SEQUENCE LISTING

<110> Novozymes A/S

<120> Polypeptides Having Antimicrobial Activity

<130> 10803.204-WO

<160> 50

<170> PatentIn version 3.3

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gcc atg gca act tct gat act gag ccc gtt gaa ccg gaa gag gaa ctt       96
Ala Met Ala Thr Ser Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

tcc atc atg cta ccg ttt gty gaa gat gac ttg ctg gag aaa cct atc      144
Ser Ile Met Leu Pro Phe Xaa Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

ccc cgg agc tgg cta tgt aac tgg ttg ggc cat gac wtc ggc tgt ata      192
Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Xaa Gly Cys Ile
    -1  1                   5                   10

rct tat tgc aag ctg ttg ggt aac agc cga ggt ggt tgc tgt gct ggg      240
Xaa Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

grc gac tgg aas ggr tac tgt tac tgc cac gac ggt mgc agc ccw acc      288
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Asp Arg Cys
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<210> 2
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<220>
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<222> (11)..(11)
<223> The 'Xaa' at location 11 stands for Ile, or Phe.

<220>
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<223> The 'Xaa' at location 15 stands for Ala, or Thr.

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<223> The 'Xaa' at location 31 stands for Gly, or Asp.

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<223> The 'Xaa' at location 34 stands for Lys, or Asn.

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<223> The 'Xaa' at location 35 stands for Gly.

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<223> The 'Xaa' at location 43 stands for Ser, or Arg.

<220>
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<223> The 'Xaa' at location 45 stands for Pro.

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Ala Met Ala Thr Ser Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
-30 -25 -20

Ser Ile Met Leu Pro Phe Xaa Glu Asp Asp Leu Leu Glu Lys Pro Ile
-15 -10 -5

Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Xaa Gly Cys Ile
-1 1 5 10

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Asp Arg Cys

<210> 3
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-50                 -45                 -40                 -35

gcc atg gca act tct gat act gag ccc gtt gaa ccg gaa gag gaa ctt       96
Ala Met Ala Thr Ser Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

tcc atc atg cta ccg ttt gtt gaa gat gac ttg ctg gag aaa cct atc      144
Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

ccc cgg agc tgg cta tgt aac tgg ttg ggc cat gac ttc ggc tgt ata      192
Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Phe Gly Cys Ile
    -1  1               5                   10

act tat tgc aag ctg ttg ggt aac agc cga ggt ggt tgc tgt gct ggg      240
Thr Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

ggc gac tgg aag gga tac tgt tac tgc cac gac ggt cgc agc cca acc      288
Gly Asp Trp Lys Gly Tyr Cys Tyr Cys His Asp Gly Arg Ser Pro Thr
                35                  40                  45

gat agg tgt                                                         297
Asp Arg Cys
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Ala Met Ala Thr Ser Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5
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Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Phe Gly Cys Ile
    -1  1               5                   10

Thr Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
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Asp Arg Cys
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-50                 -45                 -40                 -35

gcc atg gca act gct gat act gag ccc gtt gaa ccg gaa gag gaa ctt      96
Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

tcc atc atg cta ccg ttt gtt gaa gat gac ttg ctg gag aaa cct atc     144
Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

ccc cgg agc tgg cta tgt aac tgg ttg ggc cat gac ttc ggc tgt ata     192
Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Phe Gly Cys Ile
    -1  1               5                   10

act tat tgc aag ctg ttg ggt aac agc cga ggt ggt tgc tgt gct ggg     240
Thr Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

gac gac tgg aag gga tac tgt tac tgc cac gac ggt agc agc cct acc     288
Asp Asp Trp Lys Gly Tyr Cys Tyr Cys His Asp Gly Ser Ser Pro Thr
                35                  40                  45

gat agg tgt                                                        297
Asp Arg Cys
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Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Phe Gly Cys Ile
    -1  1               5                   10

Thr Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

Asp Asp Trp Lys Gly Tyr Cys Tyr Cys His Asp Gly Ser Ser Pro Thr
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Asp Arg Cys
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Met Lys Phe Phe Leu Pro Ile Met Ile Ala Leu Ala Phe Ala Ala Val
-50                 -45                 -40                 -35

gcc atg gca act gct gat act gag ccc gtt gaa ccg gaa gag gaa ctt      96
Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

tcc atc atg cta ccg ttt gtt gaa gat gac ttg ctg gag aaa cct atc     144
Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

ccc cgg agc tgg cta tgt aac tgg ttg ggc cat gac ttc ggc tgt ata     192
Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Phe Gly Cys Ile
    -1  1               5                   10
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```
act tat tgc aag ctg ttg ggt aac agc cga ggt ggt tgc tgt gct ggg      240
Thr Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

ggc gac tgg aac ggg tac tgt tac tgc cac gac ggt cgc agc cca acc      288
Gly Asp Trp Asn Gly Tyr Cys Tyr Cys His Asp Gly Arg Ser Pro Thr
                35                  40                  45

gat agg tgt                                                         297
Asp Arg Cys
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Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Phe Gly Cys Ile
    -1  1                   5                   10

Thr Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

Gly Asp Trp Asn Gly Tyr Cys Tyr Cys His Asp Gly Arg Ser Pro Thr
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Asp Arg Cys
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gcc atg gca act gct gat act gag ccc gtt gaa ccg gaa gag gaa ctt      96
Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

tcc atc atg cta ccg ttt gtc gaa gat gac ttg ctg gag aaa cct atc     144
Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

ccc cgg agc tgg cta tgt aac tgg ttg ggc cat gac atc ggc tgt ata     192
Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Ile Gly Cys Ile
    -1  1               5                   10

gct tat tgc aag ctg ttg ggt aac agc cga ggt ggt tgc tgt gct ggg     240
Ala Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
15                  20                  25                  30

ggc gac tgg aag gga tac tgt tac tgc cac gac ggt cgc agc cct acc     288
Gly Asp Trp Lys Gly Tyr Cys Tyr Cys His Asp Gly Arg Ser Pro Thr
                35                  40                  45

gat agg tgt                                                        297
Asp Arg Cys
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Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Pro Glu Glu Glu Leu
                -30                 -25                 -20

Ser Ile Met Leu Pro Phe Val Glu Asp Asp Leu Leu Glu Lys Pro Ile
            -15                 -10                 -5

Pro Arg Ser Trp Leu Cys Asn Trp Leu Gly His Asp Ile Gly Cys Ile
    -1  1               5                   10

Ala Tyr Cys Lys Leu Leu Gly Asn Ser Arg Gly Gly Cys Cys Ala Gly
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                -35                 -30                 -25

gca acc gtt acg gga caa tct ctg gat gac gaa agc gat gtt gaa aac       96
Ala Thr Val Thr Gly Gln Ser Leu Asp Asp Glu Ser Asp Val Glu Asn
            -20                 -15                 -10

gtt tcc caa cct gaa cag cgc ggt tgg tgc tgg cag tgg aca tgt gat      144
Val Ser Gln Pro Glu Gln Arg Gly Trp Cys Trp Gln Trp Thr Cys Asp
        -5              -1  1                   5

gcc cac tgc tat ctc aag cag tat gac agg ggc tgc tgt ggt gtt gga      192
Ala His Cys Tyr Leu Lys Gln Tyr Asp Arg Gly Cys Cys Gly Val Gly
10                  15                  20                  25

gaa cac agc ggt aaa tgc ctt tgc tac gac cat ggt ggc ccc ctc gcc      240
Glu His Ser Gly Lys Cys Leu Cys Tyr Asp His Gly Gly Pro Leu Ala
                30                  35                  40

gat ggc tgc aag agc                                                 255
Asp Gly Cys Lys Ser
            45
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Ala Thr Val Thr Gly Gln Ser Leu Asp Asp Glu Ser Asp Val Glu Asn
            -20                 -15                 -10

Val Ser Gln Pro Glu Gln Arg Gly Trp Cys Trp Gln Trp Thr Cys Asp
        -5              -1  1                   5

Ala His Cys Tyr Leu Lys Gln Tyr Asp Arg Gly Cys Cys Gly Val Gly
10                  15                  20                  25

Glu His Ser Gly Lys Cys Leu Cys Tyr Asp His Gly Gly Pro Leu Ala
                30                  35                  40
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Asp Gly Cys Lys Ser
            45


<210>  13
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<212>  DNA
<213>  Arenicola marina


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                -35                 -30                 -25

gca aca gtt acg gca cag tcc ctg gat gac gaa agc gat gtt gat atc       96
Ala Thr Val Thr Ala Gln Ser Leu Asp Asp Glu Ser Asp Val Asp Ile
            -20                 -15                 -10

gtt tcc caa tct gaa cag cgc cag tgg tgc tgg gag tgg tca tgt gat      144
Val Ser Gln Ser Glu Gln Arg Gln Trp Cys Trp Glu Trp Ser Cys Asp
        -5              -1  1               5

gcc aac tgc ttt ttc aag cag ttt gat aac ggc tgc tgt ggt gtt ggg      192
Ala Asn Cys Phe Phe Lys Gln Phe Asp Asn Gly Cys Cys Gly Val Gly
10                  15                  20                  25

gaa cac agc ggt aaa tgc ctt tgc tac gac cat gga ggc ccc ctc gcc      240
Glu His Ser Gly Lys Cys Leu Cys Tyr Asp His Gly Gly Pro Leu Ala
                30                  35                  40

gcc ggc tgc acg cgc                                                 255
Ala Gly Cys Thr Arg
            45


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Ala Thr Val Thr Ala Gln Ser Leu Asp Asp Glu Ser Asp Val Asp Ile
            -20                 -15                 -10


Val Ser Gln Ser Glu Gln Arg Gln Trp Cys Trp Glu Trp Ser Cys Asp
        -5              -1  1               5
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Ala Asn Cys Phe Phe Lys Gln Phe Asp Asn Gly Cys Cys Gly Val Gly
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Ala Gly Cys Thr Arg
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Met Lys Asn Ile Thr Leu Leu Met Leu Leu Val Ala Val Phe Val Met
        -35                 -30                 -25

gca acc gtt atg gca acg cct cta gat ggc gat att gaa gcc gtt tcc      96
Ala Thr Val Met Ala Thr Pro Leu Asp Gly Asp Ile Glu Ala Val Ser
    -20                 -15                 -10

cag cca gag cag cgg ctt tgg tgt ttc gag tgg tca tgt gat gtc aga     144
Gln Pro Glu Gln Arg Leu Trp Cys Phe Glu Trp Ser Cys Asp Val Arg
-5              -1  1               5                   10

tgc tgg tgg tcg cat cag aac ggc tgt tgt ggc gtt ggc gaa aac aaa     192
Cys Trp Trp Ser His Gln Asn Gly Cys Cys Gly Val Gly Glu Asn Lys
            15                  20                  25

cat aaa tgc ctc tgc tat gtg agt ggt ggc ccc ctc gcc gct ggc tgc     240
His Lys Cys Leu Cys Tyr Val Ser Gly Gly Pro Leu Ala Ala Gly Cys
        30                  35                  40

att agg gaa gtg ctg                                                 255
Ile Arg Glu Val Leu
    45
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<210> 16
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Met Lys Asn Ile Thr Leu Leu Met Leu Leu Val Ala Val Phe Val Met
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Ala Thr Val Met Ala Thr Pro Leu Asp Gly Asp Ile Glu Ala Val Ser
 -20                 -15                 -10

Gln Pro Glu Gln Arg Leu Trp Cys Phe Glu Trp Ser Cys Asp Val Arg
-5              -1  1               5                   10

Cys Trp Trp Ser His Gln Asn Gly Cys Cys Gly Val Gly Glu Asn Lys
            15                  20                  25

His Lys Cys Leu Cys Tyr Val Ser Gly Gly Pro Leu Ala Ala Gly Cys
        30                  35                  40

Ile Arg Glu Val Leu
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Met Lys Asn Ile Thr Leu Leu Met Leu Leu Val Ala Val Val Val Met
        -35                 -30                 -25

gca acc gtt atg gca acg cct cta gat ggc gat att gaa gcc gtt tcc      96
Ala Thr Val Met Ala Thr Pro Leu Asp Gly Asp Ile Glu Ala Val Ser
    -20                 -15                 -10

cag cca gag cag cgt cat tgg tgt ttc gag tgg tca tgt gat gtc aaa     144
Gln Pro Glu Gln Arg His Trp Cys Phe Glu Trp Ser Cys Asp Val Lys
-5              -1  1               5                   10

tgc tgg tgg tcg cat cag aac ggc tgt tgt ggc gtt ggc gaa aac aaa     192
Cys Trp Trp Ser His Gln Asn Gly Cys Cys Gly Val Gly Glu Asn Lys
            15                  20                  25

cat aac tgc ctc tgc tat gag agt ggt ggc ccc ctc gcc gct ggc tgc     240
His Asn Cys Leu Cys Tyr Glu Ser Gly Gly Pro Leu Ala Ala Gly Cys
        30                  35                  40

att agg gaa gtg ctg                                                 255
Ile Arg Glu Val Leu
    45
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<210> 18

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<400> 18

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        -35                 -30                 -25

Ala Thr Val Met Ala Thr Pro Leu Asp Gly Asp Ile Glu Ala Val Ser
    -20                 -15                 -10

Gln Pro Glu Gln Arg His Trp Cys Phe Glu Trp Ser Cys Asp Val Lys
-5              -1  1               5                   10

Cys Trp Trp Ser His Gln Asn Gly Cys Cys Gly Val Gly Glu Asn Lys
            15                  20                  25

His Asn Cys Leu Cys Tyr Glu Ser Gly Gly Pro Leu Ala Ala Gly Cys
        30                  35                  40

Ile Arg Glu Val Leu
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Met Lys Asn Ile Thr Met Leu Met Leu Leu Val Ala Val Val Val Met
        -35                 -30                 -25

gca acc gtt atg gca acg cct cta gat ggc gat att gaa gcc gtt tac      96
Ala Thr Val Met Ala Thr Pro Leu Asp Gly Asp Ile Glu Ala Val Tyr
    -20                 -15                 -10

cag ccg gag cag cgt cat tgg tgt tgg gaa tgg aca tgt gat gtc aga     144
Gln Pro Glu Gln Arg His Trp Cys Trp Glu Trp Thr Cys Asp Val Arg
-5              -1  1               5                   10

tgc tgg tgg tcg cat cgg gat ggc tgt tgt ggc gtt ggc gaa aac aaa     192
Cys Trp Trp Ser His Arg Asp Gly Cys Cys Gly Val Gly Glu Asn Lys
            15                  20                  25

aat aac tgc ctc tgc tat gag agt ggt ggc ccc ctc gcc gat ggc tgc     240
Asn Asn Cys Leu Cys Tyr Glu Ser Gly Gly Pro Leu Ala Asp Gly Cys
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        30                  35                  40

att agc aaa gtg ctg                                                    255
Ile Ser Lys Val Leu
    45
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        -35                 -30                 -25

Ala Thr Val Met Ala Thr Pro Leu Asp Gly Asp Ile Glu Ala Val Tyr
    -20                 -15                 -10

Gln Pro Glu Gln Arg His Trp Cys Trp Glu Trp Thr Cys Asp Val Arg
-5              -1  1               5                   10

Cys Trp Trp Ser His Arg Asp Gly Cys Cys Gly Val Gly Glu Asn Lys
            15                  20                  25

Asn Asn Cys Leu Cys Tyr Glu Ser Gly Gly Pro Leu Ala Asp Gly Cys
        30                  35                  40

Ile Ser Lys Val Leu
    45
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Met Lys Pro Ile Ile Leu Leu Met Leu Leu Val Ala Val Val Val Met
                -35                 -30                 -25

gca aca gtt acg gca gag ccc ctg gat gaa gaa agc gat gtt gaa ata      96
Ala Thr Val Thr Ala Glu Pro Leu Asp Glu Glu Ser Asp Val Glu Ile
            -20                 -15                 -10

gtt tcc cag cct gaa cag cgc atc ccc tgt tgg act ccg aca tgt agc     144
Val Ser Gln Pro Glu Gln Arg Ile Pro Cys Trp Thr Pro Thr Cys Ser
```

```
        -5            -1  1              5

aca cgc tgc tgg tgg aag ggc aag agc ggc tgt tgt ggc gtt aaa gaa      192
Thr Arg Cys Trp Trp Lys Gly Lys Ser Gly Cys Cys Gly Val Lys Glu
10                  15                  20                  25

cac tat ggt gta tgc atc tgc tat cag cat ctc ggc ccg aag gac agc      240
His Tyr Gly Val Cys Ile Cys Tyr Gln His Leu Gly Pro Lys Asp Ser
                30                  35                  40

aga tgc ctg gcc                                                     252
Arg Cys Leu Ala
            45
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<210> 22
<211> 84
<212> PRT
<213> Arenicola marina

<400> 22

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Met Lys Pro Ile Ile Leu Leu Met Leu Leu Val Ala Val Val Val Met
                -35                 -30                 -25

Ala Thr Val Thr Ala Glu Pro Leu Asp Glu Glu Ser Asp Val Glu Ile
            -20                 -15                 -10

Val Ser Gln Pro Glu Gln Arg Ile Pro Cys Trp Thr Pro Thr Cys Ser
        -5              -1  1                   5

Thr Arg Cys Trp Trp Lys Gly Lys Ser Gly Cys Cys Gly Val Lys Glu
10                  15                  20                  25

His Tyr Gly Val Cys Ile Cys Tyr Gln His Leu Gly Pro Lys Asp Ser
                30                  35                  40

Arg Cys Leu Ala
            45
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<210> 23
<211> 297
<212> DNA
<213> Arenicola marina

<220>
<221> CDS
<222> (1)..(297)

<220>
<221> sig_peptide
<222> (1)..(57)

<220>
<221> mat_peptide
<222> (151)..(297)

<400> 23

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atg aag ttt tta tta ccg ttg atg gtc gtc atg gcc ttt gct gcc gtc      48
Met Lys Phe Leu Leu Pro Leu Met Val Val Met Ala Phe Ala Ala Val
```

```
-50                 -45                 -40                 -35

gcc atg gca act gct gat act gag ccg gtt gag agg gag gag ggt gtt      96
Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Arg Glu Glu Gly Val
                -30                 -25                 -20

ttc atc atg cta ccg ttt gtt gaa gac gat atg ctg gag aaa cca att     144
Phe Ile Met Leu Pro Phe Val Glu Asp Asp Met Leu Glu Lys Pro Ile
            -15                 -10                 -5

ctt cgg ggg ggc cgg ccc tgt cat agg cat ggc cat gac atg ggt tgc     192
Leu Arg Gly Gly Arg Pro Cys His Arg His Gly His Asp Met Gly Cys
    -1  1               5                   10

aca gct gct tgc aac gaa agg ggg cac agt cta ggt agt tgc tgt cct     240
Thr Ala Ala Cys Asn Glu Arg Gly His Ser Leu Gly Ser Cys Cys Pro
15                  20                  25                  30

gtg ggc cac tat agt gga tac tgt tac tgc cac gac agt ggc act ccc     288
Val Gly His Tyr Ser Gly Tyr Cys Tyr Cys His Asp Ser Gly Thr Pro
                35                  40                  45

gat agg tgc                                                        297
Asp Arg Cys
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<210> 24
<211> 99
<212> PRT
<213> Arenicola marina

<400> 24

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Met Lys Phe Leu Leu Pro Leu Met Val Val Met Ala Phe Ala Ala Val
-50                 -45                 -40                 -35

Ala Met Ala Thr Ala Asp Thr Glu Pro Val Glu Arg Glu Glu Gly Val
                -30                 -25                 -20

Phe Ile Met Leu Pro Phe Val Glu Asp Asp Met Leu Glu Lys Pro Ile
            -15                 -10                 -5

Leu Arg Gly Gly Arg Pro Cys His Arg His Gly His Asp Met Gly Cys
    -1  1               5                   10

Thr Ala Ala Cys Asn Glu Arg Gly His Ser Leu Gly Ser Cys Cys Pro
15                  20                  25                  30

Val Gly His Tyr Ser Gly Tyr Cys Tyr Cys His Asp Ser Gly Thr Pro
                35                  40                  45

Asp Arg Cys
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<210> 25
<211> 252
<212> DNA
<213> Arenicola marina

<220>
<221> CDS
<222> (1)..(252)

<220>
<221> sig_peptide
<222> (1)..(63)

<220>
<221> mat_peptide
<222> (121)..(252)

<400> 25

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atg aca acg ctg ctc cta atg ttt ggg gtc gcc atc gtc gtc ctg gca        48
Met Thr Thr Leu Leu Leu Met Phe Gly Val Ala Ile Val Val Leu Ala
-40                 -35                 -30                 -25

act gta gca gcc gtg cct cta caa gat gac gat gtc ctt gac cca tca        96
Thr Val Ala Ala Val Pro Leu Gln Asp Asp Asp Val Leu Asp Pro Ser
               -20                 -15                 -10

ggt ctt gtg gaa ggg gaa aca cgg ggc agg tcg tgt aat ttc tgg ttg       144
Gly Leu Val Glu Gly Glu Thr Arg Gly Arg Ser Cys Asn Phe Trp Leu
           -5              -1  1                   5

tgc cac gca tcc tgc atc gct aaa gtc gct gaa cga ggc tgc tgt gga       192
Cys His Ala Ser Cys Ile Ala Lys Val Ala Glu Arg Gly Cys Cys Gly
    10                  15                  20

gtt gga aac tac ctt ggc tac tgt tat tgt tat gac agt ggc tat gaa       240
Val Gly Asn Tyr Leu Gly Tyr Cys Tyr Cys Tyr Asp Ser Gly Tyr Glu
25                  30                  35                  40

tac agg tgc cgc                                                      252
Tyr Arg Cys Arg
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<210> 26
<211> 84
<212> PRT
<213> Arenicola marina

<400> 26

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Met Thr Thr Leu Leu Leu Met Phe Gly Val Ala Ile Val Val Leu Ala
-40                 -35                 -30                 -25

Thr Val Ala Ala Val Pro Leu Gln Asp Asp Asp Val Leu Asp Pro Ser
               -20                 -15                 -10

Gly Leu Val Glu Gly Glu Thr Arg Gly Arg Ser Cys Asn Phe Trp Leu
           -5              -1  1                   5

Cys His Ala Ser Cys Ile Ala Lys Val Ala Glu Arg Gly Cys Cys Gly
    10                  15                  20

Val Gly Asn Tyr Leu Gly Tyr Cys Tyr Cys Tyr Asp Ser Gly Tyr Glu
25                  30                  35                  40

Tyr Arg Cys Arg
```

<210> 27
<211> 321
<212> DNA
<213> Arenicola marina

<220>
<221> CDS
<222> (1)..(321)

<220>
<221> sig_peptide
<222> (1)..(66)

<220>
<221> mat_peptide
<222> (145)..(321)

<400> 27

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atg aag ttg ttc tta ccc ttg gtg gtc acc gtg gca ttt gcc gcc gtc       48
Met Lys Leu Phe Leu Pro Leu Val Val Thr Val Ala Phe Ala Ala Val
            -45                 -40                 -35

gtc atg act gat acg gag cca gtt gag gct gag gat gaa gtt tcc atc       96
Val Met Thr Asp Thr Glu Pro Val Glu Ala Glu Asp Glu Val Ser Ile
        -30                 -25                 -20

atg aac cct tat gta aaa gac ggt gtg caa ggg aga cag acc ctc gag      144
Met Asn Pro Tyr Val Lys Asp Gly Val Gln Gly Arg Gln Thr Leu Glu
    -15                 -10                 -5                  -1

ggt ggg atg tgt ggt gac gac ttt ggc tcg tgg tct gac atc cgt gac      192
Gly Gly Met Cys Gly Asp Asp Phe Gly Ser Trp Ser Asp Ile Arg Asp
1               5                   10                  15

aac cag tgc agg gat tat tgt cgt tcg agg ggt agc ttc gga ggt tgc      240
Asn Gln Cys Arg Asp Tyr Cys Arg Ser Arg Gly Ser Phe Gly Gly Cys
            20                  25                  30

tgt ggt att ggt ctc tgg cag gga caa tgt tac tgc tat tac ttc tac      288
Cys Gly Ile Gly Leu Trp Gln Gly Gln Cys Tyr Cys Tyr Tyr Phe Tyr
        35                  40                  45

gga ccc agt ctt acc tat agg tgc tgg tcg aaa                          321
Gly Pro Ser Leu Thr Tyr Arg Cys Trp Ser Lys
    50                  55
```

<210> 28
<211> 107
<212> PRT
<213> Arenicola marina

<400> 28

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Met Lys Leu Phe Leu Pro Leu Val Val Thr Val Ala Phe Ala Ala Val
            -45                 -40                 -35

Val Met Thr Asp Thr Glu Pro Val Glu Ala Glu Asp Glu Val Ser Ile
        -30                 -25                 -20

Met Asn Pro Tyr Val Lys Asp Gly Val Gln Gly Arg Gln Thr Leu Glu
```

-15 -10 -5 -1

Gly Gly Met Cys Gly Asp Asp Phe Gly Ser Trp Ser Asp Ile Arg Asp
1 5 10 15

Asn Gln Cys Arg Asp Tyr Cys Arg Ser Arg Gly Ser Phe Gly Gly Cys
20 25 30

Cys Gly Ile Gly Leu Trp Gln Gly Gln Cys Tyr Cys Tyr Tyr Phe Tyr
35 40 45

Gly Pro Ser Leu Thr Tyr Arg Cys Trp Ser Lys
50 55

<210> 29
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Marinasin1B-F

<400> 29
ggatgcgaac caacttcaga aacgtagctg gctatgtaac tggttgggc 49

<210> 30
<211> 34
<212> DNA
<213> Artificial

<220>
<223> Marinasin1B-R

<400> 30
cccaagcttc acatggtgta tggttgatct ctcc 34

<210> 31
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Marinasin2A-F

<400> 31
ggatgcgaac caacttcaga aacgtggttg gtgctggcag tggacatgt 49

<210> 32
<211> 31
<212> DNA
<213> Artificial

<220>
<223> Marinasin2A-R

<400> 32
cccaagcttg cccttctagc gttcagctct t 31

<210> 33
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Marinasin3B-F

<400> 33
ggatgcgaac caacttcaga aacgtcattg gtgtttcgag tggtcatgt 49

<210> 34
<211> 31
<212> DNA
<213> Artificial

<220>
<223> Marinasin3B-R

<400> 34
cccaagcttt cagtggagaa ccgttacagc a 31

<210> 35
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Marinasin4-F

<400> 35
ggatgcgaac caacttcaga aacgtatccc ctgttggact ccgacatgt 49

<210> 36
<211> 30
<212> DNA
<213> Artificial

<220>
<223> Marinasin4-R

<400> 36
cccaagctta gcccagtatg ctctgcacgt 30

<210> 37
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Marinasin5-F

<400> 37
ggatgcgaac caacttcaga aacgtggggg ccggccctgt cataggcat 49

<210> 38
<211> 32
<212> DNA
<213> Artificial

<220>
<223> Marinasin5-R

<400> 38
cccaagctta gttgttcgct ccattagcac ct 32

<210> 39
<211> 40
<212> DNA
<213> Artificial

<220>
<223> Marinasin6-F

<400> 39
accaacttca gaaacgtggc aggtcgtgta atttctggtt 40

<210> 40
<211> 32
<212> DNA
<213> Artificial

<220>
<223> Marinasin6-R

<400> 40
cccaagcttt gggcgattct atctgcctct ta 32

<210> 41
<211> 37
<212> DNA
<213> Artificial

<220>
<223> Marinasin7-F

<400> 41
accaacttca gaaacgtggt gggatgtgtg gtgacga 37

<210> 42
<211> 29
<212> DNA
<213> Artificial

<220>
<223> Marinasin7-R

<400> 42
cccaagcttg cacatcgttt ccaccgcaa 29

<210> 43
<211> 36
<212> DNA
<213> Artificial

<220>
<223> PlecBHI-F

<400> 43
cgcggatccc accatgcaat ttaccaccat cctctc 36

<210> 44
<211> 49

<212> DNA
<213> Artificial

<220>
<223> Plec-Mar1B-R

<400> 44
gcccaaccag ttacatagcc agctacgttt ctgaagttgg ttcgcatcc 49

<210> 45
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Plec-Mar2A-R

<400> 45
acatgtccac tgccagcacc aaccacgttt ctgaagttgg ttcgcatcc 49

<210> 46
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Plec-Mar3B-R

<400> 46
acatgaccac tcgaaacacc aatgacgttt ctgaagttgg ttcgcatcc 49

<210> 47
<211> 38
<212> DNA
<213> Artificial

<220>
<223> Plec-Mar4-R

<400> 47
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<210> 48
<211> 49
<212> DNA
<213> Artificial

<220>
<223> Plec-Mar5-R

<400> 48
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<210> 49
<211> 42
<212> DNA
<213> Artificial

<220>
<223> Plec-Mar6-R

<400> 49

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<210> 50
<211> 38
<212> DNA
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<220>
<223> Plec-Mar7-R

<400> 50
cacacatccc accacgtttc tgaagttggt tcgcatcc 38