

SEQUENCE LISTING

<110> Fujifilm Wako Pure Chemical Corporation
Osaka University

<120> TIM PROTEIN-BOUND CARRIER, METHODS FOR OBTAINING, REMOVING
AND DETECTING EXTRACELLULAR MEMBRANE VESICLES AND VIRUSES
USING SAID CARRIER, AND KIT INCLUDING SAID CARRIER

<130> SP101128SGA

<150> JP 2014-246876

<151> 2014-12-05

<160> 34

<170> PatentIn version 3.5

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Arg Thr Asp Gly Thr Arg Ile Ile Ser Arg Lys Ser Thr Lys Tyr Thr
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Leu Leu Gly Lys Val Gln Phe Gly Glu Val Ser Leu Thr Ile Ser Asn
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Gly Met Arg Val Thr Ser Arg Lys Ser Ala Lys Tyr Arg Leu Gln Gly
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Thr Ile Pro Arg Gly Asp Val Ser Leu Thr Ile Leu Asn Pro Ser Glu
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 Pro Thr Thr Val Met Thr Thr Ser Val Leu Pro Thr Thr Thr Pro Pro
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 Gln Thr Leu Ala Thr Thr Ala Phe Ser Thr Ala Val Thr Thr Cys Pro
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 Gln Ile Asn Ser Arg Gln Thr Ile Leu Ile Ile Ala Cys Cys Val Gly
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 Ala Thr Gly Leu Leu Thr Pro Glu Pro Ser Lys Glu Gly Pro Ile Leu
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 Val Trp Asp Leu Pro Ser Thr Ser His Val Ser Met Trp Lys Thr Ser
 260 265 270
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 Glu Gln Asn Lys Thr Thr Lys Thr Gly Gln Met Asp Gly Ile Pro Met
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 Arg Gly Lys Leu Met Glu Thr Tyr Cys Ser Gln Lys His Thr Arg Leu
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 Thr Asn Arg Gly Asp Ser Gly Val Tyr Cys Cys Arg Ile Glu Val Pro
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 Gly Trp Phe Asn Asp Val Lys Lys Asn Val Arg Leu Glu Leu Arg Arg
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 Ala Thr Thr Thr Lys Lys Pro Thr Thr Thr Thr Arg Pro Thr Thr Thr
 115 120 125
 Pro Tyr Val Thr Thr Thr Thr Pro Glu Leu Leu Pro Thr Thr Val Met
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 Thr Thr Ser Val Leu Pro Thr Thr Thr Pro Pro Gln Thr Leu Ala Thr
 145 150 155 160

Thr Ala Phe Ser Thr Ala Val Thr Thr Cys Pro Ser Thr Thr Pro Gly
165 170 175

Ser Phe Ser Gln Glu Thr Thr Lys Gly Ser Ala Phe Thr Thr Glu Ser
180 185 190

Glu Thr Leu Pro Ala Ser Asn His Ser Gln Arg Ser Met Met Thr Ile
195 200 205

Ser Thr Asp Ile Ala Val Leu Arg Pro Thr Gly Ser Asn Pro Gly Ile
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Leu Leu Gly Lys Val Gln Phe Gly Glu Val Ser Leu Thr Ile Ser Asn
65 70 75 80

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

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

Ala Thr Thr Thr Lys Lys Pro Thr Thr Thr Thr Arg Pro Thr Thr Thr
115 120 125

Pro Tyr Val Thr Thr Thr Thr Pro Glu Leu Leu Pro Thr Thr Val Met
130 135 140

Thr Thr Ser Val Leu Pro Thr Thr Thr Pro Pro Gln Thr Leu Ala Thr
Page 6

145 150 155 160

Thr Ala Phe Ser Thr Ala Val Thr Thr Cys Pro Ser Thr Thr Pro Gly
165 170 175

Ser Phe Ser Gln Glu Thr Thr Lys Gly Ser Ala Phe Thr Thr Glu Ser
180 185 190

Glu Thr Leu Pro Ala Ser Asn His Ser Gln Arg Ser Met Met Thr Ile
195 200 205

Ser Thr Asp Ile Ala Val Leu Arg Pro Thr Gly Ser Asn Pro Gly Ile
210 215 220

Leu Pro Ser Thr Ser Gln Leu Thr Thr Gln Lys Thr Thr Leu Thr Thr
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Gln Thr

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Gly Met Arg Val Thr Ser Arg Lys Ser Ala Lys Tyr Arg Leu Gln Gly
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Thr Ile Pro Arg Gly Asp Val Ser Leu Thr Ile Leu Asn Pro Ser Glu
65 70 75 80

Ser Asp Ser Gly Val Tyr Cys Cys Arg Ile Glu Val Pro Gly Trp Phe
85 90 95

Asn Asp Val Lys Ile Asn Val Arg Leu Asn Leu Gln Arg Ala Ser Thr
100 105 110

Thr Thr His Arg Thr Ala Thr Thr Thr Arg Arg Thr Thr Thr Thr
115 120 125

Ser Pro Thr Thr Thr Arg Gln Met Thr Thr Thr Pro Ala Ala Leu Pro
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 Met Thr Thr Ile Ala Val Phe Thr Thr Ala Asn Thr Cys Leu Ser Leu
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 Thr Pro Ser Thr Leu Pro Glu Glu Ala Thr Gly Leu Leu Thr Pro Glu
 180 185 190
 Pro Ser Lys Glu Gly Pro Ile Leu Thr Ala Glu Ser Glu Thr Val Leu
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 Pro Ser Asp Ser Trp Ser Ser Val Glu Ser Thr Ser Ala Asp Thr Val
 210 215 220
 Leu Leu Thr Ser Lys Glu Ser Lys Val Trp Asp Leu Pro Ser Thr Ser
 225 230 235 240
 His Val Ser Met Trp Lys Thr Ser Asp Ser Val Ser Ser Pro Gln Pro
 245 250 255
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 Ser Gln Leu
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 Gln Cys Pro Ser Ser Ala Cys Gln Asn Thr Leu Ile Trp Thr Asn Gly
 35 40 45
 His Arg Val Thr Tyr Gln Lys Ser Ser Arg Tyr Asn Leu Lys Gly His
 50 55 60

Ile Ser Glu Gly Asp Val Ser Leu Thr Ile Glu Asn Ser Val Glu Ser
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35 40 45

Val Thr Tyr Arg Lys Asp Thr Arg Tyr Lys Leu Leu Gly Asp Leu Ser
50 55 60

Arg Arg Asp Val Ser Leu Thr Ile Glu Asn Thr Ala Val Ser Asp Ser
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85 90 95

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35 40 45

Cys Trp Gly Arg Gly Gln Cys Pro Ser Ser Ala Cys Gln Asn Thr Leu
Page 9

50

55

60

Ile Trp Thr Asn Gly His Arg Val Thr Tyr Gln Lys Ser Ser Arg Tyr
65 70 75 80

Asn Leu Lys Gly His Ile Ser Glu Gly Asp Val Ser Leu Thr Ile Glu
85 90 95

Asn Ser Val Glu Ser Asp Ser Gly Leu Tyr Cys Cys Arg Val Glu Ile
100 105 110

Pro Gly Trp Phe Asn Asp Gln Lys Val Thr Phe Ser Leu Gln Val Lys
115 120 125

Pro Glu Ile Pro Thr Arg Pro Pro Arg Arg Pro Thr Thr Thr Arg Pro
130 135 140

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

Pro Thr Ser Thr Arg Val Ser Thr Ser Thr Pro Pro Thr Ser Thr His
165 170 175

Thr Trp Thr His Lys Pro Asp Trp Asn Gly Thr Val Thr Ser Ser Gly
180 185 190

Asp Thr Trp Ser Asn His Thr Glu Ala Ile Pro Pro Gly Lys Pro Gln
195 200 205

Lys Asn Pro Thr Lys Gly Phe Tyr Val Gly Ile Cys Ile Ala Ala Leu
210 215 220

Leu Leu Leu Leu Leu Val Ser Thr Val Ala Ile Thr Arg Tyr Ile Leu
225 230 235 240

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

Thr Ala Asn Thr Thr Lys Gly Ile Tyr Ala Gly Val Cys Ile Ser Val
290 295 300

Leu Val Leu Leu Ala Leu Leu Gly Val Ile Ile Ala Lys Lys Tyr Phe
305 310 315 320

Phe Lys Lys Glu Val Gln Gln Leu Ser Val Ser Phe Ser Ser Leu Gln
325 330 335

Ile Lys Ala Leu Gln Asn Ala Val Glu Lys Glu Val Gln Ala Glu Asp
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Asn Ile Tyr Ile Glu Asn Ser Leu Tyr Ala Thr Asp
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Gln Cys Pro Ser Ser Ala Cys Gln Asn Thr Leu Ile Trp Thr Asn Gly
35 40 45

His Arg Val Thr Tyr Gln Lys Ser Ser Arg Tyr Asn Leu Lys Gly His
50 55 60

Ile Ser Glu Gly Asp Val Ser Leu Thr Ile Glu Asn Ser Val Glu Ser
65 70 75 80

Asp Ser Gly Leu Tyr Cys Cys Arg Val Glu Ile Pro Gly Trp Phe Asn
85 90 95

Asp Gln Lys Val Thr Phe Ser Leu Gln Val Lys Pro Glu Ile Pro Thr
100 105 110

Arg Pro Pro Arg Arg Pro Thr Thr Thr Arg Pro Thr Ala Thr Gly Arg
115 120 125

Pro Thr Thr Ile Ser Thr Arg Ser Thr His Val Pro Thr Ser Thr Arg
130 135 140

Val Ser Thr Ser Thr Pro Pro Thr Ser Thr His Thr Trp Thr His Lys
145 150 155 160

Pro Asp Trp Asn Gly Thr Val Thr Ser Ser Gly Asp Thr Trp Ser Asn
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His Thr Glu Ala Ile Pro Pro Gly Lys Pro Gln Lys Asn Pro Thr
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35 40 45

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

Gly Val Tyr Cys Cys Arg Val Glu His Arg Gly Trp Phe Asn Asp Met
85 90 95

Lys Ile Thr Val Ser Leu Glu Ile Val Pro Pro Lys Val Thr Thr Thr
100 105 110

Pro Ile Val Thr Thr Val Pro Thr Val Thr Thr Val Arg Thr Ser Thr
115 120 125

Thr Val Pro Thr Thr Thr Thr Val Pro Met Thr Thr Val Pro Thr Thr
130 135 140

Thr Val Pro Thr Thr Met Ser Ile Pro Thr Thr Thr Thr Val Leu Thr
145 150 155 160

Thr Met Thr Val Ser Thr Thr Thr Ser Val Pro Thr Thr Thr Ser Ile
165 170 175

Pro Thr Thr Thr Ser Val Pro Val Thr Thr Thr Val Ser Thr Phe Val
180 185 190

Pro Pro Met Pro Leu Pro Arg Gln Asn His Glu Pro Val Ala Thr Ser
195 200 205

Pro Ser Ser Pro Gln Pro Ala Glu Thr His Pro Thr Thr Leu Gln Gly
210 215 220

Ala Ile Arg Arg Glu Pro Thr Ser Ser Pro Leu Tyr Ser Tyr Thr Thr
225 230 235 240

Asp Gly Asn Asp Thr Val Thr Glu Ser Ser Asp Gly Leu Trp Asn Asn
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Asn Gln Thr Gln Leu Phe Leu Glu His Ser Leu Leu Thr Ala Asn Thr
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Thr Lys Gly
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Gly Lys Gly Phe Cys Pro Trp Ser Gln Cys Thr Asn Glu Leu Leu Arg
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Thr Asp Glu Arg Asn Val Thr Tyr Gln Lys Ser Ser Arg Tyr Gln Leu
50 55 60

Lys Gly Asp Leu Asn Lys Gly Asp Val Ser Leu Ile Ile Lys Asn Val
65 70 75 80

Thr Leu Asp Asp His Gly Thr Tyr Cys Cys Arg Ile Gln Phe Pro Gly
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Leu Met Asn Asp Lys Lys Leu Glu Leu Lys Leu Asp Ile Lys Ala Ala
100 105 110

Lys

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Gly Asp Phe Arg Lys Gly Asp Val Ser Leu Thr Ile Glu Asn Val Thr
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Leu Ala Asp Ser Gly Ile Tyr Cys Cys Arg Ile Gln Ile Pro Gly Ile
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Asn Ala Tyr Leu Pro Cys Ser Tyr Thr Leu Ser Thr Pro Gly Ala Leu
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Val Pro Met Cys Trp Gly Lys Gly Phe Cys Pro Trp Ser Gln Cys Thr
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Asn Glu Leu Leu Arg Thr Asp Glu Arg Asn Val Thr Tyr Gln Lys Ser
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Ser Arg Tyr Gln Leu Lys Gly Asp Leu Asn Lys Gly Asp Val Ser Leu
85 90 95

Ile Ile Lys Asn Val Thr Leu Asp Asp His Gly Thr Tyr Cys Cys Arg
100 105 110

Ile Gln Phe Pro Gly Leu Met Asn Asp Lys Lys Leu Glu Leu Lys Leu
115 120 125

Asp Ile Lys Ala Ala Lys Val Thr Pro Ala Gln Thr Ala His Gly Asp
130 135 140

Ser Thr Thr Ala Ser Pro Arg Thr Leu Thr Thr Glu Arg Asn Gly Ser
145 150 155 160

Glu Thr Gln Thr Leu Val Thr Leu His Asn Asn Asn Gly Thr Lys Ile
165 170 175

Ser Thr Trp Ala Asp Glu Ile Lys Asp Ser Gly Glu Thr Ile Arg Thr
180 185 190

Ala Ile His Ile Gly Val Gly Val Ser Ala Gly Leu Thr Leu Ala Leu
195 200 205

Ile Ile Gly Val Leu Ile Leu Lys Trp Tyr Ser Cys Lys Lys Lys Lys
210 215 220

Leu Ser Ser Leu Ser Leu Ile Thr Leu Ala Asn Leu Pro Pro Gly Gly
225 230 235 240

Leu Ala Asn Ala Gly Ala Val Arg Ile Arg Ser Glu Glu Asn Ile Tyr
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Cys Tyr Val Asn Ser Gln Gln Pro Ser
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Asn Ala Tyr Leu Pro Cys Phe Tyr Thr Pro Ala Ala Pro Gly Asn Leu
35 40 45

Val Pro Val Cys Trp Gly Lys Gly Ala Cys Pro Val Phe Glu Cys Gly
50 55 60

Asn Val Val Leu Arg Thr Asp Glu Arg Asp Val Asn Tyr Trp Thr Ser
65 70 75 80

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

Ile Glu Asn Val Thr Leu Ala Asp Ser Gly Ile Tyr Cys Cys Arg Ile
100 105 110

Gln Ile Pro Gly Ile Met Asn Asp Glu Lys Phe Asn Leu Lys Leu Val
115 120 125

Ile Lys Pro Ala Lys Val Thr Pro Ala Pro Thr Arg Gln Arg Asp Phe
130 135 140

Thr Ala Ala Phe Pro Arg Met Leu Thr Thr Arg Gly His Gly Pro Ala
145 150 155 160

Glu Thr Gln Thr Leu Gly Ser Leu Pro Asp Ile Asn Leu Thr Gln Ile
165 170 175

Ser Thr Leu Ala Asn Glu Leu Arg Asp Ser Arg Leu Ala Asn Asp Leu
180 185 190

Arg Asp Ser Gly Ala Thr Ile Arg Ile Gly Ile Tyr Ile Gly Ala Gly
195 200 205

Ile Cys Ala Gly Leu Ala Leu Ala Leu Ile Phe Gly Ala Leu Ile Phe
210 215 220

Lys Trp Tyr Ser His Ser Lys Glu Lys Ile Gln Asn Leu Ser Leu Ile
225 230 235 240

Ser Leu Ala Asn Leu Pro Pro Ser Gly Leu Ala Asn Ala Val Ala Glu
245 250 255

Gly Ile Arg Ser Glu Glu Asn Ile Tyr Thr Ile Glu Glu Asn Val Tyr
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Gln Pro Ser Gln Pro Leu Gly Cys Arg Phe Ala Met Pro
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100 105 110

Val Thr Pro Ala Pro Thr Arg Gln Arg Asp Phe Thr Ala Ala Phe Pro
115 120 125

Arg Met Leu Thr Thr Arg Gly His Gly Pro Ala Glu Thr Gln Thr Leu
130 135 140

Gly Ser Leu Pro Asp Ile Asn Leu Thr Gln Ile Ser Thr Leu Ala Asn
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Glu Leu Arg Asp Ser Arg Leu Ala Asn Asp Leu Arg Asp Ser Gly Ala
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Thr Ile Arg

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 <212> DNA
 <213> human Tim4

<400> 21
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 <211> 849
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 <213> mouse Tim1

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 <212> DNA
 <213> human Tim1

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acaatgactg tttcaacgac aacgagcgtt ccaacgacaa cgagcattcc aacaacaaca	600
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ttcaaaaagg aggttcaaca actaagtgtt tcatttagca gccttcaa taaagctttg	1020
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 <212> DNA
 <213> mouse Tim3

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gtgactctgg atgaccatgg gacctactgc tgcaggatac agttccctgg tcttatgaat	360
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gcccattggg actctactac agcttctcca agaaccctaa ccacggagag aaatgggtca	480
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gatgaaatta aggactctgg agaaacgac agaactgcta tccacattgg agtgggagtc	600
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aagaaaaaga agttatcgag tttagacctt attacactgg ccaacttggc tccaggaggg	720
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tcctga	846

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 <211> 906
 <212> DNA
 <213> human Tim3

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gaaaaattta acctgaagtt ggtcatcaaa ccagccaagg tcaccctgc accgactcgg	420
cagagagact tctctgcagc ctttccaagg atgcttacca ccaggggaca tggcccagca	480
gagacacaga cactggggag cctccctgat ataaatctaa cacaatatc cacattggcc	540
aatgagttac gggactctag attggccaat gacttacggg actctggagc aaccatcaga	600
ataggcatct acatcggagc agggatctgt gctgggctgg ctctggctct tatcttcggc	660
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gaagaaaaca tctataccat tgaagagaac gtatatgaag tggaggagcc caatgagtat	840
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 <211> 822
 <212> DNA
 <213> mouse Tim4

<400> 26
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 cattacctct cgtggtccca gagccgcaac agtatgtgct ggggcaaagg ttcattgtccc 180
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 aatgatgtca agaagaatgt gcgcttggag ctgaggagag ccacaacaac caaaaaacca 420
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 cactctcaaa gaagcatgat gaccatatct acagacatag ccgtactcag gccacaggc 720
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<210> 27
 <211> 840
 <212> DNA
 <213> mouse Tim4

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 aattccaagt gcaatgcaga gcttctccgt acagatggaa caagaatcat ctccaggaag 240
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 aatgatgtca agaagaatgt gcgcttggag ctgaggagag ccacaacaac caaaaaacca 420
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 ccaacaacag tcatgaccac atctgttctc ccaaccacca caccacccc gacactagcc 540
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 tctaaccctg ggattctccc atccacttca cagctgacga cacagaaaac aacattaaca 780
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<210> 28
 <211> 948
 <212> DNA
 <213> human Tim4

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<210> 29
 <211> 639
 <212> DNA
 <213> mouse Tim1

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 ccaacatcaa ccagagtctc tacctccact cctccaacat ctacacacac atggactcac 540
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<210> 30
 <211> 888
 <212> DNA
 <213> human Tim1

<400> 30
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<210> 31
 <211> 570
 <212> DNA
 <213> mouse Tim3

<400> 31
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<210> 32
 <211> 603

<212> DNA
 <213> human Tim3

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<210> 33
 <211> 846
 <212> DNA
 <213> mouse Tim4

<220>
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 <222> (820)..(843)

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 aatgatgtca agaagaatgt gcgcttgag ctgaggagag ccacaacaac caaaaaacca 420
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 aagtaa 846

<210> 34
 <211> 840
 <212> DNA
 <213> mouse Tim4

<220>
 <221> His tag
 <222> (820)..(837)

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 aatgatgtca agaagaatgt gcgcttggag ctgaggagag ccacaacaac caaaaaacca 420
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