

B09165A_W01.ST25.txt
SEQUENCE LISTING

<110> Georg-August-Universitaet Goettingen Stiftung Oeffentlichen
Rechts
Feussner, Ivo
Heilmann, Mareike

<120> METHODS AND MEANS TO ALTER LIPID BIOSYNTHESIS BY TARGETING
MULTIPLE ENZYMES TO SUBORGANELLE DOMAINS

<130> B09165A - CA

<150> EP09013248.1

<151> 2009-10-20

<160> 16

<170> PatentIn version 3.3

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<220>

<223> mouse fatty acyl CoA reductase

<220>

<221> CDS

<222> (1)..(1548)

<400> 1

| | | | | | | | | | | | | | | | | |
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| Met | Val | Ser | Ile | Pro | Glu | Tyr | Tyr | Glu | Gly | Lys | Asn | Ile | Leu | Leu | Thr | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| ggt | gca | act | gga | ttt | ctt | ggg | aag | ggt | ttg | ctt | gag | aag | ctg | cta | aga | 96 |
| Gly | Ala | Thr | Gly | Phe | Leu | Gly | Lys | Val | Leu | Leu | Glu | Lys | Leu | Leu | Arg | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| tct | tgc | cct | aga | gtc | aac | tcc | ggt | tac | ggt | cta | gtc | aga | caa | aag | gct | 144 |
| Ser | Cys | Pro | Arg | Val | Asn | Ser | Val | Tyr | Val | Leu | Val | Arg | Gln | Lys | Ala | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gga | caa | aca | cct | caa | gaa | aga | ggt | gag | gag | atc | ttg | tca | agc | aag | ctc | 192 |
| Gly | Gln | Thr | Pro | Gln | Glu | Arg | Val | Glu | Glu | Ile | Leu | Ser | Ser | Lys | Leu | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ttt | gat | aga | ctg | cgt | gat | gag | aat | cca | gat | ttc | cga | gag | aag | atc | atc | 240 |
| Phe | Asp | Arg | Leu | Arg | Asp | Glu | Asn | Pro | Asp | Phe | Arg | Glu | Lys | Ile | Ile | |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gcc | atc | aac | tct | gaa | ttg | acc | caa | cct | aag | tta | gcg | ctt | tct | gaa | gag | 288 |
| Ala | Ile | Asn | Ser | Glu | Leu | Thr | Gln | Pro | Lys | Leu | Ala | Leu | Ser | Glu | Glu | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gat | aag | gag | atc | atc | atc | gac | tca | acg | aac | ggt | atc | ttc | cat | tgc | gct | 336 |
| Asp | Lys | Glu | Ile | Ile | Ile | Asp | Ser | Thr | Asn | Val | Ile | Phe | His | Cys | Ala | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gca | aca | ggt | cgt | ttc | aat | gag | aac | cta | cgg | gat | gct | ggt | caa | ttg | aac | 384 |
| Ala | Thr | Val | Arg | Phe | Asn | Glu | Asn | Leu | Arg | Asp | Ala | Val | Gln | Leu | Asn | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gtc | att | gct | acg | aga | caa | ctg | atc | tta | ctc | gct | cag | cag | atg | aag | aac | 432 |
| Val | Ile | Ala | Thr | Arg | Gln | Leu | Ile | Leu | Leu | Ala | Gln | Gln | Met | Lys | Asn | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |

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|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| ctc Leu 145 | gaa Glu | gtc Val | ttc Phe | atg Met | cac His 150 | gtt Val | agt Ser | act Thr | gct Ala | tac Tyr 155 | gca Ala | tac Tyr | tgt Cys | aac Asn | cgc Arg 160 | 480 |
| aag Lys | cac His | atc Ile | gat Asp | gaa Glu 165 | gtt Val | gtt Val | tac Tyr | cca Pro | cct Pro 170 | cca Pro | gtt Val | gat Asp | cct Pro | aag Lys 175 | aag Lys | 528 |
| ttg Leu | atc Ile | gac Asp | tct Ser 180 | ctt Leu | gag Glu | tgg Trp | atg Met | gat Asp 185 | gat Asp | gga Gly | ctt Leu | gtg Val | aac Asn 190 | gac Asp | ata Ile | 576 |
| aca Thr | cca Pro | aag Lys 195 | ctt Leu | atc Ile | gga Gly | gac Asp | aga Arg 200 | cca Pro | aac Asn | act Thr | tac Tyr | atc Ile 205 | tac Tyr | act Thr | aag Lys | 624 |
| gca Ala | ctg Leu 210 | gct Ala | gag Glu | tat Tyr | gtt Val | gtt Val 215 | caa Gln | caa Gln | gag Glu | gga Gly | gct Ala 220 | aag Lys | ttg Leu | aac Asn | gtt Val | 672 |
| gca Ala 225 | atc Ile | gtt Val | aga Arg | ccg Pro | tct Ser 230 | att Ile | gtt Val | gga Gly | gct Ala | tca Ser 235 | tgg Trp | aaa Lys | gaa Glu | cca Pro | ttc Phe 240 | 720 |
| cca Pro | gga Gly | tgg Trp | att Ile | gac Asp 245 | aac Asn | ttc Phe | aat Asn | ggt Gly | cca Pro 250 | tct Ser | gga Gly | ctt Leu | ttc Phe 255 | att Ile | gca Ala | 768 |
| gct Ala | ggc Gly | aag Lys | ggt Gly 260 | atc Ile | ctc Leu | aga Arg | act Thr | atg Met 265 | aga Arg | gca Ala | agt Ser | aac Asn | aac Asn 270 | gca Ala | ctt Leu | 816 |
| gca Ala | gat Asp | ctt Leu 275 | gtt Val | cct Pro | gtt Val | gac Asp | gtt Val 280 | gtc Val | gtt Val | aac Asn | acc Thr | tca Ser 285 | tta Leu | gca Ala | gct Ala | 864 |
| gca Ala | tgg Trp 290 | tat Tyr | tct Ser | gga Gly | gtt Val | aac Asn 295 | aga Arg | ccc Pro | agg Arg | aac Asn | atc Ile 300 | atg Met | gtg Val | tac Tyr | aac Asn | 912 |
| tgt Cys 305 | aca Thr | acg Thr | gga Gly | tct Ser | aca Thr 310 | aac Asn | cct Pro | ttt Phe | cat His | tgg Trp 315 | ggt Gly | gaa Glu | gtt Val | gag Glu | tat Tyr 320 | 960 |
| cac His | gtc Val | atc Ile | tct Ser | acc Thr 325 | ttc Phe | aag Lys | aga Arg | aac Asn | cct Pro 330 | ctt Leu | gag Glu | caa Gln | gct Ala | ttc Phe 335 | aga Arg | 1008 |
| aga Arg | cct Pro | aac Asn | gtg Val 340 | aac Asn | ctt Leu | acc Thr | tcc Ser | aat Asn 345 | cat His | cta Leu | ctc Leu | tac Tyr | cac His 350 | tac Tyr | tgg Trp | 1056 |
| att Ile | gct Ala | gtt Val 355 | tct Ser | cat His | aag Lys | gct Ala | cct Pro 360 | gct Ala | ttc Phe | ttg Leu | tac Tyr | gac Asp 365 | atc Ile | tac Tyr | ctt Leu | 1104 |
| cga Arg | atg Met 370 | act Thr | ggt Gly | aga Arg | agt Ser | cct Pro 375 | cgg Arg | atg Met | atg Met | aag Lys | acc Thr 380 | att Ile | aca Thr | cga Arg | cta Leu | 1152 |
| cac His 385 | aag Lys | gct Ala | atg Met | gtc Val | ttc Phe 390 | ctt Leu | gag Glu | tac Tyr | ttc Phe | acc Thr 395 | tca Ser | aac Asn | tca Ser | tgg Trp | gtt Val 400 | 1200 |
| tgg Trp | aac Asn | act Thr | gac Asp | aac Asn 405 | gtt Val | aac Asn | atg Met | ctc Leu | atg Met 410 | aac Asn | cag Gln | ctt Leu | aac Asn | cct Pro 415 | gag Glu | 1248 |
| gac | aag | aag | acg | ttc | aac | att | gat | gtt | cga | cag | ctt | cac | tgg | gct | gag | 1296 |

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|-------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
| Asp | Lys | Lys | Thr | Phe | Asn | Ile | Asp | Val | Arg | Gln | Leu | His | Trp | Ala | Glu | | |
| | | | 420 | | | | | 425 | | | | | 430 | | | | |
| tac | ata | gag | aac | tac | tgt | atg | ggg | acg | aag | aag | tac | gtt | ctt | aac | gaa | 1344 | |
| Tyr | Ile | Glu | Asn | Tyr | Cys | Met | Gly | Thr | Lys | Lys | Tyr | Val | Leu | Asn | Glu | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | |
| gag | atg | tct | gga | ctt | cca | gca | gct | aga | aaa | cat | ctg | aac | aag | ctt | cgc | 1392 | |
| Glu | Met | Ser | Gly | Leu | Pro | Ala | Ala | Arg | Lys | His | Leu | Asn | Lys | Leu | Arg | | |
| | 450 | | | | | 455 | | | | | 460 | | | | | | |
| aac | atc | aga | tac | ggt | ttc | aac | acc | atc | ctg | gtt | atc | ctt | atc | tgg | agg | 1440 | |
| Asn | Ile | Arg | Tyr | Gly | Phe | Asn | Thr | Ile | Leu | Val | Ile | Leu | Ile | Trp | Arg | | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | | |
| atc | ttc | atc | gct | aga | agt | caa | atg | gcg | aga | aac | atc | tgg | tac | ttc | gtt | 1488 | |
| Ile | Phe | Ile | Ala | Arg | Ser | Gln | Met | Ala | Arg | Asn | Ile | Trp | Tyr | Phe | Val | | |
| | | | | 485 | | | | | 490 | | | | | 495 | | | |
| gtt | tcg | ctg | tgc | tac | aag | ttc | ctt | tct | tac | ttc | aga | gcc | tct | tcc | aca | 1536 | |
| Val | Ser | Leu | Cys | Tyr | Lys | Phe | Leu | Ser | Tyr | Phe | Arg | Ala | Ser | Ser | Thr | | |
| | | | 500 | | | | | 505 | | | | | 510 | | | | |
| atg | cga | tac | taa | | | | | | | | | | | | | 1548 | |
| Met | Arg | Tyr | | | | | | | | | | | | | | | |
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| <212> | PRT | | | | | | | | | | | | | | | | |
| <213> | Artificial | | | | | | | | | | | | | | | | |
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| <223> | Synthetic Construct | | | | | | | | | | | | | | | | |
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| Met | Val | Ser | Ile | Pro | Glu | Tyr | Tyr | Glu | Gly | Lys | Asn | Ile | Leu | Leu | Thr | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | |
| Gly | Ala | Thr | Gly | Phe | Leu | Gly | Lys | Val | Leu | Leu | Glu | Lys | Leu | Leu | Arg | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | |
| Ser | Cys | Pro | Arg | Val | Asn | Ser | Val | Tyr | Val | Leu | Val | Arg | Gln | Lys | Ala | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | |
| Gly | Gln | Thr | Pro | Gln | Glu | Arg | Val | Glu | Glu | Ile | Leu | Ser | Ser | Lys | Leu | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | |
| Phe | Asp | Arg | Leu | Arg | Asp | Glu | Asn | Pro | Asp | Phe | Arg | Glu | Lys | Ile | Ile | | |
| 65 | | | | | 70 | | | | 75 | | | | | | 80 | | |
| Ala | Ile | Asn | Ser | Glu | Leu | Thr | Gln | Pro | Lys | Leu | Ala | Leu | Ser | Glu | Glu | | |
| | | | | 85 | | | | | 90 | | | | | 95 | | | |
| Asp | Lys | Glu | Ile | Ile | Ile | Asp | Ser | Thr | Asn | Val | Ile | Phe | His | Cys | Ala | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| Ala | Thr | Val | Arg | Phe | Asn | Glu | Asn | Leu | Arg | Asp | Ala | Val | Gln | Leu | Asn | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |

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Val Ile Ala Thr Arg Gln Leu Ile Leu Leu Ala Gln Gln Met Lys Asn
 130 135 140
 Leu Glu Val Phe Met His Val Ser Thr Ala Tyr Ala Tyr Cys Asn Arg
 145 150 155 160
 Lys His Ile Asp Glu Val Val Tyr Pro Pro Val Asp Pro Lys Lys
 165 170 175
 Leu Ile Asp Ser Leu Glu Trp Met Asp Asp Gly Leu Val Asn Asp Ile
 180 185 190
 Thr Pro Lys Leu Ile Gly Asp Arg Pro Asn Thr Tyr Ile Tyr Thr Lys
 195 200 205
 Ala Leu Ala Glu Tyr Val Val Gln Gln Glu Gly Ala Lys Leu Asn Val
 210 215 220
 Ala Ile Val Arg Pro Ser Ile Val Gly Ala Ser Trp Lys Glu Pro Phe
 225 230 235 240
 Pro Gly Trp Ile Asp Asn Phe Asn Gly Pro Ser Gly Leu Phe Ile Ala
 245 250 255
 Ala Gly Lys Gly Ile Leu Arg Thr Met Arg Ala Ser Asn Asn Ala Leu
 260 265 270
 Ala Asp Leu Val Pro Val Asp Val Val Val Asn Thr Ser Leu Ala Ala
 275 280 285
 Ala Trp Tyr Ser Gly Val Asn Arg Pro Arg Asn Ile Met Val Tyr Asn
 290 295 300
 Cys Thr Thr Gly Ser Thr Asn Pro Phe His Trp Gly Glu Val Glu Tyr
 305 310 315 320
 His Val Ile Ser Thr Phe Lys Arg Asn Pro Leu Glu Gln Ala Phe Arg
 325 330 335
 Arg Pro Asn Val Asn Leu Thr Ser Asn His Leu Leu Tyr His Tyr Trp
 340 345 350
 Ile Ala Val Ser His Lys Ala Pro Ala Phe Leu Tyr Asp Ile Tyr Leu
 355 360 365
 Arg Met Thr Gly Arg Ser Pro Arg Met Met Lys Thr Ile Thr Arg Leu
 370 375 380
 His Lys Ala Met Val Phe Leu Glu Tyr Phe Thr Ser Asn Ser Trp Val
 385 390 395 400

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Trp Asn Thr Asp Asn Val Asn Met Leu Met Asn Gln Leu Asn Pro Glu
405 410 415

Asp Lys Lys Thr Phe Asn Ile Asp Val Arg Gln Leu His Trp Ala Glu
420 425 430

Tyr Ile Glu Asn Tyr Cys Met Gly Thr Lys Lys Tyr Val Leu Asn Glu
435 440 445

Glu Met Ser Gly Leu Pro Ala Ala Arg Lys His Leu Asn Lys Leu Arg
450 455 460

Asn Ile Arg Tyr Gly Phe Asn Thr Ile Leu Val Ile Leu Ile Trp Arg
465 470 475 480

Ile Phe Ile Ala Arg Ser Gln Met Ala Arg Asn Ile Trp Tyr Phe Val
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500 505 510

Met Arg Tyr
515

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

gag ttc atg cgc ttc aag gtg cac atg gag ggc tcc gtg aac ggc cac 96
Glu Phe Met Arg Phe Lys Val His Met Glu Gly Ser Val Asn Gly His
15 20 25 30

gag ttc gag atc gag ggc gag ggc gag ggc cgc ccc tac gag ggc acc 144
Glu Phe Glu Ile Glu Gly Glu Gly Glu Gly Arg Pro Tyr Glu Gly Thr
35 40 45

cag acc gcc aag ctg aag gtg acc aag ggt ggc ccc ctg ccc ttc gcc 192
Gln Thr Ala Lys Leu Lys Val Thr Lys Gly Gly Pro Leu Pro Phe Ala
50 55 60

tgg gac atc ctg tcc cct cag ttc atg tac ggc tcc aag gcc tac gtg 240
Trp Asp Ile Leu Ser Pro Gln Phe Met Tyr Gly Ser Lys Ala Tyr Val
65 70 75

aag cac ccc gcc gac atc ccc gac tac ttg aag ctg tcc ttc ccc gag 288
Lys His Pro Ala Asp Ile Pro Asp Tyr Leu Lys 90
80 85 90

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|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| ggc Gly 95 | ttc Phe | aag Lys | tgg Trp | gag Glu | cgc Arg 100 | gtg Val | atg Met | aac Asn | ttc Phe | gag Glu 105 | gac Asp | ggc Gly | ggc Gly | gtg Val | gtg Val 110 | 336 |
| acc Thr | gtg Val | acc Thr | cag Gln | gac Asp 115 | tcc Ser | tcc Ser | ctg Leu | cag Gln | gac Asp 120 | ggc Gly | gag Glu | ttc Phe | atc Ile | tac Tyr 125 | aag Lys | 384 |
| gtg Val | aag Lys | ctg Leu | cgc Arg 130 | ggc Gly | acc Thr | aac Asn | ttc Phe | ccc Pro 135 | tcc Ser | gac Asp | ggc Gly | ccc Pro | gta Val 140 | atg Met | cag Gln | 432 |
| aag Lys | aag Lys | acc Thr 145 | atg Met | ggc Gly | tgg Trp | gag Glu | gcc Ala 150 | tcc Ser | tcc Ser | gag Glu | cgg Arg | atg Met 155 | tac Tyr | ccc Pro | gag Glu | 480 |
| gac Asp | ggc Gly 160 | gcc Ala | ctg Leu | aag Lys | ggc Gly | gag Glu 165 | atc Ile | aag Lys | cag Gln | agg Arg | ctg Leu 170 | aag Lys | ctg Leu | aag Lys | gac Asp | 528 |
| ggc Gly 175 | ggc Gly | cac His | tac Tyr | gac Asp | gct Ala 180 | gag Glu | gtc Val | aag Lys | acc Thr | acc Thr 185 | tac Tyr | aag Lys | gcc Ala | aag Lys | aag Lys 190 | 576 |
| ccc Pro | gtg Val | cag Gln | ctg Leu | ccc Pro 195 | ggc Gly | gcc Ala | tac Tyr | aac Asn | gtc Val 200 | aac Asn | atc Ile | aag Lys | ttg Leu | gac Asp 205 | atc Ile | 624 |
| acc Thr | tcc Ser | cac His | aac Asn 210 | gag Glu | gac Asp | tac Tyr | acc Thr | atc Ile 215 | gtg Val | gaa Glu | cag Gln | tac Tyr | gaa Glu 220 | cgc Arg | gcc Ala | 672 |
| gag Glu | ggc Gly | cgc Arg 225 | cac His | tcc Ser | acc Thr | ggc Gly | ggc Gly 230 | atg Met | gac Asp | gag Glu | ctg Leu | tac Tyr 235 | aag Lys | gaa Glu | ttc Phe | 720 |
| atg Met | gtt Val 240 | tcc Ser | atc Ile | cca Pro | gag Glu | tac Tyr 245 | tat Tyr | gag Glu | gga Gly | aag Lys | aac Asn 250 | atc Ile | ttg Leu | cta Leu | act Thr | 768 |
| ggt Gly 255 | gca Ala | act Thr | gga Gly | ttt Phe | ctt Leu 260 | ggg Gly | aag Lys | gtt Val | ttg Leu | ctt Leu 265 | gag Glu | aag Lys | ctg Leu | cta Leu | aga Arg 270 | 816 |
| tct Ser | tgc Cys | cct Pro | aga Arg | gtc Val 275 | aac Asn | tcc Ser | gtt Val | tac Tyr | gtt Val 280 | cta Leu | gtc Val | aga Arg | caa Gln | aag Lys 285 | gct Ala | 864 |
| gga Gly | caa Gln | aca Thr | cct Pro 290 | caa Gln | gaa Glu | aga Arg | gtt Val | gag Glu 295 | gag Glu | atc Ile | ttg Leu | tca Ser | agc Ser 300 | aag Lys | ctc Leu | 912 |
| ttt Phe | gat Asp | aga Arg 305 | ctg Leu | cgt Arg | gat Asp | gag Glu | aat Asn 310 | cca Pro | gat Asp | ttc Phe | cga Arg | gag Glu 315 | aag Lys | atc Ile | atc Ile | 960 |
| gcc Ala | atc Ile 320 | aac Asn | tct Ser | gaa Glu | ttg Leu | acc Thr 325 | caa Gln | cct Pro | aag Lys | tta Leu | gcg Ala 330 | ctt Leu | tct Ser | gaa Glu | gag Glu | 1008 |
| gat Asp 335 | aag Lys | gag Glu | atc Ile | atc Ile | atc Ile 340 | gac Asp | tca Ser | acg Thr | aac Asn | gtt Val 345 | atc Ile | ttc Phe | cat His | tgc Cys | gct Ala 350 | 1056 |
| gca Ala | aca Thr | gtt Val | cgt Arg | ttc Phe 355 | aat Asn | gag Glu | aac Asn | cta Leu | cgg Arg 360 | gat Asp | gct Ala | gtt Val | caa Gln | ttg Leu 365 | aac Asn | 1104 |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| gtc | att | gct | acg | aga | caa | ctg | atc | tta | ctc | gct | cag | cag | atg | aag | aac | 1152 |
| Val | Ile | Ala | Thr | Arg | Gln | Leu | Ile | Leu | Leu | Ala | Gln | Gln | Met | Lys | Asn | |
| | | | 370 | | | | | 375 | | | | | 380 | | | |
| ctc | gaa | gtc | ttc | atg | cac | gtt | agt | act | gct | tac | gca | tac | tgt | aac | cgc | 1200 |
| Leu | Glu | Val | Phe | Met | His | Val | Ser | Thr | Ala | Tyr | Ala | Tyr | Cys | Asn | Arg | |
| | | 385 | | | | | 390 | | | | | 395 | | | | |
| aag | cac | atc | gat | gaa | gtt | gtt | tac | cca | cct | cca | gtt | gat | cct | aag | aag | 1248 |
| Lys | His | Ile | Asp | Glu | Val | Val | Tyr | Pro | Pro | Pro | Val | Asp | Pro | Lys | Lys | |
| | 400 | | | | | 405 | | | | | 410 | | | | | |
| ttg | atc | gac | tct | ctt | gag | tgg | atg | gat | gat | gga | ctt | gtg | aac | gac | ata | 1296 |
| Leu | Ile | Asp | Ser | Leu | Glu | Trp | Met | Asp | Asp | Gly | Leu | Val | Asn | Asp | Ile | |
| 415 | | | | | 420 | | | | | 425 | | | | | 430 | |
| aca | cca | aag | ctt | atc | gga | gac | aga | cca | aac | act | tac | atc | tac | act | aag | 1344 |
| Thr | Pro | Lys | Leu | Ile | Gly | Asp | Arg | Pro | Asn | Thr | Tyr | Ile | Tyr | Thr | Lys | |
| | | | | 435 | | | | | 440 | | | | | 445 | | |
| gca | ctg | gct | gag | tat | gtt | gtt | caa | caa | gag | gga | gct | aag | ttg | aac | gtt | 1392 |
| Ala | Leu | Ala | Glu | Tyr | Val | Val | Gln | Gln | Glu | Gly | Ala | Lys | Leu | Asn | Val | |
| | | | 450 | | | | | 455 | | | | | 460 | | | |
| gca | atc | gtt | aga | ccg | tct | att | gtt | gga | gct | tca | tgg | aaa | gaa | cca | ttc | 1440 |
| Ala | Ile | Val | Arg | Pro | Ser | Ile | Val | Gly | Ala | Ser | Trp | Lys | Glu | Pro | Phe | |
| | | 465 | | | | | 470 | | | | | 475 | | | | |
| cca | gga | tgg | att | gac | aac | ttc | aat | ggt | cca | tct | gga | ctt | ttc | att | gca | 1488 |
| Pro | Gly | Trp | Ile | Asp | Asn | Phe | Asn | Gly | Pro | Ser | Gly | Leu | Phe | Ile | Ala | |
| | 480 | | | | | 485 | | | | | 490 | | | | | |
| gct | ggc | aag | ggt | atc | ctc | aga | act | atg | aga | gca | agt | aac | aac | gca | ctt | 1536 |
| Ala | Gly | Lys | Gly | Ile | Leu | Arg | Thr | Met | Arg | Ala | Ser | Asn | Asn | Ala | Leu | |
| 495 | | | | | 500 | | | | | 505 | | | | | 510 | |
| gca | gat | ctt | gtt | cct | gtt | gac | gtt | gtc | gtt | aac | acc | tca | tta | gca | gct | 1584 |
| Ala | Asp | Leu | Val | Pro | Val | Asp | Val | Val | Val | Asn | Thr | Ser | Leu | Ala | Ala | |
| | | | | 515 | | | | | 520 | | | | | 525 | | |
| gca | tgg | tat | tct | gga | gtt | aac | aga | ccc | agg | aac | atc | atg | gtg | tac | aac | 1632 |
| Ala | Trp | Tyr | Ser | Gly | Val | Asn | Arg | Pro | Arg | Asn | Ile | Met | Val | Tyr | Asn | |
| | | | 530 | | | | | 535 | | | | | 540 | | | |
| tgt | aca | acg | gga | tct | aca | aac | cct | ttt | cat | tgg | ggt | gaa | gtt | gag | tat | 1680 |
| Cys | Thr | Thr | Gly | Ser | Thr | Asn | Pro | Phe | His | Trp | Gly | Glu | Val | Glu | Tyr | |
| | | 545 | | | | | 550 | | | | | 555 | | | | |
| cac | gtc | atc | tct | acc | ttc | aag | aga | aac | cct | ctt | gag | caa | gct | ttc | aga | 1728 |
| His | Val | Ile | Ser | Thr | Phe | Lys | Arg | Asn | Pro | Leu | Glu | Gln | Ala | Phe | Arg | |
| | 560 | | | | | 565 | | | | | 570 | | | | | |
| aga | cct | aac | gtg | aac | ctt | acc | tcc | aat | cat | cta | ctc | tac | cac | tac | tgg | 1776 |
| Arg | Pro | Asn | Val | Asn | Leu | Thr | Ser | Asn | His | Leu | Leu | Tyr | His | Tyr | Trp | |
| 575 | | | | | 580 | | | | | 585 | | | | | 590 | |
| att | gct | gtt | tct | cat | aag | gct | cct | gct | ttc | ttg | tac | gac | atc | tac | ctt | 1824 |
| Ile | Ala | Val | Ser | His | Lys | Ala | Pro | Ala | Phe | Leu | Tyr | Asp | Ile | Tyr | Leu | |
| | | | | 595 | | | | | 600 | | | | | 605 | | |
| cga | atg | act | ggt | aga | agt | cct | cgg | atg | atg | aag | acc | att | aca | cga | cta | 1872 |
| Arg | Met | Thr | Gly | Arg | Ser | Pro | Arg | Met | Met | Lys | Thr | Ile | Thr | Arg | Leu | |
| | | | 610 | | | | | 615 | | | | | 620 | | | |
| cac | aag | gct | atg | gtc | ttc | ctt | gag | tac | ttc | acc | tca | aac | tca | tgg | gtt | 1920 |
| His | Lys | Ala | Met | Val | Phe | Leu | Glu | Tyr | Phe | Thr | Ser | Asn | Ser | Trp | Val | |
| | | 625 | | | | | 630 | | | | | 635 | | | | |
| tgg | aac | act | gac | aac | gtt | aac | atg | ctc | atg | aac | cag | ctt | aac | cct | gag | 1968 |

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| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
| Trp | Asn | Thr | Asp | Asn | Val | Asn | Met | Leu | Met | Asn | Gln | Leu | Asn | Pro | Glu | | |
| 640 | | | | | | 645 | | | | | 650 | | | | | | |
| gac | aag | aag | acg | ttc | aac | att | gat | gtt | cga | cag | ctt | cac | tgg | gct | gag | 2016 | |
| Asp | Lys | Lys | Thr | Phe | Asn | Ile | Asp | Val | Arg | Gln | Leu | His | Trp | Ala | Glu | | |
| 655 | | | | | 660 | | | | | 665 | | | | | 670 | | |
| tac | ata | gag | aac | tac | tgt | atg | ggg | acg | aag | aag | tac | gtt | ctt | aac | gaa | 2064 | |
| Tyr | Ile | Glu | Asn | Tyr | Cys | Met | Gly | Thr | Lys | Lys | Tyr | Val | Leu | Asn | Glu | | |
| | | | | 675 | | | | | 680 | | | | | 685 | | | |
| gag | atg | tct | gga | ctt | cca | gca | gct | aga | aaa | cat | ctg | aac | aag | ctt | cgc | 2112 | |
| Glu | Met | Ser | Gly | Leu | Pro | Ala | Ala | Arg | Lys | His | Leu | Asn | Lys | Leu | Arg | | |
| | | | 690 | | | | | 695 | | | | | 700 | | | | |
| aac | atc | aga | tac | ggt | ttc | aac | acc | atc | ctg | gtt | atc | ctt | atc | tgg | agg | 2160 | |
| Asn | Ile | Arg | Tyr | Gly | Phe | Asn | Thr | Ile | Leu | Val | Ile | Leu | Ile | Trp | Arg | | |
| | | 705 | | | | | 710 | | | | | 715 | | | | | |
| atc | ttc | atc | gct | aga | agt | caa | atg | gcg | aga | aac | atc | tgg | tac | ttc | gtt | 2208 | |
| Ile | Phe | Ile | Ala | Arg | Ser | Gln | Met | Ala | Arg | Asn | Ile | Trp | Tyr | Phe | Val | | |
| | 720 | | | | | 725 | | | | | 730 | | | | | | |
| gtt | tcg | ctg | tgc | tac | aag | ttc | ctt | tct | tac | ttc | aga | gcc | tct | tcc | aca | 2256 | |
| Val | Ser | Leu | Cys | Tyr | Lys | Phe | Leu | Ser | Tyr | Phe | Arg | Ala | Ser | Ser | Thr | | |
| | | | | | 740 | | | | | 745 | | | | | 750 | | |
| atg | cga | tac | taa | ctcgag | | | | | | | | | | | | 2274 | |
| Met | Arg | Tyr | | | | | | | | | | | | | | | |

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 <211> 753
 <212> PRT
 <213> Artificial

<220>
 <223> Synthetic Construct

<400> 4

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

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Thr Gln Asp Ser Ser Leu Gln Asp Gly Glu Phe Ile Tyr Lys Val Lys
 115 120 125
 Leu Arg Gly Thr Asn Phe Pro Ser Asp Gly Pro Val Met Gln Lys Lys
 130 135 140
 Thr Met Gly Trp Glu Ala Ser Ser Glu Arg Met Tyr Pro Glu Asp Gly
 145 150 155 160
 Ala Leu Lys Gly Glu Ile Lys Gln Arg Leu Lys Leu Lys Asp Gly Gly
 165 170 175
 His Tyr Asp Ala Glu Val Lys Thr Thr Tyr Lys Ala Lys Lys Pro Val
 180 185 190
 Gln Leu Pro Gly Ala Tyr Asn Val Asn Ile Lys Leu Asp Ile Thr Ser
 195 200 205
 His Asn Glu Asp Tyr Thr Ile Val Glu Gln Tyr Glu Arg Ala Glu Gly
 210 215 220
 Arg His Ser Thr Gly Gly Met Asp Glu Leu Tyr Lys Glu Phe Met Val
 225 230 235 240
 Ser Ile Pro Glu Tyr Tyr Glu Gly Lys Asn Ile Leu Leu Thr Gly Ala
 245 250 255
 Thr Gly Phe Leu Gly Lys Val Leu Leu Glu Lys Leu Leu Arg Ser Cys
 260 265 270
 Pro Arg Val Asn Ser Val Tyr Val Leu Val Arg Gln Lys Ala Gly Gln
 275 280 285
 Thr Pro Gln Glu Arg Val Glu Glu Ile Leu Ser Ser Lys Leu Phe Asp
 290 295 300
 Arg Leu Arg Asp Glu Asn Pro Asp Phe Arg Glu Lys Ile Ile Ala Ile
 305 310 315 320
 Asn Ser Glu Leu Thr Gln Pro Lys Leu Ala Leu Ser Glu Glu Asp Lys
 325 330 335
 Glu Ile Ile Ile Asp Ser Thr Asn Val Ile Phe His Cys Ala Ala Thr
 340 345 350
 Val Arg Phe Asn Glu Asn Leu Arg Asp Ala Val Gln Leu Asn Val Ile
 355 360 365
 Ala Thr Arg Gln Leu Ile Leu Leu Ala Gln Gln Met Lys Asn Leu Glu
 370 375 380

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Val Phe Met His Val Ser Thr Ala Tyr Ala Tyr Cys Asn Arg Lys His
385 390 395 400

Ile Asp Glu Val Val Tyr Pro Pro Pro Val Asp Pro Lys Lys Leu Ile
405 410 415

Asp Ser Leu Glu Trp Met Asp Asp Gly Leu Val Asn Asp Ile Thr Pro
420 425 430

Lys Leu Ile Gly Asp Arg Pro Asn Thr Tyr Ile Tyr Thr Lys Ala Leu
435 440 445

Ala Glu Tyr Val Val Gln Gln Glu Gly Ala Lys Leu Asn Val Ala Ile
450 455 460

Val Arg Pro Ser Ile Val Gly Ala Ser Trp Lys Glu Pro Phe Pro Gly
465 470 475 480

Trp Ile Asp Asn Phe Asn Gly Pro Ser Gly Leu Phe Ile Ala Ala Gly
485 490 495

Lys Gly Ile Leu Arg Thr Met Arg Ala Ser Asn Asn Ala Leu Ala Asp
500 505 510

Leu Val Pro Val Asp Val Val Val Asn Thr Ser Leu Ala Ala Ala Trp
515 520 525

Tyr Ser Gly Val Asn Arg Pro Arg Asn Ile Met Val Tyr Asn Cys Thr
530 535 540

Thr Gly Ser Thr Asn Pro Phe His Trp Gly Glu Val Glu Tyr His Val
545 550 555 560

Ile Ser Thr Phe Lys Arg Asn Pro Leu Glu Gln Ala Phe Arg Arg Pro
565 570 575

Asn Val Asn Leu Thr Ser Asn His Leu Leu Tyr His Tyr Trp Ile Ala
580 585 590

Val Ser His Lys Ala Pro Ala Phe Leu Tyr Asp Ile Tyr Leu Arg Met
595 600 605

Thr Gly Arg Ser Pro Arg Met Met Lys Thr Ile Thr Arg Leu His Lys
610 615 620

Ala Met Val Phe Leu Glu Tyr Phe Thr Ser Asn Ser Trp Val Trp Asn
625 630 635 640

Thr Asp Asn Val Asn Met Leu Met Asn Gln Leu Asn Pro Glu Asp Lys
645 650 655

Lys Thr Phe Asn Ile Asp Val Arg Gln Leu His Trp Ala Glu Tyr Ile

660

665

670

Glu Asn Tyr Cys Met Gly Thr Lys Lys Tyr Val Leu Asn Glu Glu Met
 675 680 685

Ser Gly Leu Pro Ala Ala Arg Lys His Leu Asn Lys Leu Arg Asn Ile
 690 695 700

Arg Tyr Gly Phe Asn Thr Ile Leu Val Ile Leu Ile Trp Arg Ile Phe
 705 710 715 720

Ile Ala Arg Ser Gln Met Ala Arg Asn Ile Trp Tyr Phe Val Val Ser
 725 730 735

Leu Cys Tyr Lys Phe Leu Ser Tyr Phe Arg Ala Ser Ser Thr Met Arg
 740 745 750

Tyr

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<220>
 <223> mouse fatty acyl CoA reductase truncated

<220>
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 Met Val Ser Ile Pro Glu Tyr Tyr Glu Gly Lys Asn Ile Leu Leu Thr
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 ggt gca act gga ttt ctt ggg aag gtt ttg ctt gag aag ctg cta aga 96
 Gly Ala Thr Gly Phe Leu Gly Lys Val Leu Leu Glu Lys Leu Leu Arg
 20 25 30
 tct tgc cct aga gtc aac tcc gtt tac gtt cta gtc aga caa aag gct 144
 Ser Cys Pro Arg Val Asn Ser Val Tyr Val Leu Val Arg Gln Lys Ala
 35 40 45
 gga caa aca cct caa gaa aga gtt gag gag atc ttg tca agc aag ctc 192
 Gly Gln Thr Pro Gln Glu Arg Val Glu Glu Ile Leu Ser Ser Lys Leu
 50 55 60
 ttt gat aga ctg cgt gat gag aat cca gat ttc cga gag aag atc atc 240
 Phe Asp Arg Leu Arg Asp Glu Asn Pro Asp Phe Arg Glu Lys Ile Ile
 65 70 75 80
 gcc atc aac tct gaa ttg acc caa cct aag tta gcg ctt tct gaa gag 288
 Ala Ile Asn Ser Glu Leu Thr Gln Pro Lys Leu Ala Leu Ser Glu Glu
 85 90 95
 gat aag gag atc atc atc gac tca acg aac gtt atc ttc cat tgc gct 336
 Asp Lys Glu Ile Ile Ile Asp Ser Thr Asn Val Ile Phe His Cys Ala
 100 105 110

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| | | | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| gca Ala | aca Thr | ggt Val 115 | cgt Arg | ttc Phe | aat Asn | gag Glu | aac Asn 120 | cta Leu | cgg Arg | gat Asp | gct Ala | ggt Val 125 | caa Gln | ttg Leu | aac Asn | 384 |
| gtc Val | att Ile 130 | gct Ala | acg Thr | aga Arg | caa Gln | ctg Leu 135 | atc Ile | tta Leu | ctc Leu | gct Ala | cag Gln 140 | cag Gln | atg Met | aag Lys | aac Asn | 432 |
| ctc Leu 145 | gaa Glu | gtc Val | ttc Phe | atg Met | cac His 150 | ggt Val | agt Ser | act Thr | gct Ala | tac Tyr 155 | gca Ala | tac Tyr | tgt Cys | aac Asn | cgc Arg 160 | 480 |
| aag Lys | cac His | atc Ile | gat Asp | gaa Glu 165 | ggt Val | ggt Val | tac Tyr | cca Pro | cct Pro 170 | cca Pro | ggt Val | gat Asp | cct Pro | aag Lys 175 | aag Lys | 528 |
| ttg Leu | atc Ile | gac Asp | tct Ser 180 | ctt Leu | gag Glu | tgg Trp | atg Met | gat Asp 185 | gat Asp | gga Gly | ctt Leu | gtg Val | aac Asn 190 | gac Asp | ata Ile | 576 |
| aca Thr | cca Pro | aag Lys 195 | ctt Leu | atc Ile | gga Gly | gac Asp | aga Arg 200 | cca Pro | aac Asn | act Thr | tac Tyr | atc Ile 205 | tac Tyr | act Thr | aag Lys | 624 |
| gca Ala 210 | ctg Leu | gct Ala | gag Glu | tat Tyr | ggt Val | ggt Val 215 | caa Gln | caa Gln | gag Glu | gga Gly | gct Ala 220 | aag Lys | ttg Leu | aac Asn | ggt Val | 672 |
| gca Ala 225 | atc Ile | ggt Val | aga Arg | ccg Pro | tct Ser 230 | att Ile | ggt Val | gga Gly | gct Ala | tca Ser 235 | tgg Trp | aaa Lys | gaa Glu | cca Pro | ttc Phe 240 | 720 |
| cca Pro | gga Gly | tgg Trp | att Ile | gac Asp 245 | aac Asn | ttc Phe | aat Asn | ggt Gly | cca Pro 250 | tct Ser | gga Gly | ctt Leu | ttc Phe 255 | att Ile | gca Ala | 768 |
| gct Ala | ggc Gly | aag Lys | ggt Gly 260 | atc Ile | ctc Leu | aga Arg | act Thr | atg Met 265 | aga Arg | gca Ala | agt Ser | aac Asn | aac Asn 270 | gca Ala | ctt Leu | 816 |
| gca Ala | gat Asp | ctt Leu 275 | ggt Val | cct Pro | ggt Val | gac Asp | ggt Val 280 | gtc Val | ggt Val | aac Asn | acc Thr | tca Ser 285 | tta Leu | gca Ala | gct Ala | 864 |
| gca Ala | tgg Trp 290 | tat Tyr | tct Ser | gga Gly | ggt Val | aac Asn 295 | aga Arg | ccc Pro | agg Arg | aac Asn | atc Ile 300 | atg Met | gtg Val | tac Tyr | aac Asn | 912 |
| tgt Cys 305 | aca Thr | acg Thr | gga Gly | tct Ser | aca Thr 310 | aac Asn | cct Pro | ttt Phe | cat His | tgg Trp 315 | ggt Gly | gaa Glu | ggt Val | gag Glu | tat Tyr 320 | 960 |
| cac His | gtc Val | atc Ile | tct Ser | acc Thr 325 | ttc Phe | aag Lys | aga Arg | aac Asn | cct Pro 330 | ctt Leu | gag Glu | caa Gln | gct Ala | ttc Phe 335 | aga Arg | 1008 |
| aga Arg | cct Pro | aac Asn | gtg Val 340 | aac Asn | ctt Leu | acc Thr | tcc Ser | aat Asn 345 | cat His | cta Leu | ctc Leu | tac Tyr | cac His 350 | tac Tyr | tgg Trp | 1056 |
| att Ile | gct Ala | ggt Val 355 | tct Ser | cat His | aag Lys | gct Ala | cct Pro 360 | gct Ala | ttc Phe | ttg Leu | tac Tyr | gac Asp 365 | atc Ile | tac Tyr | ctt Leu | 1104 |
| cga Arg | atg Met 370 | act Thr | ggt Gly | aga Arg | agt Ser | cct Pro 375 | cgg Arg | atg Met | atg Met | aag Lys | acc Thr 380 | att Ile | aca Thr | cga Arg | cta Leu | 1152 |
| cac aag | gct atg | gtc ttc | ctt gag | tac ttc | acc tca | aac tca | tgg gtt | | | | | | | | | 1200 |

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| | | | | | | | | | | | | | | | | | |
|------------|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|------------|------|--|
| His 385 | Lys | Ala | Met | Val | Phe 390 | Leu | Glu | Tyr | Phe | Thr 395 | Ser | Asn | Ser | Trp | Val 400 | | |
| tgg | aac | act | gac | aac | gtt | aac | atg | ctc | atg | aac | cag | ctt | aac | cct | gag | 1248 | |
| Trp | Asn | Thr | Asp | Asn 405 | Val | Asn | Met | Leu | Met 410 | Asn | Gln | Leu | Asn | Pro | Glu 415 | | |
| gac | aag | aag | acg | ttc | aac | att | gat | gtt | cga | cag | ctt | cac | tgg | gct | gag | 1296 | |
| Asp | Lys | Lys | Thr 420 | Phe | Asn | Ile | Asp | Val 425 | Arg | Gln | Leu | His | Trp 430 | Ala | Glu | | |
| tac | ata | gag | aac | tac | tgt | atg | ggg | acg | aag | aag | tac | gtt | ctt | aac | gaa | 1344 | |
| Tyr | Ile | Glu 435 | Asn | Tyr | Cys | Met | Gly 440 | Thr | Lys | Lys | Tyr | Val 445 | Leu | Asn | Glu | | |
| gag | atg | tct | gga | ctt | cca | gca | gct | aga | aaa | cat | ctg | aac | aag | ctt | cgc | 1392 | |
| Glu | Met | Ser | Gly | Leu | Pro | Ala 455 | Ala | Arg | Lys | His | Leu 460 | Asn | Lys | Leu | Arg | | |
| aac | atc | aga | taa | | | | | | | | | | | | | 1404 | |
| Asn | Ile | Arg | | | | | | | | | | | | | | | |
| 465 | | | | | | | | | | | | | | | | | |

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 <211> 467
 <212> PRT
 <213> Artificial

<220>
 <223> Synthetic Construct

<400> 6

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| Met 1 | Val | Ser | Ile | Pro 5 | Glu | Tyr | Tyr | Glu | Gly 10 | Lys | Asn | Ile | Leu | Leu 15 | Thr | | |
| Gly | Ala | Thr | Gly 20 | Phe | Leu | Gly | Lys | Val 25 | Leu | Leu | Glu | Lys | Leu 30 | Leu | Arg | | |
| Ser | Cys | Pro 35 | Arg | Val | Asn | Ser | Val 40 | Tyr | Val | Leu | Val | Arg 45 | Gln | Lys | Ala | | |
| Gly | Gln | Thr | Pro | Gln | Glu | Arg 55 | Val | Glu | Glu | Ile | Leu 60 | Ser | Ser | Lys | Leu | | |
| Phe 65 | Asp | Arg | Leu | Arg | Asp 70 | Glu | Asn | Pro | Asp | Phe 75 | Arg | Glu | Lys | Ile | Ile 80 | | |
| Ala | Ile | Asn | Ser | Glu 85 | Leu | Thr | Gln | Pro | Lys 90 | Leu | Ala | Leu | Ser | Glu 95 | Glu | | |
| Asp | Lys | Glu | Ile 100 | Ile | Ile | Asp | Ser | Thr 105 | Asn | Val | Ile | Phe | His 110 | Cys | Ala | | |
| Ala | Thr | Val 115 | Arg | Phe | Asn | Glu | Asn 120 | Leu | Arg | Asp | Ala | Val 125 | Gln | Leu | Asn | | |
| Val | Ile 130 | Ala | Thr | Arg | Gln | Leu 135 | Ile | Leu | Leu | Ala | Gln 140 | Gln | Met | Lys | Asn | | |

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Leu Glu Val Phe Met His Val Ser Thr Ala Tyr Ala Tyr Cys Asn Arg
 145 150 155 160
 Lys His Ile Asp Glu Val Val Tyr Pro Pro Val Asp Pro Lys Lys
 165 170 175
 Leu Ile Asp Ser Leu Glu Trp Met Asp Asp Gly Leu Val Asn Asp Ile
 180 185 190
 Thr Pro Lys Leu Ile Gly Asp Arg Pro Asn Thr Tyr Ile Tyr Thr Lys
 195 200 205
 Ala Leu Ala Glu Tyr Val Val Gln Gln Glu Gly Ala Lys Leu Asn Val
 210 215 220
 Ala Ile Val Arg Pro Ser Ile Val Gly Ala Ser Trp Lys Glu Pro Phe
 225 230 235 240
 Pro Gly Trp Ile Asp Asn Phe Asn Gly Pro Ser Gly Leu Phe Ile Ala
 245 250 255
 Ala Gly Lys Gly Ile Leu Arg Thr Met Arg Ala Ser Asn Asn Ala Leu
 260 265 270
 Ala Asp Leu Val Pro Val Asp Val Val Val Asn Thr Ser Leu Ala Ala
 275 280 285
 Ala Trp Tyr Ser Gly Val Asn Arg Pro Arg Asn Ile Met Val Tyr Asn
 290 295 300
 Cys Thr Thr Gly Ser Thr Asn Pro Phe His Trp Gly Glu Val Glu Tyr
 305 310 315 320
 His Val Ile Ser Thr Phe Lys Arg Asn Pro Leu Glu Gln Ala Phe Arg
 325 330 335
 Arg Pro Asn Val Asn Leu Thr Ser Asn His Leu Leu Tyr His Tyr Trp
 340 345 350
 Ile Ala Val Ser His Lys Ala Pro Ala Phe Leu Tyr Asp Ile Tyr Leu
 355 360 365
 Arg Met Thr Gly Arg Ser Pro Arg Met Met Lys Thr Ile Thr Arg Leu
 370 375 380
 His Lys Ala Met Val Phe Leu Glu Tyr Phe Thr Ser Asn Ser Trp Val
 385 390 395 400
 Trp Asn Thr Asp Asn Val Asn Met Leu Met Asn Gln Leu Asn Pro Glu
 405 410 415

Asp Lys Lys Thr Phe Asn Ile Asp Val Arg Gln Leu His Trp Ala Glu
 420 425 430

Tyr Ile Glu Asn Tyr Cys Met Gly Thr Lys Lys Tyr Val Leu Asn Glu
 435 440 445

Glu Met Ser Gly Leu Pro Ala Ala Arg Lys His Leu Asn Lys Leu Arg
 450 455 460

Asn Ile Arg
 465

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 <211> 2130
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 <213> Artificial

<220>
 <223> mouse fatty acyl CoA reductase tagged with mCherry

<220>
 <221> CDS
 <222> (7)..(2124)

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 1 5 10

gag ttc atg cgc ttc aag gtg cac atg gag ggc tcc gtg aac ggc cac 96
 Glu Phe Met Arg Phe Lys Val His Met Glu Gly Ser Val Asn Gly His
 15 20 25 30

gag ttc gag atc gag ggc gag ggc gag ggc cgc ccc tac gag ggc acc 144
 Glu Phe Glu Ile Glu Gly Glu Gly Glu Gly Arg Pro Tyr Glu Gly Thr
 35 40 45

cag acc gcc aag ctg aag gtg acc aag ggt ggc ccc ctg ccc ttc gcc 192
 Gln Thr Ala Lys Leu Lys Val Thr Lys Gly Gly Pro Leu Pro Phe Ala
 50 55 60

tgg gac atc ctg tcc cct cag ttc atg tac ggc tcc aag gcc tac gtg 240
 Trp Asp Ile Leu Ser Pro Gln Phe Met Tyr Gly Ser Lys Ala Tyr Val
 65 70 75

aag cac ccc gcc gac atc ccc gac tac ttg aag ctg tcc ttc ccc gag 288
 Lys His Pro Ala Asp Ile Pro Asp Tyr Leu Lys Leu Ser Phe Pro Glu
 80 85 90

ggc ttc aag tgg gag cgc gtg atg aac ttc gag gac ggc ggc gtg gtg 336
 Gly Phe Lys Trp Glu Arg Val Met Asn Phe Glu Asp Gly Gly Val Val
 95 100 105 110

acc gtg acc cag gac tcc tcc ctg cag gac ggc gag ttc atc tac aag 384
 Thr Val Thr Gln Asp Ser Ser Leu Gln Asp Gly Glu Phe Ile Tyr Lys
 115 120 125

gtg aag ctg cgc ggc acc aac ttc ccc tcc gac ggc ccc gta atg cag 432
 Val Lys Leu Arg Gly Thr Asn Phe Pro Ser Asp Gly Pro Val Met Gln
 130 135 140

aag aag acc atg ggc tgg gag gcc tcc tcc gag cgg atg tac ccc gag 480
 Lys Lys Thr Met Gly Trp Glu Ala Ser Ser Glu Arg Met Tyr Pro Glu
 145 150 155

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| | | | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| gac Asp | ggc Gly 160 | gcc Ala | ctg Leu | aag Lys | ggc Gly | gag Glu 165 | atc Ile | aag Lys | cag Gln | agg Arg | ctg Leu 170 | aag Lys | ctg Leu | aag Lys | gac Asp | 528 |
| ggc Gly 175 | ggc Gly | cac His | tac Tyr | gac Asp | gct Ala 180 | gag Glu | gtc Val | aag Lys | acc Thr 185 | tac Tyr | aag Lys | gcc Ala | aag Lys | aag Lys 190 | 576 | |
| ccc Pro | gtg Val | cag Gln | ctg Leu | ccc Pro 195 | ggc Gly | gcc Ala | tac Tyr | aac Asn | gtc Val 200 | aac Asn | atc Ile | aag Lys | ttg Leu | gac Asp 205 | atc Ile | 624 |
| acc Thr | tcc Ser | cac His | aac Asn 210 | gag Glu | gac Asp | tac Tyr | acc Thr | atc Ile 215 | gtg Val | gaa Glu | cag Gln | tac Tyr | gaa Glu 220 | cgc Arg | gcc Ala | 672 |
| gag Glu | ggc Gly | cgc Arg 225 | cac His | tcc Ser | acc Thr | ggc Gly | ggc Gly 230 | atg Met | gac Asp | gag Glu | ctg Leu | tac Tyr 235 | aag Lys | gaa Glu | ttc Phe | 720 |
| atg Met | gtt Val 240 | tcc Ser | atc Ile | cca Pro | gag Glu | tac Tyr 245 | tat Tyr | gag Glu | gga Gly | aag Lys | aac Asn 250 | atc Ile | ttg Leu | cta Leu | act Thr | 768 |
| ggt Gly 255 | gca Ala | act Thr | gga Gly | ttt Phe | ctt Leu 260 | ggg Gly | aag Lys | gtt Val | ttg Leu | ctt Leu 265 | gag Glu | aag Lys | ctg Leu | cta Leu | aga Arg 270 | 816 |
| tct Ser | tgc Cys | cct Pro | aga Arg | gtc Val 275 | aac Asn | tcc Ser | gtt Val | tac Tyr | gtt Val 280 | cta Leu | gtc Val | aga Arg | caa Gln | aag Lys 285 | gct Ala | 864 |
| gga Gly | caa Gln | aca Thr | cct Pro 290 | caa Gln | gaa Glu | aga Arg | gtt Val | gag Glu 295 | gag Glu | atc Ile | ttg Leu | tca Ser | agc Ser 300 | aag Lys | ctc Leu | 912 |
| ttt Phe | gat Asp | aga Arg 305 | ctg Leu | cgt Arg | gat Asp | gag Glu | aat Asn 310 | cca Pro | gat Asp | ttc Phe | cga Arg | gag Glu 315 | aag Lys | atc Ile | atc Ile | 960 |
| gcc Ala 320 | atc Ile | aac Asn | tct Ser | gaa Glu | ttg Leu | acc Thr 325 | caa Gln | cct Pro | aag Lys | tta Leu | gcg Ala 330 | ctt Leu | tct Ser | gaa Glu | gag Glu | 1008 |
| gat Asp 335 | aag Lys | gag Glu | atc Ile | atc Ile | atc Ile 340 | gac Asp | tca Ser | acg Thr | aac Asn | gtt Val 345 | atc Ile | ttc Phe | cat His | tgc Cys | gct Ala 350 | 1056 |
| gca Ala | aca Thr | gtt Val | cgt Arg | ttc Phe 355 | aat Asn | gag Glu | aac Asn | cta Leu | cgg Arg 360 | gat Asp | gct Ala | gtt Val | caa Gln | ttg Leu 365 | aac Asn | 1104 |
| gtc Val | att Ile | gct Ala | acg Thr 370 | aga Arg | caa Gln | ctg Leu | atc Ile | tta Leu 375 | ctc Leu | gct Ala | cag Gln | cag Gln | atg Met 380 | aag Lys | aac Asn | 1152 |
| ctc Leu | gaa Glu | gtc Val 385 | ttc Phe | atg Met | cac His | gtt Val | agt Ser 390 | act Thr | gct Ala | tac Tyr | gca Ala | tac Tyr 395 | tgt Cys | aac Asn | cgc Arg | 1200 |
| aag Lys | cac His 400 | atc Ile | gat Asp | gaa Glu | gtt Val | gtt Val 405 | tac Tyr | cca Pro | cct Pro | cca Pro | gtt Val 410 | gat Asp | cct Pro | aag Lys | aag Lys | 1248 |
| ttg Leu 415 | atc Ile | gac Asp | tct Ser | ctt Leu | gag Glu 420 | tgg Trp | atg Met | gat Asp | gat Asp | gga Gly 425 | ctt Leu | gtg Val | aac Asn | gac Asp | ata Ile 430 | 1296 |

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| aca | cca | aag | ctt | atc | gga | gac | aga | cca | aac | act | tac | atc | tac | act | aag | 1344 |
| Thr | Pro | Lys | Leu | Ile | Gly | Asp | Arg | Pro | Asn | Thr | Tyr | Ile | Tyr | Thr | Lys | |
| | | | | 435 | | | | | 440 | | | | | 445 | | |
| gca | ctg | gct | gag | tat | gtt | gtt | caa | caa | gag | gga | gct | aag | ttg | aac | gtt | 1392 |
| Ala | Leu | Ala | Glu | Tyr | Val | Val | Gln | Gln | Glu | Gly | Ala | Lys | Leu | Asn | Val | |
| | | | 450 | | | | | 455 | | | | | 460 | | | |
| gca | atc | gtt | aga | ccg | tct | att | gtt | gga | gct | tca | tgg | aaa | gaa | cca | ttc | 1440 |
| Ala | Ile | Val | Arg | Pro | Ser | Ile | Val | Gly | Ala | Ser | Trp | Lys | Glu | Pro | Phe | |
| | | 465 | | | | | 470 | | | | | 475 | | | | |
| cca | gga | tgg | att | gac | aac | ttc | aat | ggc | cca | tct | gga | ctt | ttc | att | gca | 1488 |
| Pro | Gly | Trp | Ile | Asp | Asn | Phe | Asn | Gly | Pro | Ser | Gly | Leu | Phe | Ile | Ala | |
| | 480 | | | | | 485 | | | | | 490 | | | | | |
| gct | ggc | aag | ggt | atc | ctc | aga | act | atg | aga | gca | agt | aac | aac | gca | ctt | 1536 |
| Ala | Gly | Lys | Gly | Ile | Leu | Arg | Thr | Met | Arg | Ala | Ser | Asn | Asn | Ala | Leu | |
| 495 | | | | | 500 | | | | | 505 | | | | | 510 | |
| gca | gat | ctt | gtt | cct | gtt | gac | gtt | gtc | gtt | aac | acc | tca | tta | gca | gct | 1584 |
| Ala | Asp | Leu | Val | Pro | Val | Asp | Val | Val | Val | Asn | Thr | Ser | Leu | Ala | Ala | |
| | | | | 515 | | | | | 520 | | | | | 525 | | |
| gca | tgg | tat | tct | gga | gtt | aac | aga | ccc | agg | aac | atc | atg | gtg | tac | aac | 1632 |
| Ala | Trp | Tyr | Ser | Gly | Val | Asn | Arg | Pro | Arg | Asn | Ile | Met | Val | Tyr | Asn | |
| | | | 530 | | | | | 535 | | | | | 540 | | | |
| tgt | aca | acg | gga | tct | aca | aac | cct | ttt | cat | tgg | ggc | gaa | gtt | gag | tat | 1680 |
| Cys | Thr | Thr | Gly | Ser | Thr | Asn | Pro | Phe | His | Trp | Gly | Glu | Val | Glu | Tyr | |
| | | 545 | | | | | 550 | | | | | 555 | | | | |
| cac | gtc | atc | tct | acc | ttc | aag | aga | aac | cct | ctt | gag | caa | gct | ttc | aga | 1728 |
| His | Val | Ile | Ser | Thr | Phe | Lys | Arg | Asn | Pro | Leu | Glu | Gln | Ala | Phe | Arg | |
| | 560 | | | | | 565 | | | | | 570 | | | | | |
| aga | cct | aac | gtg | aac | ctt | acc | tcc | aat | cat | cta | ctc | tac | cac | tac | tgg | 1776 |
| Arg | Pro | Asn | Val | Asn | Leu | Thr | Ser | Asn | His | Leu | Leu | Tyr | His | Tyr | Trp | |
| 575 | | | | | 580 | | | | | 585 | | | | | 590 | |
| att | gct | gtt | tct | cat | aag | gct | cct | gct | ttc | ttg | tac | gac | atc | tac | ctt | 1824 |
| Ile | Ala | Val | Ser | His | Lys | Ala | Pro | Ala | Phe | Leu | Tyr | Asp | Ile | Tyr | Leu | |
| | | | | 595 | | | | | 600 | | | | | 605 | | |
| cga | atg | act | ggt | aga | agt | cct | cgg | atg | atg | aag | acc | att | aca | cga | cta | 1872 |
| Arg | Met | Thr | Gly | Arg | Ser | Pro | Arg | Met | Met | Lys | Thr | Ile | Thr | Arg | Leu | |
| | | | 610 | | | | | 615 | | | | | 620 | | | |
| cac | aag | gct | atg | gtc | ttc | ctt | gag | tac | ttc | acc | tca | aac | tca | tgg | gtt | 1920 |
| His | Lys | Ala | Met | Val | Phe | Leu | Glu | Tyr | Phe | Thr | Ser | Asn | Ser | Trp | Val | |
| | | 625 | | | | | 630 | | | | | 635 | | | | |
| tgg | aac | act | gac | aac | gtt | aac | atg | ctc | atg | aac | cag | ctt | aac | cct | gag | 1968 |
| Trp | Asn | Thr | Asp | Asn | Val | Asn | Met | Leu | Met | Asn | Gln | Leu | Asn | Pro | Glu | |
| | 640 | | | | | 645 | | | | | 650 | | | | | |
| gac | aag | aag | acg | ttc | aac | att | gat | gtt | cga | cag | ctt | cac | tgg | gct | gag | 2016 |
| Asp | Lys | Lys | Thr | Phe | Asn | Ile | Asp | Val | Arg | Gln | Leu | His | Trp | Ala | Glu | |
| 655 | | | | | 660 | | | | | 665 | | | | | 670 | |
| tac | ata | gag | aac | tac | tgt | atg | ggg | acg | aag | aag | tac | gtt | ctt | aac | gaa | 2064 |
| Tyr | Ile | Glu | Asn | Tyr | Cys | Met | Gly | Thr | Lys | Lys | Tyr | Val | Leu | Asn | Glu | |
| | | | | 675 | | | | | 680 | | | | | 685 | | |
| gag | atg | tct | gga | ctt | cca | gca | gct | aga | aaa | cat | ctg | aac | aag | ctt | cgc | 2112 |
| Glu | Met | Ser | Gly | Leu | Pro | Ala | Ala | Arg | Lys | His | Leu | Asn | Lys | Leu | Arg | |
| | | | 690 | | | | | 695 | | | | | 700 | | | |
| aac | atc | aga | taa | ctcgag | | | | | | | | | | | | 2130 |

Asn Ile Arg
705

<210> 8
<211> 705
<212> PRT
<213> Artificial

<220>
<223> Synthetic Construct

<400> 8

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Met Arg Phe Lys Val His Met Glu Gly Ser Val Asn Gly His Glu Phe
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Glu Ile Glu Gly Glu Gly Glu Gly Arg Pro Tyr Glu Gly Thr Gln Thr
35 40 45

Ala Lys Leu Lys Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Trp Asp
50 55 60

Ile Leu Ser Pro Gln Phe Met Tyr Gly Ser Lys Ala Tyr Val Lys His
65 70 75 80

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

Lys Trp Glu Arg Val Met Asn Phe Glu Asp Gly Gly Val Val Thr Val
100 105 110

Thr Gln Asp Ser Ser Leu Gln Asp Gly Glu Phe Ile Tyr Lys Val Lys
115 120 125

Leu Arg Gly Thr Asn Phe Pro Ser Asp Gly Pro Val Met Gln Lys Lys
130 135 140

Thr Met Gly Trp Glu Ala Ser Ser Glu Arg Met Tyr Pro Glu Asp Gly
145 150 155 160

Ala Leu Lys Gly Glu Ile Lys Gln Arg Leu Lys Leu Lys Asp Gly Gly
165 170 175

His Tyr Asp Ala Glu Val Lys Thr Thr Tyr Lys Ala Lys Lys Pro Val
180 185 190

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

His Asn Glu Asp Tyr Thr Ile Val Glu Gln Tyr Glu Arg Ala Glu Gly
210 215 220

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Arg His Ser Thr Gly Gly Met Asp Glu Leu Tyr Lys Glu Phe Met Val
 225 230 235 240
 Ser Ile Pro Glu Tyr Tyr Glu Gly Lys Asn Ile Leu Leu Thr Gly Ala
 245 250 255
 Thr Gly Phe Leu Gly Lys Val Leu Leu Glu Lys Leu Leu Arg Ser Cys
 260 265 270
 Pro Arg Val Asn Ser Val Tyr Val Leu Val Arg Gln Lys Ala Gly Gln
 275 280 285
 Thr Pro Gln Glu Arg Val Glu Glu Ile Leu Ser Ser Lys Leu Phe Asp
 290 295 300
 Arg Leu Arg Asp Glu Asn Pro Asp Phe Arg Glu Lys Ile Ile Ala Ile
 305 310 315 320
 Asn Ser Glu Leu Thr Gln Pro Lys Leu Ala Leu Ser Glu Glu Asp Lys
 325 330 335
 Glu Ile Ile Ile Asp Ser Thr Asn Val Ile Phe His Cys Ala Ala Thr
 340 345 350
 Val Arg Phe Asn Glu Asn Leu Arg Asp Ala Val Gln Leu Asn Val Ile
 355 360 365
 Ala Thr Arg Gln Leu Ile Leu Leu Ala Gln Gln Met Lys Asn Leu Glu
 370 375 380
 Val Phe Met His Val Ser Thr Ala Tyr Ala Tyr Cys Asn Arg Lys His
 385 390 395 400
 Ile Asp Glu Val Val Tyr Pro Pro Pro Val Asp Pro Lys Lys Leu Ile
 405 410 415
 Asp Ser Leu Glu Trp Met Asp Asp Gly Leu Val Asn Asp Ile Thr Pro
 420 425 430
 Lys Leu Ile Gly Asp Arg Pro Asn Thr Tyr Ile Tyr Thr Lys Ala Leu
 435 440 445
 Ala Glu Tyr Val Val Gln Gln Glu Gly Ala Lys Leu Asn Val Ala Ile
 450 455 460
 Val Arg Pro Ser Ile Val Gly Ala Ser Trp Lys Glu Pro Phe Pro Gly
 465 470 475 480
 Trp Ile Asp Asn Phe Asn Gly Pro Ser Gly Leu Phe Ile Ala Ala Gly
 485 490 495

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Lys Gly Ile Leu Arg Thr Met Arg Ala Ser Asn Asn Ala Leu Ala Asp
500 505 510

Leu Val Pro Val Asp Val Val Val Asn Thr Ser Leu Ala Ala Ala Trp
515 520 525

Tyr Ser Gly Val Asn Arg Pro Arg Asn Ile Met Val Tyr Asn Cys Thr
530 535 540

Thr Gly Ser Thr Asn Pro Phe His Trp Gly Glu Val Glu Tyr His Val
545 550 555 560

Ile Ser Thr Phe Lys Arg Asn Pro Leu Glu Gln Ala Phe Arg Arg Pro
565 570 575

Asn Val Asn Leu Thr Ser Asn His Leu Leu Tyr His Tyr Trp Ile Ala
580 585 590

Val Ser His Lys Ala Pro Ala Phe Leu Tyr Asp Ile Tyr Leu Arg Met
595 600 605

Thr Gly Arg Ser Pro Arg Met Met Lys Thr Ile Thr Arg Leu His Lys
610 615 620

Ala Met Val Phe Leu Glu Tyr Phe Thr Ser Asn Ser Trp Val Trp Asn
625 630 635 640

Thr Asp Asn Val Asn Met Leu Met Asn Gln Leu Asn Pro Glu Asp Lys
645 650 655

Lys Thr Phe Asn Ile Asp Val Arg Gln Leu His Trp Ala Glu Tyr Ile
660 665 670

Glu Asn Tyr Cys Met Gly Thr Lys Lys Tyr Val Leu Asn Glu Glu Met
675 680 685

Ser Gly Leu Pro Ala Ala Arg Lys His Leu Asn Lys Leu Arg Asn Ile
690 695 700

Arg
705

<210> 9
<211> 2559
<212> DNA
<213> Artificial

<220>
<223> mouse fatty acyl CoA reductase truncated, tagged with mCherry and
fused to oleosin 3At

<220>
<221> CDS
<222> (7)..(2553)

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| | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|-----|
| <400> | 9 | | | | | | | | | | | | | | | | |
| gtc | gac | atg | gcg | gac | caa | aca | aga | acc | cat | cac | gag | atg | ata | agc | cga | | 48 |
| | Met | Ala | Asp | Gln | Thr | Arg | Thr | His | His | Glu | Met | Ile | Ser | Arg | | | |
| | 1 | | | | 5 | | | | | | 10 | | | | | | |
| gac | agt | acc | caa | gag | gcc | cat | ccg | aag | gcc | agg | cag | atg | gtg | aag | gca | | 96 |
| Asp | Ser | Thr | Gln | Glu | Ala | His | Pro | Lys | Ala | Arg | Gln | Met | Val | Lys | Ala | | |
| 15 | | | | | 20 | | | | | 25 | | | | | 30 | | |
| gca | acc | gct | gtc | aca | gcc | ggg | gga | tcc | cta | ctt | gtc | ctc | tcc | ggc | tta | | 144 |
| Ala | Thr | Ala | Val | Thr | Ala | Gly | Gly | Ser | Leu | Leu | Val | Leu | Ser | Gly | Leu | | |
| | | | | 35 | | | | | 40 | | | | | 45 | | | |
| aca | ctc | gct | gga | aca | gtc | atc | gca | ctc | acg | gtg | gct | act | cct | ctc | ctc | | 192 |
| Thr | Leu | Ala | Gly | Thr | Val | Ile | Ala | Leu | Thr | Val | Ala | Thr | Pro | Leu | Leu | | |
| | | | 50 | | | | | 55 | | | | | 60 | | | | |
| gtc | atc | ttc | agc | ccc | gtc | ttg | gtt | cca | gca | gtg | gta | acc | gtt | gct | ctc | | 240 |
| Val | Ile | Phe | Ser | Pro | Val | Leu | Val | Pro | Ala | Val | Val | Thr | Val | Ala | Leu | | |
| | | 65 | | | | | 70 | | | | | 75 | | | | | |
| atc | att | acc | gga | ttc | ctt | gca | tcc | ggg | ggc | ttt | gga | ata | gcc | gcc | att | | 288 |
| Ile | Ile | Thr | Gly | Phe | Leu | Ala | Ser | Gly | Gly | Phe | Gly | Ile | Ala | Ala | Ile | | |
| | 80 | | | | | 85 | | | | 90 | | | | | | | |
| acc | gcc | ttc | tct | tgg | ctc | tac | agg | cac | atg | acg | gga | tct | gga | tcg | gat | | 336 |
| Thr | Ala | Phe | Ser | Trp | Leu | Tyr | Arg | His | Met | Thr | Gly | Ser | Gly | Ser | Asp | | |
| 95 | | | | | 100 | | | | | 105 | | | | | 110 | | |
| aag | ata | gag | aat | gct | cgg | atg | aag | gtt | gga | agc | aga | gtg | cag | gat | act | | 384 |
| Lys | Ile | Glu | Asn | Ala | Arg | Met | Lys | Val | Gly | Ser | Arg | Val | Gln | Asp | Thr | | |
| | | | | 115 | | | | | 120 | | | | | 125 | | | |
| aag | tat | ggg | cag | cac | aac | att | gga | gtc | caa | cac | caa | caa | gtt | tct | gga | | 432 |
| Lys | Tyr | Gly | Gln | His | Asn | Ile | Gly | Val | Gln | His | Gln | Gln | Val | Ser | Gly | | |
| | | | 130 | | | | | 135 | | | | | 140 | | | | |
| tcc | atg | gtg | agc | aag | ggc | gag | gag | gat | aac | atg | gcc | atc | atc | aag | gag | | 480 |
| Ser | Met | Val | Ser | Lys | Gly | Glu | Glu | Asp | Asn | Met | Ala | Ile | Ile | Lys | Glu | | |
| | | 145 | | | | | 150 | | | | | 155 | | | | | |
| ttc | atg | cgc | ttc | aag | gtg | cac | atg | gag | ggc | tcc | gtg | aac | ggc | cac | gag | | 528 |
| Phe | Met | Arg | Phe | Lys | Val | His | Met | Glu | Gly | Ser | Val | Asn | Gly | His | Glu | | |
| | 160 | | | | | 165 | | | | | 170 | | | | | | |
| ttc | gag | atc | gag | ggc | gag | ggc | gag | ggc | cgc | ccc | tac | gag | ggc | acc | cag | | 576 |
| Phe | Glu | Ile | Glu | Gly | Glu | Gly | Glu | Gly | Arg | Pro | Tyr | Glu | Gly | Thr | Gln | | |
| 175 | | | | | 180 | | | | 185 | | | | | | 190 | | |
| acc | gcc | aag | ctg | aag | gtg | acc | aag | ggg | ggc | ccc | ctg | ccc | ttc | gcc | tgg | | 624 |
| Thr | Ala | Lys | Leu | Lys | Val | Thr | Lys | Gly | Gly | | | | | | | | |

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| | | | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| aag Lys | ctg Leu | cg Arg | ggc Gly | acc Thr 275 | aac Asn | ttc Phe | ccc Pro | tcc Ser | gac Asp 280 | ggc Gly | ccc Pro | gta Val | atg Met | cag Gln 285 | aag Lys | 864 |
| aag Lys | acc Thr | atg Met | ggc Gly 290 | tgg Trp | gag Glu | gcc Ala | tcc Ser | tcc Ser 295 | gag Glu | cgg Arg | atg Met | tac Tyr | ccc Pro 300 | gag Glu | gac Asp | 912 |
| ggc Gly | gcc Ala | ctg Leu 305 | aag Lys | ggc Gly | gag Glu | atc Ile | aag Lys 310 | cag Gln | agg Arg | ctg Leu | aag Lys | ctg Leu 315 | aag Lys | gac Asp | ggc Gly | 960 |
| ggc Gly | cac His 320 | tac Tyr | gac Asp | gct Ala | gag Glu | gtc Val 325 | aag Lys | acc Thr | acc Thr | tac Tyr | aag Lys 330 | gcc Ala | aag Lys | aag Lys | ccc Pro | 1008 |
| gtg Val 335 | cag Gln | ctg Leu | ccc Pro | ggc Gly | gcc Ala 340 | tac Tyr | aac Asn | gtc Val | aac Asn | atc Ile 345 | aag Lys | ttg Leu | gac Asp | atc Ile | acc Thr 350 | 1056 |
| tcc Ser | cac His | aac Asn | gag Glu | gac Asp 355 | tac Tyr | acc Thr | atc Ile | gtg Val | gaa Glu 360 | cag Gln | tac Tyr | gaa Glu | cgc Arg | gcc Ala 365 | gag Glu | 1104 |
| ggc Gly | cgc Arg | cac His | tcc Ser 370 | acc Thr | ggc Gly | ggc Gly | atg Met | gac Asp 375 | gag Glu | ctg Leu | tac Tyr | aag Lys | gaa Glu 380 | ttc Phe | atg Met | 1152 |
| gtt Val | tcc Ser | atc Ile 385 | cca Pro | gag Glu | tac Tyr | tat Tyr | gag Glu 390 | gga Gly | aag Lys | aac Asn | atc Ile | ttg Leu 395 | cta Leu | act Thr | ggt Gly | 1200 |
| gca Ala | act Thr 400 | gga Gly | ttt Phe | ctt Leu | ggg Gly | aag Lys 405 | gtt Val | ttg Leu | ctt Leu | gag Glu | aag Lys 410 | ctg Leu | cta Leu | aga Arg | tct Ser | 1248 |
| tgc Cys 415 | cct Pro | aga Arg | gtc Val | aac Asn | tcc Ser 420 | gtt Val | tac Tyr | gtt Val | cta Leu | gtc Val 425 | aga Arg | caa Gln | aag Lys | gct Ala | gga Gly 430 | 1296 |
| caa Gln | aca Thr | cct Pro | caa Gln | gaa Glu 435 | aga Arg | gtt Val | gag Glu | gag Glu | atc Ile 440 | ttg Leu | tca Ser | agc Ser | aag Lys | ctc Leu 445 | ttt Phe | 1344 |
| gat Asp | aga Arg | ctg Leu | cgt Arg 450 | gat Asp | gag Glu | aat Asn | cca Pro | gat Asp 455 | ttc Phe | cga Arg | gag Glu | aag Lys | atc Ile 460 | atc Ile | gcc Ala | 1392 |
| atc Ile | aac Asn | tct Ser 465 | gaa Glu | ttg Leu | acc Thr | caa Gln | cct Pro 470 | aag Lys | tta Leu | gcg Ala | ctt Leu | tct Ser 475 | gaa Glu | gag Glu | gat Asp | 1440 |
| aag Lys | gag Glu 480 | atc Ile | atc Ile | atc Ile | gac Asp | tca Ser 485 | acg Thr | aac Asn | gtt Val | atc Ile | ttc Phe 490 | cat His | tgc Cys | gct Ala | gca Ala | 1488 |
| aca Thr 495 | gtt Val | cgt Arg | ttc Phe | aat Asn | gag Glu 500 | aac Asn | cta Leu | cgg Arg | gat Asp | gct Ala 505 | gtt Val | caa Gln | ttg Leu | aac Asn | gtc Val 510 | 1536 |
| att Ile | gct Ala | acg Thr | aga Arg | caa Gln 515 | ctg Leu | atc Ile | tta Leu | ctc Leu | gct Ala 520 | cag Gln | cag Gln | atg Met | aag Lys | aac Asn 525 | ctc Leu | 1584 |
| gaa Glu | gtc Val | ttc Phe | atg Met 530 | cac His | gtt Val | agt Ser | act Thr | gct Ala 535 | tac Tyr | gca Ala | tac Tyr | tgt Cys | aac Asn 540 | cgc Arg | aag Lys | 1632 |

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| | | | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| cac His | atc Ile | gat Asp 545 | gaa Glu | gtt Val | gtt Val | tac Tyr | cca Pro 550 | cct Pro | cca Pro | gtt Val | gat Asp 555 | cct Pro | aag Lys | aag Lys | ttg Leu | 1680 |
| atc Ile | gac Asp 560 | tct Ser | ctt Leu | gag Glu | tgg Trp | atg Met 565 | gat Asp | gat Asp | gga Gly | ctt Leu | gtg Val 570 | aac Asn | gac Asp | ata Ile | aca Thr | 1728 |
| cca Pro 575 | aag Lys | ctt Leu | atc Ile | gga Gly | gac Asp 580 | aga Arg | cca Pro | aac Asn | act Thr | tac Tyr 585 | atc Ile | tac Tyr | act Thr | aag Lys | gca Ala 590 | 1776 |
| ctg Leu | gct Ala | gag Glu | tat Tyr | gtt Val 595 | gtt Val | caa Gln | caa Gln | gag Glu | gga Gly 600 | gct Ala | aag Lys | ttg Leu | aac Asn | gtt Val 605 | gca Ala | 1824 |
| atc Ile | gtt Val | aga Arg 610 | ccg Pro | tct Ser | att Ile | gtt Val | gga Gly | gct Ala 615 | tca Ser | tgg Trp | aaa Lys | gaa Glu | cca Pro 620 | ttc Phe | cca Pro | 1872 |
| gga Gly | tgg Trp | att Ile 625 | gac Asp | aac Asn | ttc Phe | aat Asn | ggt Gly 630 | cca Pro | tct Ser | gga Gly | ctt Leu | ttc Phe 635 | att Ile | gca Ala | gct Ala | 1920 |
| ggc Gly | aag Lys 640 | ggt Gly | atc Ile | ctc Leu | aga Arg | act Thr 645 | atg Met | aga Arg | gca Ala | agt Ser | aac Asn 650 | aac Asn | gca Ala | ctt Leu | gca Ala | 1968 |
| gat Asp 655 | ctt Leu | gtt Val | cct Pro | gtt Val | gac Asp 660 | gtt Val | gtc Val | gtt Val | aac Asn | acc Thr 665 | tca Ser | tta Leu | gca Ala | gct Ala | gca Ala 670 | 2016 |
| tgg Trp | tat Tyr | tct Ser | gga Gly | gtt Val 675 | aac Asn | aga Arg | ccc Pro | agg Arg | aac Asn 680 | atc Ile | atg Met | gtg Val | tac Tyr | aac Asn 685 | tgt Cys | 2064 |
| aca Thr | acg Thr | gga Gly | tct Ser 690 | aca Thr | aac Asn | cct Pro | ttt Phe | cat His 695 | tgg Trp | ggt Gly | gaa Glu | gtt Val | gag Glu 700 | tat Tyr | cac His | 2112 |
| gtc Val | atc Ile | tct Ser 705 | acc Thr | ttc Phe | aag Lys | aga Arg | aac Asn 710 | cct Pro | ctt Leu | gag Glu | caa Gln | gct Ala 715 | ttc Phe | aga Arg | aga Arg | 2160 |
| cct Pro 720 | aac Asn | gtg Val | aac Asn | ctt Leu | acc Thr | tcc Ser 725 | aat Asn | cat His | cta Leu | ctc Leu | tac Tyr 730 | cac His | tac Tyr | tgg Trp | att Ile | 2208 |
| gct Ala 735 | gtt Val | tct Ser | cat His | aag Lys | gct Ala 740 | cct Pro | gct Ala | ttc Phe | ttg Leu | tac Tyr 745 | gac Asp | atc Ile | tac Tyr | ctt Leu | cga Arg 750 | 2256 |
| atg Met | act Thr | ggt Gly | aga Arg | agt Ser 755 | cct Pro | cgg Arg | atg Met | atg Met | aag Lys 760 | acc Thr | att Ile | aca Thr | cga Arg | cta Leu 765 | cac His | 2304 |
| aag Lys | gct Ala | atg Met | gtc Val 770 | ttc Phe | ctt Leu | gag Glu | tac Tyr | ttc Phe 775 | acc Thr | tca Ser | aac Asn | tca Ser | tgg Trp 780 | gtt Val | tgg Trp | 2352 |
| aac Asn | act Thr | gac Asp 785 | aac Asn | gtt Val | aac Asn | atg Met | ctc Leu 790 | atg Met | aac Asn | cag Gln | ctt Leu | aac Asn 795 | cct Pro | gag Glu | gac Asp | 2400 |
| aag Lys | aag Lys 800 | acg Thr | ttc Phe | aac Asn | att Ile | gat Asp 805 | gtt Val | cga Arg | cag Gln | ctt Leu | cac His 810 | tgg Trp | gct Ala | gag Glu | tac Tyr | 2448 |
| ata | gag | aac | tac | tgt | atg | ggg | acg | aag | aag | tac | gtt | ctt | aac | gaa | gag | 2496 |

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Ile Glu Asn Tyr Cys Met Gly Thr Lys Lys Tyr Val Leu Asn Glu Glu
815 820 825 830
atg tct gga ctt cca gca gct aga aaa cat ctg aac aag ctt cgc aac 2544
Met Ser Gly Leu Pro Ala Ala Arg Lys His Leu Asn Lys Leu Arg Asn
835 840 845

atc aga taa ctcgag 2559
Ile Arg

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<212> PRT
<213> Artificial

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<223> Synthetic Construct
<400> 10

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Thr Gln Glu Ala His Pro Lys Ala Arg Gln Met Val Lys Ala Ala Thr
20 25 30

Ala Val Thr Ala Gly Gly Ser Leu Leu Val Leu Ser Gly Leu Thr Leu
35 40 45

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

Phe Ser Pro Val Leu Val Pro Ala Val Val Thr Val Ala Leu Ile Ile
65 70 75 80

Thr Gly Phe Leu Ala Ser Gly Gly Phe Gly Ile Ala Ala Ile Thr Ala
85 90 95

Phe Ser Trp Leu Tyr Arg His Met Thr Gly Ser Gly Ser Asp Lys Ile
100 105 110

Glu Asn Ala Arg Met Lys Val Gly Ser Arg Val Gln Asp Thr Lys Tyr
115 120 125

Gly Gln His Asn Ile Gly Val Gln His Gln Gln Val Ser Gly Ser Met
130 135 140

Val Ser Lys Gly Glu Glu Asp Asn Met Ala Ile Ile Lys Glu Phe Met
145 150 155 160

Arg Phe Lys Val His Met Glu Gly Ser Val Asn Gly His Glu Phe Glu
165 170 175

Ile Glu Gly Glu Gly Glu Gly Arg Pro Tyr Glu Gly Thr Gln Thr Ala
180 185 190

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

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Ser Glu Leu Thr Gln Pro Lys Leu Ala Leu Ser Glu Glu Asp Lys Glu
 465 470 475 480
 Ile Ile Ile Asp Ser Thr Asn Val Ile Phe His Cys Ala Ala Thr Val
 485 490 495
 Arg Phe Asn Glu Asn Leu Arg Asp Ala Val Gln Leu Asn Val Ile Ala
 500 505 510
 Thr Arg Gln Leu Ile Leu Leu Ala Gln Gln Met Lys Asn Leu Glu Val
 515 520 525
 Phe Met His Val Ser Thr Ala Tyr Ala Tyr Cys Asn Arg Lys His Ile
 530 535 540
 Asp Glu Val Val Tyr Pro Pro Pro Val Asp Pro Lys Lys Leu Ile Asp
 545 550 555 560
 Ser Leu Glu Trp Met Asp Asp Gly Leu Val Asn Asp Ile Thr Pro Lys
 565 570 575
 Leu Ile Gly Asp Arg Pro Asn Thr Tyr Ile Tyr Thr Lys Ala Leu Ala
 580 585 590
 Glu Tyr Val Val Gln Gln Glu Gly Ala Lys Leu Asn Val Ala Ile Val
 595 600 605
 Arg Pro Ser Ile Val Gly Ala Ser Trp Lys Glu Pro Phe Pro Gly Trp
 610 615 620
 Ile Asp Asn Phe Asn Gly Pro Ser Gly Leu Phe Ile Ala Ala Gly Lys
 625 630 635 640
 Gly Ile Leu Arg Thr Met Arg Ala Ser Asn Asn Ala Leu Ala Asp Leu
 645 650 655
 Val Pro Val Asp Val Val Val Asn Thr Ser Leu Ala Ala Ala Trp Tyr
 660 665 670
 Ser Gly Val Asn Arg Pro Arg Asn Ile Met Val Tyr Asn Cys Thr Thr
 675 680 685
 Gly Ser Thr Asn Pro Phe His Trp Gly Glu Val Glu Tyr His Val Ile
 690 695 700
 Ser Thr Phe Lys Arg Asn Pro Leu Glu Gln Ala Phe Arg Arg Pro Asn
 705 710 715 720
 Val Asn Leu Thr Ser Asn His Leu Leu Tyr His Tyr Trp Ile Ala Val
 725 730 735
 Ser His Lys Ala Pro Ala Phe Leu Tyr Asp Ile Tyr Leu Arg Met Thr
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740

745

750

Gly Arg Ser Pro Arg Met Met Lys Thr Ile Thr Arg Leu His Lys Ala
 755 760 765

Met Val Phe Leu Glu Tyr Phe Thr Ser Asn Ser Trp Val Trp Asn Thr
 770 775 780

Asp Asn Val Asn Met Leu Met Asn Gln Leu Asn Pro Glu Asp Lys Lys
 785 790 795 800

Thr Phe Asn Ile Asp Val Arg Gln Leu His Trp Ala Glu Tyr Ile Glu
 805 810 815

Asn Tyr Cys Met Gly Thr Lys Lys Tyr Val Leu Asn Glu Glu Met Ser
 820 825 830

Gly Leu Pro Ala Ala Arg Lys His Leu Asn Lys Leu Arg Asn Ile Arg
 835 840 845

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 gct ctt ttc caa tgg gct ttg tct gca ctc gtt atc gtt act acc gtc 96
 Ala Leu Phe Gln Trp Ala Leu Ser Ala Leu Val Ile Val Thr Thr Val
 20 25 30
 atc atc gtg aac ctg tac ctt gtt gtg ttc act tca tac tgg cca gtt 144
 Ile Ile Val Asn Leu Tyr Leu Val Val Phe Thr Ser Tyr Trp Pro Val
 35 40 45
 acc gtt ttg atg cta aca tgg ctg gca ttc gat tgg aaa aca cct gaa 192
 Thr Val Leu Met Leu Thr Trp Leu Ala Phe Asp Trp Lys Thr Pro Glu
 50 55 60
 aga gga ggt aga agg ttc aca tgt gtg aga aag tgg cgt ctt tgg aaa 240
 Arg Gly Gly Arg Arg Phe Thr Cys Val Arg Lys Trp Arg Leu Trp Lys
 65 70 75 80
 cac tac tct gac tac ttc cct ctt aag atg gtg aag acg aag gat atc 288
 His Tyr Ser Asp Tyr Phe Pro Leu Lys Met Val Lys Thr Lys Asp Ile
 85 90 95
 tcc cct gat aga aac tac ata ctt gtc tgt cac cca cat ggt ctt atg 336
 Ser Pro Asp Arg Asn Tyr Ile Leu Val Cys His Pro His Gly Leu Met
 100 105 110

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| gca | cat | agt | tgt | ttc | gga | cat | ttc | gct | acc | gat | act | aca | gga | ttc | agt | 384 |
| Ala | His | Ser | Cys | Phe | Gly | His | Phe | Ala | Thr | Asp | Thr | Thr | Gly | Phe | Ser | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| aag | acc | ttc | cct | ggt | atc | aca | cct | tac | atg | ctt | act | ctt | gga | gct | ttc | 432 |
| Lys | Thr | Phe | Pro | Gly | Ile | Thr | Pro | Tyr | Met | Leu | Thr | Leu | Gly | Ala | Phe | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| ttc | tgg | gtt | cct | ttc | ttg | aga | gat | tac | gtc | atg | tca | acc | gga | agt | tgt | 480 |
| Phe | Trp | Val | Pro | Phe | Leu | Arg | Asp | Tyr | Val | Met | Ser | Thr | Gly | Ser | Cys | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| tct | gtg | tcc | aga | agc | tct | atg | gac | ttc | ttg | ctt | acg | caa | aag | ggt | aca | 528 |
| Ser | Val | Ser | Arg | Ser | Ser | Met | Asp | Phe | Leu | Leu | Thr | Gln | Lys | Gly | Thr | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| gga | aac | atg | ctt | gtt | gtc | gtt | gtt | ggt | gga | ctt | gct | gaa | tgt | aga | tac | 576 |
| Gly | Asn | Met | Leu | Val | Val | Val | Val | Gly | Gly | Leu | Ala | Glu | Cys | Arg | Tyr | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| tct | aca | cca | ggc | tca | aca | acc | ctt | ttc | cta | aag | aag | agg | cag | gga | ttt | 624 |
| Ser | Thr | Pro | Gly | Ser | Thr | Thr | Leu | Phe | Leu | Lys | Lys | Arg | Gln | Gly | Phe | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| gtt | cgt | aca | gca | cta | aag | cat | ggg | gtt | tct | ttg | atc | cct | gct | tat | gca | 672 |
| Val | Arg | Thr | Ala | Leu | Lys | His | Gly | Val | Ser | Leu | Ile | Pro | Ala | Tyr | Ala | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| ttt | gga | gag | act | gac | ctc | tac | gat | caa | cat | atc | ttc | act | cct | gga | gga | 720 |
| Phe | Gly | Glu | Thr | Asp | Leu | Tyr | Asp | Gln | His | Ile | Phe | Thr | Pro | Gly | Gly | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| ttc | gtc | aac | aga | ttc | caa | aag | tgg | ttc | cag | aag | atg | gtt | cac | atc | tac | 768 |
| Phe | Val | Asn | Arg | Phe | Gln | Lys | Trp | Phe | Gln | Lys | Met | Val | His | Ile | Tyr | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| cca | tgt | gct | ttc | tat | gga | aga | ggt | ctg | acc | aag | aat | tca | tgg | ggt | ctt | 816 |
| Pro | Cys | Ala | Phe | Tyr | Gly | Arg | Gly | Leu | Thr | Lys | Asn | Ser | Trp | Gly | Leu | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| ttg | cct | tac | tca | caa | cca | gtt | act | aca | gtt | gtt | gga | gag | cca | tta | ccg | 864 |
| Leu | Pro | Tyr | Ser | Gln | Pro | Val | Thr | Thr | Val | Val | Gly | Glu | Pro | Leu | Pro | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| ttg | cct | aag | ata | gaa | aac | cct | agc | gaa | gag | att | gtt | gcc | aag | tat | cac | 912 |
| Leu | Pro | Lys | Ile | Glu | Asn | Pro | Ser | Glu | Glu | Ile | Val | Ala | Lys | Tyr | His | |
| | 290 | | | | | 295 | | | | | 300 | | | | | |
| acc | ctt | tac | atc | gat | gct | ctc | aga | aag | cta | ttc | gac | cag | cac | aag | act | 960 |
| Thr | Leu | Tyr | Ile | Asp | Ala | Leu | Arg | Lys | Leu | Phe | Asp | Gln | His | Lys | Thr | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| aag | ttc | gga | atc | tct | gag | aca | caa | gag | ctg | gtt | atc | gtc | taa | | | 1002 |
| Lys | Phe | Gly | Ile | Ser | Glu | Thr | Gln | Glu | Leu | Val | Ile | Val | | | | |
| | | | | 325 | | | | | 330 | | | | | | | |

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 <223> Synthetic Construct

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Ala Leu Phe Gln Trp Ala Leu Ser Ala Leu Val Ile Val Thr Thr Val
20 25 30

Ile Ile Val Asn Leu Tyr Leu Val Val Phe Thr Ser Tyr Trp Pro Val
35 40 45

Thr Val Leu Met Leu Thr Trp Leu Ala Phe Asp Trp Lys Thr Pro Glu
50 55 60

Arg Gly Gly Arg Arg Phe Thr Cys Val Arg Lys Trp Arg Leu Trp Lys
65 70 75 80

His Tyr Ser Asp Tyr Phe Pro Leu Lys Met Val Lys Thr Lys Asp Ile
85 90 95

Ser Pro Asp Arg Asn Tyr Ile Leu Val Cys His Pro His Gly Leu Met
100 105 110

Ala His Ser Cys Phe Gly His Phe Ala Thr Asp Thr Thr Gly Phe Ser
115 120 125

Lys Thr Phe Pro Gly Ile Thr Pro Tyr Met Leu Thr Leu Gly Ala Phe
130 135 140

Phe Trp Val Pro Phe Leu Arg Asp Tyr Val Met Ser Thr Gly Ser Cys
145 150 155 160

Ser Val Ser Arg Ser Ser Met Asp Phe Leu Leu Thr Gln Lys Gly Thr
165 170 175

Gly Asn Met Leu Val Val Val Val Gly Gly Leu Ala Glu Cys Arg Tyr
180 185 190

Ser Thr Pro Gly Ser Thr Thr Leu Phe Leu Lys Lys Arg Gln Gly Phe
195 200 205

Val Arg Thr Ala Leu Lys His Gly Val Ser Leu Ile Pro Ala Tyr Ala
210 215 220

Phe Gly Glu Thr Asp Leu Tyr Asp Gln His Ile Phe Thr Pro Gly Gly
225 230 235 240

Phe Val Asn Arg Phe Gln Lys Trp Phe Gln Lys Met Val His Ile Tyr
245 250 255

Pro Cys Ala Phe Tyr Gly Arg Gly Leu Thr Lys Asn Ser Trp Gly Leu
260 265 270

Leu Pro Tyr Ser Gln Pro Val Thr Thr Val Val Gly Glu Pro Leu Pro
275 280 285

Leu Pro Lys Ile Glu Asn Pro Ser Glu Glu Ile Val Ala Lys Tyr His
290 295 300

Lys Phe Gly Ile Ser Glu Thr Gln Glu Leu Val Ile Val
325 330

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<222> (7) .. (1725)

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Lys Asn Gly Ile Lys Val Asn Phe Lys Ile Arg His Asn Ile Glu Asp

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| 160 | 165 | 170 | |
|-------------------|-------------------|-------------------|-------------------|
| ggc Gly 175 | agc Ser | gtg Val | cag Gln |
| ctc Leu | gcc Ala 180 | gac Asp | cac His |
| tac Tyr | cag Gln | cag Gln 185 | aac Asn |
| acc Thr | ccc Pro | atc Ile | ggc Gly 190 |
| 576 | | | |
| gac Asp | ggc Gly | ccc Pro | gtg Val |
| ctg Leu 195 | ctg Leu | ccc Pro | gac Asp |
| aac Asn | cac His 200 | tac Tyr | ctg Leu |
| agc Ser | tac Tyr | cag Gln 205 | tcc Ser |
| 624 | | | |
| gcc Ala | ctg Leu | agc Ser | aaa Lys 210 |
| gac Asp | ccc Pro | aac Asn | gag Glu |
| aag Lys 215 | cgc Arg | gat Asp | cac His |
| atg Met | gtc Val 220 | ctg Leu | ctg Leu |
| 672 | | | |
| gag Glu | ttc Phe | gtg Val 225 | acc Thr |
| gcc Ala | gcc Ala | ggg Gly | atc Ile 230 |
| act Thr | ctc Leu | ggc Gly | atg Met |
| gac Asp 235 | gag Glu | ctg Leu | tac Tyr |
| 720 | | | |
| aag Lys | atg Met 240 | ttc Phe | tgg Trp |
| cct Pro | act Thr | aag Lys 245 | aag Lys |
| gac Asp | ctt Leu | aag Lys | act Thr 250 |
| gca Ala | atg Met | gag Glu | gtt Val |
| 768 | | | |
| ttc Phe 255 | gct Ala | ctt Leu | ttc Phe |
| caa Gln | tgg Trp 260 | gct Ala | ttg Leu |
| tct Ser | gca Ala | ctc Leu 265 | gtt Val |
| atc Ile | gtt Val | act Thr | acc Thr 270 |
| 816 | | | |
| gtc Val | atc Ile | atc Ile | gtt Val |
| aac Asn 275 | ctg Leu | tac Tyr | ctt Leu |
| ggt Val | tac Tyr | gtt Val 280 | ttc Phe |
| act Thr | tca Ser | tac Tyr | tgg Trp 285 |
| 864 | | | |
| gtt Val | acc Thr | gtt Val | ttg Leu 290 |
| atg Met | cta Leu | aca Thr | tgg Trp |
| ctg Leu 295 | gca Ala | ttc Phe | gat Asp |
| tgg Trp | aaa Lys 300 | aca Thr | cct Pro |
| 912 | | | |
| gaa Glu | aga Arg | gga Gly 305 | ggt Gly |
| aga Arg | agg Arg | ttc Phe | aca Thr 310 |
| tgt Cys | gtg Val | aga Arg | aag Lys |
| tgg Trp 315 | cgt Arg | ctt Leu | tgg Trp |
| 960 | | | |
| aaa Lys | cac His 320 | tac Tyr | tct Ser |
| gac Asp | tac Tyr | ttc Phe 325 | cct Pro |
| ctt Leu | aag Lys | atg Met | gtg Val 330 |
| aag Lys | acg Thr | aag Lys | gat Asp |
| 1008 | | | |
| atc Ile 335 | tcc Ser | cct Pro | gat Asp |
| aga Arg | aac Asn 340 | tac Tyr | ata Ile |
| ctt Leu | gtc Val | tgt Cys 345 | cac His |
| cca Pro | cat His | ggt Gly 350 | ctt Leu 350 |
| 1056 | | | |
| atg Met | gca Ala | cat His | agt Ser |
| tgt Cys 355 | ttc Phe | gga Gly | cat His |
| gct Ala 360 | acc Thr | gat Asp | act Thr |
| aca Thr | gga Gly 365 | ttc Phe | ttc Phe |
| 1104 | | | |
| agt Ser | aag Lys | acc Thr | ttc Phe 370 |
| cct Pro | ggt Gly | atc Ile | aca Thr |
| cct Pro 375 | tac Tyr | atg Met | ctt Leu |
| act Thr | ctt Leu 380 | gga Gly | gct Ala |
| 1152 | | | |
| ttc Phe | ttc Phe | tgg Trp 385 | gtt Val |
| cct Pro | ttc Phe | ttg Leu | aga Arg 390 |
| gat Asp | tac Tyr | gtc Val | atg Met |
| ctt Leu | act Thr | aca Thr | aag Lys |
| 1200 | | | |
| tgt Cys | tct Ser | gtg Val | tcc Ser |
| aga Arg | agc Ser | tct Ser 405 | atg Met |
| gac Asp | ttc Phe | ttg Leu | ctt Leu 410 |
| act Thr | caa Gln | aag Lys | ggt Gly |
| 1248 | | | |
| aca Thr 415 | gga Gly | aac Asn | atg Met |
| ctt Leu | gtt Val 420 | gtc Val | gtt Val |
| ggt Gly 425 | gga Gly | ctt Leu | gct Ala |
| gaa Glu | tgt Cys | aga Arg 430 | |
| 1296 | | | |
| tac Tyr | tct Ser | aca Thr | acc Thr |
| ctt Leu | ttc Phe 440 | cta Leu | aag Lys |
| aag Lys | agg Arg | cag Gln 445 | gga Gly |
| 1344 | | | |

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| | |
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| ttt gtt cgt aca gca cta aag cat ggg gtt tct ttg atc cct gct tat | 1392 |
| Phe Val Arg Thr 450 Ala Leu Lys His Gly 455 Val Ser Leu Ile Pro Ala Tyr | |
| gca ttt gga gag act gac ctc tac gat caa cat atc ttc act cct gga | 1440 |
| Ala Phe Gly 465 Glu Thr Asp Leu Tyr 470 Asp Gln His Ile Phe 475 Thr Pro Gly | |
| gga ttc gtc aac aga ttc caa aag tgg ttc cag aag atg gtt cac atc | 1488 |
| Gly Phe 480 Val Asn Arg Phe 485 Gln Lys Trp Phe Gln Lys 490 Met Val His Ile | |
| tac cca tgt gct ttc tat gga aga ggt ctg acc aag aat tca tgg ggt | 1536 |
| Tyr Pro Cys Ala Phe Tyr 500 Gly Arg Gly Leu Thr 505 Lys Asn Ser Trp Gly 510 | |
| ctt ttg cct tac tca caa cca gtt act aca gtt gtt gga gag cca tta | 1584 |
| Leu Leu Pro Tyr Ser 515 Gln Pro Val Thr 520 Thr Val Val Gly Glu Pro Leu 525 | |
| ccg ttg cct aag ata gaa aac cct agc gaa gag att gtt gcc aag tat | 1632 |
| Pro Leu Pro Lys 530 Ile Glu Asn Pro Ser 535 Glu Glu Ile Val Ala Lys Tyr | |
| cac acc ctt tac atc gat gct ctc aga aag cta ttc gac cag cac aag | 1680 |
| His Thr 545 Leu Tyr Ile Asp Ala Leu 550 Arg Lys Leu Phe 555 Asp Gln His Lys | |
| act aag ttc gga atc tct gag aca caa gag ctg gtt atc gtc taa | 1725 |
| Thr Lys 560 Phe Gly Ile Ser Glu 565 Thr Gln Glu Leu Val 570 Ile Val | |
| gagctc | 1731 |

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 20 25 30

Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile
 35 40 45

Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr
 50 55 60

Phe Gly Tyr Gly Leu Gln Cys Phe Ala Arg Tyr Pro Asp His Met Lys
 65 70 75 80

Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu
 85 90 95

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Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu
 100 105 110
 Val Lys Phe Glu Gly Asp Thr Leu Val Asn Arg Ile Glu Leu Lys Gly
 115 120 125
 Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr
 130 135 140
 Asn Tyr Asn Ser His Asn Val Tyr Ile Met Ala Asp Lys Gln Lys Asn
 145 150 155 160
 Gly Ile Lys Val Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser
 165 170 175
 Val Gln Leu Ala Asp His Tyr Gln Gln Asn Thr Pro Ile Gly Asp Gly
 180 185 190
 Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Tyr Gln Ser Ala Leu
 195 200 205
 Ser Lys Asp Pro Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe
 210 215 220
 Val Thr Ala Ala Gly Ile Thr Leu Gly Met Asp Glu Leu Tyr Lys Met
 225 230 235 240
 Phe Trp Pro Thr Lys Lys Asp Leu Lys Thr Ala Met Glu Val Phe Ala
 245 250 255
 Leu Phe Gln Trp Ala Leu Ser Ala Leu Val Ile Val Thr Thr Val Ile
 260 265 270
 Ile Val Asn Leu Tyr Leu Val Val Phe Thr Ser Tyr Trp Pro Val Thr
 275 280 285
 Val Leu Met Leu Thr Trp Leu Ala Phe Asp Trp Lys Thr Pro Glu Arg
 290 295 300
 Gly Gly Arg Arg Phe Thr Cys Val Arg Lys Trp Arg Leu Trp Lys His
 305 310 315 320
 Tyr Ser Asp Tyr Phe Pro Leu Lys Met Val Lys Thr Lys Asp Ile Ser
 325 330 335
 Pro Asp Arg Asn Tyr Ile Leu Val Cys His Pro His Gly Leu Met Ala
 340 345 350
 His Ser Cys Phe Gly His Phe Ala Thr Asp Thr Thr Gly Phe Ser Lys
 355 360 365

Thr Phe Pro Gly Ile Thr Pro Tyr Met Leu Thr Leu Gly Ala Phe Phe
 370 375 380

Trp Val Pro Phe Leu Arg Asp Tyr Val Met Ser Thr Gly Ser Cys Ser
 385 390 395 400

Val Ser Arg Ser Ser Met Asp Phe Leu Leu Thr Gln Lys Gly Thr Gly
 405 410 415

Asn Met Leu Val Val Val Val Gly Gly Leu Ala Glu Cys Arg Tyr Ser
 420 425 430

Thr Pro Gly Ser Thr Thr Leu Phe Leu Lys Lys Arg Gln Gly Phe Val
 435 440 445

Arg Thr Ala Leu Lys His Gly Val Ser Leu Ile Pro Ala Tyr Ala Phe
 450 455 460

Gly Glu Thr Asp Leu Tyr Asp Gln His Ile Phe Thr Pro Gly Gly Phe
 465 470 475 480

Val Asn Arg Phe Gln Lys Trp Phe Gln Lys Met Val His Ile Tyr Pro
 485 490 495

Cys Ala Phe Tyr Gly Arg Gly Leu Thr Lys Asn Ser Trp Gly Leu Leu
 500 505 510

Pro Tyr Ser Gln Pro Val Thr Thr Val Val Gly Glu Pro Leu Pro Leu
 515 520 525

Pro Lys Ile Glu Asn Pro Ser Glu Glu Ile Val Ala Lys Tyr His Thr
 530 535 540

Leu Tyr Ile Asp Ala Leu Arg Lys Leu Phe Asp Gln His Lys Thr Lys
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Phe Gly Ile Ser Glu Thr Gln Glu Leu Val Ile Val
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<211> 2154

<212> DNA

<213> Artificial

<220>

<223> Wax ester synthase from mouse tagged with YFP fused to oleosin 3
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<220>

<221> CDS

<222> (7)..(2148)

<400> 15

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 Met Ala Asp Gln Thr Arg Thr His His Glu Met Ile Ser Arg

48

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| gac Asp 15 | agt Ser | acc Thr | caa Gln |
| gag Glu | gcc Ala 20 | cat His | ccg Pro |
| aag Lys | gcc Ala 25 | agg Arg | cag Gln |
| atg Met | gtg Val | aag Lys | gca Ala 30 |
| 96 | | | |
| gca Ala | acc Thr | gct Ala | gtc Val 35 |
| aca Thr 35 | gcc Ala | ggg Gly | gga Gly |
| tcc Ser 40 | cta Leu 40 | ctt Leu | gtc Val |
| ctc Leu | tcc Ser 45 | ggc Gly 45 | tta Leu |
| 144 | | | |
| aca Thr | ctc Leu | gct Ala | gga Gly 50 |
| aca Thr 50 | gtc Val | atc Ile | gca Ala 55 |
| ctc Leu 55 | acg Thr | gtg Val | gct Ala |
| act Thr 60 | cct Pro 60 | ctc Leu | ctc Leu |
| 192 | | | |
| gtc Val | atc Ile | ttc Phe 65 | agc Ser |
| ccc Pro | gtc Val | ttg Leu 70 | ggt Val 70 |
| cca Pro | gca Ala | gtg Val | gta Val |
| acc Thr 75 | ggt Val | gct Ala | ctc Leu |
| 240 | | | |
| atc Ile | att Ile 80 | acc Thr | gga Gly |
| ttc Phe | gga Gly | ttc Phe | ctt Leu |
| gca Ala 85 | tcc Ser | ggg Gly | ggc Gly |
| ttt Phe 90 | gga Gly 90 | ata Ile | gcc Ala |
| gcc Ala | att Ile | | |
| 288 | | | |
| acc Thr 95 | gcc Ala | ttc Phe | tct Ser |
| tgt Trp 100 | ctc Leu 100 | tac Tyr | agg Arg |
| cac His | atg Met 105 | acg Thr 105 | gga Gly |
| tct Ser | gga Gly | tcg Ser | gat Asp 110 |
| 336 | | | |
| aag Lys | ata Ile | gag Glu | aat Asn 115 |
| gct Ala 115 | cgg Arg | atg Met | aag Lys |
| ggt Val 120 | agg Arg | atg Met 105 | gga Gly 120 |
| aga Arg | gtg Val | cag Gln | gat Asp 125 |
| act Thr 125 | | | |
| 384 | | | |
| aag Lys | tat Tyr | ggg Gly | cag Gln 130 |
| cac His | aac Asn | att Ile | gga Gly 135 |
| gtc Val 135 | caa Gln | cac His | caa Gln |
| caa Gln | ggt Val 140 | tct Ser | atg Met |
| 432 | | | |
| gtg Val | agc Ser | aag Lys 145 | ggc Gly |
| gag Glu | gag Glu | ctg Leu 150 | ttc Phe 150 |
| acc Thr | ggg Gly | gtg Val | ccc Pro 155 |
| atc Ile 155 | ctg Leu | gtc Val | gag Glu |
| 528 | | | |
| gag Glu | ctg Leu 160 | gac Asp | ggc Gly |
| gac Asp | gta Val 165 | aac Asn 165 | ggc Gly |
| cac His | aag Lys | ttc Phe | agg Arg 170 |
| gtg Val | tcc Ser | atg Met 175 | gtc Val |
| 576 | | | |
| ggc Gly 175 | gag Glu | ggc Gly | gat Asp |
| gcc Ala 180 | acc Thr 180 | tac Tyr | ggc Gly |
| aag Lys | ctg Leu | acc Thr 185 | ctg Leu |
| aag Lys | tcc Ser | atg Met 190 | tgc Cys 190 |
| 624 | | | |
| acc Thr | acc Thr | ggc Gly | aag Lys |
| ctg Leu 195 | ccc Pro | gtg Val | ccc Pro |
| ccc Pro | tgg Trp 200 | ccc Pro | acc Thr |
| ctc Leu | gtg Val | acc Thr | ctc Leu |
| 672 | | | |
| ggc Gly | tac Tyr | ggc Gly | ctg Leu 210 |
| cag Gln | tgc Cys | ttc Phe | gcc Ala |
| cgc Arg 215 | tac Tyr | ccc Pro | gac Asp |
| cac His | atg Met 220 | aag Lys | cag Gln |
| 720 | | | |
| cac His | gac Asp 225 | ttc Phe | ttc Phe |
| aag Lys | tcc Ser | gcc Ala 230 | atg Met 230 |
| ccc Pro | gaa Glu | ggc Gly | tac Tyr |
| gtc Val 235 | cag Gln | gag Glu | cgc Arg |
| 768 | | | |
| acc Thr | atc Ile 240 | ttc Phe | ttc Phe |
| aag Lys | gac Asp | gac Asp 245 | ggc Gly |
| aac Asn | tac Tyr | aag Lys | acc Thr 250 |
| cgc Arg | gag Glu | ctg Leu | aag Lys |
| ggc Gly | atc Ile 265 | gag Glu | ctg Leu |
| 816 | | | |
| gac Asp | ttc Phe | aag Lys | gag Glu |
| gac Asp 275 | ggc Gly | aac Asn | atc Ile |
| ctg Leu | ggg Gly 280 | cac His | aag Lys |
| ctg Leu | gag Glu | tac Tyr 285 | aac Asn |
| 864 | | | |

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| tac | aac | agc | cac | aac | gtc | tat | atc | atg | gcc | gac | aag | cag | aag | aac | ggc | 912 |
| Tyr | Asn | Ser | His | Asn | Val | Tyr | Ile | Met | Ala | Asp | Lys | Gln | Lys | Asn | Gly | |
| | | | 290 | | | | | 295 | | | | | 300 | | | |
| atc | aag | gtg | aac | ttc | aag | atc | cgc | cac | aac | atc | gag | gac | ggc | agc | gtg | 960 |
| Ile | Lys | Val | Asn | Phe | Lys | Ile | Arg | His | Asn | Ile | Glu | Asp | Gly | Ser | Val | |
| | | 305 | | | | | 310 | | | | | 315 | | | | |
| cag | ctc | gcc | gac | cac | tac | cag | cag | aac | acc | ccc | atc | ggc | gac | ggc | ccc | 1008 |
| Gln | Leu | Ala | Asp | His | Tyr | Gln | Gln | Asn | Thr | Pro | Ile | Gly | Asp | Gly | Pro | |
| | 320 | | | | | 325 | | | | | 330 | | | | | |
| gtg | ctg | ctg | ccc | gac | aac | cac | tac | ctg | agc | tac | cag | tcc | gcc | ctg | agc | 1056 |
| Val | Leu | Leu | Pro | Asp | Asn | His | Tyr | Leu | Ser | Tyr | Gln | Ser | Ala | Leu | Ser | |
| 335 | | | | | 340 | | | | | 345 | | | | | 350 | |
| aaa | gac | ccc | aac | gag | aag | cgc | gat | cac | atg | gtc | ctg | ctg | gag | ttc | gtg | 1104 |
| Lys | Asp | Pro | Asn | Glu | Lys | Arg | Asp | His | Met | Val | Leu | Leu | Glu | Phe | Val | |
| | | | | 355 | | | | | 360 | | | | | 365 | | |
| acc | gcc | gcc | ggg | atc | act | ctc | ggc | atg | gac | gag | ctg | tac | aag | atg | ttc | 1152 |
| Thr | Ala | Ala | Gly | Ile | Thr | Leu | Gly | Met | Asp | Glu | Leu | Tyr | Lys | Met | Phe | |
| | | | 370 | | | | | 375 | | | | | 380 | | | |
| tgg | cct | act | aag | aag | gac | ctt | aag | act | gca | atg | gag | gtt | ttc | gct | ctt | 1200 |
| Trp | Pro | Thr | Lys | Lys | Asp | Leu | Lys | Thr | Ala | Met | Glu | Val | Phe | Ala | Leu | |
| | | 385 | | | | | 390 | | | | | 395 | | | | |
| ttc | caa | tgg | gct | ttg | tct | gca | ctc | gtt | atc | gtt | act | acc | gtc | atc | atc | 1248 |
| Phe | Gln | Trp | Ala | Leu | Ser | Ala | Leu | Val | Ile | Val | Thr | Thr | Val | Ile | Ile | |
| | 400 | | | | | 405 | | | | | 410 | | | | | |
| gtg | aac | ctg | tac | ctt | gtt | gtg | ttc | act | tca | tac | tgg | cca | gtt | acc | gtt | 1296 |
| Val | Asn | Leu | Tyr | Leu | Val | Val | Phe | Thr | Ser | Tyr | Trp | Pro | Val | Thr | Val | |
| 415 | | | | | 420 | | | | 425 | | | | | | 430 | |
| ttg | atg | cta | aca | tgg | ctg | gca | ttc | gat | tgg | aaa | aca | cct | gaa | aga | gga | 1344 |
| Leu | Met | Leu | Thr | Trp | Leu | Ala | Phe | Asp | Trp | Lys | Thr | Pro | Glu | Arg | Gly | |
| | | | | 435 | | | | | 440 | | | | | 445 | | |
| ggt | aga | agg | ttc | aca | tgt | gtg | aga | aag | tgg | cgt | ctt | tgg | aaa | cac | tac | 1392 |
| Gly | Arg | Arg | Phe | Thr | Cys | Val | Arg | Lys | Trp | Arg | Leu | Trp | Lys | His | Tyr | |
| | | | 450 | | | | | 455 | | | | | 460 | | | |
| tct | gac | tac | ttc | cct | ctt | aag | atg | gtg | aag | acg | aag | gat | atc | tcc | cct | 1440 |
| Ser | Asp | Tyr | Phe | Pro | Leu | Lys | Met | Val | Lys | Thr | Lys | Asp | Ile | Ser | Pro | |
| | | 465 | | | | | 470 | | | | | 475 | | | | |
| gat | aga | aac | tac | ata | ctt | gtc | tgt | cac | cca | cat | ggt | ctt | atg | gca | cat | 1488 |
| Asp | Arg | Asn | Tyr | Ile | Leu | Val | Cys | His | Pro | His | Gly | Leu | Met | Ala | His | |
| | 480 | | | | | 485 | | | | | 490 | | | | | |
| agt | tgt | ttc | gga | cat | ttc | gct | acc | gat | act | aca | gga | ttc | agt | aag | acc | 1536 |
| Ser | Cys | Phe | Gly | His | Phe | Ala | Thr | Asp | Thr | Thr | Gly | Phe | Ser | Lys | Thr | |
| 495 | | | | | 500 | | | | | 505 | | | | | 510 | |
| ttc | cct | ggt | atc | aca | cct | tac | atg | ctt | act | ctt | gga | gct | ttc | ttc | tgg | 1584 |
| Phe | Pro | Gly | Ile | Thr | Pro | Tyr | Met | Leu | Thr | Leu | Gly | Ala | Phe | Phe | Trp | |
| | | | | 515 | | | | | 520 | | | | | 525 | | |
| gtt | cct | ttc | ttg | aga | gat | tac | gtc | atg | tca | acc | gga | agt | tgt | tct | gtg | 1632 |
| Val | Pro | Phe | Leu | Arg | Asp | Tyr | Val | Met | Ser | Thr | Gly | Ser | Cys | Ser | Val | |
| | | | 530 | | | | | 535 | | | | | 540 | | | |
| tcc | aga | agc | tct | atg | gac | ttc | ttg | ctt | acg | caa | aag | ggt | aca | gga | aac | 1680 |
| Ser | Arg | Ser | Ser | Met | Asp | Phe | Leu | Leu | Thr | Gln | Lys | Gly | Thr | Gly | Asn | |
| | | 545 | | | | | 550 | | | | | 555 | | | | |

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|-----|-----|-----|------|
| atg | ctt | gtt | gtc | gtt | gtt | ggg | gga | ctt | gct | gaa | tgt | aga | tac | tct | aca | 1728 |
| Met | Leu | Val | Val | Val | Val | Gly | Gly | Leu | Ala | Glu | Cys | Arg | Tyr | Ser | Thr | |
| | 560 | | | | | 565 | | | | | 570 | | | | | |
| cca | ggc | tca | aca | acc | ctt | ttc | cta | aag | aag | agg | cag | gga | ttt | gtt | cgt | 1776 |
| Pro | Gly | Ser | Thr | Thr | Leu | Phe | Leu | Lys | Lys | Arg | Gln | Gly | Phe | Val | Arg | |
| 575 | | | | | 580 | | | | | 585 | | | | | 590 | |
| aca | gca | cta | aag | cat | ggg | gtt | tct | ttg | atc | cct | gct | tat | gca | ttt | gga | 1824 |
| Thr | Ala | Leu | Lys | His | Gly | Val | Ser | Leu | Ile | Pro | Ala | Tyr | Ala | Phe | Gly | |
| | | | | 595 | | | | | 600 | | | | | 605 | | |
| gag | act | gac | ctc | tac | gat | caa | cat | atc | ttc | act | cct | gga | gga | ttc | gtc | 1872 |
| Glu | Thr | Asp | Leu | Tyr | Asp | Gln | His | Ile | Phe | Thr | Pro | Gly | Gly | Phe | Val | |
| | | | 610 | | | | | 615 | | | | | 620 | | | |
| aac | aga | ttc | caa | aag | tgg | ttc | cag | aag | atg | gtt | cac | atc | tac | cca | tgt | 1920 |
| Asn | Arg | Phe | Gln | Lys | Trp | Phe | Gln | Lys | Met | Val | His | Ile | Tyr | Pro | Cys | |
| | | 625 | | | | | 630 | | | | | 635 | | | | |
| gct | ttc | tat | gga | aga | ggg | ctg | acc | aag | aat | tca | tgg | ggg | ctt | ttg | cct | 1968 |
| Ala | Phe | Tyr | Gly | Arg | Gly | Leu | Thr | Lys | Asn | Ser | Trp | Gly | Leu | Leu | Pro | |
| | 640 | | | | | 645 | | | | | 650 | | | | | |
| tac | tca | caa | cca | gtt | act | aca | gtt | gtt | gga | gag | cca | tta | ccg | ttg | cct | 2016 |
| Tyr | Ser | Gln | Pro | Val | Thr | Thr | Val | Val | Gly | Glu | Pro | Leu | Pro | Leu | Pro | |
| 655 | | | | | 660 | | | | | 665 | | | | | 670 | |
| aag | ata | gaa | aac | cct | agc | gaa | gag | att | gtt | gcc | aag | tat | cac | acc | ctt | 2064 |
| Lys | Ile | Glu | Asn | Pro | Ser | Glu | Glu | Ile | Val | Ala | Lys | Tyr | His | Thr | Leu | |
| | | | | 675 | | | | | 680 | | | | | 685 | | |
| tac | atc | gat | gct | ctc | aga | aag | cta | ttc | gac | cag | cac | aag | act | aag | ttc | 2112 |
| Tyr | Ile | Asp | Ala | Leu | Arg | Lys | Leu | Phe | Asp | Gln | His | Lys | Thr | Lys | Phe | |
| | | | 690 | | | | | 695 | | | | | 700 | | | |
| gga | atc | tct | gag | aca | caa | gag | ctg | gtt | atc | gtc | taa | gagctc | | | | 2154 |
| Gly | Ile | Ser | Glu | Thr | Gln | Glu | Leu | Val | Ile | Val | | | | | | |
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<220>
 <223> Synthetic Construct

<400> 16

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

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

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Pro Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe Val Thr Ala
 355 360 365
 Ala Gly Ile Thr Leu Gly Met Asp Glu Leu Tyr Lys Met Phe Trp Pro
 370 375 380
 Thr Lys Lys Asp Leu Lys Thr Ala Met Glu Val Phe Ala Leu Phe Gln
 385 390 395 400
 Trp Ala Leu Ser Ala Leu Val Ile Val Thr Thr Val Ile Ile Val Asn
 405 410 415
 Leu Tyr Leu Val Val Phe Thr Ser Tyr Trp Pro Val Thr Val Leu Met
 420 425 430
 Leu Thr Trp Leu Ala Phe Asp Trp Lys Thr Pro Glu Arg Gly Gly Arg
 435 440 445
 Arg Phe Thr Cys Val Arg Lys Trp Arg Leu Trp Lys His Tyr Ser Asp
 450 455 460
 Tyr Phe Pro Leu Lys Met Val Lys Thr Lys Asp Ile Ser Pro Asp Arg
 465 470 475 480
 Asn Tyr Ile Leu Val Cys His Pro His Gly Leu Met Ala His Ser Cys
 485 490 495
 Phe Gly His Phe Ala Thr Asp Thr Thr Gly Phe Ser Lys Thr Phe Pro
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 Gly Ile Thr Pro Tyr Met Leu Thr Leu Gly Ala Phe Phe Trp Val Pro
 515 520 525
 Phe Leu Arg Asp Tyr Val Met Ser Thr Gly Ser Cys Ser Val Ser Arg
 530 535 540
 Ser Ser Met Asp Phe Leu Leu Thr Gln Lys Gly Thr Gly Asn Met Leu
 545 550 555 560
 Val Val Val Val Gly Gly Leu Ala Glu Cys Arg Tyr Ser Thr Pro Gly
 565 570 575
 Ser Thr Thr Leu Phe Leu Lys Lys Arg Gln Gly Phe Val Arg Thr Ala
 580 585 590
 Leu Lys His Gly Val Ser Leu Ile Pro Ala Tyr Ala Phe Gly Glu Thr
 595 600 605
 Asp Leu Tyr Asp Gln His Ile Phe Thr Pro Gly Gly Phe Val Asn Arg
 610 615 620

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Phe Gln Lys Trp Phe Gln Lys Met Val His Ile Tyr Pro Cys Ala Phe
625 630 635 640

Tyr Gly Arg Gly Leu Thr Lys Asn Ser Trp Gly Leu Leu Pro Tyr Ser
645 650 655

Gln Pro Val Thr Thr Val Val Gly Glu Pro Leu Pro Leu Pro Lys Ile
660 665 670

Glu Asn Pro Ser Glu Glu Ile Val Ala Lys Tyr His Thr Leu Tyr Ile
675 680 685

Asp Ala Leu Arg Lys Leu Phe Asp Gln His Lys Thr Lys Phe Gly Ile
690 695 700

Ser Glu Thr Gln Glu Leu Val Ile Val
705 710