

English translation of sequence listing as filed
Sequence Listing

<110> PEKING UNIVERSITY
<120> MG53 Mutants, Methods of Making the Same, and Uses Thereof
<130> 066467-8001WO01
<160> 154
<170> PatentIn version 3.5
<210> 1
<211> 477
<212> PRT
<213> Homo sapiens

<400> 1

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
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English translation of sequence listing as filed

195 200 205
 Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
 210 215 220
 Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
 225 230 235 240
 Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
 245 250 255
 Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
 260 265 270
 Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
 275 280 285
 Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
 290 295 300
 Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 305 310 315 320
 Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
 325 330 335
 His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
 340 345 350
 Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
 355 360 365
 Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380
 Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400
 Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
 405 410 415
 Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430
 Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
 435 440 445
 Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
 450 455 460
 Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala

465 English translation of sequence listing as filed
470 475

<210> 2
<211> 477
<212> PRT
<213> Mus musculus

<400> 2

Met Ser Ala Ala Pro Gly Leu Leu Arg Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Ala Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Thr Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala Gln Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Met Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Thr Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Met Phe Leu Ala Ala Leu Glu Ser Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Asp Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Ser Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

English translation of sequence listing as filed

Phe Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ser Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Lys Lys Met Phe Arg Ala Leu Met Pro Ala Leu
275 280 285

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
290 295 300

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Asp Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Thr Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
325 330 335

Gln Gln Leu Leu Ser Gln Gly Glu His Tyr Trp Glu Val Glu Val Gly
340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Met Ala Ala Asp Ala Ser Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

Leu Arg Asp Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Pro Pro Ala Arg Ile Gly Leu Tyr
405 410 415

Leu Ser Phe Ala Asp Gly Val Leu Ala Phe Tyr Asp Ala Ser Asn Pro
420 425 430

Asp Val Leu Thr Pro Ile Phe Ser Phe His Glu Arg Leu Pro Gly Pro
435 440 445

Val Tyr Pro Ile Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Glu Gln Glu Gln Ala
465 470 475

<210> 3
<211> 477
<212> PRT
<213> Rattus norvegicus
<400> 3

English translation of sequence listing as filed

Met Ser Thr Ala Pro Gly Leu Leu Arg Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Ala Cys Pro Cys Cys Gln Ala Ser Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Thr Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Ala Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Met Phe Leu Ala Ala Leu Glu Ser Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Ser Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Phe Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ser Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

English translation of sequence listing as filed

Lys Phe Gln Val Trp Lys Lys Met Phe Arg Ala Leu Met Pro Glu Leu
275 280 285

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
290 295 300

Ser Ala Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Thr Cys Gln Phe Asp Lys Thr Val Ala Val Val Ala
325 330 335

Lys Gln Leu Leu Ser Gln Gly Glu His Tyr Trp Glu Val Glu Val Gly
340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Met Ala Ala Asp Ala Ser Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

Leu Arg Asp Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Pro Pro Ala Arg Ile Gly Leu Tyr
405 410 415

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

Asp Ala Leu Thr Pro Leu Phe Ser Phe His Glu Arg Leu Pro Gly Pro
435 440 445

Val Tyr Pro Met Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ser
450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Asp Ser Glu Gln Ala
465 470 475

<210> 4
<211> 477
<212> PRT
<213> Macaca fascicularis

<400> 4

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

English translation of sequence listing as filed

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
275 280 285

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
290 295 300

English translation of sequence listing as filed
 Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 305 310 315 320

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
 325 330 335

His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Glu Val Gly
 340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Gly Pro Arg
 355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400

Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
 405 410 415

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430

Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Gly Pro
 435 440 445

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ser
 450 455 460

Gln Pro Leu Leu Leu Val Gly Ser Glu Gly Ala Glu Ala
 465 470 475

<210> 5
 <211> 478
 <212> PRT
 <213> Sus scrofa
 <400> 5

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
 1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
 20 25 30

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

Gly Thr Val Leu Cys Pro Ser Cys Gln Ala Pro Thr Arg Pro Gln Ala
 50 55 60

Leu Ser Thr Asn Gln Gln Leu Ala Arg Leu Val Glu Gly Leu Ala Gln
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65 English translation of sequence listing as filed 70 75 80

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Val Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Gly Val Leu Glu Gln Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Leu Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Lys Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Met
275 280 285

Gln Glu Leu Thr Phe Asp Pro Ser Thr Ala His Pro Ser Leu Val Leu
290 295 300

Ser Ala Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Thr
325 330 335

His Gln Leu Leu Ser Glu Gly Glu His Tyr Trp Glu Val Glu Val Gly
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English translation of sequence listing as filed
 340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Gly Ala Gln Ala Gly Arg
 355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Arg Pro Ser Arg Ile Gly Ile Tyr
 405 410 415

Leu Ser Phe Ala Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430

Asp Ala Leu Glu Leu Leu Phe Ala Phe His Glu Arg Leu Pro Gly Pro
 435 440 445

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
 450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Asp Ser Gly Gly Glu Ala
 465 470 475

<210> 6
 <211> 477
 <212> PRT
 <213> Canis lupus familiaris

<400> 6

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
 1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
 20 25 30

Phe Cys Arg Ala Cys Leu Ser Arg Val Ala Gly Glu Pro Ala Ala Asp
 35 40 45

Gly Thr Val Pro Cys Pro Cys Cys Gln Ala Leu Thr Arg Pro Gln Ala
 50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
 85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
 100 105 110

English translation of sequence listing as filed

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Leu Leu Glu His Gln Leu Met Glu
145 150 155 160

Val Glu Glu Met Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Val Thr
275 280 285

Lys Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Leu
290 295 300

Ser Pro Ser Gly Arg Arg Val Glu Cys Ser Asp Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Pro Cys Gln Phe Asp Lys Ala Val Ala Val Val Ala
325 330 335

Gln Gln Val Leu Ser Asp Gly Glu His Tyr Trp Glu Val Gln Val Gly
340 345 350

Glu Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Gln Ala Ser Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

English translation of sequence listing as filed

Leu Arg Asp Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Arg Pro Thr Arg Ile Gly Ile Tyr
405 410 415

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Pro
420 425 430

Asp Ala Leu Glu Leu Leu Phe Ala Phe His Glu Arg Leu Pro Gly Pro
435 440 445

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Asp Gly Glu Glu Ala
465 470 475

<210> 7
<211> 477
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of human MG53 S255A mutant

<400> 7

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

English translation of sequence listing as filed

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
275 280 285

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
290 295 300

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
325 330 335

His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

English translation of sequence listing as filed
 Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
 405 410 415

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430

Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
 435 440 445

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
 450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
 465 470 475

<210> 8
 <211> 477
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Amino acid sequence of mouse MG53 S255A mutant

<400> 8

Met Ser Ala Ala Pro Gly Leu Leu Arg Gln Glu Leu Ser Cys Pro Leu
 1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
 20 25 30

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

Gly Thr Val Ala Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
 50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
 85 90 95

Cys Glu Gln Asp Arg Thr Leu Val Cys Gly Val Cys Ala Ser Leu Gly
 100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala Gln Ala Arg
 115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Met Gln Leu Gln Glu Ala Cys
 130 135 140

Met Arg Lys Glu Lys Thr Val Ala Val Leu Glu His Gln Leu Val Glu
 145 150 155 160

English translation of sequence listing as filed

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Met Phe Leu Ala Ala Leu Glu Ser Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Asp Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Ser Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Phe Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ser Glu Ala Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Lys Lys Met Phe Arg Ala Leu Met Pro Ala Leu
275 280 285

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
290 295 300

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Asp Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Thr Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
325 330 335

Gln Gln Leu Leu Ser Gln Gly Glu His Tyr Trp Glu Val Glu Val Gly
340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Met Ala Ala Asp Ala Ser Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

Leu Arg Asp Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Pro Pro Ala Arg Ile Gly Leu Tyr
405 410 415

Leu Ser Phe Ala Asp Gly Val Leu Ala Phe Tyr Asp Ala Ser Asn Pro
420 425 430

English translation of sequence listing as filed

Asp Val Leu Thr Pro Ile Phe Ser Phe His Glu Arg Leu Pro Gly Pro
435 440 445

Val Tyr Pro Ile Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Glu Gln Glu Gln Ala
465 470 475

<210> 9

<211> 477

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of rat MG53 S255A mutant

<400> 9

Met Ser Thr Ala Pro Gly Leu Leu Arg Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Ala Cys Pro Cys Cys Gln Ala Ser Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Thr Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Ala Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

English translation of sequence listing as filed

Gly Lys Met Arg Met Phe Leu Ala Leu Glu Ser Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Ser Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Phe Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ser Glu Ala Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Lys Lys Met Phe Arg Ala Leu Met Pro Glu Leu
275 280 285

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
290 295 300

Ser Ala Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Thr Cys Gln Phe Asp Lys Thr Val Ala Val Val Ala
325 330 335

Lys Gln Leu Leu Ser Gln Gly Glu His Tyr Trp Glu Val Glu Val Gly
340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Met Ala Ala Asp Ala Ser Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

Leu Arg Asp Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Pro Pro Ala Arg Ile Gly Leu Tyr
405 410 415

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

Asp Ala Leu Thr Pro Leu Phe Ser Phe His Glu Arg Leu Pro Gly Pro
435 440 445

English translation of sequence listing as filed
Val Tyr Pro Met Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ser
450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Asp Ser Glu Gln Ala
465 470 475

<210> 10
<211> 477
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of monkey MG53 S255A mutant
<400> 10

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

English translation of sequence listing as filed

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
 210 215 220
 Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
 225 230 235 240
 Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
 245 250 255
 Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
 260 265 270
 Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
 275 280 285
 Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
 290 295 300
 Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 305 310 315 320
 Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
 325 330 335
 His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Glu Val Gly
 340 345 350
 Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Gly Pro Arg
 355 360 365
 Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380
 Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400
 Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
 405 410 415
 Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430
 Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Gly Pro
 435 440 445
 Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ser
 450 455 460
 Gln Pro Leu Leu Leu Val Gly Ser Glu Gly Ala Glu Ala
 465 470 475

English translation of sequence listing as filed

<210> 11
 <211> 478
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Amino acid sequence of swine MG53 S255A mutant
 <400> 11

Met	Ser	Ala	Ala	Pro	Gly	Leu	Leu	His	Gln	Glu	Leu	Ser	Cys	Pro	Leu
1				5					10					15	
Cys	Leu	Gln	Leu	Phe	Asp	Ala	Pro	Val	Thr	Ala	Glu	Cys	Gly	His	Ser
		20						25					30		
Phe	Cys	Arg	Ala	Cys	Leu	Gly	Arg	Val	Ala	Gly	Glu	Pro	Ala	Ala	Asp
		35					40					45			
Gly	Thr	Val	Leu	Cys	Pro	Ser	Cys	Gln	Ala	Pro	Thr	Arg	Pro	Gln	Ala
	50					55					60				
Leu	Ser	Thr	Asn	Gln	Gln	Leu	Ala	Arg	Leu	Val	Glu	Gly	Leu	Ala	Gln
65				70						75					80
Val	Pro	Gln	Gly	His	Cys	Glu	Glu	His	Leu	Asp	Pro	Leu	Ser	Ile	Tyr
				85					90					95	
Cys	Glu	Gln	Asp	Arg	Val	Leu	Val	Cys	Gly	Val	Cys	Ala	Ser	Leu	Gly
			100					105					110		
Ser	His	Arg	Gly	His	Arg	Leu	Leu	Pro	Ala	Ala	Glu	Ala	His	Ala	Arg
		115					120					125			
Leu	Lys	Thr	Gln	Leu	Pro	Gln	Gln	Lys	Leu	Gln	Leu	Gln	Glu	Ala	Cys
	130					135					140				
Met	Arg	Lys	Glu	Lys	Ser	Val	Gly	Val	Leu	Glu	Gln	Gln	Leu	Val	Glu
145					150					155					160
Val	Glu	Glu	Thr	Val	Arg	Gln	Phe	Arg	Gly	Ala	Val	Gly	Glu	Gln	Leu
				165					170					175	
Gly	Lys	Met	Arg	Leu	Phe	Leu	Ala	Ala	Leu	Glu	Gly	Ser	Leu	Asp	Arg
			180					185					190		
Glu	Ala	Glu	Arg	Val	Arg	Gly	Glu	Ala	Gly	Val	Ala	Leu	Arg	Arg	Glu
		195					200					205			
Leu	Gly	Ser	Leu	Lys	Ser	Tyr	Leu	Glu	Gln	Leu	Arg	Gln	Met	Glu	Lys
	210					215					220				

English translation of sequence listing as filed
 Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
 225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
 245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
 260 265 270

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Met
 275 280 285

Gln Glu Leu Thr Phe Asp Pro Ser Thr Ala His Pro Ser Leu Val Leu
 290 295 300

Ser Ala Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 305 310 315 320

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Thr
 325 330 335

His Gln Leu Leu Ser Glu Gly Glu His Tyr Trp Glu Val Glu Val Gly
 340 345 350

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Gly Ala Gln Ala Gly Arg
 355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Arg Pro Ser Arg Ile Gly Ile Tyr
 405 410 415

Leu Ser Phe Ala Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430

Asp Ala Leu Glu Leu Leu Phe Ala Phe His Glu Arg Leu Pro Gly Pro
 435 440 445

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
 450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Asp Ser Gly Gly Glu Ala
 465 470 475

<210> 12
 <211> 477
 <212> PRT
 <213> Artificial Sequence

English translation of sequence listing as filed

<220>

<223> Amino acid sequence of dog MG53 S255A mutant

<400> 12

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

Phe Cys Arg Ala Cys Leu Ser Arg Val Ala Gly Glu Pro Ala Ala Asp
35 40 45

Gly Thr Val Pro Cys Pro Cys Cys Gln Ala Leu Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Leu Leu Glu His Gln Leu Met Glu
145 150 155 160

Val Glu Glu Met Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
245 250 255

English translation of sequence listing as filed

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Val Ile Ser Asp Asp Phe
260 265 270

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Val Thr
275 280 285

Lys Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Leu
290 295 300

Ser Pro Ser Gly Arg Arg Val Glu Cys Ser Asp Gln Lys Ala Pro Pro
305 310 315 320

Ala Gly Glu Asp Pro Cys Gln Phe Asp Lys Ala Val Ala Val Val Ala
325 330 335

Gln Gln Val Leu Ser Asp Gly Glu His Tyr Trp Glu Val Gln Val Gly
340 345 350

Glu Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Gln Ala Ser Arg
355 360 365

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
370 375 380

Leu Arg Asp Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
385 390 395 400

Arg Ala Leu Arg Thr Pro Glu Arg Arg Pro Thr Arg Ile Gly Ile Tyr
405 410 415

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Pro
420 425 430

Asp Ala Leu Glu Leu Leu Phe Ala Phe His Glu Arg Leu Pro Gly Pro
435 440 445

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
450 455 460

Gln Pro Leu Leu Leu Val Gly Pro Asp Gly Glu Glu Ala
465 470 475

<210> 13
<211> 1434
<212> DNA
<213> Artificial sequence

<220>
<223> Encoding sequence of human MG53 S255A mutant

<400> 13
atgtcggctg cgcccgccct cctgcaccag gagctgtcct gcccgctgtg cctgcagctg
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English translation of sequence listing as filed

ttcgacgcgc ccgtagacagc cgagtgcggc cacagtttct gccgcgcctg cctagggcgc	120
gtggccgggg agccggcggc ggatggcacc gttctctgcc cctgctgcca ggccccacg	180
cggccgcagg cactcagcac caacctgcag ctggcgcgcc tgggtggaggg gctggcccag	240
gtgccgcagg gccactgcga ggagcacctg gacccgctga gcatctactg cgagcaggac	300
cgcgcgctgg tgtgaggagt gtgcgcctca ctgggctcgc accgcggtca tcgcctcctg	360
cctgccgccg agggccacgc acgcctcaag acacagctgc cacagcagaa actgcagctg	420
caggaggcat gcatgcgcaa ggagaagagt gtggctgtgc tggagcatca gctggtggag	480
gtggaggaga cagtgcgtca gttccggggg gccgtggggg agcagctggg caagatgcgg	540
gtgttcctgg ctgactgga gggctccttg gaccgcgagg cagagcgtgt acggggtgag	600
gcaggggtcg ccttgcgccg ggagctgggg agcctgaact cttacctgga gcagctgcgg	660
cagatggaga aggtcctgga ggaggtggcg gacaagccgc agactgagtt cctcatgaaa	720
tactgcctgg tgaccagcag gctgcagaag atcctggcag aggtccccc acccgccgt	780
ctggacatcc agctgccaat tatctcagat gacttcaaat tccaggtgtg gaggaagatg	840
ttccgggctc tgatgccagc gctggaggag ctgacctttg acccgagctc tgcgcacccg	900
agcctggtgg tgtcttcctc tggccgccgc gtggagtgtc cggagcagaa ggcgccgccg	960
gccggggagg acccgcgcca gttcgacaag gcggtggcgg tgggtggcgca ccagcagctc	1020
tccgagggcg agcactactg ggaggtggat gttggcgaca agccgcgctg ggcgctgggc	1080
gtgatcgcg ccgaggcccc ccgcccggg cgctgcacg cgggtgccctc gcagggcctg	1140
tggctgctgg ggctgcgca gggcaagatc ctggaggcac acgtggaggc caaggagccg	1200
cgcgctctgc gcagccccga gaggcggccc acgcgcattg gcctttacct gagcttcggc	1260
gacggcgtcc tctccttcta cgatgccagc gacgccgacg cgctcgtgcc gctttttgcc	1320
ttccacgagc gcctgcccag gcccggtgtac cccttcttcg acgtgtgctg gcacgacaag	1380
ggcaagaatg cccagccgct gctgctcgtg ggtcccgaag gcgccgaggc ctga	1434

<210> 14

<211> 1434

<212> DNA

<213> Artificial Sequence

<220>

<223> Encoding sequence of mouse MG53 S255A mutant

<400> 14

atgtcggctg caccggcct tctgcgtcag gaactgtcct gccactgtg cttgcagctg	60
ttcgatgcgc cagtgcggc tgagtgtggc cacagtttct gccgtgcctg cctgatccgg	120
gtggcagggg agcctgctgc ggacggcaca gttgcctgtc cctgttgtca ggcacctaca	180
cggccgcagg ctctaagcac taacctccag ttgtcacgcc ttgtggaggg tttggcgcaa	240
gtgcccgaag gccactgcga ggaacacctg gatccactga gcatctactg cgagcaggac	300
cgcacacttg tgtgtggtgt gtgtgcctcg ctcggttctc accgtggtca tcgtctcctg	360

English translation of sequence listing as filed

cctgccgctg aagcccaagc acgcctcaag acacagcttc cacagcagaa gatgcagctg	420
caggaggcat gcatgcgcaa ggagaagact gtagcggtagc tggagcatca gctggtggag	480
gtggaggaga cagtgcgcca gttccgggga gctgtcgggg agcagctggg gaagatgcgg	540
atgttcctgg ctgccctaga aagttctctg gaccgtgaag cagaaagggg tcggggtgat	600
gctgggggtt ccttgcgtagc ggagctgtca agcctgaact cttacctaga gcaactgagg	660
cagatggaga aggtgctgga ggaggtggct gacaagccac agacagaatt cctcatgaaa	720
ttctgcctgg taaccagcag gctgcagaag atcctgtcag aggcaccacc accggcaagg	780
ctagatatcc agctgcctgt catctcagat gacttcaaat tccaggtgtg gaagaagatg	840
ttccgggctc tgatgccagc gctggaggaa ctgacttttg accccagctc tgcgcacccg	900
agcctggtgg tgtcctcctc tggtcgccga gtggagtgtc cagaccagaa ggcgccgcca	960
gcggggagaag acacgcgtca gttcgacaag gcagtagcgg tgggtggcgca gcagctgctg	1020
tcacagggcg agcactattg ggaggtggag gtgggcgaca aaccacgctg ggccctggga	1080
gtgatggcgg ctgacgcttc ccgccgtggc cggctgcacg cgggtgccctc acaggggctg	1140
tggctgctgg gtctgcgca tggcaagatc ctggaggcgc acgtggaggc caaggagccg	1200
cgggcactgc gcaccccaga gaggcctccg gcgcgcattg gcctctacct aagcttcgca	1260
gatggcgtcc tggctttcta tgatgcgagc aaccccgacg tacttacgcc aatcttttct	1320
ttccacgagc gtctgcccgg gccggtgtac cccatctttg acgtgtgctg gcacgacaag	1380
ggcaagaatg cccagcccct gctgcttgtg gggccggagc aggaacaggc ctga	1434

<210> 15

<211> 1434

<212> DNA

<213> Artificial Sequence

<220>

<223> Encoding sequence of rat MG53 S255A mutant

<400> 15

atgtcgactg caccaggcct tttgcgccag gaactgtctt gcccgtgtg cttgcagctg	60
ttcgatgcac cagtgaccgc tgagtgtggc cacagtttct gccgtgcctg cctgatccgt	120
gtggcagggg agcctgccga cgatggcacg gttgcctgtc cctgtttgtca ggcattctact	180
cggccacagg cgctaagcac taacctccag ttggcacgcc ttgtggaggg tttggcacia	240
gtgccccaaag gccactgcga ggaacacctg gatccactga gcatctactg cgagcaggac	300
cgcacacttg tgtgtggtgt gtgtgcctct ctcggttcac accgtggtca ccgtcttctg	360
cctgccgcag aagcccatgc acgtctcaag acacagcttc cacaacagaa ggcccagctg	420
caggaggcat gcatgcgcaa ggagaagagt gtagcagtc tggagcatca gctggtggag	480
gtggaggaga ccgtgcgtca gttccgggga gctgttgggg agcagctggg gaagatgcgg	540
atgttcctgg ctgccctaga aagttctttg gaccgtgaag cagaaagggg tcgaggtgag	600
gcagggggtt ccttgcgtagc ggagctgtca agcctgaact cttacctgga gcaactgagg	660

English translation of sequence listing as filed

cagatggaga aggtgctgga ggaggtggct gacaagccac agacagaatt cctcatgaaa	720
ttctgcctgg tgaccagcag gctgcagaag attctgtcag aggcaccacc cccagcaagg	780
ctagatatcc agctgcctgt catctcagat gacttcaaat tccaggtgtg gaagaagatg	840
ttccgggctc tgatgccaga gttggaggaa ctgacttttg accccagctc tgcgcacccg	900
agcctggttg tgtccgcctc tggtcgccga gtggagtgtc cggagcagaa ggcgccgcca	960
gcaggagaag acacgtgcc a gttcgacaag acggtagcgg tagtggcgaa gcagctgctg	1020
tcacaggggg agcactactg ggaggtggag gtgggcgaca agccacgctg ggccctgggt	1080
gtgatggcgg ctgacgttc ccgtcgtggc cgcctgcacg cggtgccctc acaggggctg	1140
tggttgctcg gcctgcgcga tggcaagatc ctggaggcac acgtggaggc caaggagcca	1200
cgggcactgc gcacccaga gaggccacca gcgcgcattg gcctctacct aagctttgca	1260
gatggcgtcc tgactttcta tgatgcaagc aacaccgacg cgcttacacc gctcttttct	1320
tttcatgagc gtctgcctgg gccggtgtac cccatgtttg acgtgtgctg gcacgacaag	1380
ggcaagaatt ctacgccgt gttgctcgtg gggccagaca gtgagcaggc ctga	1434

<210> 16
 <211> 1434
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Encoding sequence of monkey MG53 S255A mutant

<400> 16	
atgtcggctg cgccgggcct cctgcaccag gagctgtcct gcccgtgtg cctgcagctg	60
ttcgacgcgc ccgtgacagc cgagtgcggc cacagtttct gtcgcgcctg cctggggccgc	120
gtggccgggg aaccggcggc ggatggcacc gttctctgcc cctgctgtca ggccccacg	180
cggccgcagg cactcagcac caacctgcag ctggcgcgcc tgggtggagg gctggcccag	240
gtgccgcagg gccactgcga ggagcacctg gaccgcgtga gcattctactg tgagcaggac	300
cgcgcgctgg tgtgcggagt gtgcgcctca ctcggtcgc accgcggtca tcgcctgctg	360
cccgccgccg agggccacgc acgcctcaag acgcagctgc cacagcagaa actgcagctg	420
caggaggcat gcatgcgcaa ggagaagagt gtagctgtgc tggagcatca gttggtggaa	480
gtggaggaga cagtgcgtca gttccggggg gccgtggggg agcagctggg caagatgcgg	540
gtgttcctgg ctgactgga gggctccttg gaccgtgagg cagagcgtgt gcggggtgag	600
gcaggggtcg ctttgcgccg ggagctgggg agcctgaact cttacctgga gcagctgcgg	660
cagatggaga aggtgctgga ggaggtggcc gacaagccgc agactgagtt cctaataaaa	720
tactgcctgg tgaccagcag gctgcagaag atcctggcag aggtccccc acccgcccgt	780
ctggacatcc agctgccaat catctcagat gacttcaaat tccaggtgtg gaggaagatg	840
ttccgggctc tgatgccagc gctggaggag ctgacctttg acccgagctc tgcgcacccc	900
agcctggttg tgtcttcctc cggccgccgc gtggagtgtc cggagcagaa ggcgccgccg	960

English translation of sequence listing as filed

gcgggggagg acccgcgcca gttcgacaag gcggtagcgg tgggtggcgca ccagcagctc	1020
tccgagggcg aacactactg ggaggtggag gtgggcgaca agccgcgctg ggcgctgggt	1080
gtgatcgcg cagaggggcc ccgtcgcggg cgcctgcacg cggtgccctc gcagggcctg	1140
tggctgctgg ggctgcgtga gggcaagatc ctggaggctc acgtggaggc caaggagccg	1200
cgcgctctgc gcagccccga gcggcgggcc acgcgcatcg gcctctacct gagcttcggc	1260
gacggcgctc tctccttcta cgatgccagc gacgccgacg cgctcgtgcc gctttttgcc	1320
ttccacgagc gcctgcctgg gcccgtgtac cccttcttcg acgtgtgctg gcacgacaag	1380
ggcaagaact cccagccgct gctgctcgtg gggtcggaag gcgccgaagc ctga	1434

<210> 17

<211> 1437

<212> DNA

<213> Artificial Sequence

<220>

<223> Encoding sequence of swine MG53 S255A mutant

<400> 17

atgtcagctg cgccccgcct cctgcaccag gagctgtcct gtccgctgtg cctgcagctg	60
ttcgatgctg cggtgacggc tgagtgcggc cacagcttct gccgcgcctg cctgggcccgc	120
gtggcagggg agccagccgc ggatggcacg gtgctctgcc ccagctgcca ggcacccacg	180
cggccgcagg cgctcagcac caaccagcag ctggcgcgcc tgggtggagg gctggcgtag	240
gtgccgcagg gccactgcga ggagcaccta gaccgctca gcatctactg cgagcaggac	300
cgctgtctcg tgtgcggcgt ctgcgcctcg ctgggttcgc accgcggcca ccgcctgctg	360
cccgcgcgag aagcccatgc gcgccttaag acgcagctcc cgagcagaaa gctgcagctg	420
caggaggcgt gtatgcggaa ggagaagagc gtgggtgtgc tggagcaaca actggtggaa	480
gtggaggaga cggtgcgtca gttccggggg gcagtggggg agcagctggg caagatgcgg	540
ttgttcctgg ctgcactgga gggctccttg gaccgagaag cagagcgtgt gcgggggtgag	600
gcgggggtcg ccttgcggag ggagctgggg agcctgaagt cttacttgga gcagctgcgg	660
cagatggaga aggtgctgga ggaggtggca gacaagcccc agaccgagtt cctcatgaaa	720
tactgcctgg tgaccagcag gctgcagaag atcctggcag aggcgcccc acctgcccgc	780
ctggacattc agctgcctgt catctcagac gacttcaaat tccaggtgtg gagaaagatg	840
ttccggggccc tgatgccagc gatgcaggag ctgacctttg accccagcac ggcccacccg	900
agcctggtgc tgtcggcctc gggccgcccgc gtggagtgtc cggagcagaa ggcgccgccg	960
gccggagagg acccgcgcca gttcgacaag gcggtggcg tggtagcgca ccagctgctg	1020
tcggaaggcg agcactactg ggaggtggag gtgggcgaca agccacgctg ggcgctgggc	1080
gtgatcgggg cccaggccgg tcgccgcggc cggctgcacg ccgtgccctc gcagggcctc	1140
tggctgctcg ggctgcgcga gggcaagatc ctggaggctc acgtcgaggc caaggagccg	1200
cgcgccctgc gcacccccga gaggcgggcg tcgcgcatcg ggatctacct gagcttcgag	1260

English translation of sequence listing as filed

gatggcgtcc tctcgttcta cgacgccagc gacgccgacg cgctggagct gctcttcgcc	1320
ttccacgaac gcctgccggg ccccggtgtac cccttcttcg acgtgtgctg gcacgacaag	1380
ggcaagaacg ctacagccgct cctgctggtg gggcccgaca gcggcgggga ggcctga	1437

<210> 18
 <211> 1434
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Encoding sequence of dog MG53 S255A mutant

<400> 18	
atgtcggccg cgccgggcct cctgcaccag gagctgtcct gcccgccttg cctgcagctg	60
tttgacgcgc cggtgaccgc cgagtgcggc cacagtttct gccgcgcctg cctgagccgc	120
gtggctgggg agccggcggc ggacggcacc gtgccctgcc cgtgctgcca ggcactcacg	180
cggccacagg cgctcagcac caaccagcag ctggcgcgcc tgggtggaggg gctggcgagc	240
gtgccgcagg gccactgcga ggagcaccta gaccgcctca gcatctactg cgagcaggat	300
cgagcgctcg tgtgcggcgt gtgcgcctcg ctcggtctcg acccgggcca ccgcctgctg	360
cccgccgccg aagcccacgc gcgcctcaag acacagctgc cacagcagaa actgcagctg	420
caggaggcat gtatgcgcaa ggagaagagt gtggctctgc tggagcatca gctcatggaa	480
gtggaggaga tgggtgcgtca gttccggggg gctgtagggg agcagctggg caagatgcgg	540
gtgttcctgg ctgcactgga gggctccttg gaccgtgagg cagagcgcggt gcggggagag	600
gcagggggtg ccctgcggcg ggagctgggg agcctgaact cttacctgga gcagttgcgt	660
cagatggaga aggtgctgga ggaggtggcc gacaagccac agactgagtt cctcatgaaa	720
tactgcctgg tgaccagcag gctacagaag atcctggcag aagcaccacc gcctgcccgt	780
ttggacatcc agctgcctgt catctcagat gacttcaaat tccaggtgtg gaggaagatg	840
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gccggggagg atccgtgcca gttcgacaag gccgtggcgg tgggtggcgca gcaggtgctg	1020
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cgcgcgctgc gcaccccga gaggcggccc acgcgcatcg ggatctacct aagcttcggc	1260
gacggagtcc tctcctttta tgatgccagt gaccccgacg ccctcgagct gctctttgcc	1320
ttccacgagc gcctgcccgg gcccggtgtac cccttcttcg acgtatgctg gcacgacaag	1380
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<210> 19
 <211> 1434

English translation of sequence listing as filed

<212> DNA
<213> Homo sapiens

<400> 19
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cagatggaga aggtcctgga ggaggtggcg gacaagccgc agactgagtt cctcatgaaa 720
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ggcaagaatg cccagccgct gctgctcgtg ggtcccgaag gcgccgaggc ctga 1434

<210> 20
<211> 1434
<212> DNA
<213> Mus musculus

<400> 20
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gtggcagggg agcctgctgc ggacggcaca gttgcctgtc cctgttgtca ggcacctaca 180
cggccgcagg ctctaagcac taacctccag ttgtcacgcc ttgtggaggg tttggcgcaa 240
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English translation of sequence listing as filed

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ttctgcctgg	taaccagcag	gctgcagaag	atcctgtcag	agtcaccacc	accggcaagg	780
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gcgggagaag	acacgcgtca	gttcgacaag	gcagtagcgg	tgggtggcgca	gcagctgctg	1020
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cgggcactgc	gcaccccaga	gaggcctccg	gcgcgcattg	gcctctacct	aagcttcgca	1260
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ttccacgagc	gtctgcccgg	gccggtgtac	cccatctttg	acgtgtgctg	gcacgacaag	1380
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<210> 21
 <211> 1434
 <212> DNA
 <213> Rattus norvegicus

<400> 21						
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gtgcccgaag	gccactgcga	ggaacacctg	gatccactga	gcatctactg	cgagcaggac	300
cgcacacttg	tgtgtggtgt	gtgtgcctct	ctcggttcac	accgtggtca	ccgtcttctg	360
cctgccgcag	aagcccatgc	acgtctcaag	acacagcttc	cacaacagaa	ggcccagctg	420
caggaggcat	gcatgcgcaa	ggagaagagt	gtagcagtc	tggagcatca	gctggtggag	480
gtggaggaga	ccgtgcgtca	gttccgggga	gctgttgggg	agcagctggg	gaagatgcgg	540
atgttcctgg	ctgccctaga	aagttctttg	gaccgtgaag	cagaaagggg	tcgaggtgag	600
gcaggggttg	ccttgcggcg	ggagctgtca	agcctgaact	cttacctgga	gcaactgagg	660

English translation of sequence listing as filed

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ctagatatcc agctgcctgt catctcagat gacttcaaat tccaggtgtg gaagaagatg	840
ttccgggctc tgatgccaga gttggaggaa ctgacttttg accccagctc tgcgcacccg	900
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gcaggagaag acacgtgcc a gttcgacaag acggtagcgg tagtggcgaa gcagctgctg	1020
tcacaggggg agcactactg ggaggtggag gtgggcgaca agccacgctg ggcctgggt	1080
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gatggcgtcc tgactttcta tgatgcaagc aacaccgacg cgcttacacc gctcttttct	1320
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<210> 22

<211> 1434

<212> DNA

<213> Macaca fascicularis

<400> 22

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English translation of sequence listing as filed

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ggcaagaact	cccagccgct	gctgctcgtg	gggtccgaag	gcgccgaagc	ctga	1434

<210> 23
 <211> 1437
 <212> DNA
 <213> Sus scrofa

<400> 23						
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English translation of sequence listing as filed

<210> 24
 <211> 1434
 <212> DNA
 <213> *Canis lupus familiaris*

<400> 24
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 gtgccgcagg gccactgcga ggagcaccta gacccgctca gcattctactg cgagcaggat 300
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<210> 25
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of human MG53 S255A mutant

<400> 25
 tgcagaagat cctggcagag gctccccac ccg 33

English translation of sequence listing as filed

<210> 26
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of human MG53 S255A mutant

 <400> 26
 tccagacggg cgggtggggg agcctctgcc agg 33

 <210> 27
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of human MG53 S255G mutant

 <400> 27
 tgcagaagat cctggcagag ggtccccac ccg 33

 <210> 28
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of human MG53 S255G mutant

 <400> 28
 tccagacggg cgggtggggg accctctgcc agg 33

 <210> 29
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of human MG53 S255L mutant

 <400> 29
 tgcagaagat cctggcagag cttccccac ccg 33

 <210> 30
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of human MG53 S255L mutant

 <400> 30
 tccagacggg cgggtggggg aagctctgcc agg 33

 <210> 31
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of human MG53 S255V mutant

English translation of sequence listing as filed

<400> 31
tgcaagaat cctggcagag gttccccac ccg 33

<210> 32
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of human MG53 S255V mutant

<400> 32
tccagacggg cgggtggggg aacctctgcc agg 33

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

<220>
<223> Forward primer of human MG53 S255P mutant

<400> 33
tgcaagaat cctggcagag cttccccac ccg 33

<210> 34
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of human MG53 S255P mutant

<400> 34
tccagacggg cgggtggggg aggctctgcc agg 33

<210> 35
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of human MG53 S255F mutant

<400> 35
tgcaagaat cctggcagag tttccccac ccg 33

<210> 36
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of human MG53 S255F mutant

<400> 36
tccagacggg cgggtggggg aaactctgcc agg 33

<210> 37
<211> 33
<212> DNA
<213> Artificial Sequence

English translation of sequence listing as filed

<220>
 <223> Forward primer of human MG53 S255W mutant
 <400> 37
 tgcagaagat cctggcagag tggcccccac ccg 33

<210> 38
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of human MG53 S255W mutant
 <400> 38
 tccagacggg cgggtggggg ccactctgcc agg 33

<210> 39
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of human MG53 S255Q mutant
 <400> 39
 tgcagaagat cctggcagag caacccccac ccg 33

<210> 40
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of human MG53 S255Q mutant
 <400> 40
 tccagacggg cgggtggggg ttgctctgcc agg 33

<210> 41
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of human MG53 S255C mutant
 <400> 41
 tgcagaagat cctggcagag tgtcccccac ccg 33

<210> 42
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of human MG53 S255C mutant
 <400> 42
 tccagacggg cgggtggggg acactctgcc agg 33

English translation of sequence listing as filed

<210> 43
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of human MG53 S255Y mutant

 <400> 43
 tgcagaagat cctggcagag tatccccac ccg 33

 <210> 44
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of human MG53 S255Y mutant

 <400> 44
 tccagacggg cgggtggggg atactctgcc agg 33

 <210> 45
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of human MG53 S255D mutant

 <400> 45
 tgcagaagat cctggcagag gatccccac ccg 33

 <210> 46
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of human MG53 S255D mutant

 <400> 46
 tccagacggg cgggtggggg ctactctgcc agg 33

 <210> 47
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of human MG53 S255R mutant

 <400> 47
 tgcagaagat cctggcagag cgtccccac ccg 33

 <210> 48
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of human MG53 S255R mutant

English translation of sequence listing as filed

<400> 48
tccagacggg cgggtggggg acgctctgcc agg 33

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

<220>
<223> Forward primer of human MG53 S211A mutant

<400> 49
ccttgcgccg ggagctgggg gccctgaact ctt 33

<210> 50
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of human MG53 S211A mutant

<400> 50
gctgctccag gtaagagttc agggccccc gctcc 35

<210> 51
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of human MG53 S214A mutant

<400> 51
gggagctggg gagcctgaac gcttacctgg agc 33

<210> 52
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of human MG53 S214A mutant

<400> 52
tgccgcagct gctccaggta agcggtcagg ctc 33

<210> 53
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of human MG53 S246A mutant

<400> 53
tgaaatactg cctgggtgacc gccaggctgc aga 33

<210> 54
<211> 33
<212> DNA
<213> Artificial Sequence

English translation of sequence listing as filed

<220>
 <223> Reverse primer of human MG53 S246A mutant
 <400> 54
 gccaggatct tctgcagcct ggcggtcacc agg 33

<210> 55
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of human MG53 S269A mutant
 <400> 55
 aggagctgac ctttgaccg gcctctgcgc acc 33

<210> 56
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of human MG53 S296A mutant
 <400> 56
 accaggctcg ggtgcgaga ggccgggtca aag 33

<210> 57
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of human MG53 S297A mutant
 <400> 57
 agctgacctt tgacccgagc gctgcgacc cga 33

<210> 58
 <211> 33
 <212> DNA
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<220>
 <223> Reverse primer of human MG53 S297A mutant
 <400> 58
 accaccaggc tcgggtgcgc agcgctcggg tca 33

<210> 59
 <211> 33
 <212> DNA
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<220>
 <223> Forward primer of mouse MG53 S255A mutant
 <400> 59
 tgcagaagat cctgtcagag gcaccaccac cg 33

English translation of sequence listing as filed

<210> 60
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of mouse MG53 S255A mutant

 <400> 60
 tctagccttg ccggtggtgg tgcctctgac agg 33

 <210> 61
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of mouse MG53 S255G mutant

 <400> 61
 tgcagaagat cctgtcagag ggaccaccac cgg 33

 <210> 62
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of mouse MG53 S255G mutant

 <400> 62
 tctagccttg ccggtggtgg tccctctgac agg 33

 <210> 63
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of mouse MG53 S255L mutant

 <400> 63
 tgcagaagat cctgtcagag ttaccaccac cgg 33

 <210> 64
 <211> 33
 <212> DNA
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 <220>
 <223> Reverse primer of mouse MG53 S255L mutant

 <400> 64
 tctagccttg ccggtggtgg taactctgac agg 33

 <210> 65
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of mouse MG53 S255W mutant

English translation of sequence listing as filed

<400> 65
tgcaagaat cctgtcagag tggccaccac cgg 33

<210> 66
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of mouse MG53 S255W mutant

<400> 66
tctagccttg ccggtggtgg ccactctgac agg 33

<210> 67
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of mouse MG53 S255Q mutant

<400> 67
tgcaagaat cctgtcagag caaccaccac cgg 33

<210> 68
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of mouse MG53 S255Q mutant

<400> 68
tctagccttg ccggtggtgg ttgctctgac agg 33

<210> 69
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of mouse MG53 S255Y mutant

<400> 69
tgcaagaat cctgtcagag tatccaccac cgg 33

<210> 70
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of mouse MG53 S255Y mutant

<400> 70
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<210> 71
<211> 33
<212> DNA
<213> Artificial Sequence

English translation of sequence listing as filed

<220>
<223> Forward primer of mouse MG53 S255D mutant

<400> 71
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<210> 72
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of mouse MG53 S255D mutant

<400> 72
tctagccttg ccggtggtgg atcctctgac agg 33

<210> 73
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of mouse MG53 S255R mutant

<400> 73
tgcagaagat cctgtcagag cgaccaccac cgg 33

<210> 74
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of mouse MG53 S255R mutant

<400> 74
tctagccttg ccggtggtgg tcgctctgac agg 33

<210> 75
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of rat MG53 S255A mutant

<400> 75
tgcagaagat tctgtcagag gcaccacccc cag 33

<210> 76
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of rat MG53 S255A mutant

<400> 76
tctagccttg ctgggggtgg tgcctctgac aga 33

English translation of sequence listing as filed

<210> 77
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of rat MG53 S255G mutant

 <400> 77
 tgcagaagat tctgtcagag ggaccacccc cag 33

 <210> 78
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of rat MG53 S255G mutant

 <400> 78
 tctagccttg ctgggggtgg tccctctgac aga 33

 <210> 79
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of rat MG53 S255L mutant

 <400> 79
 tgcagaagat tctgtcagag ttaccacccc cag 33

 <210> 80
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of rat MG53 S255L mutant

 <400> 80
 tctagccttg ctgggggtgg taactctgac aga 33

 <210> 81
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of rat MG53 S255W mutant

 <400> 81
 tgcagaagat tctgtcagag tggccacccc cag 33

 <210> 82
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of rat MG53 S255W mutant

English translation of sequence listing as filed

<400> 82
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<210> 83
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of rat MG53 S255Q mutant

<400> 83
tgcaagaat tctgtcagag caaccacccc cag 33

<210> 84
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of rat MG53 S255Q mutant

<400> 84
tctagccttg ctgggggtgg ttgctctgac aga 33

<210> 85
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of rat MG53 S255Y mutant

<400> 85
tgcaagaat tctgtcagag tatccacccc cag 33

<210> 86
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of rat MG53 S255Y mutant

<400> 86
tctagccttg ctgggggtgg atactctgac aga 33

<210> 87
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of rat MG53 S255D mutant

<400> 87
tgcaagaat tctgtcagag gatccacccc cag 33

<210> 88
<211> 33
<212> DNA
<213> Artificial Sequence

English translation of sequence listing as filed

<220>
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 <400> 88
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<210> 89
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of rat MG53 S255R mutant
 <400> 89
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<210> 90
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of rat MG53 S255R mutant
 <400> 90
 tctagccttg ctgggggtgg tcgctctgac aga 33

<210> 91
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of monkey MG53 S255A mutant
 <400> 91
 aagatccttg cagaggctcc cccacccgcc cgtctg 36

<210> 92
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of monkey MG53 S255A mutant
 <400> 92
 cagacgggcg ggtgggggag cctctgccag gatctt 36

<210> 93
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of monkey MG53 S255G mutant
 <400> 93
 aagatccttg cagagggtcc cccacccgcc cgtctgg 37

English translation of sequence listing as filed

<210> 94
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of monkey MG53 S255G mutant

 <400> 94
 ccagacgggc ggggtggggga ccctctgcca ggatctt 37

 <210> 95
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of monkey MG53 S255L mutant

 <400> 95
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 <210> 96
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of monkey MG53 S255L mutant

 <400> 96
 tccagacggg cgggtggggg taactctgcc aggatct 37

 <210> 97
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of monkey MG53 S255W mutant

 <400> 97
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 <210> 98
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of monkey MG53 S255W mutant

 <400> 98
 tccagacggg cgggtggggg ccactctgcc aggatct 37

 <210> 99
 <211> 38
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Forward primer of monkey MG53 S255Q mutant

English translation of sequence listing as filed

<400> 99
aagatcctgg cagagcaacc cccacccgcc cgtctgga 38

<210> 100
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<220>
<223> Reverse primer of monkey MG53 S255Q mutant

<400> 100
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<210> 101
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of monkey MG53 S255Y mutant

<400> 101
agatcctggc agagtatccc ccacccgccc gtctgg 36

<210> 102
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of monkey MG53 S255Y mutant

<400> 102
ccagacgggc ggggtggggga tactctgcca ggatct 36

<210> 103
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of monkey MG53 S255D mutant

<400> 103
aagatcctgg cagaggatcc cccacccgcc cgtctgg 37

<210> 104
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of monkey MG53 S255D mutant

<400> 104
ccagacgggc ggggtggggga tcctctgcca ggatctt 37

<210> 105
<211> 37
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<213> Artificial Sequence

English translation of sequence listing as filed

<220>
 <223> Forward primer of monkey MG53 S255R mutant
 <400> 105
 aagatcctgg cagagcgtcc cccacccgcc cgtctggt 37

<210> 106
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of monkey MG53 S255R mutant
 <400> 106
 ccagacgggc gggtagggga cgctctgcca ggatctt 37

<210> 107
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of swine MG53 S255A mutant
 <400> 107
 aagatcctgg cagaggcgcc cccacctgcc cgcctg 36

<210> 108
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of swine MG53 S255A mutant
 <400> 108
 caggcgggca ggtgggggag cctctgccag gatctt 36

<210> 109
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of swine MG53 S255G mutant
 <400> 109
 aagatcctgg cagaggggcc cccacctgcc cgcctgg 37

<210> 110
 <211> 37
 <212> DNA
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<220>
 <223> Reverse primer of swine MG53 S255G mutant
 <400> 110
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English translation of sequence listing as filed

<210> 111
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 <220>
 <223> Forward primer of swine MG53 S255L mutant

 <400> 111
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 <210> 112
 <211> 36
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of swine MG53 S255L mutant

 <400> 112
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 <210> 113
 <211> 36
 <212> DNA
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 <220>
 <223> Forward primer of swine MG53 S255W mutant

 <400> 113
 agatcctggc agagtggccc ccacctgccc gcctgg 36

 <210> 114
 <211> 36
 <212> DNA
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 <220>
 <223> Reverse primer of swine MG53 S255W mutant

 <400> 114
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 <210> 115
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 <212> DNA
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 <220>
 <223> Forward primer of swine MG53 S255Q mutant

 <400> 115
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 <210> 116
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 <213> Artificial Sequence

 <220>
 <223> Reverse primer of swine MG53 S255Q mutant

English translation of sequence listing as filed

<400> 116
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<210> 117
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<213> Artificial Sequence

<220>
<223> Forward primer of swine MG53 S255Y mutant

<400> 117
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<210> 118
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of swine MG53 S255Y mutant

<400> 118
tccaggcggg caggtggggg atactctgcc aggatct 37

<210> 119
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of swine MG53 S255D mutant

<400> 119
aagatcctgg cagaggatcc cccacctgcc cgcctgga 38

<210> 120
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of swine MG53 S255D mutant

<400> 120
tccaggcggg caggtggggg atcctctgcc aggatctt 38

<210> 121
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward primer of swine MG53 S255R mutant

<400> 121
aagatcctgg cagagcggcc cccacctgcc cgcctgg 37

<210> 122
<211> 37
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English translation of sequence listing as filed

<220>
 <223> Reverse primer of swine MG53 S255R mutant
 <400> 122
 ccaggcgggc aggtgggggc cgctctgcca ggatctt 37

<210> 123
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of dog MG53 S255A mutant
 <400> 123
 aagatcctgg cagaagcacc accgcctgcc cgtttg 36

<210> 124
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of dog MG53 S255A mutant
 <400> 124
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<210> 125
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of dog MG53 S255G mutant
 <400> 125
 aagatcctgg cagaaggacc accgcctgcc cgtttgg 37

<210> 126
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Reverse primer of dog MG53 S255G mutant
 <400> 126
 ccaaacgggc aggcggtggt cttctgcca ggatctt 37

<210> 127
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward primer of dog MG53 S255L mutant
 <400> 127
 agatcctggc agaattacca ccgcctgccc gtttgg 36

English translation of sequence listing as filed

<210> 128
 <211> 36
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Reverse primer of dog MG53 S255L mutant

 <400> 128
 ccaaacgggc aggcggtggt aattctgcca ggatct 36

 <210> 129
 <211> 37
 <212> DNA
 <213> Artificial Sequence

 <220>
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 <400> 129
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 <210> 130
 <211> 37
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 <220>
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 <400> 130
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 <210> 131
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 <220>
 <223> Forward primer of dog MG53 S255Q mutant

 <400> 131
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 <400> 132
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English translation of sequence listing as filed

<400> 133
agatcctggc agaatatcca ccgcctgccc gtttgga 37

<210> 134
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<400> 134
tccaaacggg caggcggtag atattctgcc aggatct 37

<210> 135
<211> 38
<212> DNA
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<220>
<223> Forward primer of dog MG53 S255D mutant

<400> 135
aagatcctgg cagaagatcc accgcctgcc cgtttgga 38

<210> 136
<211> 38
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<400> 136
tccaaacggg caggcggtag atcttctgcc aggatctt 38

<210> 137
<211> 37
<212> DNA
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<220>
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<400> 137
aagatcctgg cagaacgacc accgcctgcc cgtttgga 37

<210> 138
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer of dog MG53 S255R mutant

<400> 138
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<210> 139
<211> 477
<212> PRT
<213> Homo sapiens

English translation of sequence listing as filed

<400> 139

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Cys
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe

English translation of sequence listing as filed

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
 260 275 280 285
 Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
 290 295 300
 Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 305 310 315 320
 Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
 325 330 335
 His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
 340 345 350
 Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
 355 360 365
 Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380
 Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400
 Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
 405 410 415
 Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430
 Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
 435 440 445
 Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
 450 455 460
 Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
 465 470 475

<210> 140
 <211> 333
 <212> PRT
 <213> Homo sapiens

<400> 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
 1 5 10 15
 Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
 20 25 30

English translation of sequence listing as filed

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
35 40 45

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
50 55 60

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
65 70 75 80

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
85 90 95

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
100 105 110

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
115 120 125

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
130 135 140

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
145 150 155 160

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
165 170 175

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
180 185 190

His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
195 200 205

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
210 215 220

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
225 230 235 240

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
245 250 255

Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
260 265 270

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
275 280 285

Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
290 295 300

English translation of sequence listing as filed

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
305 310 315 320

Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
325 330

<210> 141
<211> 333
<212> PRT
<213> Homo sapiens
<400> 141

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

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
20 25 30

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
35 40 45

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
50 55 60

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
65 70 75 80

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
85 90 95

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
100 105 110

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
115 120 125

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
130 135 140

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
145 150 155 160

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Gly Gln Lys Ala Pro Pro
165 170 175

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
180 185 190

His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
195 200 205

English translation of sequence listing as filed

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
210 215 220

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
225 230 235 240

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
245 250 255

Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
260 265 270

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
275 280 285

Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
290 295 300

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
305 310 315 320

Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
325 330

<210> 142
<211> 269
<212> PRT
<213> Homo sapiens
<400> 142

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

English translation of sequence listing as filed

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ser Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser
260 265

<210> 143
<211> 1434
<212> DNA
<213> Homo sapiens

<400> 143
atgtcggctg cgccggcct cctgcaccag gagctgtcct gcccgctgtg cctgcagctg 60
ttcgacgcgc ccgtgacagc cgagtgcggc cacagtttct gccgcgcctg cctaggccgc 120
gtggccgggg agccggcggc ggatggcacc gttctctgcc cctgctgcca ggccccacg 180
cggccgcagg cactcagcac caacctgcag ctggcgcgcc tgggtggaggg gctggcccag 240
gtgccgcagg gccactgcga ggagcacctg gacccgctga gcatctactg cgagcaggac 300
cgcgcgctgg tgtgcggagt gtgcgcctca ctgggctcgc accgcggtca tcgcctcctg 360
cctgccgccg aggccacgc acgcctcaag acacagctgc cacagcagaa actgcagctg 420
caggaggcat gcatgcgtaa ggagaagagt gtggctgtgc tggagcatca gctggtggag 480
gtggaggaga cagtgcgtca gttccggggg gccgtggggg agcagctggg caagatgcgg 540
gtgttcctgg ctgcactgga gggctccttg gactgcgagg cagagcgtgt acggggtgag 600
gcaggggtcg ccttgcgccg ggagctgggg agcctgaact cttacctgga gcagctgcgg 660

English translation of sequence listing as filed						
cagatggaga	aggtcctgga	ggaggtggcg	gacaagccgc	agactgagtt	cctcatgaaa	720
tactgcctgg	tgaccagcag	gctgcagaag	atcctggcag	agtctcccc	acccgcccgt	780
ctggacatcc	agctgccaat	tatctcagat	gacttcaaat	tccaggtgtg	gaggaagatg	840
ttccgggctc	tgatgccagc	gctggaggag	ctgacctttg	acccgagctc	tgcgcacccg	900
agcctggtgg	tgtcttcctc	tggccgccgc	gtggagtgtc	cggagcagaa	ggcgccgccg	960
gccggggagg	acccgcgcca	gttcgacaag	gcggtggcgg	tggtggcgca	ccagcagctc	1020
tccgagggcg	agcactactg	ggaggtggat	gttggcgaca	agccgcgctg	ggcgctgggc	1080
gtgatcgcg	ccgaggcccc	ccgccgcggg	cgctgcacg	cgggtgccctc	gcagggcctg	1140
tggctgtctg	ggctgcgcga	gggcaagatc	ctggaggcac	acgtggaggc	caaggagccg	1200
cgcgctctgc	gcagccccga	gaggcgcccc	acgcgcattg	gcctttacct	gagcttcggc	1260
gacggcgtcc	tctccttcta	cgatgccagc	gacgccgacg	cgctcgtgcc	gctttttgcc	1320
ttccacgagc	gcctgcccag	gcccgtgtac	cccttcttcg	acgtgtgctg	gcacgacaag	1380
ggcaagaatg	cccagccgct	gctgctcgtg	ggtcccgaag	gcgccgaggc	ctga	1434

<210> 144
 <211> 1002
 <212> DNA
 <213> Homo sapiens

<400> 144						
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gtgcgtcagt	tccggggggc	cgtggggggag	cagctgggca	agatgcgggt	gttcctggct	120
gcactggagg	gctccttga	ccgcgaggca	gagcgtgtac	ggggtgaggc	aggggtcgcc	180
ttgcgccggg	agctggggag	cctgaactct	tacctggagc	agctgcggca	gatggagaag	240
gtcctggagg	aggtggcgga	caagccgcag	actgagttcc	tcatgaaata	ctgcctggtg	300
accagcaggc	tgcaagaat	cctggcagag	tctccccac	ccgcccgtct	ggacatccag	360
ctgccaatta	tctcagatga	cttcaaattc	caggtgtgga	ggaagatgtt	ccgggctctg	420
atgccagcgc	tggaggagct	gacctttgac	ccgagctctg	cgaccccgag	cctggtggtg	480
tcttcctctg	gccgccgcgt	ggagtgtctg	gagcagaagg	cgccgccggc	cggggaggac	540
ccgcgccagt	tcgacaaggc	ggtggcggtg	gtggcgcacc	agcagctctc	cgagggcgag	600
cactactggg	aggtggatgt	tggcgacaag	ccgcgctggg	cgctgggcgt	gatcgcggcc	660
gaggcccccc	gcccggggcg	cctgcacgcg	gtgccctcgc	agggcctgtg	gctgctgggg	720
ctgcgcgagg	gcaagatcct	ggaggcacac	gtggaggcca	aggagccgcg	cgctctgcgc	780
agccccgaga	ggcgggccac	gcgcattggc	ctttacctga	gcttcggcga	cggcgtcctc	840
tccttctacg	atgccagcga	cgccgacgcg	ctcgtgccgc	tttttgctt	ccacgagcgc	900
ctgcccaggc	ccgtgtaccc	cttcttcgac	gtgtgctggc	acgacaaggg	caagaatgcc	960
cagccgctgc	tgctcgtggg	tcccgaaggc	gccgaggcct	ga		1002

English translation of sequence listing as filed

<210> 145
<211> 1002
<212> DNA
<213> Homo sapiens

<400> 145
atgctgaagg agaagagtgt ggctgtgctg gagcatcagc tgggtggaggt ggaggagaca 60
gtgcgtcagt tccggggggc cgtggggggag cagctgggca agatgcgggt gttcctggct 120
gcactggagg gtccttgga ccgcgaggca gagcgtgtac ggggtgaggc aggggtcgcc 180
ttgcgccggg agctggggag cctgaactct tacctggagc agctgcggca gatggagaag 240
gtcctggagg aggtggcgga caagccgcag actgagttcc tcatgaaata ctgcctgggtg 300
accagcaggc tgcagaagat cctggcagag tctccccac ccgcccgtct ggacatccag 360
ctgccaatta tctcagatga cttcaaattc caggtgtgga ggaagatgtt ccgggctctg 420
atgccagcgc tggaggagct gacctttgac ccgagctctg cgcacccgag cctggtgggtg 480
tcttcctctg gccgccgcgt ggagtgtctg gggcagaagg cgccgccggc cggggaggac 540
ccgcgccagt tcgacaaggc ggtggcggtg gtggcgacc agcagctctc cgagggcgag 600
cactactggg aggtggatgt tggcgacaag ccgcgctggg cgctgggctg gatcgcgcc 660
gaggcccccc gccgcgggcg cctgcacgcg gtgccctcgc agggcctgtg gctgctgggg 720
ctgcgcgagg gcaagatcct ggaggcacac gtggaggcca aggagccgcg cgctctgcgc 780
agccccgaga ggcgcccccac gcgcattggc ctttacctga gcttcggcga cggcgtcctc 840
tccttctacg atgccagcga cgccgacgcg ctctgtccgc tttttgcctt ccacgagcgc 900
ctgcccaggc ccgtgtaccc cttcttcgac gtgtgctggc acgacaaggg caagaatgcc 960
cagccgctgc tgctcgtggg tcccgaaggc gccgaggcct ga 1002

<210> 146
<211> 810
<212> DNA
<213> Homo sapiens

<400> 146
atgtcggctg cggccggcct cctgcaccag gagctgtcct gccgctgtg cctgcagctg 60
ttcgacgcgc ccgtgacagc cgagtgcggc cacagtttct gccgcgcctg cctaggccgc 120
gtggccgggg agccggcggc ggatggcacc gttctctgcc cctgctgcca ggccccacg 180
cggccgcagg cactcagcac caacctgcag ctggcgcgcc tgggtggagg gctggcccag 240
gtgccgcagg gccactgcga ggagcacctg gacccgctga gcatctactg cgagcaggac 300
cgcgcgctgg tgtgcggagt gtgcgcctca ctcggtcgc accgcggtca tcgcctcctg 360
cctgccgccg agggccacgc acgcctcaag acacagctgc cacagcagaa actgcagctg 420
caggaggcat gcatgcgtaa ggagaagagt gtggctgtgc tggagcatca gctggtggag 480
gtggaggaga cagtgcgtca gttccggggg gccgtggggg agcagctggg caagatgcgg 540
gtgttcctgg ctgactgga gggctccttg gaccgcgagg cagagcgtgt acggggtgag 600
gcaggggtcg ccttgcgccg ggagctgggg agcctgaact cttacctgga gcagctgcgg 660

English translation of sequence listing as filed

cagatggaga aggtcctgga ggaggtggcg gacaagccgc agactgagtt cctcatgaaa 720
tactgcctgg tgaccagcag gctgcagaag atcctggcag agtctccccc acccgcccgt 780
ctggacatcc agctgccaat tatctcctga 810

<210> 147
<211> 477
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of a human MG53 subtype S255A mutant
<400> 147

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

English translation of sequence listing as filed

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
 210 215 220
 Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
 225 230 235 240
 Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
 245 250 255
 Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
 260 265 270
 Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
 275 280 285
 Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
 290 295 300
 Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 305 310 315 320
 Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
 325 330 335
 His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
 340 345 350
 Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
 355 360 365
 Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
 370 375 380
 Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
 385 390 395 400
 Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
 405 410 415
 Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
 420 425 430
 Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
 435 440 445
 Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
 450 455 460
 Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
 465 470 475

English translation of sequence listing as filed

<210> 148
 <211> 333
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Amino acid sequence of a human MG53 subtype S255A mutant
 <400> 148

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

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
 20 25 30

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
 35 40 45

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
 50 55 60

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
 65 70 75 80

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
 85 90 95

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
 100 105 110

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
 115 120 125

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
 130 135 140

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
 145 150 155 160

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Glu Gln Lys Ala Pro Pro
 165 170 175

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
 180 185 190

His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
 195 200 205

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
 210 215 220

English translation of sequence listing as filed

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
225 230 235 240

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
245 250 255

Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
260 265 270

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
275 280 285

Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
290 295 300

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
305 310 315 320

Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
325 330

<210> 149

<211> 333

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of a human MG53 subtype S255A mutant

<400> 149

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

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
20 25 30

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
35 40 45

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
50 55 60

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
65 70 75 80

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
85 90 95

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
100 105 110

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser Asp Asp Phe
115 120 125

English translation of sequence listing as filed

Lys Phe Gln Val Trp Arg Lys Met Phe Arg Ala Leu Met Pro Ala Leu
130 135 140

Glu Glu Leu Thr Phe Asp Pro Ser Ser Ala His Pro Ser Leu Val Val
145 150 155 160

Ser Ser Ser Gly Arg Arg Val Glu Cys Ser Gly Gln Lys Ala Pro Pro
165 170 175

Ala Gly Glu Asp Pro Arg Gln Phe Asp Lys Ala Val Ala Val Val Ala
180 185 190

His Gln Gln Leu Ser Glu Gly Glu His Tyr Trp Glu Val Asp Val Gly
195 200 205

Asp Lys Pro Arg Trp Ala Leu Gly Val Ile Ala Ala Glu Ala Pro Arg
210 215 220

Arg Gly Arg Leu His Ala Val Pro Ser Gln Gly Leu Trp Leu Leu Gly
225 230 235 240

Leu Arg Glu Gly Lys Ile Leu Glu Ala His Val Glu Ala Lys Glu Pro
245 250 255

Arg Ala Leu Arg Ser Pro Glu Arg Arg Pro Thr Arg Ile Gly Leu Tyr
260 265 270

Leu Ser Phe Gly Asp Gly Val Leu Ser Phe Tyr Asp Ala Ser Asp Ala
275 280 285

Asp Ala Leu Val Pro Leu Phe Ala Phe His Glu Arg Leu Pro Arg Pro
290 295 300

Val Tyr Pro Phe Phe Asp Val Cys Trp His Asp Lys Gly Lys Asn Ala
305 310 315 320

Gln Pro Leu Leu Leu Val Gly Pro Glu Gly Ala Glu Ala
325 330

<210> 150
<211> 269
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of a human MG53 subtype S255A mutant
<400> 150

Met Ser Ala Ala Pro Gly Leu Leu His Gln Glu Leu Ser Cys Pro Leu
1 5 10 15

English translation of sequence listing as filed

Cys Leu Gln Leu Phe Asp Ala Pro Val Thr Ala Glu Cys Gly His Ser
20 25 30

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

Gly Thr Val Leu Cys Pro Cys Cys Gln Ala Pro Thr Arg Pro Gln Ala
50 55 60

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

Val Pro Gln Gly His Cys Glu Glu His Leu Asp Pro Leu Ser Ile Tyr
85 90 95

Cys Glu Gln Asp Arg Ala Leu Val Cys Gly Val Cys Ala Ser Leu Gly
100 105 110

Ser His Arg Gly His Arg Leu Leu Pro Ala Ala Glu Ala His Ala Arg
115 120 125

Leu Lys Thr Gln Leu Pro Gln Gln Lys Leu Gln Leu Gln Glu Ala Cys
130 135 140

Met Arg Lys Glu Lys Ser Val Ala Val Leu Glu His Gln Leu Val Glu
145 150 155 160

Val Glu Glu Thr Val Arg Gln Phe Arg Gly Ala Val Gly Glu Gln Leu
165 170 175

Gly Lys Met Arg Val Phe Leu Ala Ala Leu Glu Gly Ser Leu Asp Arg
180 185 190

Glu Ala Glu Arg Val Arg Gly Glu Ala Gly Val Ala Leu Arg Arg Glu
195 200 205

Leu Gly Ser Leu Asn Ser Tyr Leu Glu Gln Leu Arg Gln Met Glu Lys
210 215 220

Val Leu Glu Glu Val Ala Asp Lys Pro Gln Thr Glu Phe Leu Met Lys
225 230 235 240

Tyr Cys Leu Val Thr Ser Arg Leu Gln Lys Ile Leu Ala Glu Ala Pro
245 250 255

Pro Pro Ala Arg Leu Asp Ile Gln Leu Pro Ile Ile Ser
260 265

<210> 151
<211> 1434
<212> DNA
<213> Artificial Sequence

English translation of sequence listing as filed

<220>

<223> Encoding nucleic acid sequence of a human MG53 subtype S255A mutant

<400> 151

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atgtcggctg cgccccggcct cctgcaccag gagctgtcct gcccgctgtg cctgcagctg      60
ttcgacgcgc ccgtgacagc cgagtgcggc cacagtttct gccgcgcctg cctaggccgc      120
gtggccgggg agccggcggc ggatggcacc gttctctgcc cctgctgcca ggccccacg      180
cggccgcagg cactcagcac caacctgcag ctggcgcgcc tgggtggaggg gctggcccag      240
gtgccgcagg gccactgcga ggagcacctg gacccgctga gcatctactg cgagcaggac      300
cgcgcgctgg tgtgctggagt gtgcgcctca ctgggctcgc accgcggtca tcgcctcctg      360
cctgccgccg agggccacgc acgcctcaag acacagctgc cacagcagaa actgcagctg      420
caggaggcat gcatgcgtaa ggagaagagt gtggctgtgc tggagcatca gctggtggag      480
gtggaggaga cagtgcgtca gttccggggg gccgtggggg agcagctggg caagatgcgg      540
gtgttcctgg ctgactgga gggctccttg gactgagagg cagagcgtgt acggggtgag      600
gcaggggtcg ccttgcgccg ggagctgggg agcctgaact cttacctgga gcagctgcgg      660
cagatggaga aggtcctgga ggaggtggcg gacaagccgc agactgagtt cctcatgaaa      720
tactgcctgg tgaccagcag gctgcagaag atcctggcag aggctcccc acccgcccg      780
ctggacatcc agctgccaat tatctcagat gacttcaaat tccaggtgtg gaggaagatg      840
ttccgggctc tgatgccagc gctggaggag ctgacctttg acccgagctc tgcgcacccg      900
agcctggtgg tgtcttcctc tggccgccgc gtggagtgtc cggagcagaa ggcgccgccg      960
gccggggagg acccgcgcca gttcgacaag gcggtggcgg tgggtggcgca ccagcagctc     1020
tccgagggcg agcactactg ggaggtggat gttggcgaca agccgcgctg ggcgctgggc     1080
gtgatcgcg ccgaggcccc ccgcccggg cgctgcacg cggtgccctc gcagggcctg     1140
tggctgctgg ggctgcgcga gggcaagatc ctggaggcac acgtggaggc caaggagccg     1200
cgcgctctgc gcagccccga gaggcggccc acgcgcattg gcctttacct gagcttcggc     1260
gacggcgctc tctccttcta cgatgccagc gacgccgacg cgctcgtgcc gctttttgcc     1320
ttccacgagc gcctgcccag gcccggtgtac cccttcttcg acgtgtgctg gcacgacaag     1380
ggcaagaatg cccagccgct gctgctcgtg ggtcccgaag gcgccgaggc ctga          1434

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<210> 152

<211> 1002

<212> DNA

<213> Artificial Sequence

<220>

<223> Encoding nucleic acid sequence of a human MG53 subtype S255A mutant

<400> 152

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atgcgcaagg agaagagtgt ggctgtgctg gagcatcagc tgggtggaggt ggaggagaca      60
gtgcgtcagt tccggggggc cgtgggggag cagctgggca agatgcgggt gttcctggct      120
gcactggagg gtccttgga ccgcgaggca gagcgtgtac ggggtgaggc aggggtcgcc      180

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English translation of sequence listing as filed

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ttgcgccggg agctggggag cctgaactct tacctggagc agctgaggca gatggagaag      240
gtcctggagg aggtggcgga caagccgcag actgagttcc tcatgaaata ctgcctggtg      300
accagcaggc tgcagaagat cctggcagag gctccccac cgcctcgtct ggacatccag      360
ctgccaatta tctcagatga cttcaaattc caggtgtgga ggaagatgtt ccgggctctg      420
atgccagcgc tggaggagct gacctttgac ccgagctctg cgcacccgag cctggtggtg      480
tcttcctctg gccgccgctg ggagtgtctg gagcagaagg cgccgccggc cggggaggac      540
ccgcgccagt tcgacaaggc ggtggcggtg gtggcgcacc agcagctctc cgagggcgag      600
cactactggg aggtggatgt tggcgacaag ccgcgctggg cgctgggctg gatcgcggcc      660
gaggcccccc gccgcgggag cctgcacgcg gtgccctcgc agggcctgtg gctgctgggg      720
ctgcgcgagg gcaagatcct ggaggcacac gtggaggcca aggagccgcg cgctctgcgc      780
agccccgaga ggcgggccac gcgcattggc ctttacctga gcttcggcga cggcgctctc      840
tccttctacg atgccagcga cgccgacgcg ctcgtgccgc tttttgcctt ccacgagcgc      900
ctgcccaggc ccgtgtaccc cttcttcgac gtgtgctggc acgacaaggg caagaatgcc      960
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<210> 153
 <211> 1002
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Encoding nucleic acid sequence of a human MG53 subtype S255A mutant
 <400> 153

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20     25     30
Gly Cys Ala Thr Cys Ala Gly Cys Thr Gly Gly Thr Gly Gly Ala Gly
35     40     45
Gly Thr Gly Gly Ala Gly Gly Ala Gly Ala Cys Ala Gly Thr Gly Cys
50     55     60
Gly Thr Cys Ala Gly Thr Thr Cys Cys Gly Gly Gly Gly Gly Cys
65     70     75     80
Cys Gly Thr Gly Gly Gly Gly Ala Gly Cys Ala Gly Cys Thr Gly
85     90     95
Gly Gly Cys Ala Ala Gly Ala Thr Gly Cys Gly Gly Gly Thr Gly Thr
100    105    110

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English translation of sequence listing as filed

Thr Cys Cys Thr Gly Gly Cys Thr Gly Cys Ala Cys Thr Gly Gly Ala
115 120 125

Gly Gly Gly Cys Thr Cys Cys Thr Thr Gly Gly Ala Cys Cys Gly Cys
130 135 140

Gly Ala Gly Gly Cys Ala Gly Ala Gly Cys Gly Thr Gly Thr Ala Cys
145 150 155 160

Gly Gly Gly Gly Thr Gly Ala Gly Gly Cys Ala Gly Gly Gly Gly Thr
165 170 175

Cys Gly Cys Cys Thr Thr Gly Cys Gly Cys Cys Gly Gly Gly Ala Gly
180 185 190

Cys Thr Gly Gly Gly Gly Ala Gly Cys Cys Thr Gly Ala Ala Cys Thr
195 200 205

Cys Thr Thr Ala Cys Cys Thr Gly Gly Ala Gly Cys Ala Gly Cys Thr
210 215 220

Gly Cys Gly Gly Cys Ala Gly Ala Thr Gly Gly Ala Gly Ala Ala Gly
225 230 235 240

Gly Thr Cys Cys Thr Gly Gly Ala Gly Gly Ala Gly Gly Thr Gly Gly
245 250 255

Cys Gly Gly Ala Cys Ala Ala Gly Cys Cys Gly Cys Ala Gly Ala Cys
260 265 270

Thr Gly Ala Gly Thr Thr Cys Cys Thr Cys Ala Thr Gly Ala Ala Ala
275 280 285

Thr Ala Cys Thr Gly Cys Cys Thr Gly Gly Thr Gly Ala Cys Cys Ala
290 295 300

Gly Cys Ala Gly Gly Cys Thr Gly Cys Ala Gly Ala Ala Gly Ala Thr
305 310 315 320

Cys Cys Thr Gly Gly Cys Ala Gly Ala Gly Gly Cys Thr Cys Cys Cys
325 330 335

Cys Cys Ala Cys Cys Cys Gly Cys Cys Cys Gly Thr Cys Thr Gly Gly
340 345 350

Ala Cys Ala Thr Cys Cys Ala Gly Cys Thr Gly Cys Cys Ala Ala Thr
355 360 365

Thr Ala Thr Cys Thr Cys Ala Gly Ala Thr Gly Ala Cys Thr Thr Cys
370 375 380

English translation of sequence listing as filed

Ala 385 Ala Ala Thr Thr Cys 390 Cys Ala Gly Gly Thr 395 Gly Thr Gly Gly Ala 400

Gly Gly Ala Ala Gly 405 Ala Thr Gly Thr Thr 410 Cys Cys Gly Gly Gly 415 Cys

Thr Cys Thr Gly 420 Ala Thr Gly Cys Cys 425 Ala Gly Cys Gly Cys 430 Thr Gly

Gly Ala Gly 435 Gly Ala Gly Cys Thr 440 Gly Ala Cys Cys Thr 445 Thr Thr Gly

Ala Cys 450 Cys Cys Gly Ala Gly 455 Cys Thr Cys Thr Gly 460 Cys Gly Cys Ala

Cys 465 Cys Cys Gly Ala Gly 470 Cys Cys Thr Gly Gly 475 Thr Gly Gly Thr Gly 480

Thr Cys Thr Thr Cys 485 Cys Thr Cys Thr Gly 490 Gly Cys Cys Gly Cys 495 Cys

Gly Cys Gly Thr 500 Gly Gly Ala Gly Thr 505 Gly Cys Thr Cys Gly 510 Gly Gly

Gly Cys Ala 515 Gly Ala Ala Gly Gly 520 Cys Gly Cys Cys Gly 525 Cys Cys Gly

Gly Cys 530 Cys Gly Gly Gly Gly 535 Ala Gly Gly Ala Cys 540 Cys Cys Gly Cys

Gly 545 Cys Cys Ala Gly Thr 550 Thr Cys Gly Ala Cys 555 Ala Ala Gly Gly Cys 560

Gly Gly Thr Gly Gly 565 Cys Gly Gly Thr Gly 570 Gly Thr Gly Gly Cys 575 Gly

Cys Ala Cys Cys 580 Ala Gly Cys Ala Gly 585 Cys Thr Cys Thr Cys 590 Cys Gly

Ala Gly Gly 595 Gly Cys Gly Ala Gly 600 Cys Ala Cys Thr Ala 605 Cys Thr Gly

Gly Gly 610 Ala Gly Gly Thr Gly 615 Gly Ala Thr Gly Thr 620 Thr Gly Gly Cys

Gly 625 Ala Cys Ala Ala Gly 630 Cys Cys Gly Cys Gly 635 Cys Thr Gly Gly Gly 640

Cys Gly Cys Thr Gly 645 Gly Gly Cys Gly Thr 650 Gly Ala Thr Cys Gly 655 Cys

English translation of sequence listing as filed

Gly Gly Cys Cys Gly Ala Gly Gly Cys Cys Cys Cys Cys Gly Cys
660 665 670

Cys Gly Cys Gly Gly Gly Cys Gly Cys Cys Thr Gly Cys Ala Cys Gly
675 680 685

Cys Gly Gly Thr Gly Cys Cys Cys Thr Cys Gly Cys Ala Gly Gly Gly
690 695 700

Cys Cys Thr Gly Thr Gly Gly Cys Thr Gly Cys Thr Gly Gly Gly Gly
705 710 715 720

Cys Thr Gly Cys Gly Cys Gly Ala Gly Gly Gly Cys Ala Ala Gly Ala
725 730 735

Thr Cys Cys Thr Gly Gly Ala Gly Gly Cys Ala Cys Ala Cys Gly Thr
740 745 750

Gly Gly Ala Gly Gly Cys Cys Ala Ala Gly Gly Ala Gly Cys Cys Gly
755 760 765

Cys Gly Cys Gly Cys Thr Cys Thr Gly Cys Gly Cys Ala Gly Cys Cys
770 775 780

Cys Cys Gly Ala Gly Ala Gly Gly Cys Gly Gly Cys Cys Cys Ala Cys
785 790 795 800

Gly Cys Gly Cys Ala Thr Thr Gly Gly Cys Cys Thr Thr Thr Ala Cys
805 810 815

Cys Thr Gly Ala Gly Cys Thr Thr Cys Gly Gly Cys Gly Ala Cys Gly
820 825 830

Gly Cys Gly Thr Cys Cys Thr Cys Thr Cys Cys Thr Thr Cys Thr Ala
835 840 845

Cys Gly Ala Thr Gly Cys Cys Ala Gly Cys Gly Ala Cys Gly Cys Cys
850 855 860

Gly Ala Cys Gly Cys Gly Cys Thr Cys Gly Thr Gly Cys Cys Gly Cys
865 870 875 880

Thr Thr Thr Thr Thr Gly Cys Cys Thr Thr Cys Cys Ala Cys Gly Ala
885 890 895

Gly Cys Gly Cys Cys Thr Gly Cys Cys Cys Ala Gly Gly Cys Cys Cys
900 905 910

Gly Thr Gly Thr Ala Cys Cys Cys Cys Thr Thr Cys Thr Thr Cys Gly
915 920 925

English translation of sequence listing as filed
Ala Cys Gly Thr Gly Thr Gly Cys Thr Gly Gly Cys Ala Cys Gly Ala
930 935 940

Cys Ala Ala Gly Gly Gly Cys Ala Ala Gly Ala Ala Thr Gly Cys Cys
945 950 955 960

Cys Ala Gly Cys Cys Gly Cys Thr Gly Cys Thr Gly Cys Thr Cys Gly
965 970 975

Thr Gly Gly Gly Thr Cys Cys Cys Gly Ala Ala Gly Gly Cys Gly Cys
980 985 990

Cys Gly Ala Gly Gly Cys Cys Thr Gly Ala
995 1000

<210> 154
<211> 810
<212> DNA
<213> Artificial Sequence

<220>
<223> Encoding nucleic acid sequence of a human MG53 subtype S255A mutant

<400> 154
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gtggccgggg agccggcggc ggatggcacc gttctctgcc cctgctgcca ggccccacg 180
cggccgcagg cactcagcac caacctgcag ctggcgcgcc tgggtggagg gctggcccag 240
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cgcgcgctgg tgtgcggagt gtgcgcctca ctcggctcgc accgcgggtca tcgcctcctg 360
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caggaggcat gcatgcgtaa ggagaagagt gtggctgtgc tggagcatca gctggtggag 480
gtggaggaga cagtgcgtca gttccggggg gccgtggggg agcagctggg caagatgcgg 540
gtgttcctgg ctgcactgga gggctccttg gaccgcgagg cagagcgtgt acggggtgag 600
gcaggggtcg ccttgcgccg ggagctgggg agcctgaact cttacctgga gcagctgcgg 660
cagatggaga aggtcctgga ggaggtggcg gacaagccgc agactgagtt cctcatgaaa 720
tactgcctgg tgaccagcag gctgcagaag atcctggcag aggctcccc acccgcccg 780
ctggacatcc agctgccaat tatctcctga 810