SEQUENCE LISTING

<110> California Institute of Technology
Deverman, Benjamin E.
Gradinaru, Viviana
Chan, Ken Y.

<120> TARGETING PEPTIDES FOR DIRECTING
ADENO-ASSOCIATED VIRUSES (AAVs)

<130> CALTE.118WO

<150> 62/266184
<151> 2015-12-11

<150> 62/421891
<151> 2016-11-14

<160> 93

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Gly Gly Thr Leu Ala Val Pro Phe Lys Ala Gln
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<400> 7
Ala Gln Thr Leu Ala Thr Pro Phe Lys Ala Gln
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<400> 8
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Ser Gly Ser Leu Ala Val Pro Phe Lys Ala Gln
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 1   5   10

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 1   5   10

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Gln Gly Thr Leu Ala Val Pro Phe Lys Ala Gln
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Asn Gln Thr Leu Ala Val Pro Phe Lys Ala Gln
 1   5   10

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<400> 18
Glu Gly Ser Leu Ala Val Pro Phe Lys Ala Gln
 1   5   10

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<400> 19
Ser Gly Asn Leu Ala Val Pro Phe Lys Ala Gln
 1   5   10

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1 5

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<223> PHP.B-DST

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1 5 10

<210> 23
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<400> 23
Ala Gln Thr Leu Ser Thr Pro Phe Lys Ala Gln
1 5 10

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<400> 24
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<400> 25
Ala Gln Thr Leu Ser Gln Pro Phe Lys Ala Gln
 1   5   10

<210> 26
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<400> 26
Ala Gln Thr Leu Gln Leu Pro Phe Lys Ala Gln
 1   5   10

<210> 27
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<213> Artificial Sequence

<220>
<223> PHP.B-TMP

<400> 27
Ala Gln Thr Leu Thr Met Pro Phe Lys Ala Gln
 1   5   10

<210> 28
<211> 11
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<213> Artificial Sequence

<220>
<223> PHP.B-TTP

<400> 28
Ala Gln Thr Leu Thr Thr Pro Phe Lys Ala Gln
 1   5   10

<210> 29
<211> 11
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<213> Artificial Sequence

<220>
<223> PHP.A

<400> 29
Ala Gln Tyr Thr Leu Ser Gln Gly Trp Ala Gln
 1   5   10

<210> 30
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<220>
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<400> 30
Ala Gln Met Asn Ala Thr Lys Asn Val Ala Gln
 1   5   10

<210> 31
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 31
Ala Gln Val Ser Gly Gly His His Ser Ala Gln
 1   5   10

<210> 32
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 32
Ala Gln Thr Leu Pro Gln Pro Phe Lys Ala Gln
 1   5   10

<210> 33

<211> 11
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<223> PHP.B-ATP

<400> 33
Ala Gln Thr Leu Ala Thr Pro Phe Lys Ala Gln
 1   5   10

<210> 34
<211> 11
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<400> 34
Ala Gln Thr Leu Thr Met Pro Phe Lys Ala Gln
 1   5   10

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<400> 35
Ala Gln Thr Leu Thr Met Pro Phe Lys Ala Gln
 1   5   10

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<400> 36
Ala Gln Thr Leu Ser Lys Pro Phe Lys Ala Gln
 1   5   10

<210> 37
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<220>
<223> AAV-PHP.S

<400> 37
Gln Ala Val Arg Thr Ser Leu
 1   5

<210> 38
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<212> PRT
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<220>
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<400> 38
Tyr Thr Leu Ser Gln Gly Trp
 1   5

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<400> 39
Leu Ala Lys Glu Arg Leu Ser
 1   5

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<400> 40
Thr Leu Ala Val Pro Phe Lys
 1   5

<210> 41
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<400> 41
Ser Val Ser Lys Pro Phe Leu
 1   5

<210> 42
<211> 7
<212> PRT
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<220>
<223> PHP.B3

<400> 42
Phe Thr Leu Thr Thr Pro Lys
 1   5

<210> 43
<211> 7
<212> PRT
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<220>
<223> G2B4

<400> 43
Met Asn Ser Thr Lys Asn Val
 1   5

<210> 44
<211> 7
<212> PRT
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<223> G2B5

<400> 44
Val Ser Gly Gly His His Ser
 1   5

<210> 45
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<212> PRT
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<220>
<223> AAV9 Capsid Sequence

<400> 45
Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
 1   5   10   15
Glu Gly Ile Arg Glu Trp Trp Ala Leu Lys Pro Gly Ala Pro Gln Pro
            20   25   30
Lys Ala Asn Gln Gln His Gln Asp Asn Ala Arg Gly Leu Val Leu Pro
        35   40   45
Gly Tyr Lys Tyr Leu Gly Pro Gly Asn Gly Leu Asp Lys Gly Glu Pro
    50   55   60
Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65   70   75   80
Gln Gln Leu Lys Ala Gly Asp Asn Pro Tyr Leu Lys Tyr Asn His Ala
                85   90   95
Asp Ala Glu Phe Gln Glu Arg Leu Lys Glu Asp Thr Ser Phe Gly Gly
            100   105   110
Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Leu Leu Glu Pro
        115   120   125
Leu Gly Leu Val Glu Glu Ala Ala Lys Thr Ala Pro Gly Lys Lys Arg
    130   135   140
Pro Val Glu Gln Ser Pro Gln Glu Pro Asp Ser Ser Ala Gly Ile Gly
145   150   155   160
Lys Ser Gly Ala Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln Thr
                165   170   175
Gly Asp Thr Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro Pro
            180   185   190
Ala Ala Pro Ser Gly Val Gly Ser Leu Thr Met Ala Ser Gly Gly Gly
        195   200   205
Ala Pro Val Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser Ser
    210   215   220
Ser Gly Asn Trp His Cys Asp Ser Gln Trp Leu Gly Asp Arg Val Ile
225   230   235   240
Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His Leu
                245   250   255

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Tyr Lys Gln Ile Ser Asn Ser Thr Ser Gly Gly Ser Ser Asn Asp Asn
            260                 265                 270
Ala Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg
        275                 280                 285
Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asn
    290                 295                 300
Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn Ile
305                 310                 315                 320
Gln Val Lys Glu Val Thr Asp Asn Asn Gly Val Lys Thr Ile Ala Asn
                325                 330                 335
Asn Leu Thr Ser Thr Val Gln Val Phe Thr Asp Ser Asp Tyr Gln Leu
            340                 345                 350
Pro Tyr Val Leu Gly Ser Ala His Glu Gly Cys Leu Pro Pro Phe Pro
        355                 360                 365
Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn Asp
    370                 375                 380
Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr Phe
385                 390                 395                 400
Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Gln Phe Ser Tyr Glu
                405                 410                 415
Phe Glu Asn Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser Leu
            420                 425                 430
Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ser
        435                 440                 445
Arg Thr Ile Asn Gly Ser Gly Gln Asn Gln Gln Thr Leu Lys Phe Ser
    450                 455                 460
Val Ala Gly Pro Ser Asn Met Ala Val Gln Gly Arg Asn Tyr Ile Pro
465                 470                 475                 480
Gly Pro Ser Tyr Arg Gln Gln Arg Val Ser Thr Thr Val Thr Gln Asn
                485                 490                 495
Asn Asn Ser Glu Phe Ala Trp Pro Gly Ala Ser Ser Trp Ala Leu Asn
            500                 505                 510
Gly Arg Asn Ser Leu Met Asn Pro Gly Pro Ala Met Ala Ser His Lys
        515                 520                 525
Glu Gly Glu Asp Arg Phe Phe Pro Leu Ser Gly Ser Leu Ile Phe Gly
    530                 535                 540
Lys Gln Gly Thr Gly Arg Asp Asn Val Asp Ala Asp Lys Val Met Ile
545                 550                 555                 560
Thr Asn Glu Glu Glu Ile Lys Thr Thr Asn Pro Val Ala Thr Glu Ser
                565                 570                 575
Tyr Gly Gln Val Ala Thr Asn His Gln Ser Ala Gln Ala Gln Ala Gln
            580                 585                 590
Thr Gly Trp Val Gln Asn Gln Gly Ile Leu Pro Gly Met Val Trp Gln
        595                 600                 605
Asp Arg Asp Val Tyr Leu Gln Gly Pro Ile Trp Ala Lys Ile Pro His
    610                 615                 620
Thr Asp Gly Asn Phe His Pro Ser Pro Leu Met Gly Gly Phe Gly Met
625                 630                 635                 640
Lys His Pro Pro Pro Gln Ile Leu Ile Lys Asn Thr Pro Val Pro Ala
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645 650 655
Asp Pro Pro Thr Ala Phe Asn Lys Asp Lys Leu Asn Ser Phe Ile Thr
660 665 670
Gln Tyr Ser Thr Gly Gln Val Ser Val Glu Ile Glu Trp Glu Leu Gln
675 680 685
Lys Glu Asn Ser Lys Arg Trp Asn Pro Glu Ile Gln Tyr Thr Ser Asn
690 695 700
Tyr Tyr Lys Ser Asn Asn Val Glu Phe Ala Val Asn Thr Glu Gly Val
705 710 715 720
Tyr Ser Glu Pro Arg Pro Ile Gly Thr Arg Tyr Leu Thr Arg Asn Leu
725 730 735

<210> 46
<211> 743
<212> PRT
<213> Artificial Sequence

<220>
<223> AAV-PHP.N VP1 Capsid Sequence

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

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    210                 215                 220
Ser Gly Asn Trp His Cys Asp Ser Gln Trp Leu Gly Asp Arg Val Ile
225                 230                 235                 240
Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His Leu
                245                 250                 255
Tyr Lys Gln Ile Ser Asn Ser Thr Ser Gly Gly Ser Ser Asn Asp Asn
            260                 265                 270
Ala Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg
        275                 280                 285
Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asn
    290                 295                 300
Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn Ile
305                 310                 315                 320
Gln Val Lys Glu Val Thr Asp Asn Asn Gly Val Lys Thr Ile Ala Asn
                325                 330                 335
Asn Leu Thr Ser Thr Val Gln Val Phe Thr Asp Ser Asp Tyr Gln Leu
            340                 345                 350
Pro Tyr Val Leu Gly Ser Ala His Glu Gly Cys Leu Pro Pro Phe Pro
        355                 360                 365
Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn Asp
    370                 375                 380
Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr Phe
385                 390                 395                 400
Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Gln Phe Ser Tyr Glu
                405                 410                 415
Phe Glu Asn Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser Leu
            420                 425                 430
Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ser
        435                 440                 445
Arg Thr Ile Asn Gly Ser Gly Gln Asn Gln Gln Thr Leu Lys Phe Ser
    450                 455                 460
Val Ala Gly Pro Ser Asn Met Ala Val Gln Gly Arg Asn Tyr Ile Pro
465                 470                 475                 480
Gly Pro Ser Tyr Arg Gln Gln Arg Val Ser Thr Thr Val Thr Gln Asn
                485                 490                 495
Asn Asn Ser Glu Phe Ala Trp Pro Gly Ala Ser Ser Trp Ala Leu Asn
            500                 505                 510
Gly Arg Asn Ser Leu Met Asn Pro Gly Pro Ala Met Ala Ser His Lys
        515                 520                 525
Glu Gly Glu Asp Arg Phe Phe Pro Leu Ser Gly Ser Leu Ile Phe Gly
    530                 535                 540
Lys Gln Gly Thr Gly Arg Asp Asn Val Asp Ala Asp Lys Val Met Ile
545                 550                 555                 560
Thr Asn Glu Glu Glu Ile Lys Thr Thr Asn Pro Val Ala Thr Glu Ser
                565                 570                 575
Tyr Gly Gln Val Ala Thr Asn His Gln Ser Asp Gly Thr Leu Ala Val
            580                 585                 590
Pro Phe Lys Ala Gln Ala Gln Thr Gly Trp Val Gln Asn Gln Gly Ile
        595                 600                 605
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Leu Pro Gly Met Val Trp Gln Asp Arg Asp Val Tyr Leu Gln Gly Pro
610 615 620
Ile Trp Ala Lys Ile Pro His Thr Asp Gly Asn Phe His Pro Ser Pro
625 630 635 640
Leu Met Gly Gly Phe Gly Met Lys His Pro Pro Pro Gln Ile Leu Ile
645 650 655
Lys Asn Thr Pro Val Pro Ala Asp Pro Pro Thr Ala Phe Asn Lys Asp
660 665 670
Lys Leu Asn Ser Phe Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val
675 680 685
Glu Ile Glu Trp Glu Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro
690 695 700
Glu Ile Gln Tyr Thr Ser Asn Tyr Tyr Lys Ser Asn Asn Val Glu Phe
705 710 715 720
Ala Val Asn Thr Glu Gly Val Tyr Ser Glu Pro Arg Pro Ile Gly Thr
725 730 735
Arg Tyr Leu Thr Arg Asn Leu
740

<210> 47
<211> 743
<212> PRT
<213> Artificial Sequence

<220>
<223> AAV-PHP.S VP1 Capsid Sequence

<400> 47
Met Ala Ala Asp Gly Tyr Leu Pro Asp Trp Leu Glu Asp Asn Leu Ser
1 5 10 15
Glu Gly Ile Arg Glu Trp Trp Ala Leu Lys Pro Gly Ala Pro Gln Pro
20 25 30
Lys Ala Asn Gln Gln His Gln Asp Asn Ala Arg Gly Leu Val Leu Pro
35 40 45
Gly Tyr Lys Tyr Leu Gly Pro Gly Asn Gly Leu Asp Lys Gly Glu Pro
50 55 60
Val Asn Ala Ala Asp Ala Ala Ala Leu Glu His Asp Lys Ala Tyr Asp
65 70 75 80
Gln Gln Leu Lys Ala Gly Asp Asn Pro Tyr Leu Lys Tyr Asn His Ala
85 90 95
Asp Ala Glu Phe Gln Glu Arg Leu Lys Glu Asp Thr Ser Phe Gly Gly
100 105 110
Asn Leu Gly Arg Ala Val Phe Gln Ala Lys Lys Arg Leu Leu Glu Pro
115 120 125
Leu Gly Leu Val Glu Glu Ala Ala Lys Thr Ala Pro Gly Lys Lys Arg
130 135 140
Pro Val Glu Gln Ser Pro Gln Glu Pro Asp Ser Ser Ala Gly Ile Gly
145 150 155 160

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Lys Ser Gly Ala Gln Pro Ala Lys Lys Arg Leu Asn Phe Gly Gln Thr
                165                 170                 175
Gly Asp Thr Glu Ser Val Pro Asp Pro Gln Pro Ile Gly Glu Pro Pro
            180                 185                 190
Ala Ala Pro Ser Gly Val Gly Ser Leu Thr Met Ala Ser Gly Gly Gly
        195                 200                 205
Ala Pro Val Ala Asp Asn Asn Glu Gly Ala Asp Gly Val Gly Ser Ser
    210                 215                 220
Ser Gly Asn Trp His Cys Asp Ser Gln Trp Leu Gly Asp Arg Val Ile
225                 230                 235                 240
Thr Thr Ser Thr Arg Thr Trp Ala Leu Pro Thr Tyr Asn Asn His Leu
                245                 250                 255
Tyr Lys Gln Ile Ser Asn Ser Thr Ser Gly Gly Ser Ser Asn Asp Asn
            260                 265                 270
Ala Tyr Phe Gly Tyr Ser Thr Pro Trp Gly Tyr Phe Asp Phe Asn Arg
        275                 280                 285
Phe His Cys His Phe Ser Pro Arg Asp Trp Gln Arg Leu Ile Asn Asn
    290                 295                 300
Asn Trp Gly Phe Arg Pro Lys Arg Leu Asn Phe Lys Leu Phe Asn Ile
305                 310                 315                 320
Gln Val Lys Glu Val Thr Asp Asn Asn Gly Val Lys Thr Ile Ala Asn
                325                 330                 335
Asn Leu Thr Ser Thr Val Gln Val Phe Thr Asp Ser Asp Tyr Gln Leu
            340                 345                 350
Pro Tyr Val Leu Gly Ser Ala His Glu Gly Cys Leu Pro Pro Phe Pro
        355                 360                 365
Ala Asp Val Phe Met Ile Pro Gln Tyr Gly Tyr Leu Thr Leu Asn Asp
    370                 375                 380
Gly Ser Gln Ala Val Gly Arg Ser Ser Phe Tyr Cys Leu Glu Tyr Phe
385                 390                 395                 400
Pro Ser Gln Met Leu Arg Thr Gly Asn Asn Phe Gln Phe Ser Tyr Glu
                405                 410                 415
Phe Glu Asn Val Pro Phe His Ser Ser Tyr Ala His Ser Gln Ser Leu
            420                 425                 430
Asp Arg Leu Met Asn Pro Leu Ile Asp Gln Tyr Leu Tyr Tyr Leu Ser
        435                 440                 445
Arg Thr Ile Asn Gly Ser Gly Gln Asn Gln Gln Thr Leu Lys Phe Ser
    450                 455                 460
Val Ala Gly Pro Ser Asn Met Ala Val Gln Gly Arg Asn Tyr Ile Pro
465                 470                 475                 480
Gly Pro Ser Tyr Arg Gln Gln Arg Val Ser Thr Thr Val Thr Gln Asn
                485                 490                 495
Asn Asn Ser Glu Phe Ala Trp Pro Gly Ala Ser Ser Trp Ala Leu Asn
            500                 505                 510
Gly Arg Asn Ser Leu Met Asn Pro Gly Pro Ala Met Ala Ser His Lys
        515                 520                 525
Glu Gly Glu Asp Arg Phe Phe Pro Leu Ser Gly Ser Leu Ile Phe Gly
    530                 535                 540
Lys Gln Gly Thr Gly Arg Asp Asn Val Asp Ala Asp Lys Val Met Ile
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545 550 555 560
Thr Asn Glu Glu Glu Ile Lys Thr Thr Asn Pro Val Ala Thr Glu Ser
565 570 575
Tyr Gly Gln Val Ala Thr Asn His Gln Ser Ala Gln Gln Ala Val Arg
580 585 590
Thr Ser Leu Ala Gln Ala Gln Thr Gly Trp Val Gln Asn Gln Gly Ile
595 600 605
Leu Pro Gly Met Val Trp Gln Asp Arg Asp Val Tyr Leu Gln Gly Pro
610 615 620
Ile Trp Ala Lys Ile Pro His Thr Asp Gly Asn Phe His Pro Ser Pro
625 630 635 640
Leu Met Gly Gly Phe Gly Met Lys His Pro Pro Pro Gln Ile Leu Ile
645 650 655
Lys Asn Thr Pro Val Pro Ala Asp Pro Pro Thr Ala Phe Asn Lys Asp
660 665 670
Lys Leu Asn Ser Phe Ile Thr Gln Tyr Ser Thr Gly Gln Val Ser Val
675 680 685
Glu Ile Glu Trp Glu Leu Gln Lys Glu Asn Ser Lys Arg Trp Asn Pro
690 695 700
Glu Ile Gln Tyr Thr Ser Asn Tyr Tyr Lys Ser Asn Asn Val Glu Phe
705 710 715 720
Ala Val Asn Thr Glu Gly Val Tyr Ser Glu Pro Arg Pro Ile Gly Thr
725 730 735
Arg Tyr Leu Thr Arg Asn Leu
740

<210> 48
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 48
Ser Ala Gln Thr Leu Ala Val Pro Phe Lys Ala Gln Ala Gln
1 5 10

<210> 49
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<220>

<221> VARIANT
<222> 2-4
<223> Xaa = any amino acid

<400> 49
Ser Xaa Xaa Xaa Leu Ala Val Pro Phe Lys Ala Gln Ala Gln
 1   5   10

<210> 50
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<220>
<221> VARIANT
<222> 4-6
<223> Xaa = any amino acid

<400> 50
Ser Ala Gln Xaa Xaa Xaa Val Pro Phe Lys Ala Gln Ala Gln
 1   5   10

<210> 51
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<220>
<221> VARIANT
<222> 6-8
<223> Xaa = any amino acid

<400> 51
Ser Ala Gln Thr Leu Xaa Xaa Xaa Phe Lys Ala Gln Ala Gln
 1   5   10

<210> 52
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<220>
<221> VARIANT
<222> 8-10
<223> Xaa = any amino acid

<400> 52
Ser Ala Gln Thr Leu Ala Val Xaa Xaa Xaa Ala Gln Ala Gln
 1   5   10

<210> 53
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<220>
<221> VARIANT
<222> 10-12
<223> Xaa = any amino acid

<400> 53
Ser Ala Gln Thr Leu Ala Val Pro Phe Xaa Xaa Xaa Ala Gln
 1   5   10

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

<220>
<223> Synthetic nucleotide sequence

<400> 54
gatgggactt tggcggtgcc ttttaaggca cag   33

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

<220>

<223> Synthetic nucleotide sequence

<400> 55
gatgggacgt tggcggtgcc ttttaaggca cag 33

<210> 56
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 56
caggcggtta ggacgtcttt g 21

<210> 57
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 57
caggtcttca cggactcaga ctatcag 27

<210> 58
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 58
caagtaaaac ctctacaaat gtggtaaaat cg 32

<210> 59
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 59
actcatcgac caatacttgt actatctctc tagaac 36

<210> 60
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 60
ggaagtattc cttggttttg aaccca 26

<210> 61
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 61
ggtcgcggtt cttgtttgtg gat 23

<210> 62
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 62
cgaccttgaa gcgcatgaac tcct 24

<210> 63
<211> 83
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<220>
<221> misc_feature
<222> 42, 43, 45, 46, 48, 49, 51, 52, 54, 55, 57, 58, 60, 61
<223> n = a, c, t or g

<400> 63
gtattccttg gttttgaacc caaccggtct gcgcctgtgc mnnmnnmnnm nnmnnmnnmn 60
nttgggcact ctggtggttt gtc 83

<210> 64

<400> 64
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<210> 65
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 65
Thr Asn His Gln Ser Ala Gln
 1   5

<210> 66
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 66
Ala Gln Ala Gln Thr Gly Trp
 1   5

<210> 67
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 67
Asp Gly Thr Leu Ala Thr Pro Phe Lys
 1   5

<210> 68
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<220>
<221> VARIANT
<222> 10-11
<223> Xaa = any amino acid

<400> 68
Asp Gly Thr Leu Ala Thr Pro Phe Lys Xaa Xaa
 1   5   10

<210> 69
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<220>
<221> misc_feature
<222> 36, 37, 39, 40, 42, 43
<223> n = a, c, t or g

<400> 69
gtattccttg gttttgaacc caaccggtct gcgcmnnmnn mnnaaaaggc accgccaaag 60
tttg   64

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

<220>
<223> Synthetic nucleotide sequence

<220>
<221> misc_feature
<222> 42, 43, 45, 46, 48, 49
<223> n = a, c, t or g

<400> 70
gtattccttg gttttgaacc caaccggtct gcgcctgtgc mnnmnnmnnc accgccaaag 60
tttgggcact   70

<210> 71

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

<220>
<223> Synthetic nucleotide sequence

<220>
<221> misc_feature
<222> 48, 49, 51, 52, 54, 55
<223> n = a, c, t or g

<400> 71
gtattccttg gttttgaacc caaccggtct gcgcctgtgc cttaaamnnm nnmnncaaag 60
tttgggcact ctggtgg 77

<210> 72
<211> 83
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<220>
<221> misc_feature
<222> 54, 55, 57, 58, 60, 61
<223> n = a, c, t or g

<400> 72
gtattccttg gttttgaacc caaccggtct gcgcctgtgc cttaaaaggc acmnnmnnmn 60
nttgggcact ctggtggttt gtg 83

<210> 73
<211> 90
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse primer sequence used to generate the
AAV-PHP.B-XXX libraries

<220>
<221> misc_feature
<222> 57, 58, 60, 61, 63, 64
<223> n = a, c, t or g

<400> 73
ttccttggtt ttgaacccaa ccggtctgcg cctgtgcctt aaaaggcacc gccaamnnmn 60

nmnnactctg gtggtttgtg gccacttgtc 90

<210> 74
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 74
actttggcgg tgccttttaa g 21

<210> 75
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 75
agtgtgagta agccttttt g 21

<210> 76
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 76
tttacgttga cgacgcctaa g 21

<210> 77
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 77
tatactttgt cgcagggttg g 21

<210> 78
<211> 21
<212> DNA

<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 78
caggcggtta ggacgtcttt g 21

<210> 79
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic nucleotide sequence

<400> 79
cttgcgaagg agcggctttc g 21

<210> 80
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 80
Leu Ala Val Pro Phe Lys Ala Gln
1 5

<210> 81
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 81
Val Pro Phe Lys Ala Gln
1 5

<210> 82
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 82
Phe Lys Ala Gln
 1

<210> 83
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 83
Ala Gln Thr Leu Ala Val
 1   5

<210> 84
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 84
Ala Gln Thr Leu Ala Val Pro Phe
 1   5

<210> 85
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 85
Gln Ala Val Arg
 1

<210> 86

<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 86
Ala Val Arg Thr
 1

<210> 87
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 87
Val Arg Thr Ser
 1

<210> 88
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 88
Arg Thr Ser Leu
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<210> 89
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 89
Gln Ala Val Arg Thr
 1   5

<210> 90
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 90
Ala Val Arg Thr Ser
 1   5

<210> 91
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
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<400> 91
Val Arg Thr Ser Leu
 1   5

<210> 92
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 92
Gln Ala Val Arg Thr Ser
 1   5

<210> 93
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic amino acid sequence

<400> 93
Ala Val Arg Thr Ser Leu
 1   5