Sequence listing 251 WO1_ST25
SEQUENCE LISTING

<110> MANUKAMED LIMITED
Amanda, Bean

<120> ANTI-INFLAMMATORY PROTEINS AND METHODS OF PREPARATION AND USE THEREOF

<130> 251 WO1

<150> NZ 590143
<151> 2010-12-22

<160> 5

<170> PatentIn version 3.5

<210> 1
<211> 432
<212> PRT
<213> Apis mellifera

<220>
<221> MAJOR ROYAL JELLY PROTEIN 1
<222> (1)..(432)

<400> 1

Met Thr Arg Leu Phe Met Leu Val Cys Leu Gly Ile Val Cys Gln Gly
1 5 10 15

Thr Thr Gly Asn Ile Leu Arg Gly Glu Ser Leu Asn Lys Ser Leu Pro
20 25 30

Ile Leu His Glu Trp Lys Phe Phe Asp Tyr Asp Phe Gly Ser Asp Glu
35 40 45

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

Tyr Pro Ser Asp Ile Asp Gln Trp His Asp Lys Ile Phe Val Thr Met
65 70 75 80

Leu Arg Tyr Asn Gly Val Pro Ser Ser Leu Asn Val Ile Ser Lys Lys
85 90 95

Val Gly Asp Gly Gly Pro Leu Leu Gln Pro Tyr Pro Asp Trp Ser Phe
100 105 110

Ala Lys Tyr Asp Asp Cys Ser Gly Ile Val Ser Ala Ser Lys Leu Ala
115 120 125

Ile Asp Lys Cys Asp Arg Leu Trp Val Leu Asp Ser Gly Leu Val Asn
130 135 140

Asn Thr Gln Pro Met Cys Ser Pro Lys Leu Leu Thr Phe Asp Leu Thr
145 150 155 160

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

Asn Ala Thr Thr Gly Lys Gly Arg Leu Ser Ser Leu Ala Val Gln Ser
180 185 190

Leu Asp Cys Asn Thr Asn Ser Asp Thr Met Val Tyr Ile Ala Asp Glu
195 200 205

Lys Gly Glu Gly Leu Ile Val Tyr His Asn Ser Asp Asp Ser Phe His
210 215 220

Arg Leu Thr Ser Asn Thr Phe Asp Tyr Asp Pro Lys Phe Thr Lys Met
225 230 235 240

Thr Ile Asp Gly Glu Ser Tyr Thr Ala Gln Asp Gly Ile Ser Gly Met
245 250 255

Ala Leu Ser Pro Met Thr Asn Asn Leu Tyr Tyr Ser Pro Val Ala Ser
260 265 270

Thr Ser Leu Tyr Tyr Val Asn Thr Glu Gln Phe Arg Thr Ser Asp Tyr
275 280 285

Gln Gln Asn Asp Ile His Tyr Glu Gly Val Gln Asn Ile Leu Asp Thr
290 295 300

Gln Ser Ser Ala Lys Val Val Ser Lys Ser Gly Val Leu Phe Phe Gly
305 310 315 320

Leu Val Gly Asp Ser Ala Leu Gly Cys Trp Asn Glu His Arg Thr Leu
325 330 335

Glu Arg His Asn Ile Arg Thr Val Ala Gln Ser Asp Glu Thr Leu Gln
340 345 350

Met Ile Ala Ser Met Lys Ile Lys Glu Ala Leu Pro His Val Pro Ile
355 360 365

Phe Asp Arg Tyr Ile Asn Arg Glu Tyr Ile Leu Val Leu Ser Asn Lys
370 375 380

Met Gln Lys Met Val Asn Asn Asp Phe Asn Phe Asp Asp Val Asn Phe
385 390 395 400

Arg Ile Met Asn Ala Asn Val Asn Glu Leu Ile Leu Asn Thr Arg Cys
405 410 415

Glu Asn Pro Asp Asn Asp Arg Thr Pro Phe Lys Ile Ser Ile His Leu
420 425 430

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<210> 2
<211> 452
<212> PRT
<213> Apis mellifera

<220>
<221> Major Royal Jelly Protein 2
<222> (1)..(452)

<400> 2

Met Thr Arg Trp Leu Phe Met Val Ala Cys Leu Gly Ile Ala Cys Gln
1 5 10 15

Gly Ala Ile Val Arg Glu Asn Ser Pro Arg Asn Leu Glu Lys Ser Leu
20 25 30

Asn Val Ile His Glu Trp Lys Tyr Phe Asp Tyr Asp Phe Gly Ser Glu
35 40 45

Glu Arg Arg Gln Ala Ala Ile Gln Ser Gly Glu Tyr Asp His Thr Lys
50 55 60

Asn Tyr Pro Phe Asp Val Asp Gln Trp Arg Asp Lys Thr Phe Val Thr
65 70 75 80

Ile Leu Arg Tyr Asp Gly Val Pro Ser Thr Leu Asn Val Ile Ser Gly
85 90 95

Lys Thr Gly Lys Gly Gly Arg Leu Leu Lys Pro Tyr Pro Asp Trp Ser
100 105 110

Phe Ala Glu Phe Lys Asp Cys Ser Lys Ile Val Ser Ala Phe Lys Ile
115 120 125

Ala Ile Asp Lys Phe Asp Arg Leu Trp Val Leu Asp Ser Gly Leu Val
130 135 140

Asn Arg Thr Val Pro Val Cys Ala Pro Lys Leu His Val Phe Asp Leu
145 150 155 160

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

Val Asn Ala Thr Thr Gly Lys Gly Gly Leu Val Ser Leu Ala Val Gln
180 185 190

Ala Ile Asp Leu Ala Asn Thr Leu Val Tyr Met Ala Asp His Lys Gly
195 200 205

Asp Ala Leu Ile Val Tyr Gln Asn Ala Asp Asp Ser Phe His Arg Leu
210 215 220

Thr Ser Asn Thr Phe Asp Tyr Asp Pro Arg Tyr Ala Lys Met Thr Ile
225 230 235 240

Asp Gly Glu Ser Phe Thr Leu Lys Asn Gly Ile Cys Gly Met Ala Leu
245 250 255

Ser Pro Val Thr Asn Asn Leu Tyr Tyr Ser Pro Leu Ala Ser His Gly
260 265 270

Leu Tyr Tyr Val Asn Thr Ala Pro Phe Met Lys Ser Gln Phe Gly Glu
275 280 285

Asn Asn Val Gln Tyr Gln Gly Ser Glu Asp Ile Leu Asn Thr Gln Ser
290 295 300

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

Gly Asn Ser Ala Val Gly Cys Trp Asn Glu His Gln Ser Leu Gln Arg
325 330 335

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

Ala Gly Met Lys Ile Lys Glu Glu Leu Pro His Phe Val Gly Ser Asn
355 360 365

Lys Pro Val Lys Asp Glu Tyr Met Leu Val Leu Ser Asn Arg Met Gln
370 375 380

Lys Ile Val Asn Asp Asp Phe Asn Phe Asp Asp Val Asn Phe Arg Ile
385 390 395 400

Leu Gly Ala Asn Val Lys Glu Leu Ile Arg Asn Thr His Cys Val Asn
405 410 415

Asn Asn Gln Asn Asp Asn Ile Gln Asn Thr Asn Asn Gln Asn Asp Asn
420 425 430

Asn Gln Lys Asn Asn Lys Lys Asn Ala Asn Asn Gln Lys Asn Asn Asn
435 440 445

Gln Asn Asp Asn
450

<210> 3
<211> 544
<212> PRT
<213> Apis mellifera

<220>

Sequence listing 251 WO1_ST25

<221> Majo rRoyal Jelly Protein3
<222> (1)..(544)

<220>
<221> Major Royal Jelly Protein3
<222> (1)..(544)

<400> 3

```
Met Thr Lys Trp Leu Leu Leu Val Val Cys Leu Gly Ile Ala Cys Gln
1               5                  10                  15

Asp Val Thr Ser Ala Ala Val Asn His Gln Arg Lys Ser Ala Asn Asn
            20                  25                  30

Leu Ala His Ser Met Lys Val Ile Tyr Glu Trp Lys His Ile Asp Phe
        35                  40                  45

Asp Phe Gly Ser Asp Glu Arg Arg Asp Ala Ala Ile Lys Ser Gly Glu
    50                  55                  60

Phe Asp His Thr Lys Asn Tyr Pro Phe Asp Val Asp Arg Trp Arg Asp
65                  70                  75                  80

Lys Thr Phe Val Thr Ile Glu Arg Asn Asn Gly Val Pro Ser Ser Leu
                85                  90                  95

Asn Val Val Thr Asn Lys Lys Gly Lys Gly Gly Pro Leu Leu Arg Pro
            100                 105                 110

Tyr Pro Asp Trp Ser Phe Ala Lys Tyr Glu Asp Cys Ser Gly Ile Val
        115                 120                 125

Ser Ala Phe Lys Ile Ala Val Asp Lys Phe Asp Arg Leu Trp Val Leu
    130                 135                 140

Asp Ser Gly Leu Val Asn Asn Asn Gln Pro Met Cys Ser Pro Lys Leu
145                 150                 155                 160

Leu Thr Phe Asp Leu Lys Thr Ser Lys Leu Val Lys Gln Val Glu Ile
                165                 170                 175

Pro His Asn Ile Ala Val Asn Ala Thr Thr Gly Met Gly Glu Leu Val
            180                 185                 190

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

Ala Asp Glu Lys Gly Glu Gly Leu Ile Met Tyr Gln Asn Ser Asp Asp
    210                 215                 220

Ser Phe His Arg Leu Thr Ser Asn Thr Phe Asp Tyr Asp Pro Arg Tyr
225                 230                 235                 240
```

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

Tyr Gly Ile Ala Leu Ser Pro Val Thr Asn Asn Leu Tyr Tyr Ser Pro
260 265 270

Leu Leu Ser His Gly Leu Tyr Tyr Val Asp Thr Glu Gln Phe Ser Asn
275 280 285

Pro Gln Tyr Glu Glu Asn Asn Val Gln Tyr Glu Gly Ser Gln Asp Ile
290 295 300

Leu Asn Thr Gln Ser Phe Gly Lys Val Val Ser Lys Asn Gly Val Leu
305 310 315 320

Phe Leu Gly Leu Val Gly Asn Ser Gly Ile Ala Cys Val Asn Glu His
325 330 335

Gln Val Leu Gln Arg Glu Ser Phe Asp Val Val Ala Gln Asn Glu Glu
340 345 350

Thr Leu Gln Met Ile Val Ser Met Lys Ile Met Glu Asn Leu Pro Gln
355 360 365

Ser Gly Arg Ile Asn Asp Pro Glu Gly Asn Glu Tyr Met Leu Ala Leu
370 375 380

Ser Asn Arg Met Gln Lys Ile Ile Asn Asn Asp Phe Asn Phe Asn Asp
385 390 395 400

Val Asn Phe Arg Ile Leu Gly Ala Asn Val Asp Asp Leu Met Arg Asn
405 410 415

Thr Arg Cys Gly Arg Tyr His Asn Gln Asn Ala Gly Asn Gln Asn Ala
420 425 430

Asp Asn Gln Asn Ala Asp Asn Gln Asn Ala Asn Asn Gln Asn Ala Asp
435 440 445

Asn Gln Asn Ala Asn Lys Gln Asn Gly Asn Arg Gln Asn Asp Asn Arg
450 455 460

Gln Asn Asp Asn Lys Gln Asn Gly Asn Arg Gln Asn Asp Asn Lys Gln
465 470 475 480

Asn Gly Asn Arg Gln Asn Asp Asn Lys Gln Asn Gly Asn Arg Gln Asn
485 490 495

Gly Asn Lys Gln Asn Asp Asn Lys Gln Asn Gly Asn Arg Gln Asn Asp
500 505 510

```
Asn Lys Arg Asn Gly Asn Arg Gln Asn Asp Asn Gln Asn Asn Gln Asn
        515                 520                 525

Asp Asn Asn Arg Asn Asp Asn Gln Val His His Ser Ser Lys Leu His
    530                 535                 540
```

<210> 4
<211> 464
<212> PRT
<213> Apis mellifera

<220>
<221> Major Royal Jelly Protein 4
<222> (1)..(464)

<400> 4

```
Met Thr Lys Trp Leu Leu Leu Met Val Cys Leu Gly Ile Ala Cys Gln
1               5                   10                  15

Asn Ile Arg Gly Gly Val Val Arg Glu Asn Ser Ser Gly Lys Asn Leu
            20                  25                  30

Thr Asn Thr Leu Asn Val Ile His Lys Trp Lys Tyr Leu Asp Tyr Asp
        35                  40                  45

Phe Asp Asn Asp Glu Arg Arg Gln Ala Ala Ile Gln Ser Gly Glu Tyr
    50                  55                  60

Asp Arg Thr Lys Asn Tyr Pro Leu Asp Val Asp Gln Trp His Asn Lys
65                  70                  75                  80

Thr Phe Leu Ala Val Ile Arg Tyr Asn Gly Val Pro Ser Ser Leu Asn
                85                  90                  95

Val Val Ser Asp Lys Thr Gly Asn Gly Gly Arg Leu Leu Gln Pro Tyr
            100                 105                 110

Pro Asp Trp Ser Phe Ala Lys Tyr Glu Asp Cys Ser Gly Ile Val Ser
        115                 120                 125

Ala His Lys Ile Ala Ile Asp Glu Tyr Glu Arg Leu Trp Val Leu Asp
    130                 135                 140

Ser Gly Leu Val Asn Asn Thr Gln Pro Met Cys Ser Pro Lys Leu Phe
145                 150                 155                 160

Ala Phe Asp Leu Asn Thr Ser Gln Leu Leu Lys Gln Val Glu Ile Pro
                165                 170                 175

His Asp Val Ala Thr Thr Gly Lys Gly Glu Leu Val Ser Leu Thr Val
            180                 185                 190
```

```
Gln Ala Met Asp Ser Thr Asn Thr Met Val Tyr Met Val Asp Asn Lys
        195                 200                 205

Asn Thr Leu Ile Ile Tyr Gln Asn Ala Asp Asp Ser Phe His Arg Leu
    210                 215                 220

Ser Ser His Thr Leu Asn His Asn Ser Asp Lys Met Ser Asp Gln Gln
225                 230                 235                 240

Glu Asn Leu Thr Leu Lys Glu Val Asp Asn Lys Val Tyr Gly Met Ala
                245                 250                 255

Leu Ser Pro Val Thr His Asn Leu Tyr Tyr Asn Ser Pro Ser Ser Glu
            260                 265                 270

Asn Leu Tyr Tyr Val Asn Thr Glu Ser Leu Met Lys Ser Glu Asn Gln
        275                 280                 285

Gly Asn Asp Val Gln Tyr Glu Arg Val Gln Asp Val Phe Asp Ser Gln
    290                 295                 300

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

Ala Asn Asn Thr Leu Ser Cys Trp Asn Glu His Gln Ser Leu Asp Arg
                325                 330                 335

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

Val Ser Met Lys Ile Lys Gln Asn Val Pro Gln Ser Gly Arg Val Asn
        355                 360                 365

Asn Thr Gln Arg Asn Glu Tyr Leu Leu Ala Leu Ser Asp Arg Asn Gln
    370                 375                 380

Asn Val Leu Asn Asn Asp Leu Asn Leu Glu His Val Asn Phe Gln Ile
385                 390                 395                 400

Leu Gly Ala Asn Val Asn Asp Leu Ile Arg Asn Ser Arg Cys Ala Asn
                405                 410                 415

Phe Asp Asn Gln Asp Asn Asn His Tyr Asn His Asn His Asn Gln Ala
            420                 425                 430

Arg His Ser Ser Lys Ser Asp Asn Gln Asn Asn Asn Gln His Asn Asp
        435                 440                 445

Gln Ala His His Ser Ser Lys Ser Asn Asn Arg His Asn Asn Asn Asp
    450                 455                 460
```

Sequence listing 251 WO1_ST25

<210> 5
<211> 598
<212> PRT
<213> Apis mellifera

<220>
<221> Major Royal Jelly Protein 5
<222> (1)..(598)

<400> 5

```
Met Thr Thr Trp Leu Leu Leu Val Val Cys Leu Gly Ile Ala Cys Gln
1               5                  10                  15

Gly Ile Thr Ser Val Thr Val Arg Glu Asn Ser Pro Arg Lys Leu Ala
            20                  25                  30

Asn Ser Met Asn Val Ile His Glu Trp Lys Tyr Leu Asp Tyr Asp Phe
        35                  40                  45

Gly Ser Asp Glu Arg Arg Gln Ala Ala Met Gln Ser Gly Glu Tyr Asp
    50                  55                  60

His Thr Lys Asn Tyr Pro Phe Asp Val Asp Gln Trp Arg Gly Met Thr
65                  70                  75                  80

Phe Val Thr Val Pro Arg Tyr Lys Gly Val Pro Ser Ser Leu Asn Val
                85                  90                  95

Ile Ser Glu Lys Ile Gly Asn Gly Gly Arg Leu Leu Gln Pro Tyr Pro
            100                 105                 110

Asp Trp Ser Trp Ala Asn Tyr Lys Asp Cys Ser Gly Ile Val Ser Ala
        115                 120                 125

Tyr Lys Ile Ala Ile Asp Lys Phe Asp Arg Leu Trp Ile Leu Asp Ser
    130                 135                 140

Gly Ile Ile Asn Asn Thr Gln Pro Met Cys Ser Pro Lys Leu His Val
145                 150                 155                 160

Phe Asp Leu Asn Thr Ser His Gln Leu Lys Gln Val Val Met Pro His
                165                 170                 175

Asp Ile Ala Val Asn Ala Ser Thr Gly Asn Gly Gly Leu Val Ser Leu
            180                 185                 190

Val Val Gln Ala Met Asp Pro Val Asn Thr Ile Val Tyr Met Ala Asp
        195                 200                 205

Asp Lys Gly Asp Ala Leu Ile Val Tyr Gln Asn Ser Asp Glu Ser Phe
    210                 215                 220
```

His Arg Leu Thr Ser Asn Thr Phe Asp Tyr Asp Pro Lys Tyr Ile Lys
225 230 235 240

Met Met Asp Ala Gly Glu Ser Phe Thr Ala Gln Asp Gly Ile Phe Gly
245 250 255

Met Ala Leu Ser Pro Met Thr Asn Asn Leu Tyr Tyr Ser Pro Leu Ser
260 265 270

Ser Arg Ser Leu Tyr Tyr Val Asn Thr Lys Pro Phe Met Lys Ser Glu
275 280 285

Tyr Gly Ala Asn Asn Val Gln Tyr Gln Gly Val Gln Asp Ile Phe Asn
290 295 300

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

Gly Leu Met Asn Asn Ser Ala Ile Gly Cys Trp Asn Glu His Gln Pro
325 330 335

Leu Gln Arg Glu Asn Met Asp Met Val Ala Gln Asn Glu Glu Thr Leu
340 345 350

Gln Thr Val Val Ala Met Lys Met Met His Leu Pro Gln Ser Asn Lys
355 360 365

Met Asn Arg Met His Arg Met Asn Arg Val Asn Arg Val Asn Arg Met
370 375 380

Asp Arg Met Asp Arg Ile Asp Arg Met Asp Arg Met Asp Arg Met Asp
385 390 395 400

Thr Met Asp Thr Met Asp Arg Ile Asp Arg Met Asp Arg Met Asp Arg
405 410 415

Ile Asp Arg Ile Asp Arg Met His Thr Met Asp Thr Met Asp Thr Met
420 425 430

Asp Arg Thr Asp Lys Met Ser Ser Met Asp Arg Met Asp Arg Met Asp
435 440 445

Arg Val Asp Arg Met Asp Thr Met Asp Arg Thr Asp Lys Met Ser Ser
450 455 460

Met Asp Arg Met Asp Arg Met Asp Arg Val Asp Thr Met Asp Thr Met
465 470 475 480

Asp Thr Met Asp Arg Met Asp Arg Met Asp Arg Met Asp Arg Met Asp
485 490 495

Sequence listing 251 WO1_ST25

```
Arg Met Asp Arg Met Asp Thr Met Asp Arg Thr Asp Lys Met Ser Arg
            500                 505                 510

Ile Asp Arg Met Asp Lys Ile Asp Arg Met Asp Arg Met Asp Arg Thr
        515                 520                 525

Asn Arg Met Asp Arg Met Asn Arg Met Asn Arg Gln Met Asn Glu Tyr
    530                 535                 540

Met Met Ala Leu Ser Met Lys Leu Gln Lys Phe Ile Asn Asn Asp Tyr
545                 550                 555                 560

Asn Phe Asn Glu Val Asn Phe Arg Ile Leu Gly Ala Asn Val Asn Asp
                565                 570                 575

Leu Ile Met Asn Thr Arg Cys Ala Asn Ser Asp Asn Gln Asn Asn Asn
            580                 585                 590

Gln Asn Lys His Asn Asn
        595
```