Gly Phe Asp Lys Val Gly Pro Val  
340 345 350

Asp Gln Phe Ile Asp Gly Asn Thr Ala Ile Thr Ile Asn Asn Lys Lys  
355 360 365

Asp Gln Trp Leu Leu Gly Val Asn Ser Glu Val Phe Lys Asn Thr Thr  
370 375 380

Val Gly Leu Glu Tyr Ala Arg Val Gly Gln Leu Asp Ser Thr Gly Thr  
385 390 395 400

Asp Thr Asn Arg Tyr Asn Val Leu Thr Ala Asp Met Thr Val Lys Phe  
405 410 415

<210> 9  
<211> 367  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 9

Met Ala Thr Leu Ala Val Gln Arg Glu Val Tyr Met Ser Asp Pro Asp  
1 5 10 15

Asp Ile Ala Val Ile Leu Tyr Thr Ser Gly Thr Thr Gly Gln Pro Lys  
20 25 30

Gly Ala Met Leu Ser His Arg Ala Leu Val Gln Asn Cys Ile Asp Leu  
35 40 45

Asn Leu Cys Trp Gly Phe Thr Asp Ser Asp Val Leu Leu His Thr Leu  
50 55 60

Pro Leu Phe His Val His Gly Leu Phe Phe Ala Leu His Ser Val Leu  
65 70 75 80

Tyr Ala Ser Ala Ser Met Ile Leu Gln Ala Lys Phe Asp Pro Met Glu  
85 90 95

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

Tyr Tyr Thr Arg Leu Leu Lys Glu Ala Glu Phe Thr Gly Ser Arg Ala  
115 120 125

Ala Gln Val Arg Leu Phe Ile Ser Gly Ser Ala Pro Leu His Glu Lys  
130 135 140

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

Tyr Gly Met Ser Glu Thr Gly Ile Asn Thr Ser Asn Pro Leu His Gly  
165 170 175

Glu Arg Lys Phe Gly Thr Val Gly Thr Ala Leu Glu His Val Thr Val  
180 185 190

Arg Val Val Asp Glu Val Ser Glu Lys Val Leu Met Pro Gly Gln Thr  
195 200 205

Gly Glu Val Gln Val Gln Gly Arg His Leu Phe Ser Gly Tyr Trp Gln  
210 215 220

Lys Glu Asp Gln Thr Asp Gly Ala Phe Thr Cys Asp Gln Phe Phe Lys  
225 230 235 240

Thr Gly Asp Leu Gly Tyr Leu Asp Glu Gln Gly Tyr Leu Thr Leu Val  
245 250 255

Gly Arg Val Lys Asp Met Ile Ile Ser Gly Gly Leu Asn Ile Tyr Pro  
260 265 270

Lys Glu Ile Glu Thr Ala Ile Asp Arg Val Thr Gly Val Asn Glu Ser  
275 280 285

Ala Val Val Gly Val Ala His Glu Asp Leu Gly Glu Gly Val Val Ala  
290 295 300

Val Val Val Leu Gln Asp Asn Ala Asn Met Leu Ala Glu His Ile Ile  
305 310 315 320

Ala Tyr Cys Lys Ala Ser Leu Ala Asp Phe Lys Cys Pro Lys Lys Val  
325 330 335

Val Phe Ile Asp Gln Leu Pro Arg Asn Thr Met Gly Lys Val Gln Lys  
340 345 350

Asn Gln Leu Arg Gln Gln Tyr Gln Ala Ile Phe Ala Asp Ala His  
355 360 365

<210> 10  
<211> 39  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 10

Met Cys Lys Ile Pro Thr Glu Val Ala Thr Leu Thr Ala Glu Leu Asn  
1 5 10 15

Lys Arg Leu Arg Leu Asn Met Phe Ala Cys Leu Tyr Ile Asp Phe Ile  
20 25 30

Pro Pro Cys Ile Asn Arg Tyr  
35

<210> 11  
<211> 127  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 11

Met Lys Asn Leu Ile Tyr Ala Gln Arg Leu Leu Tyr Phe Ala Val Leu  
1 5 10 15

Ile Ala Val Ile Val Thr Phe Val Gln Pro Phe Leu Met Pro Ile Lys  
20 25 30

Leu Ala Asp Val Pro Leu Met Pro Leu Val Val Ala Ser Ile Tyr Ser  
35 40 45

Leu Ile Phe Ala Ala Ala Leu Ala Leu Ala Ala Tyr Lys Leu Pro Ser  
50 55 60

Lys Ala Gly Trp Pro Arg Phe Leu Leu Val Ile Leu Phe Ile Gly Asp  
65 70 75 80

Ala Met Pro Ala Val Lys Asn Trp Leu Val Leu Trp His Thr Thr Glu  
85 90 95

Leu Phe Ala Ile Ile Tyr Leu Met Lys Leu Met Leu Met Leu Ala Ala  
100 105 110

Ile Leu Leu Ser Leu Ser Lys Leu Ala Arg Asp Phe Tyr Lys Cys  
115 120 125

<210> 12  
<211> 74  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 12

Met Asp Asn Ala Ser Phe His Lys Ser Lys Gly Val Lys Glu Ala Ile  
1 5 10 15

Glu Asp Ala Gly Cys His Leu Leu Phe Leu Pro Pro Tyr Ser Pro Asp  
20 25 30

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

Met Lys Leu Asp Gln Asp Glu Ile Asn Leu Glu Thr Ala Leu Ser Gln  
50 55 60

Val Met Lys Ser Met Ser Glu Thr Ile Arg  
65 70

<210> 13  
<211> 81  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 13

Met Pro Ser Pro Tyr Ser Tyr Asp Leu Arg Ile Arg Ala Leu Lys Met

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

Ser

<210> 14  
 <211> 319  
 <212> PRT  
 <213> Piscirickettsia salmonis

<400> 14

Leu Lys Ser Gln Lys Pro Pro Gly Asn Leu Thr Tyr Asn Leu Ser Ala		
1	5	10 15
Pro Trp Ser Gln Leu Met Ala Leu Met Ser Pro Arg Lys Ser Leu Ala		
20	25	30
Arg Leu Ser Val Phe Leu Phe Gln Ser Gly Asp Phe Val Glu Lys Gly		
35	40	45
Arg Pro Leu Val Gln Leu Asp Asp Arg Thr Glu Gln Ala Asn Leu Leu		
50	55	60
Gln Tyr Lys Ala Lys Leu Lys Leu Asp Gln Leu Thr Tyr Asp Arg Asp		
65	70	75 80
Arg Ser Leu Leu Lys Lys Asn Ala Ile Ser Arg Gln Asp Val Asp Thr		
85	90	95
Ala Leu Thr Ser Leu Glu Gln Thr Lys Ala Gln Met Leu Ala Thr Glu		
100	105	110
Val Ser Ile Ser Gln Lys Leu Ile Arg Ala Pro Phe Ser Gly Lys Ile		
115	120	125

Gly Ile Arg Asn Val Asn Leu Gly Gln Tyr Ile Ser Pro Gly Thr Asn  
130 135 140

Ile Val Ser Leu Gln Ser Ile Asn Pro Leu His Val Asn Phe Ser Leu  
145 150 155 160

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

His Val Asp Thr Phe Ala Gly Arg Glu Phe Thr Gly Thr Ile Thr Ala  
180 185 190

Met Asn Ser Glu Val Asp Ser Asn Thr Arg Thr Ile Glu Ile Gln Ala  
195 200 205

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

Val Gln Val Tyr Leu Pro Val Leu Pro Lys Val Leu Thr Leu Pro His  
225 230 235 240

Thr Ala Val Thr Tyr Thr Leu Tyr Gly Asn Ser Val Tyr Leu Ile Gln  
245 250 255

Leu Asn Gly Lys Lys Asn Gln Gln Gly Glu Pro Thr Gly Thr Val Thr  
260 265 270

Arg Ile Ser Ile Gln Thr Gly Asp Gln Arg Ser Asn Thr Val Val Ile  
275 280 285

Asn Lys Gly Leu Lys Ala Gly Asp Leu Ile Val Asp Gly Gly Gln Leu  
290 295 300

Lys Leu Glu Asn Gly Ala Ala Ile Ala Leu Lys Asn Thr Thr Gln  
305 310 315

<210> 15  
<211> 572  
<212> PRT  
<213> Piscirickettsia salmonis

<400> 15

Met Val Leu Ala Ile Gly Leu Val Val Asp Asp Ala Ile Ile Val Val  
1 5 10 15

Glu Asn Val His Arg His Ile Glu Glu Gly Lys Gln Pro Phe Asp Ala

20

25

30

Ala Leu Ile Gly Ala Arg Glu Ile Ala Ser Pro Val Ile Ala Met Thr  
 35 40 45

Ile Thr Leu Ala Ala Val Tyr Ala Pro Ile Ala Phe Val Gly Gly Ile  
 50 55 60

Thr Gly Ala Leu Phe Lys Glu Phe Ala Leu Thr Leu Ala Ala Ala Val  
 65 70 75 80

Ile Val Ser Gly Val Ile Ala Leu Thr Leu Ser Pro Met Met Cys Ser  
 85 90 95

Lys Leu Leu Val Ala Asp Asn Ala Asn Gly Gly Leu Ala His Trp Leu  
 100 105 110

Asp Arg Gln Phe Leu Arg Leu Gln Gln Arg Tyr Glu Arg Ile Leu His  
 115 120 125

His Thr Leu Glu His Arg Pro Val Val Leu Thr Phe Gly Leu Ile Ile  
 130 135 140

Leu Val Gly Ile Phe Gly Met Leu Lys Met Thr Gln Lys Gln Leu Ala  
 145 150 155 160

Pro His Glu Asp Gln Gly Phe Leu Ile Thr Phe Ala Ser Ala Pro Lys  
 165 170 175

Tyr Ala Asn Ile Asn Tyr Val Glu Lys Tyr Ser Glu Glu Phe Ala Lys  
 180 185 190

Ile Tyr Lys Ser Phe Pro Ala Ile Ala Asp Tyr Phe Ile Ile Asn Thr  
 195 200 205

Thr Gly Ala Gly Thr Phe Pro Ser Gln Val Thr Ser Gly Ala Val Leu  
 210 215 220

Lys Pro Trp Arg Asp Arg Ser Met Thr Thr Met Gln Leu Gln Pro Leu  
 225 230 235 240

Leu Gln His Lys Leu Asn Gln Ile Thr Gly Leu Gln Ala Gln Ala Ile  
 245 250 255

Gln Met Pro Ala Leu Pro Gly Pro Asp Gly Met Pro Ile Gln Phe Val  
 260 265 270



Leu Thr Ser Thr Ala Asp Tyr Ser Val Leu Asn Asn Val Met Thr Lys  
275 280 285

Phe Lys Ala Ala Ala Asp Lys Ser Gly Leu Phe Leu Phe Ser Ser Ser  
290 295 300

Asp Leu Lys Phe Asn Lys Pro Lys Leu Asn Ile Ala Ile Asp Arg Ala  
305 310 315 320

Lys Ala Ala Gln Met Gly Ile Thr Met Gln Gln Ile Gly Ser Thr Leu  
325 330 335

Ser Thr Leu Leu Ser Gly Gly Lys Val Asn Tyr Phe Ser Leu Asp Gly  
340 345 350

Arg Ser Tyr Lys Val Ile Pro Gln Leu Ala Asp Asn Glu Arg Leu Thr  
355 360 365

Pro Gln Gln Leu Asn Asn Asn Tyr Ile Lys Thr Ala Ala Gly Ala Leu  
370 375 380

Ile Pro Leu Ser Thr Leu Ile Thr Leu Ser Thr Ser Ile Glu Pro Gly  
385 390 395 400

Thr Leu Asn Gln Phe Gln Gln Leu Asn Ser Ala Thr Leu Ser Ala Val  
405 410 415

Ala Met Pro Gly His Thr Asp Thr Glu Ala Leu Asn Phe Leu Lys Ala  
420 425 430

Gln Ala Thr Lys Leu Met Pro Lys Gly Met Ser Tyr Asn Phe Ser Gly  
435 440 445

Gln Ser Arg Thr Leu Val Gln Glu Gly Asn Ala Leu Ile Tyr Thr Phe  
450 455 460

Phe Phe Ala Leu Ile Met Ile Phe Leu Val Leu Ala Ala Gln Phe Glu  
465 470 475 480

Ser Phe Arg Asp Pro Phe Ile Ile Met Phe Thr Val Pro Met Ala Ile  
485 490 495

Phe Gly Ala Ala Ile Pro Met Ala Phe Gly Trp Thr Ser Leu Asn Ile  
500 505 510

Tyr Thr Glu Ile Gly Leu Val Thr Leu Ile Gly Leu Ile Thr Lys His  
515 520 525

Gly Ile Leu Met Val Gln Phe Ala Asn Asp Leu Gln Glu Gln Glu Gly  
530 535 540

Arg Asp Ile Arg Ser Ala Ile Glu His Ala Ala Gly Met Arg Leu Arg  
545 550 555 560

Pro Ile Leu Met Thr Thr Ala Ala Met Val Val Gly  
565 570

<210> 16  
<211> 2092  
<212> DNA  
<213> *Piscirickettsia salmonis*

<400> 16  
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aatctttctt aagggtgaaa acaggctaaa atcaacattt tgataaaatt attaattttt 180  
ttttattgtt cttttttaat cggtttttat cctaatttga tagatagtta tcgaaattca 240  
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