

SEQUENCE LISTING

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<120> COMPOSITIONS AND METHODS OF USING THE SAME FOR TREATMENT OF
 NEURODEGENERATIVE AND MITOCHONDRIAL DISEASE

<130> 37930.0006P1

<150> US 62/980,143
 <151> 2020-02-21

<160> 19

<170> PatentIn version 3.5

<210> 1
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 <212> PRT
 <213> human PINK1

<400> 1

Met Ala Val Arg Gln Ala Leu Gly Arg Gly Leu Gln Leu Gly Arg Ala
 1 5 10 15

Leu Leu Leu Arg Phe Thr Gly Lys Pro Gly Arg Ala Tyr Gly Leu Gly
 20 25 30

Arg Pro Gly Pro Ala Ala Gly Cys Val Arg Gly Glu Arg Pro Gly Trp
 35 40 45

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

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

Leu Gln Arg Gln Phe Val Val Arg Ala Trp Gly Cys Ala Gly Pro Cys
 85 90 95

Gly Arg Ala Val Phe Leu Ala Phe Gly Leu Gly Leu Gly Leu Ile Glu
 100 105 110

Glu Lys Gln Ala Glu Ser Arg Arg Ala Val Ser Ala Cys Gln Glu Ile
 115 120 125

Gln Ala Ile Phe Thr Gln Lys Ser Lys Pro Gly Pro Asp Pro Leu Asp
 130 135 140

Thr Arg Arg Leu Gln Gly Phe Arg Leu Glu Glu Tyr Leu Ile Gly Gln
 145 150 155 160

Ser Ile Gly Lys Gly Cys Ser Ala Ala Val Tyr Glu Ala Thr Met Pro
 165 170 175

Thr Leu Pro Gln Asn Leu Glu Val Thr Lys Ser Thr Gly Leu Leu Pro
 180 185 190

Gly Arg Gly Pro Gly Thr Ser Ala Pro Gly Glu Gly Gln Glu Arg Ala
 195 200 205

Pro Gly Ala Pro Ala Phe Pro Leu Ala Ile Lys Met Met Trp Asn Ile
 210 215 220

Ser Ala Gly Ser Ser Ser Glu Ala Ile Leu Asn Thr Met Ser Gln Glu
 225 230 235 240

Leu Val Pro Ala Ser Arg Val Ala Leu Ala Gly Glu Tyr Gly Ala Val
 245 250 255

Thr Tyr Arg Lys Ser Lys Arg Gly Pro Lys Gln Leu Ala Pro His Pro
 260 265 270

Asn Ile Ile Arg Val Leu Arg Ala Phe Thr Ser Ser Val Pro Leu Leu
 275 280 285

Pro Gly Ala Leu Val Asp Tyr Pro Asp Val Leu Pro Ser Arg Leu His
 290 295 300

Pro Glu Gly Leu Gly His Gly Arg Thr Leu Phe Leu Val Met Lys Asn
 305 310 315 320

Tyr Pro Cys Thr Leu Arg Gln Tyr Leu Cys Val Asn Thr Pro Ser Pro
 325 330 335

Arg Leu Ala Ala Met Met Leu Leu Gln Leu Leu Glu Gly Val Asp His
 340 345 350

Leu Val Gln Gln Gly Ile Ala His Arg Asp Leu Lys Ser Asp Asn Ile
 355 360 365

Leu Val Glu Leu Asp Pro Asp Gly Cys Pro Trp Leu Val Ile Ala Asp
 370 375 380

Phe Gly Cys Cys Leu Ala Asp Glu Ser Ile Gly Leu Gln Leu Pro Phe
 385 390 395 400

Ser Ser Trp Tyr Val Asp Arg Gly Gly Asn Gly Cys Leu Met Ala Pro
 405 410 415

Glu Val Ser Thr Ala Arg Pro Gly Pro Arg Ala Val Ile Asp Tyr Ser
 420 425 430

Lys Ala Asp Ala Trp Ala Val Gly Ala Ile Ala Tyr Glu Ile Phe Gly
 435 440 445

Leu Val Asn Pro Phe Tyr Gly Gln Gly Lys Ala His Leu Glu Ser Arg
 450 455 460

Ser Tyr Gln Glu Ala Gln Leu Pro Ala Leu Pro Glu Ser Val Pro Pro
 465 470 475 480

Asp Val Arg Gln Leu Val Arg Ala Leu Leu Gln Arg Glu Ala Ser Lys
 485 490 495

Arg Pro Ser Ala Arg Val Ala Ala Asn Val Leu His Leu Ser Leu Trp
 500 505 510

Gly Glu His Ile Leu Ala Leu Lys Asn Leu Lys Leu Asp Lys Met Val
 515 520 525

Gly Trp Leu Leu Gln Gln Ser Ala Ala Thr Leu Leu Ala Asn Arg Leu
 530 535 540

Thr Glu Lys Cys Cys Val Glu Thr Lys Met Lys Met Leu Phe Leu Ala
 545 550 555 560

Asn Leu Glu Cys Glu Thr Leu Cys Gln Ala Ala Leu Leu Leu Cys Ser
 565 570 575

Trp Arg Ala Ala Leu
 580

<210> 2
 <211> 580
 <212> PRT
 <213> mouse PINK1

<400> 2

Met Ala Val Arg Gln Ala Leu Gly Arg Gly Leu Gln Leu Gly Arg Ala
 1 5 10 15

Leu Leu Leu Arg Phe Ala Pro Lys Pro Gly Pro Leu Phe Gly Trp Gly
 20 25 30

Lys Pro Gly Pro Ala Ala Ala Trp Gly Arg Gly Glu Arg Pro Gly Gln
 35 40 45

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

Asp Arg Tyr Arg Phe Phe Arg Gln Ser Val Ala Gly Leu Ala Ala Arg
 65 70 75 80

Ile Gln Arg Gln Phe Met Val Arg Ala Arg Gly Gly Ala Gly Pro Cys
 85 90 95

Gly Arg Ala Val Phe Leu Ala Phe Gly Leu Gly Leu Gly Leu Ile Glu
 100 105 110

Glu Lys Gln Ala Glu Gly Arg Arg Ala Ala Ser Ala Cys Gln Glu Ile
 115 120 125

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

Thr Arg Cys Trp Gln Gly Phe Arg Leu Glu Asp Tyr Leu Ile Gly Gln
 145 150 155 160

Ala Ile Gly Lys Gly Cys Asn Ala Ala Val Tyr Glu Ala Thr Met Pro
 165 170 175

Thr Leu Pro Gln His Leu Glu Lys Ala Lys His Leu Gly Leu Ile Gly
 180 185 190

Lys Gly Pro Asp Val Val Leu Lys Gly Ala Asp Gly Glu Gln Ala Pro
 195 200 205

Gly Thr Pro Thr Phe Pro Phe Ala Ile Lys Met Met Trp Asn Ile Ser
 210 215 220

Ala Gly Ser Ser Ser Glu Ala Ile Leu Ser Lys Met Ser Gln Glu Leu
 225 230 235 240

Val Pro Ala Ser Arg Val Ala Leu Ala Gly Glu Tyr Gly Ala Val Thr
 245 250 255

Tyr Arg Arg Ser Arg Asp Gly Pro Lys Gln Leu Ala Pro His Pro Asn
 260 265 270

Ile Ile Arg Val Phe Arg Ala Phe Thr Ser Ser Val Pro Leu Leu Pro
 275 280 285

Gly Ala Leu Ala Asp Tyr Pro Asp Met Leu Pro Pro His Tyr Tyr Pro
 290 295 300

Glu Gly Leu Gly His Gly Arg Thr Leu Phe Leu Val Met Lys Asn Tyr
 305 310 315 320

Pro Cys Thr Leu Arg Gln Tyr Leu Glu Glu Gln Thr Pro Ser Ser Arg
 325 330 335

Leu Ala Thr Met Met Thr Leu Gln Leu Leu Glu Gly Val Asp His Leu
 340 345 350

Val Gln Gln Gly Ile Ala His Arg Asp Leu Lys Ser Asp Asn Ile Leu
 355 360 365

Val Glu Trp Asp Ser Asp Gly Cys Pro Trp Leu Val Ile Ser Asp Phe
 370 375 380

Gly Cys Cys Leu Ala Asp Gln His Val Gly Leu Arg Leu Pro Phe Asn
 385 390 395 400

Ser Ser Ser Val Glu Arg Gly Gly Asn Gly Ser Leu Met Ala Pro Glu
 405 410 415

Val Ser Thr Ala His Ser Gly Pro Ser Ala Val Ile Asp Tyr Ser Lys
 420 425 430

Ala Asp Thr Trp Ala Val Gly Ala Ile Ala Tyr Glu Ile Phe Gly Leu

435

440

445

Ala Asn Pro Phe Tyr Gly Gln Gly Ser Ala His Leu Glu Ser Arg Ser
 450 455 460

Tyr Gln Glu Ala Gln Leu Pro Glu Met Pro Glu Ser Val Pro Pro Glu
 465 470 475 480

Ala Arg Arg Leu Val Arg Ser Leu Leu Gln Arg Glu Ala Ser Lys Arg
 485 490 495

Pro Ser Ala Arg Leu Ala Ala Asn Val Leu His Leu Ser Leu Trp Gly
 500 505 510

Glu His Leu Leu Ala Leu Lys Asn Leu Lys Leu Asp Lys Met Ile Ala
 515 520 525

Trp Leu Leu Gln Gln Ser Ala Ala Thr Leu Leu Ala Asp Arg Leu Arg
 530 535 540

Glu Lys Ser Cys Val Glu Thr Lys Leu Gln Met Leu Phe Leu Ala Asn
 545 550 555 560

Leu Glu Cys Glu Ala Leu Cys Gln Ala Ala Leu Leu Leu Ser Ser Trp
 565 570 575

Arg Ala Ala Pro
 580

<210> 3
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 <212> PRT
 <213> rat PINK1

<400> 3

Met Ala Val Arg Gln Ala Leu Gly Arg Gly Leu Gln Leu Gly Arg Ala
 1 5 10 15

Leu Leu Leu Arg Phe Ala Pro Lys Pro Gly Pro Val Ser Gly Trp Gly
 20 25 30

Lys Pro Gly Pro Gly Ala Ala Trp Gly Arg Gly Glu Arg Pro Gly Arg
 35 40 45

Val Ser Ser Pro Gly Ala Gln Pro Arg Pro Leu Gly Leu Pro Leu Pro

50

55

60

Asp Arg Tyr Arg Phe Phe Arg Gln Ser Val Ala Gly Leu Ala Ala Arg
 65 70 75 80

Ile Gln Arg Gln Phe Val Val Arg Ala Arg Gly Gly Ala Gly Pro Cys
 85 90 95

Gly Arg Ala Val Phe Leu Ala Phe Gly Leu Gly Leu Gly Leu Ile Glu
 100 105 110

Glu Lys Gln Ala Glu Ser Arg Arg Ala Ala Ser Ala Cys Gln Glu Ile
 115 120 125

Gln Ala Ile Phe Thr Gln Lys Asn Lys Gln Val Ser Asp Pro Leu Asp
 130 135 140

Thr Arg Arg Trp Gln Gly Phe Arg Leu Glu Asp Tyr Leu Ile Gly Gln
 145 150 155 160

Ala Ile Gly Lys Gly Cys Asn Ala Ala Val Tyr Glu Ala Thr Met Pro
 165 170 175

Thr Leu Pro Gln His Leu Glu Lys Ala Lys His Leu Gly Leu Leu Gly
 180 185 190

Lys Gly Pro Asp Val Val Ser Lys Gly Ala Asp Gly Glu Gln Ala Pro
 195 200 205

Gly Ala Pro Ala Phe Pro Phe Ala Ile Lys Met Met Trp Asn Ile Ser
 210 215 220

Ala Gly Ser Ser Ser Glu Ala Ile Leu Ser Lys Met Ser Gln Glu Leu
 225 230 235 240

Val Pro Ala Ser Arg Met Ala Leu Asp Gly Glu Tyr Gly Ala Val Thr
 245 250 255

Tyr Arg Arg Ser Arg Asp Gly Pro Lys Gln Leu Ala Pro His Pro Asn
 260 265 270

Ile Ile Arg Val Phe Arg Ala Phe Thr Ser Ser Val Pro Leu Leu Pro
 275 280 285

Gly Ala Leu Ala Asp Tyr Pro Asp Met Leu Pro Pro His Tyr Tyr Pro
 290 295 300

Glu Gly Leu Gly His Gly Arg Thr Leu Phe Leu Val Met Lys Asn Tyr
 305 310 315 320

Pro Cys Thr Leu Arg Gln Tyr Leu Glu Glu Gln Thr Pro Ser Ser Arg
 325 330 335

Leu Ala Thr Met Met Thr Leu Gln Leu Leu Glu Gly Val Asp His Leu
 340 345 350

Val Gln Gln Gly Ile Ala His Arg Asp Leu Lys Ser Asp Asn Ile Leu
 355 360 365

Val Glu Trp Asp Ser Asp Gly Cys Pro Trp Leu Val Ile Ser Asp Phe
 370 375 380

Gly Cys Cys Leu Ala Asp Glu Arg Val Gly Leu Gln Leu Pro Phe Asn
 385 390 395 400

Ser Ser Ser Val Glu Arg Gly Gly Asn Gly Ser Leu Met Ala Pro Glu
 405 410 415

Val Ser Thr Ala His Ser Gly Pro His Ala Val Ile Asp Tyr Ser Lys
 420 425 430

Ala Asp Thr Trp Ala Val Gly Ala Ile Ala Tyr Glu Ile Phe Gly Leu
 435 440 445

Ala Asn Pro Phe Tyr Gly Gln Gly Ser Ala His Leu Glu Ser Arg Ser
 450 455 460

Tyr Gln Glu Ala Gln Leu Pro Glu Met Pro Lys Ser Val Pro Pro Glu
 465 470 475 480

Thr Arg Gln Leu Val Arg Ser Leu Leu Gln Arg Glu Ala Asn Lys Arg
 485 490 495

Pro Ser Ala Arg Ile Ala Ala Asn Val Leu His Leu Ser Leu Trp Gly
 500 505 510

Glu His Leu Leu Ala Leu Lys Asn Leu Lys Leu Asp Lys Met Ile Ala
 515 520 525

Trp Leu Leu Gln Gln Ser Ala Ala Thr Leu Leu Ala Asp Arg Leu Arg
 530 535 540

Glu Lys Ser Cys Val Glu Thr Lys Leu Gln Met Leu Phe Leu Ala Asn
 545 550 555 560

Leu Glu Cys Glu Ala Leu Cys Gln Ala Ala Leu Leu Leu Ser Ser Trp
 565 570 575

Arg Ala Ala Pro
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<210> 4
 <211> 20
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Synthetic construct

<400> 4

Gly Thr Gly Thr Thr Gly Gly Gly Ala Thr Thr Cys Gly Gly Cys Thr
 1 5 10 15

Thr Gly Gly Thr
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<210> 5
 <211> 21
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Synthetic construct

<400> 5

Gly Thr Cys Cys Ala Thr Gly Cys Ala Cys Thr Thr Gly Thr Cys Gly
 1 5 10 15

Ala Gly Gly Thr Cys
 20

<210> 6
 <211> 23
 <212> PRT
 <213> Artificial sequence

<220>

<223> Synthetic construct

<400> 6

Gly Ala Gly Gly Ala Thr Thr Thr Thr Gly Cys Thr Ala Ala Cys Cys
1 5 10 15

Thr Gly Ala Cys Ala Cys Cys
20

<210> 7

<211> 21

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 7

Thr Thr Gly Ala Cys Gly Gly Thr Ala Ala Cys Thr Gly Ala Cys Thr
1 5 10 15

Cys Cys Ala Gly Cys
20

<210> 8

<211> 21

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 8

Gly Cys Ala Cys Ala Thr Cys Cys Ala Thr Cys Gly Gly Thr Cys Ala
1 5 10 15

Thr Cys Cys Ala Gly
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<210> 9

<211> 22

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 9

Gly Cys Cys Ala Cys Ala Gly Thr Cys Ala Ala Ala Cys Cys Thr Thr

1 5 10 15

Cys Thr Thr Cys Ala Ala
20

<210> 10
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic construct

<400> 10

Cys Thr Gly Gly Cys Ala Ala Thr Gly Cys Cys Thr Gly Ala Ala Cys
1 5 10 15

Ala Ala Cys Gly
20

<210> 11
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic construct

<400> 11

Gly Gly Thr Cys Gly Gly Gly Ala Cys Thr Thr Gly Gly Thr Thr Cys
1 5 10 15

Thr Gly Ala Gly
20

<210> 12
<211> 19
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic construct

<400> 12

Gly Gly Gly Cys Ala Thr Cys Cys Thr Gly Ala Cys Cys Cys Thr Cys
1 5 10 15

Ala Ala Gly

<210> 13
 <211> 20
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Synthetic construct

<400> 13

Thr Cys Cys Ala Thr Gly Thr Cys Gly Thr Cys Cys Cys Ala Gly Thr
 1 5 10 15

Thr Gly Gly Thr
 20

<210> 14
 <211> 22
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Synthetic construct

<400> 14

Cys Cys Gly Cys Ala Ala Gly Gly Gly Ala Ala Ala Gly Ala Thr Gly
 1 5 10 15

Ala Ala Ala Gly Ala Cys
 20

<210> 15
 <211> 20
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Synthetic construct

<400> 15

Thr Cys Gly Thr Thr Thr Gly Gly Thr Thr Thr Cys Gly Gly Gly Gly
 1 5 10 15

Thr Thr Thr Cys
 20

<210> 16
 <211> 20
 <212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 16

Cys Thr Ala Gly Cys Ala Gly Ala Ala Ala Cys Ala Ala Ala Cys Cys
1 5 10 15

Gly Gly Gly Cys
20

<210> 17

<211> 20

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 17

Cys Cys Gly Gly Cys Thr Gly Cys Gly Thr Ala Thr Thr Cys Thr Ala
1 5 10 15

Cys Gly Thr Thr
20

<210> 18

<211> 24

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 18

Gly Cys Cys Ala Gly Cys Cys Thr Cys Thr Cys Cys Thr Gly Ala Thr
1 5 10 15

Thr Thr Thr Ala Gly Thr Gly Thr
20

<210> 19

<211> 24

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 19

Gly	Gly	Gly	Ala	Ala	Cys	Ala	Cys	Ala	Ala	Ala	Ala	Gly	Ala	Cys	Cys
1				5					10					15	

Thr	Cys	Thr	Thr	Cys	Thr	Gly	Gly
			20				