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ctcgtggggg agctgctgga cgagctcgcc gccacccgc ccggagagcc ggtcgacctg 420  
cgggagcact tcgcctatcc gctgcccata ggggtcgtcg gccagctcgc cggcctcccc 480  
gaatccgtcc ggccccgggt ccgccgtacc gtcgacgtga tcttctccac cagccacagc 540  
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gaaggcgacg gagagcccct gacggaggcc gaactcgtcg acaccctgct gctgggtggtc 720  
aacgccgggt tcgaaaccac cgtcaacctc ctggaccagg cgatcacgcg actcctcacc 780  
gaccccgggc aactcgccca tgtccgcgcc ggacgcgcgg gctggaagga cgtggtcagag 840  
gaatcactcc gccacgaggc cccgctcgcg catctgccga tgcgcttcgc cgtggaggac 900  
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gccgccgcca accggcatcc ggacctgcac ggcctcaccg ccgacgactt cgacgccacc 1020  
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ctcggtcgcc tcgaagccga aatcgccctg cgcggcctct tcgaacgctt ccccgtctc 1140  
gccctcgccg tgcccctgga ccgactgcgc cccaagccga gcttcatctc caacggccac 1200  
agcgaactgc ccgtcatcat cgacccg 1227

&lt;210&gt; 9

&lt;211&gt; 1188

&lt;212&gt; DNA

&lt;213&gt; Streptomyces tsukubaensis

&lt;400&gt; 9

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gccactgtga ccggcctgcg ccggggccgggt ctgctccgcc tcgggacccc gaccgagtgc 180  
ggcggccggg gtgcgggtgc ccgtaccgcg gtggatgtgt gcgaggagct ggccaagggc 240  
tgtgcgtccg cctcctggat cgtgggcata gcctacggcg gcgccctctt cgcctcccag 300  
cttccccact ccgagcgtgc ggccctgtgg cgggacgacc cggacgctgt cgtctgcggc 360

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ggcgcagggg gcgaaccgga gcgcggcatg gccgtggtcc ccaccgccgg cctgaccgtc	540
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ggcgtgtacg tgccggactc ccgcacgatc tccctgaccg ccatggcgga cggcgcctac	660
cggcgacgcc atcccggcga accccgggtc accttccatc tctccatcaa cctgccgttg	720
gtggcgacgg ccgtcgggat cgccacagcg tccctggaga aggtgctgga tgccgcggcc	780
cggggcaaac agacgggtct cccgctgcac cggctggtcg ccgaggactc cgcccatcag	840
ctcaatgtgg cggacgccgc gacgtcatc gacacggccc ggctgcatct gcgccgcgcc	900
gccgacgagg tggactccca cggcgcgcg gggcgccgtc ccgcgctcgc cgagcggggc	960
cgactgcgga tggacgccgc ccacgccatg cgctgcgccc gcgacgccgt gaggctgctg	1020
ctggacaccg cgggcgcggg cagcttcgcg gacggctcgg tcctgcaacg ggcctggcgc	1080
gatatcgaga cggcgtcccg gcacgccgcg ctacgcgtcc agaccagcaa ggagatatac	1140
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<210> 10  
 <211> 654  
 <212> DNA  
 <213> Streptomyces tsukubaensis

<400> 10 gtggccctgc tggaccgcga cggcgacgcc gtgaccgggc tgtccgccgc cctcgacccc	60
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gccgcgctgc gcgagaccgc cgccgcctgg cacgcgcccg acatcctgat caacaatgcc	180
gcccggaccg cccccggctc ggtatgggac atcgaaccgg acgaatggga cgccgtactg	240
acgaccaatc tgcgcagcgt cctgaccctg acccggtgtg gcgcgcccgc gatgcgcgac	300
cgcggtggg gccgggtggt caacctctcc tcgctggccg gtcagcaggg cggcaccctc	360
gccggcgccc actactccgc cgccaaggcg ggcgttctcg tgctgaccaa ggtgttcgcc	420
cgtgaactgg cggcgcacgg cgtgaccgtc aacgcggtag ccccggccgc cgtcgacacc	480
ccggcggtcg ccgggctcgg cccgtcggcg gtggccgagg cggcccggca gatcccggtg	540
ggccggatgg ggaggccttc ggaggtcgcc ggcctcgtgg cctatctggt gggcgaagag	600
ggcggatacg tcaccggcgc caccttcgac atcaacggcg gcacccatat gcgc	654

<210> 11  
 <211> 1335  
 <212> DNA  
 <213> Streptomyces tsukubaensis

<400> 11 gtgaaggaaa tcctggacgc gatctcgtcg gcggatgcga cgccggcgga cttcgccgcc	60
ctcgcagtcc ccgagtccta ccgcgcggtg accgtgcaca aggacgaagc cgagatgttc	120

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gccggcctgc cgagccggga caaggacccc cgtaagtcgc tgcattgtcga agacgtcgcg	180
gtgcccgaac tcggggcccgg tgaggcgctc gtcgccgtga tggccagctc cgtcaactac	240
aactccgtgt ggacgtcga cttcgagccg ctgtccacct tcggcttcct ggagcgctac	300
gggcgcgta gcgaactcac ccggcggcac gatctgccgt accacgtcat cggctcggac	360
ctggcggggc tcgtcctgcg caccggggccc ggggtgaacg cctggaaacc gggggacgag	420
gtcgtcgcgc actgtctgtc ggtggagctg gagtcctcgg acgggcacaa cgacaccatg	480
ctcgaccccg agcagcggat ctggggcttc gagaccaact tcggcggcct cgccgaactc	540
gcgctgggtc agtcgaacca gctgatgccc aagccagccc atctgtcctg ggaggaggcc	600
gcggcgccgg ggctgggtga ctccaccgcg taccgccagc tgggtctccc caacggcgcc	660
cggatgaagc agggcgacaa cgtcctgatc tggggtgcga gcggcgggct cggctcgtac	720
gccaccagtc tcgcgctcgc cggggggcgc aaccgatct gtgtggtctc cagcgaccgc	780
aaggcggaca tctgccggtc gatgggcgcg gaggcgatca tcgaccggag cgccgaggac	840
taccggttct ggaaggacga gcggtcgcag gaccgcgctg agtggaagcg gttcggcgcc	900
cggatccgtg agctgaccgg cggcgaggac gtcgacatcg tcttcgagca ccccggccgg	960
gagaccttcg gggcctccgt gtacgtcacc cgcaaggcg gcacgatcgt cacctgcgcc	1020
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atcatcggct cccacttcgc caactaccgg gaggcgtggg aggccaaacc gctgatcgcc	1140
aaggggaaga tccacccac gctgtcgaag gtgtacccc tggcgagac cggccaggcg	1200
gcgcacgacg tccaccgcaa cggccaccag ggcaaggctc gcgtcctctg tctggcacc	1260
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cgttccgca atgtc	1335

<210> 12  
 <211> 1977  
 <212> DNA  
 <213> Streptomyces tsukubaensis

<400> 12	
atgcgacact atgccgggca ctccacggcc gaggcctcga acgagctgta ccggcgcaat	60
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gaccccgatc atctgctggc ccgcggcgag gtcggccggg tcgggggtgcc cgtcgcccat	180
ctcggcgata tgcggaggct gttccgggag atcccgtctg ggcagatgaa cacgtcgaat	240
acgatcaacg ccaccgcat gtggctgctg gcgctctacc aggtcgtcgc cgaggaacag	300
ggcacggatc tcgccgccct ccagggcacc acccagaacg acatcgtgaa ggagtacctg	360
tcgcgcggga cgcacgtctt cccgcccggc ccttcgctgc ggctgacgac cgacatgatc	420
gcgtacacgg tcggccggat gcccaagtgg aatccgatca acatctgcag ctaccacctc	480
caggaggccg gtgccacccc ggtccaggag atcagctacg cgatgtcgac ggcggtcgcc	540
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ggccggatct ctttcttcgt gaacgcgggc gtccggttca tcgaggagat gtgcaagatg 660  
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 cggcagcgcc ggttccgcta cggcgtccag gtcaactcgc tggggctgac cgaggcacag 780  
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 gccccggccc gggccgtaca gcttccggcg tggaacgagg cgctcgggct gccccggccg 900  
 tgggaccagc agtggtcgct ccgtatccag caggtcctgg cgcacgagtc ggatctgctg 960  
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 gcccgcgcgg gcgtcaccac cggcgagtgg agctgggcgc tcggggacgt cttcggcgag 1440  
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 ctgcggctgc tgggtgggcaa gccggggctc gacgggcatt ccaacgggtg cgagcagatc 1620  
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 gcggccgggg tggccgccgt cttcaccccg aaggacttcg gtatcacgga gatcatcggc 1920  
 cgtatcgtcg acgagatccg gcaagcgaac cagctcgacc ccctggaggt ccccgta 1977

<210> 13  
 <211> 431  
 <212> PRT  
 <213> Streptomyces tsukubaensis

<400> 13

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

Pro Gly Val Phe Ala Gly Leu Gly Ala Asp Ala Gly Arg Val Ala Thr  
 20 25 30

Leu Val Ala Glu Ile Asp Ala Ala Val Glu Glu Phe Arg Leu Lys Pro  
 35 40 45

Val Arg Pro Leu Leu Phe Ser Pro Asp Ala Pro Ala Leu Ala Glu Leu  
 50 55 60



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Leu Glu Ser Asp His Glu Arg Leu Asp Val Ala Ile Leu Ala Thr Ser  
 65 70 75 80  
 Ile Ala Leu Ala Glu Leu Leu Glu Ser Arg His Gly Met Ser Pro Asp  
 85 90 95  
 His Val Ala Gly His Ser Leu Gly Glu Phe Gly Ala Leu Ala Val Ala  
 100 105 110  
 Gly Val Phe Thr Pro Gly Asp Ala Ala Arg Ala Val Cys Glu Arg His  
 115 120 125  
 Ala Thr Leu Arg Lys Ala Pro Pro Pro Thr Gly Gly Met Leu Ala Val  
 130 135 140  
 Lys Ala Asp Ala Ala Arg Ala Gly Glu Leu Ile Ala Ala Ala Arg Ala  
 145 150 155 160  
 Gly Thr Ser Ala Val Ser Ala Leu Asn Ser Pro Ser Gln Thr Val Ile  
 165 170 175  
 Ser Gly Ala Glu Ala Asp Leu Val Lys Val Gln Gln Leu Ala Arg Glu  
 180 185 190  
 Glu Gly Ile Arg Thr Ser Arg Leu His Val Pro Gly Pro Phe His Val  
 195 200 205  
 Pro Gln Leu Ala Asp Ala Ser Ala Leu Tyr Ala Thr Thr Met Arg Thr  
 210 215 220  
 Ile Arg Ile Ser Ala Pro Arg Glu Arg Phe Phe Tyr Ser His Gly Leu  
 225 230 235 240  
 Gly Arg Phe Leu Thr Ala Gln Asp Asp Val Val Asp Leu Met Val Asn  
 245 250 255  
 Asp Met Thr Arg Pro Val Arg Phe His Asp Ser Val Arg Ala Leu Asn  
 260 265 270  
 Ala Glu Gly Val Thr Thr Tyr Val Glu Cys Gly Ala Leu Asp Val Leu  
 275 280 285  
 Thr Arg Ile Val Ser Gly Ser Leu Pro Arg Ala Val Thr Leu Ala Pro  
 290 295 300  
 Leu Arg Glu Ala Thr Thr Thr Pro Asp Leu Ser Ala Arg Leu Arg Pro  
 305 310 315 320  
 Ala Gly Thr Pro Ala Val Asn Gly Val Ala Ala Pro Ala Gly Pro Ala  
 325 330 335

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Pro Ala Ala Glu Val Asp Pro Glu Val Leu Ala Gly Val Arg Ala Val  
340 345 350

Cys Ala Glu Val Leu Glu Tyr Pro Leu Glu Val Ile Thr Asp Asp Ala  
355 360 365

Asp Phe Gln Ala Asp Leu Gly Val Asp Ser Leu Ala Met Thr Glu Leu  
370 375 380

Gln Ala His Ala Leu Gln Arg Phe Gly Leu Lys Glu Thr Leu Gln Asp  
385 390 395 400

Ala Asp Thr Gly Thr Tyr Gly Thr Val Ser Gly Leu Ala Ala Tyr Ile  
405 410 415

Thr Gly Leu Leu Ser Glu Gly Thr Gly Ser Val Ser Gly Arg Arg  
420 425 430

<210> 14  
<211> 796  
<212> PRT  
<213> Streptomyces tsukubaensis  
<400> 14

Val Ile Ser Arg Ala Pro Asp Gly Glu Gly Pro His Asp Asp Arg Val  
1 5 10 15

Ala Val Val Gly Met Gly Val Ala Val Pro Gly Ala Cys Asp Pro Glu  
20 25 30

Glu Leu Trp Lys Leu Leu Cys Gly Asp Arg Pro Val Phe Asp Glu Pro  
35 40 45

Ser Asp Arg Phe Arg Leu Asp Ser Phe Trp Ser Ala Asp Pro Ala Ala  
50 55 60

Glu Asp Arg Gly Tyr Val Arg Thr Ser Gly Phe Leu His Asp Phe Arg  
65 70 75 80

Pro His Pro Ala Leu Ala Ala Glu Ile Ala Ala Gly Thr Leu Ser Ala  
85 90 95

Ala Ala Gln Asn Pro Val Trp Leu Arg His Cys Leu Leu Gln Ala Arg  
100 105 110

Asp Thr Val Thr Ala Arg Ser Thr Asp Arg Tyr Ala Tyr His Val Gly  
115 120 125

Thr Ser Ala Leu Val Gly Gln Arg Thr Asp Glu Ala Val Leu Ala Glu  
130 135 140

Cys Val Pro Arg Ala Val Ala Glu Arg Leu His Arg Asp Glu Pro Ala  
145 150 155 160

Arg Met Ala Glu Ala<sub>165</sub> Glu Ala Arg Leu Arg<sub>170</sub> Ala Leu Leu Arg Ser<sub>175</sub> His  
 His Gly Tyr Gly<sub>180</sub> Ala Glu Glu Pro Arg<sub>185</sub> Asp Thr Leu Pro Asp<sub>190</sub> Arg Val  
 Val Arg Ala<sub>195</sub> Ala Ala Ala Gly Leu<sub>200</sub> Leu Pro Asp Asp Cys<sub>205</sub> Glu Phe Ser  
 Val Val<sub>210</sub> Asp Ala Ala Cys Ser<sub>215</sub> Ser Ser Leu Tyr Ala<sub>220</sub> Ile Gly Leu Gly  
 Val<sub>225</sub> Ala Ser Leu Leu Ala<sub>230</sub> Gly Ala Cys Asp Ile<sub>235</sub> Ala Tyr Cys Gly Gly<sub>240</sub>  
 Val Ser Gly Val Thr<sub>245</sub> Pro Arg Tyr Asn Val<sub>250</sub> Thr Phe Ser Lys Leu<sub>255</sub> His  
 Gly Leu Ser Pro<sub>260</sub> Ser Gly Asp Val Arg<sub>265</sub> Ala Phe Asp Asp Asp<sub>270</sub> Ala Asp  
 Gly Thr Leu Phe Ser Asp Gly Ala<sub>280</sub> Gly Val Val Ala Leu<sub>285</sub> Lys Arg Leu  
 Asp Arg<sub>290</sub> Ala Val Glu Asp Gly<sub>295</sub> Asp Pro Val Phe Gly<sub>300</sub> Val Leu Val Gly  
 Phe<sub>305</sub> Gly Gly Ser Ser Asp<sub>310</sub> Gly Arg Gly Thr Ala<sub>315</sub> Ile Tyr Ala Pro Asn<sub>320</sub>  
 Pro Val Gly Gln Arg<sub>325</sub> Arg Cys Leu Asp Arg<sub>330</sub> Ala Arg Gln Ala Ser<sub>335</sub> Gly  
 Leu Thr Ala Asp<sub>340</sub> Asp Val Asp Trp Val<sub>345</sub> Ile Ala His Gly Thr<sub>350</sub> Gly Thr  
 Ala Val Gly<sub>355</sub> Asp Ala Val Glu Leu<sub>360</sub> Arg Thr Leu Ala Ala<sub>365</sub> Ala Thr Asp  
 Pro Gly<sub>370</sub> Ser Val Trp Cys Gly<sub>375</sub> Ser Asn Lys Ser Leu<sub>380</sub> Leu Gly His Thr  
 Gly Trp Ser Ser Gly Val<sub>390</sub> Val Ser Val Val Gln Ala Leu Thr Ala Leu<sub>400</sub>  
 Arg Gln Gly Thr Ile<sub>405</sub> Pro Ala Gln Arg Arg<sub>410</sub> Phe Thr Gly Pro Gly<sub>415</sub> Leu  
 Thr Ala Gln Thr<sub>420</sub> Gly Asp Arg Val Arg<sub>425</sub> Ile Pro Ser Ala Asp<sub>430</sub> Val Pro

Trp His Ala Gly Gly Arg Arg Ser Arg Thr Ala Gly Val Ser Ala Phe  
 435 440 445  
 Gly Phe Gly Gly Thr Asn Ala His Leu Leu Ile Thr Asp Arg Glu Pro  
 450 455 460  
 Val Arg Thr Gly Pro Arg Pro Ala Arg Thr Gly Pro Asp Pro Val Val  
 465 470 475 480  
 Val Leu Ala Trp Thr Ala His Leu Pro Gly Asp Pro Gly Pro Glu Ala  
 485 490 495  
 Thr Glu Arg Leu Leu Arg Glu Gly Arg Ile Pro Gly Pro Arg Thr Phe  
 500 505 510  
 Gly Pro Arg Tyr Pro Ala Pro Pro Phe Pro Asp Val Arg Leu Pro Pro  
 515 520 525  
 Pro Thr Val Arg Ser Thr Asp Ala Gly Gln Leu Met Ala Leu Arg Val  
 530 535 540  
 Ala Gly Leu Phe Ala Ala Glu His Gly Glu Leu Trp Ala Pro Val Arg  
 545 550 555 560  
 Ala Thr Thr Gly Val Phe Ala Ala Ala Thr Gly Pro Pro Pro Ser Ser  
 565 570 575  
 Met Asp His Leu Val Arg Cys His Ala Ala Asp Val His Arg Ile Leu  
 580 585 590  
 Asp Glu Pro Asp Arg Thr Ala Phe Thr Glu Trp Leu Ala Asp Leu Arg  
 595 600 605  
 Ala Thr Thr Pro Ala Thr Thr Lys Asp Thr Leu Pro Gly Leu Leu Pro  
 610 615 620  
 Asn Ile Ile Pro Ala Arg Ile Ala Asn Arg Tyr Asp Leu Gly Gly Pro  
 625 630 635 640  
 Thr Met Leu Val Asp Thr Gly Thr Thr Ser Gly Leu Thr Ala Val His  
 645 650 655  
 Thr Ala Val Arg Gln Leu Ala Ala Gly Ala Val Asp Met Ala Leu Val  
 660 665 670  
 Leu Gly Val Ser Ala Thr Gly Arg Pro Glu Phe Ala Arg Phe Met Gly  
 675 680 685  
 Val Ala Ala Glu Arg Ile Ala Glu Gly Ala Phe Leu Leu Ala Leu Ser  
 690 695 700

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Arg Glu Ser Val Ala Leu Ala His Gly Leu Thr Pro Leu Val Arg Leu  
705 710 715 720

Arg Thr Asp Trp Thr Gly Ser Pro Gln Ala Ser Ala Asp Ala Val Pro  
725 730 735

Gly Gly Pro Gly Ala Ala Glu Asp Thr Phe Leu Gly Ala Asp Gly Val  
740 745 750

Leu Ala Val Ile Arg Ala Leu His Ser Thr Ala Ser Gly Val Thr Val  
755 760 765

Gly Pro Ala Asp Gly Glu Pro Gly Pro Val Ile Thr Leu Ser Pro Ala  
770 775 780

Asp Gly Ser Pro Leu Arg Gln Thr Arg Thr Ser Arg  
785 790 795

<210> 15  
<211> 445  
<212> PRT  
<213> Streptomyces tsukubaensis  
<400> 15

Met Thr His Val Arg Asp Ala Ala Ala Thr Asp Asp Pro Gln Ala Ile  
1 5 10 15

Ala Ala Cys Glu Val Pro Ala Gly Tyr Arg Ala Ala Val Val Leu Ala  
20 25 30

Ala Asp His Gln Ala Leu Ala Gly Ser Pro Val Glu Asp Arg Asp Pro  
35 40 45

Arg Lys Thr Val Gln Val Gln Glu Val Pro Thr Pro Glu Pro Asp His  
50 55 60

Gly Glu Val Leu Ile Ala Thr Met Ala Ser Ser Ile Asn Tyr Asn Thr  
65 70 75 80

Val Trp Ser Ala Leu Phe Glu Pro Val Pro Thr Phe Arg Phe Leu Arg  
85 90 95

Thr Leu Gly Arg Thr Ser Pro Glu Ala Ala Arg His Asp Gln Pro Tyr  
100 105 110

His Val Leu Gly Ser Asp Leu Ser Gly Val Val Leu Arg Thr Gly Pro  
115 120 125

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

Gln Pro Asp Leu Gln Thr Pro Gly Gly His Asp Asp Thr Leu Leu Asp  
145 150 155 160

Pro Gly Gln Arg Val<sub>165</sub> Trp Gly Tyr Glu Thr<sub>170</sub> Asn Phe Gly Gly Leu<sub>175</sub> Ala  
 Glu Leu Ser Leu<sub>180</sub> Val Lys Ala Asn Gln<sub>185</sub> Leu Met Pro Lys Pro<sub>190</sub> Ala His  
 Leu Thr Trp<sub>195</sub> Glu Glu Ala Ala Ser<sub>200</sub> Leu Gly Val Ala Leu<sub>205</sub> Ser Thr Ala  
 Tyr Arg<sub>210</sub> Gln Leu Val Ser His<sub>215</sub> His Gly Ala Ala Met<sub>220</sub> Lys Gln Gly Glu  
 Arg Val<sub>225</sub> Leu Val Trp Gly<sub>230</sub> Ala Ala Gly Gly Val<sub>235</sub> Gly Ala Tyr Ala Thr<sub>240</sub>  
 Gln Leu Ala Leu Asn<sub>245</sub> Gly Gly Ala Val Pro<sub>250</sub> Ile Cys Val Val Ser<sub>255</sub> Ser  
 Gln Ala Lys Ala<sub>260</sub> Asp Leu Cys Arg Gln<sub>265</sub> Met Gly Ala Glu Leu<sub>270</sub> Val Ile  
 Asp Arg Ala<sub>275</sub> Ala Glu Gly Phe Ser<sub>280</sub> Phe Trp Glu Gly Arg<sub>285</sub> Asp Arg Pro  
 Arg Leu<sub>290</sub> Ser Glu Trp Ser Arg<sub>295</sub> Phe Arg Gly Ala Val<sub>300</sub> Arg Ser Leu Ala  
 Gly<sub>305</sub> Asp Asp Pro Asp Ile<sub>310</sub> Val Ile Glu His Pro<sub>315</sub> Gly Arg Asp Thr Phe<sub>320</sub>  
 Gly Val Ser Val Met<sub>325</sub> Ile Ala Ala Arg Gly<sub>330</sub> Gly Lys Val Val Thr<sub>335</sub> Cys  
 Ala Ser Thr Thr<sub>340</sub> Gly Tyr Gln His Thr<sub>345</sub> Tyr Asp Asn Arg His<sub>350</sub> Leu Trp  
 Met Arg Val<sub>355</sub> Lys Arg Ile Ile Gly<sub>360</sub> Ser His Met Ala Asn<sub>365</sub> Tyr Arg Glu  
 Ala Trp<sub>370</sub> Ala Ala Asn Glu Leu<sub>375</sub> Val Ala Arg Gly Ser<sub>380</sub> Ile His Pro Val  
 Leu<sub>385</sub> Ser Arg Val Tyr Pro<sub>390</sub> Leu Asp Ala Thr Gly<sub>395</sub> Asp Ala Thr His Ala<sub>400</sub>  
 Val Ala Asn Asn Ser<sub>405</sub> His His Gly Lys Val<sub>410</sub> Gly Val Leu Cys Leu<sub>415</sub> Ala  
 Asp Arg Pro Gly<sub>420</sub> Met Gly Val Arg Asp<sub>425</sub> Pro Glu Leu Arg Ala<sub>430</sub> Arg Lys

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Leu Asp Ser Ile Asn Leu Phe Arg Lys Gly Gln Pro Arg  
435 440 445

<210> 16  
<211> 386  
<212> PRT  
<213> Streptomyces tsukubaensis

<400> 16

Val Ser Glu Ser Glu Arg Leu Gly Ile Val Arg Asp Phe Val Ala Arg  
1 5 10 15

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

Leu Ala Leu Tyr Glu Arg Phe Ala Glu Thr Gly Leu Met Asn Trp Trp  
35 40 45

Val Pro Lys Glu His Gly Gly Leu Gly Leu Gly Leu Glu Glu Ser Val  
50 55 60

Arg Ile Val Ser Glu Leu Ala Tyr Gly Asp Ala Gly Val Ala Phe Thr  
65 70 75 80

Leu Phe Leu Pro Val Leu Thr Thr Ser Met Ile Gly Trp Tyr Gly Ser  
85 90 95

Glu Glu Leu Lys Glu Arg Phe Leu Gly Pro Leu Val Ala Arg Arg Gly  
100 105 110

Phe Cys Ala Thr Leu Gly Ser Glu His Glu Ala Gly Ser Glu Leu Ala  
115 120 125

Arg Ile Ser Thr Thr Val Arg Arg Asp Gly Asp Thr Leu Val Leu Asp  
130 135 140

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

Val Ile Ala Arg Ser Ala Asp Asp Pro Ala Arg Tyr Thr Ala Val Thr  
165 170 175

Val Pro Arg Asp Ala Pro Gly Leu Arg Val Asp Lys Arg Trp Asp Val  
180 185 190

Ile Gly Met Arg Ala Ser Ala Thr Tyr Gln Val Ser Phe Ser Asp Cys  
195 200 205

Arg Val Pro Gly Asp Asn Ala Leu Asn Gly Asn Gly Leu Arg Leu Leu  
210 215 220

Glu Ile Gly Leu Asn Ala Ser Arg Ile Leu Ile Ala Ala Ser Ala Leu

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225 230 235 240

Gly Val Ala Arg Arg Ile Arg Asp Val Cys Met Glu Tyr Gly Lys Thr  
245 250 255

Lys Ser Leu Lys Gly Ala Pro Leu Val Lys Asp Gly Val Phe Ala Gly  
260 265 270

Arg Leu Gly Gln Phe Glu Met Gln Ile Asp Val Met Ala Asn Gln Cys  
275 280 285

Leu Ala Ala Ala Arg Ala Tyr Asp Ala Thr Ala Ala Arg Pro Asp Ala  
290 295 300

Ala Arg Val Leu Leu Arg Gln Gly Ala Gln Lys Ser Ala Leu Thr Ala  
305 310 315 320

Lys Met Phe Cys Gly Gln Thr Ala Trp Gln Ile Ala Ser Thr Ala Ser  
325 330 335

Glu Met Phe Gly Gly Ile Gly Tyr Thr His Asp Met Val Ile Gly Lys  
340 345 350

Leu Leu Arg Asp Val Arg His Ala Ser Ile Ile Glu Gly Gly Asp Asp  
355 360 365

Val<sup>370</sup> Leu Arg Asp Leu Val<sup>375</sup> Tyr Gln Arg Phe Val<sup>380</sup> Val Pro Thr Ala Lys

Arg Thr  
385

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<210> 17
<211> 384
<212> PRT
<213> Streptomyces tsukubaensis
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<400> 17

Met Pro Ser His His Trp Glu Thr Arg Ala Val His Ala Gly Arg Glu  
1 5 10 15

Asp Leu Val Asp Leu Gly Leu His Val Pro Pro Ile Asp Leu Ser Thr  
20 25 30

Thr Tyr Pro Ser Arg Asp Thr Val Ala Glu Ala Ala Arg Ile Asp Val  
35 40 45

Phe Gly Ser Gly Ala Asp Asp Gly Gly Pro Pro Ile Tyr Gly Arg Ala  
50 55 60

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



Gly Ala Glu Ala Ala Val Ala Phe Ala Ser Gly Met Ala Ala Leu Cys  
 85 90 95  
 Ala Cys Leu Leu Val Gln Val Ala Arg Gly Arg Pro His Ile Val Ala  
 100 105 110  
 Val Arg Pro Leu Tyr Gly Thr Ser Asp Tyr Leu Leu Asp Ser Gly Leu  
 115 120 125  
 Leu Gly Thr Ser Val Thr Trp Ala Gln Pro His Ser Ala Gly Asp Ala  
 130 135 140  
 Ile Arg Ser Asp Thr Gly Leu Val Ile Val Glu Ser Pro Ala Asn Pro  
 145 150 155 160  
 Thr Leu Thr Glu Thr Asp Ile Gln Ala Leu Ala Ala Ala Cys Ala Pro  
 165 170 175  
 Val Pro Val Leu Val Asp Asn Thr Phe Ala Thr Pro Ala Leu Gln Arg  
 180 185 190  
 Pro Leu Asn Arg Gly Ala Ala Ile Val Leu His Ser Ala Thr Lys Tyr  
 195 200 205  
 Leu Gly Gly His Gly Asp Val Met Gly Gly Val Val Ala Ser Asn Glu  
 210 215 220  
 Glu Phe Ala Arg Ala Leu Arg Arg Ile Arg Phe Ala Thr Gly Gly Ile  
 225 230 235 240  
 Leu His Pro Leu Ala Gly Tyr Gln Leu Leu Arg Gly Leu Ser Thr Leu  
 245 250 255  
 Ser Val Arg Met His His Ala Ser Ala Ser Ala Ala Glu Ile Ala Arg  
 260 265 270  
 Arg Leu Leu His His Pro Ala Val Thr Arg Val His Tyr Pro Gly Leu  
 275 280 285  
 Ser Gly Glu Pro Arg Pro Pro Lys Gln Met Ala Ala Gly Gly Ala Ile  
 290 295 300  
 Val Ser Phe Glu Val Asp Asp Pro His Ala Val Thr Gly Gly Val Arg  
 305 310 315 320  
 Leu Phe Thr Pro Ala Val Ser Leu Gly Ser Val Asp Ser Leu Ile Gln  
 325 330 335  
 His Pro Val Ser Leu Thr His His Ala Met Asp Pro Gly Ser Arg Glu  
 340 345 350

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Gln Ala Gly Ile Ser Asp Arg Leu Leu Arg Ile Ser Val Gly Leu Glu  
355 360 365

His Val Asp Asp Leu Trp Ala Asp Leu Thr Gln Ala Leu Thr Arg Asp  
370 375 380

<210> 18  
<211> 155  
<212> PRT  
<213> Streptomyces tsukubaensis

<400> 18

Met Lys Glu Lys Val Val Leu Asp Ser Ile Asp Gln Ala Ile Leu Arg  
1 5 10 15

Glu Leu Gln Asn Asp Gly Arg Leu Pro Asn Lys Thr Leu Ala Arg Arg  
20 25 30

Val Gly Val Ala Pro Ser Thr Cys Leu Ala Arg Thr Gln Arg Leu Met  
35 40 45

Glu Ala Gly Val Ile Arg Gly Phe Gln Ala Gln Val Ser Ala Ala Ala  
50 55 60

Ile Gly Arg Gln Val Gln Ala Val Leu Ala Val Gln Phe Ile Ala His  
65 70 75 80

Ser Arg Pro Phe Val Asp Pro Phe Val Ala Trp Ala Arg Glu Arg Pro  
85 90 95

Glu Thr Arg Ala Leu His His Val Thr Gly Ala Phe Asp Phe Leu Val  
100 105 110

His Thr Ala Cys Arg Asp Thr Glu Asn Leu Gln Gln Leu Val Leu Glu  
115 120 125

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

Gly Ser Trp Ser Gly Gly Pro Leu Thr Pro Gly  
145 150 155

<210> 19  
<211> 409  
<212> PRT  
<213> Streptomyces tsukubaensis

<400> 19

Val Asp Arg Glu Pro Val Phe Val Leu Asp Pro Arg Gly Gly Asp Arg  
1 5 10 15

His Gly Glu Asp Ala Ala Leu Arg Ala Arg Gly Pro Leu Thr Arg Val  
20 25 30

Asp Ala Leu Gly Val Glu Ala Trp Ser Val Thr Asp Pro Val Leu Leu  
 35 40 45  
 Arg Arg Leu Leu Leu Asp Ser Arg Val Ser Lys Asn Ala Arg Gln His  
 50 55 60  
 Trp Pro Ala Phe Pro Glu Glu Ile Val Gly Val Trp Pro Leu Ala Leu  
 65 70 75 80  
 Trp Val Ala Val Glu Asn Met Phe Thr Ala Tyr Gly Glu Glu His Arg  
 85 90 95  
 Arg Leu Arg Arg Thr Ile Gly Pro Ala Phe Ala Ala Arg Arg Ile Asn  
 100 105 110  
 Ala Leu Ala Pro Val Ile Glu Gln Leu Val Gly Glu Leu Leu Asp Glu  
 115 120 125  
 Leu Ala Ala Thr Pro Pro Gly Glu Pro Val Asp Leu Arg Glu His Phe  
 130 135 140  
 Ala Tyr Pro Leu Pro Ile Gly Val Val Gly Gln Leu Ala Gly Leu Pro  
 145 150 155 160  
 Glu Ser Val Arg Pro Arg Phe Arg Arg Thr Val Asp Val Ile Phe Ser  
 165 170 175  
 Thr Ser His Ser Pro Glu Glu Thr Thr Ala Ala Val Gln Asp Leu Tyr  
 180 185 190  
 Ala Leu Leu Ala Asp Leu Val Ala Ala Lys Arg Ala Glu Pro Gly Asp  
 195 200 205  
 Asp Leu Thr Ser Ala Leu Ile Ala Ala Arg Asp Thr Glu Gly Asp Gly  
 210 215 220  
 Glu Pro Leu Thr Glu Ala Glu Leu Val Asp Thr Leu Leu Leu Val Val  
 225 230 235 240  
 Asn Ala Gly Phe Glu Thr Thr Val Asn Leu Leu Asp Gln Ala Ile Thr  
 245 250 255  
 Ala Leu Leu Thr Asp Pro Gly Gln Leu Ala His Val Arg Ala Gly Arg  
 260 265 270  
 Ala Gly Trp Lys Asp Val Val Glu Glu Ser Leu Arg His Glu Ala Pro  
 275 280 285  
 Leu Ala His Leu Pro Met Arg Phe Ala Val Glu Asp Ile Pro Leu Pro  
 290 295 300

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Glu His Gly Val Thr Ile Arg Gln Gly Asp Ala Val Leu Pro Ala Tyr  
305 310 315 320

Ala Ala Ala Asn Arg His Pro Asp Leu His Gly Leu Thr Ala Asp Asp  
325 330 335

Phe Asp Ala Thr Arg Ser Asp Lys Ser His Leu Ser Phe Gly His Gly  
340 345 350

Met His Leu Cys Leu Gly Ala Ala Leu Gly Arg Leu Glu Ala Glu Ile  
355 360 365

Ala Leu Arg Gly Leu Phe Glu Arg Phe Pro Arg Leu Ala Leu Ala Val  
370 375 380

Pro Leu Asp Arg Leu Arg Pro Lys Pro Ser Phe Ile Ser Asn Gly His  
385 390 395 400

Ser Glu Leu Pro Val Ile Ile Asp Pro  
405

<210> 20  
<211> 395  
<212> PRT  
<213> Streptomyces tsukubaensis  
<400> 20

Val Gly Thr Pro Gln Pro Asp Val Ala Glu Gly Leu Thr Pro Val Glu  
1 5 10 15

Ala Ala Arg Ser Leu Val Pro Leu Leu Ala Ala Glu Ala Ala Arg Thr  
20 25 30

Glu Glu Arg Arg Ala Leu Thr Gly Ala Thr Val Thr Gly Leu Arg Arg  
35 40 45

Ala Gly Leu Leu Arg Leu Gly Thr Pro Thr Glu Cys Gly Gly Arg Gly  
50 55 60

Ala Gly Ala Arg Thr Ala Val Asp Val Cys Glu Glu Leu Ala Lys Gly  
65 70 75 80

Cys Ala Ser Ala Ser Trp Ile Val Gly Ile Ala Tyr Gly Gly Ala Leu  
85 90 95

Phe Ala Ser Gln Leu Pro His Ser Glu Arg Ala Ala Leu Trp Arg Asp  
100 105 110

Asp Pro Asp Ala Val Val Cys Gly Ser Ala Asn Pro Ser Gly Thr Ala  
115 120 125

Arg Arg Thr Asp Gly Gly Trp Thr Leu Ser Gly Arg Trp Pro Trp Ile  
130 135 140

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Ser Gly Ile His His Ala Pro Trp Thr Leu Leu Gly Phe Val Arg Pro  
145 150 155 160

Gly Ala Gly Gly Glu Pro Glu Arg Gly Met Ala Val Val Pro Thr Ala  
165 170 175

Gly Leu Thr Val Glu Asp Val Trp His Met Ala Gly Met Arg Gly Thr  
180 185 190

Gly Ser Asp Thr Ala Val Ala Asp Gly Val Tyr Val Pro Asp Ser Arg  
195 200 205

Thr Ile Ser Leu Thr Ala Met Ala Asp Gly Ala Tyr Arg Arg Arg His  
210 215 220

Pro Gly Glu Pro Arg Val Thr Phe His Leu Ser Ile Asn Leu Pro Leu  
225 230 235 240

Val Ala Thr Ala Val Gly Ile Ala Thr Ala Ser Leu Glu Lys Val Leu  
245 250 255

Asp Ala Ala Ala Arg Gly Lys Gln Thr Val Ser Pro Leu His Arg Leu  
260 265 270

Val Ala Glu Asp Ser Ala His Gln Leu Asn Val Ala Asp Ala Ala Thr  
275 280 285

Leu Ile Asp Thr Ala Arg Leu His Leu Arg Arg Ala Ala Asp Glu Val  
290 295 300

Asp Ser His Ala Arg Ala Gly Arg Arg Pro Ala Leu Ala Glu Arg Ala  
305 310 315 320

Arg Leu Arg Met Asp Ala Ala His Ala Met Arg Cys Ala Arg Asp Ala  
325 330 335

Val Ser Leu Leu Leu Asp Thr Ala Gly Ala Gly Ser Phe Ala Asp Gly  
340 345 350

Ser Val Leu Gln Arg Ala Trp Arg Asp Ile Glu Thr Ala Ser Arg His  
355 360 365

Ala Ala Leu Ser Val Gln Thr Ser Lys Glu Ile Tyr Gly Arg Ala Leu  
370 375 380

Leu Gly Ala Pro Leu Pro Pro Gly Pro Val Val  
385 390 395

<210> 21  
<211> 218  
<212> PRT

&lt;213&gt; Streptomyces tsukubaensis

&lt;400&gt; 21

Val Ala Leu Leu Asp Arg Asp Gly Asp Ala Val Thr Gly Leu Ser Ala  
 1 5 10 15  
 Ala Leu Asp Pro Ala Gly Ala Gly Thr Ala Leu Pro Leu Arg Ala Asp  
 20 25 30  
 Val Asp Asp Thr Asp Ala Val His Ala Ala Leu Arg Glu Thr Ala Ala  
 35 40 45  
 Ala Trp His Ala Pro Asp Ile Leu Ile Asn Asn Ala Ala Arg Thr Ala  
 50 55 60  
 Pro Gly Ser Val Trp Asp Ile Glu Pro Asp Glu Trp Asp Ala Val Leu  
 65 70 75 80  
 Thr Thr Asn Leu Arg Ser Val Leu Thr Leu Thr Arg Leu Cys Ala Pro  
 85 90 95  
 Ala Met Arg Asp Arg Gly Trp Gly Arg Val Val Asn Leu Ser Ser Leu  
 100 105 110  
 Ala Gly Gln Gln Gly Gly Thr Leu Ala Gly Ala His Tyr Ser Ala Ala  
 115 120 125  
 Lys Ala Gly Val Leu Val Leu Thr Lys Val Phe Ala Arg Glu Leu Ala  
 130 135 140  
 Ala His Gly Val Thr Val Asn Ala Val Ala Pro Ala Ala Val Asp Thr  
 145 150 155 160  
 Pro Ala Val Ala Gly Leu Gly Pro Ser Ala Val Ala Glu Ala Ala Arg  
 165 170 175  
 Gln Ile Pro Val Gly Arg Met Gly Arg Pro Ser Glu Val Ala Gly Leu  
 180 185 190  
 Val Ala Tyr Leu Val Gly Glu Glu Gly Gly Tyr Val Thr Gly Ala Thr  
 195 200 205  
 Phe Asp Ile Asn Gly Gly Thr His Met Arg  
 210 215