

NPP1 (wild-type)

MERDGCAGGGSRGGEGRAPREGPAGNGRDRGRSHAAEAPGD PQAAASLLAPMDVGEEPLEKAARA
RTAKDPNTYKVLSLVLSVCVLTTLGCIFGLK**PSCAKE**VKSCKGRCFERTFGNCRCDAAACVELGNCCLDYQET
 CIEPEHIWTCNKFRCGEKRLTRSLCACSDDCDKGDCCINYSSVCQGEKSWVEEPCESINEPQCP**AGFETP**
 PTLFSLDGFRAEYLHTWGGLLPVISKLLKCGTYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIIDNKMYDP
 K**MN**ASFSLKSKEKFNPEWYKGEPWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYK**MYNG**SVPFEERILAV
 LQWLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGMMLMDGLKELNLHRCLNLILISD
 HGMEQGSCCKYIYLNKYLGDVKNIKVIYGPAARLRPSDVPDKYYSFNYEGIAR**NL**SCREPNQHFKPYLKHF
 LPKRLHFAKSDRIEPLTFYLDPQWQLAL**NP**SERKYCGSGFHGSDNVFSNMQALFVGYPGFKHGIEADTF
 ENIEVYNLMCDLL**NL**TPAP**NG**THGSLNHLLKNPVYTPKHPKEVHPLVQCPFTRNPRDNLGCSC**NP**SILPI
 EDFQTQFNLTVAEEKIHKETLPYGRPRVLQKENTICLLSQHQFMSGYSQDILMPLWTSYTVDR**ND**SFSTE
 DFSNCLYQDFRIPLSPVHKCSFYK**NNT**KVSYGFLSP**QL**N**KN**SSGIYSEALLTTNIVPMYQSFQVIWRYFHD
 TLLRKYAERNGVNVVSGPVDFDYDGRCDLENLRQKRRVIRNQEILIPTHFFIVLTSCKDTSQTPLHCENL
 DTLAFILPHRTDNSESCVHGKHDSSWVEELLMLHRARITDVEHITGLSFYQQRKEPVSDILKCLKTHLPTFSQ
 ED (SEQ ID NO:1)

Fig. 1

sssNPP1 (NPP1 catalytic domain with no TAG)

AGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLLKCGTYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIIDN
 KMYDPK**MN**ASFSLKSKEKFNPEWYKGEPWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYK**MYNG**SVPF
 EERILAVLQWLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGMMLMDGLKELNLHRCL
 NLILISDHGMEQGSCCKYIYLNKYLGDVKNIKVIYGPAARLRPSDVPDKYYSFNYEGIAR**NL**SCREPNQHFK
 PYLKHF LPKRLHFAKSDRIEPLTFYLDPQWQLAL**NP**SERKYCGSGFHGSDNVFSNMQALFVGYPGFKHG
 IEADTFENIEVYNLMCDLL**NL**TPAP**NG**THGSL (SEQ ID NO:2)

Fig. 2

TAGsssNPP1 (N-terminus D8)

IGVLLTQRTLLSLVLALLFPSMASM**DDDDDDDD**DAGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLKCCG
TYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPEWYKGEPWVTAKY
QGLKSGTFFWPGSDVEINGIFPDYKMYNGSVPFEERILAVLQWLQLPKDERPHFYTLYLEEPDSSGHSYG
PVSSEVIKALQRVDGMVGMLMDGLKELNLHRCLNLILISDHGMEQGSCKKIYLNKYLGDVKNIKVIYGPA
ARLRPSDVPDKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNPSE
RKYCGSGFHGSDNVFSNMQALFVGYPGPGFKHGIEADTFENIEVYNLMCDLLNLTAPNNGTHGSL (SEQ
ID NO:3)

Fig. 3**TAGsssNPP1 (C-terminus D10)**

IGVLLTQRTLLSLVLALLFPSMASMMAGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLKCCGTYTKNMRPV
YPTKTFPNHYSIVTGLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPEWYKGEPWVTAKYQGLKSGTFF
WPGSDVEINGIFPDYKMYNGSVPFEERILAVLQWLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKAL
QRVDGMVGMLMDGLKELNLHRCLNLILISDHGMEQGSCKKIYLNKYLGDVKNIKVIYGPAARLRPSDVP
DKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNPSEKRYCGSGFH
GSDNVFSNMQALFVGYPGPGFKHGIEADTFENIEVYNLMCDLLNLTAPNNGTHGSL**DDDDDDDDDD**
(SEQ ID NO:4)

Fig. 4

TAGssNPP1 (N-terminus D8)

ATGGGTGTA CTGCTCACACAGAGGACGCTGCTCAGTCTGGTCCTTGCACTCCTGTTTCCAAGCATGGCGAGCA
TGGATGACGATGATGACGACGATGACGCAGGGTTTGAAACGCCTCCTACACTCTTGTTTTCTTTGGATGGATT
CAGGGCAGAATATTTGCACACTTGGGGTGGACTTCTTCTGTTATTAGCAAACCTCAAAAAATGTGGAACATAT
ACTAAAAACATGAGACCGGTGTATCCAACAAAACTTTCCCAATCACTACAGCATTGTCACCGGATTGTATCC
AGAATCTCATGGCATAATCGACAATAAGATGTATGATCCCAAAATGAATGCTTCCTTTTCACTTAAAAGTAAAG
AGAAATTTAATCCGGAGTGGTACAAAGGAGAACCAATTTGGGTACAGCTAAGTATCAAGGCCTCAAGTCTG
GCACATTTTTCTGGCCAGGATCAGATGTGGAAATTAACGGAATTTCCAGACATCTATAAAATGTATAATGGT
TCAGTGCCATTTGAAGAAAGGATTTTGGCTGTTCTTCACTGGCTGCAGCTTCCAAAAGATGAAAGACCACACT
TTTACACTTTGTATTTGGAAGAACCAGATTCTTCAGGTCATTATATGGACCAGTCAGCAGTGAAGTCATCAAA
GCCTTGAGAGGGTTGATGGTATGGTTGGTATGCTGATGGATGGTCTGAAAGAGCTGAACCTGCACAGATGC
CTGAACCTCATCCTTATTTAGATCATGGCATGGAACAAGGCAGTTGTAAGAAATACATATATCTGAATAAGTA
TTTGGGGGATGTTAAAAATATTAAGTTATCTATGGACCTGCAGCTCGATTGAGACCCTCTGATGTCCAGATA
AATACTATTCATTTAACTATGAAGGCATTGCCCCGAAATCTTTCTTGCCGGAACCAAAACCAGCACTTCAAACCT
TATCTGAAACATTTCTTGCTAAGCGTTTGCACCTTGCTAAGAGTGATAGAATTGAGCCCTTGACATTCTATTTG
GACCCTCAGTGGCAACTTGCAATCCCTCAGAAAGGAAATATTGTGGAAGTGGATTTATGGCTCTGACA
ATGTGTTTTCAAATATGCAAGCCCTCTTTGTTGGCTATGGACCTGGATTCAAGCATGGCATTGAGGCTGACACC
TTTGAAACATTGAAGTCTATAACTTGATGTGTGATTTGCTGAATTTGACACCGGCTCCTAATAACGGAACCTCA
TGGAAGTCTTAACACCTTCTGAAGAATCCTGTTTATACGCCAAAGCATCCCAAAGAAGTGACCCCCCTGGTG
AGTGCCCCCTTCAAGAAACCCAGAGATAACCTTGGCTGCTCATGTAACCCCTTCATTTTGCCGATTGAGGAT
TTTCAAACACAGTTCAATCTGACCGTGGCAGAAGAGAAGATTATTAAGCATGAACTTTGCCCTATGGAAGAC
CTAGAGTTCTCCAGAAGGAAAACACCATCTGTCTTCTTCCAGCACCAGTTTATGAGTGGATACAGCCAAGAC
ATCTTGATGCCCCCTTGGACATCCTATACCGTGGACAGAAATGACAGTTTCTCTACGGAAGACTTCTCCAACCTG
TCTGTACCAGGACTTTAGAATTCCTCTTAGTCCTGTCCATAAATGTTCATTTTATAAAAAATAACACCAAAGTGAG
TTACGGGTTCTCTCCCCACCACAACCTGAATAAGAATTCAAGTGGAATATATTCTGAAGCCTTGCTTACTACAA
ATATAGTGCCAATGTACCAGAGTTTTCAAGTTATATGGCGCTACTTTCATGACACCCTCTTGCGAAAGTATGCA
GAAGAAAGAAATGGTGTCAATGTCGTCAGTGGTCCTGTGTTTGACTTTGATTATGATGGACGTTGTGATTCCT
TGGAGAATTTGAGGCAAAAAAGAAGAGTCATCCGTAACCAAGAAATTTGATTCCAACCTCATTTCTTCATTGTG
CTGACAAGCTGTAAAGATACATCTCAGACGCCTTGCAGTGTGAAAACCTGGACACCTTGGCTTTTCATTTTGCC
TCACAGGACTGATAACAGCGAGAGCTGTGTGCATGGGAAGCATGACTCCTCATGGGTTGAAGAATTGTTGAT
GTTGCACAGAGCACGGATCACAGACGTCGAGCACATCACTGGACTCAGCTTTTATCAACAAAGAAAAGAGCC
AGTTTCAGACATTTTGAAGTTGAAAACACATTTGCCAACCTTTAGCCAAGAAGATTGA (SEQ ID NO:5)

Fig. 5

TAGssNPP1 (N-terminus D8; signal peptide sequence underlined and the targeting moiety in bold)

IGVLLTQRTLLSLVLALLFPSMASM**DDDDDDDD**DAGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLKKCG
TYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPEWYKGEPWVTAKY
QGLKSGTFFWPGSDVEINGIFPDIYKMYNGSVPFEEIRILAVLQWLQLPKDERPHFYTYLLEPDSSGHSYG
PVSSEVIKALQRVDGMVGMMLMDGLKELNLHRCNLILISDHGMEQGSCKKYIYLNKYLGDVKNIKVIYGP
AARLRPSDVPDKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNP
SERKYCGSGFHGSDNVFSNMQALFVGYPGFKHGIEADTFENIEVYNLMCDLLNLTPAPNNGTHGSLN
HLLKNPVYTPKHPKEVHPLVQCPFTRNPRDNLGCSCNPSILPIEDFQTQFNLTVAEEKIIKHETLPYGRPRV
LQKENTICLLSQHQFMSGYSQDILMPLWTSYTVDRNDSFSTEDFSNCLYQDFRIPLSPVHKCSFYKNNTK
VSYGFLSPPQLNKNSSGIYSEALLTTNIVPMYQSFQVIWRYFHDTLRKYAEERNGVNVVSGPVFDFDYD
GRCDSENLRQKRRVIRNQEILIPTHFFIVLTSCKDTSQTPLHCENLDTLAFILPHRTDNSESCVHGKHDSS
WVEELLMLHRARITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFSQED (SEQ ID NO:6)

Fig. 6

ssNPP1 (2238bp)

ATGGGTGTA CTGCTCACACAGAGGACGCTGCTCAGTCTGGTCCTTGCACTCCTGTTTCCAAGCATGGCGAGCA
TGGCAGGGTTTGAAACGCCTCCTACACTCTTGTTTTCTTTGGATGGATT CAGGGCAGAATATTTGCACACTTGG
GGTGGACTTCTTCTGTTATTAGCAAAC TCAAAAAATGTGGAACATATACTAAAAACATGAGACCGGTGTATC
CAACAAAAACTTTCCCAATCACTACAGCATTGTCAACGGATTGTATCCAGAATCTCATGGCATAATCGACAAT
AAGATGTATGATCCCAAAATGAATGCTTCCTTTCACTTAAAAGTAAAGAGAAATTTAATCCGGAGTGGTACA
AAGGAGAACCAATTTGGGTACAGCTAAGTATCAAGGCCTCAAGTCTGGCACATTTTTCTGGCCAGGATCAGA
TGTGGAATTAACGGAATTTTCCAGACATCTATAAATGTATAATGGTTCAGTGCCATTTGAAGAAAGGATTT
TGGCTGTTCTTCAGTGGCTGCAGCTTCCAAAAGATGAAAGACCACACTTTTACACTTTGTATTTGGAAGAACCA
GATTCTTCAGGTCATTCATATGGACCAGTCAGCAGTGAAGTCATCAAAGCCTTG CAGAGGGTTGATGGTATGG
TTGGTATGCTGATGGATGGTCTGAAAGAGCTGAACTTGACAGATGCCTGAACCTCATCCTTATTT CAGATCAT
GGCATGGAACAAGGCAGTTGTAAGAAATACATATATCTGAATAAGTATTTGGGGGATGTTAAAAATATTA
GTTATCTATGGACCTGCAGCTCGATTGAGACCCTCTGATGTCCAGATAAATACTATTCATTTAACTATGAAGG
CATTGCCCCGAAATCTTTCTTGCCGGGAACCAAACCAGCACTTCAAACCTTATCTGAAACATTTCTTGCCTAAGC
GTTTGCATTTGCTAAGAGTGATAGAATTGAGCCCTTGACATTCTATTTGGACCCTCAGTGGCAACTTGCAATTG
AATCCCTCAGAAAGGAAATATTGTGGAAGTGGATTT CATGGCTCTGACAATGTGTTTTCAAATATGCAAGCCC
TCTTTGTTGGCTATGGACCTGGATTCAAGCATGGCATTGAGGCTGACACCTTTGAAAACATTGAAGTCTATAAC
TTGATGTGTGATTTGCTGAATTTGACACCGGCTCCTAATAACGGAACCTCATGGAAGTCTTAACCACTTCTGAA
GAATCCTGTTTATACGCCAAAGCATCCCAAAGAAGTGACCCCCCTGGTGCACTGCCCCCTCACAAGAAACCCC
AGAGATAACCTTGGCTGCTCATGTAACCCTCCATTTTGCCGATTGAGGATTTCAAACACAGTTCAATCTGAC
CGTGGCAGAAGAGAAGATTATTAAGCATGAAACTTTGCCCTATGGAAGACCTAGAGTTCTCCAGAAGGAAAA
CACCATCTGTCTTTTCCAGCACCAGTTTATGAGTGGATACAGCCAAGACATCTTGATGCCCCCTTGGACATC
CTATACCGTGGACAGAAATGACAGTTTCTCTACGGAAGACTTCTCCAAGTGTCTGTACCAGGACTTTAGAATTC
CTCTTAGTCCTGTCCATAAATGTTCATTTTATAAAAAATAACCAAAAGTGAGTTACGGGTTCTCTCCCCACCAC
AACTGAATAAGAATTCAAGTGGAAATATATTCTGAAGCCTTGCTTACTACAAATATAGTGCCAATGTACCAGAG
TTTTCAAGTTATATGGCGCTACTTT CATGACACCCTCTTGCGAAAGTATGCAGAAGAAAGAAATGGTGTCAAT
GTCGTCACTGGTCCTGTGTTTGACTTTGATTATGATGGACGTTGTGATTCCTTGGAGAATTTGAGGCAAAAA
GAAGAGTCATCCGTAACCAAGAAATTTTGATTCCAAGTCAATTTCTTCATTGTGCTGACAAGCTGTAAAGATACA
TCTCAGACGCCTTTGCACTGTGAAAACCTGGACACCTTGCTTTCATTTTGCCTCACAGGACTGATAACAGCGA
GAGCTGTGTGCATGGGAAGCATGACTCCTCATGGGTTGAAGAATTGTTGATGTTGCACAGAGCACGGATCAC
AGACGTCGAGCACATCACTGGACTCAGCTTTTATCAACAAAGAAAAGAGCCAGTTTCAGACATTTTGAAGTTG
AAAACACATTTGCCAACCTTTAGCCAAGAAGAT (SEQ ID NO:7)

Fig. 7

ssNPP1 (signal peptide sequence underlined)

IGVLLTQRTLLSLVLALLFPSMASMAGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLKKCGTYTKNMRPV
YPTKTFPNHYSIVTGLYPESHGIIDNKMYPKMNASFSLKSKEKFNPEWYKGEPWVTAKYQGLKSGTFF
WPGSDVEINGIFPDIYKMYNGSVPFEEIRILAVLQWLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKAL
QRVDGMVGMMLMDGLKELNLHRCLNLILSDHGMEQGSCKKIYLNKYLGDVKNIKVIYGPAARLRPSDV
PDKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNPSEKCYCGSG
FHGSDNVFSNMQALFVGYPGPGFKHGIEADTFENIEVYNLMCDLLNLTPAPNNGTHGSLNHLLKNPVYTP
KHPKEVHPLVQCPFTRNPRDNLGCSCNPSILPIEDFQTQFNLTVAEEKIIKHETLPYGRPRVLQKENTICLLS
QHQMMSGYSQDILMPLWTSYTVDRNDSFSTEDFSNCLYQDFRIPLSPVHKCSFYKNNTKVSYGFLSPPQL
NKNSSGIYSEALLTTNIVPMYQSFQVIWRYFHDTLLRKYAEERNGVNVVSGPVDFDFDYDGRCDSENLRLQ
KRRVIRNQEILIPTHFFIVLTSCKDTSQTPLHCENLDTLAFILPHRTDNSESCVHGKHDSSWVEELLMLHRA
RITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFSQED (SEQ ID NO:8)

Fig. 8

sNPP1

ATGGGTGTA CTGCTCACACAGAGGACGCTGCTCAGTCTGGTCCTTGCACTCCTGTTTCCAAGCATGGCGAGCA
TGCCAAGTTGTGCCAAAGAAGTTAAAAGTTGCAAAGGTCGCTGTTTCGAGAGAACATTTGGGAACTGTCGCT
GTGATGCTGCCTGTGTTGAGCTTGGAACTGCTGTTTGGATTACCAGGAGACGTGCATAGAACCCAGAACATAT
ATGGACTTGCAACAAATTCAGGTGTGGTGAGAAAAGATTGACCAGAAGCCTCTGTGCCTGTTTCAGATGATTGC
AAGGACAAGGGCGACTGCTGCATCACTACAGTTCAGTGTGTCAAGGTGAGAAAAGTTGGGTGGAAGAACC
ATGTGAGAGCATTAAATGAGCCACAGTGCCAGCAGGGTTTGAAACGCCTCCTACACTCTTGTTTTCTTTGGATG
GATTCAGGGGCAGAATATTTGCACACTTGGGGTGGACTTCTTCTGTTATTAGCAAACTCAAAAAATGTGGAAC
ATATACTAAAAACATGAGACCGGTGTATCCAACAAAACTTTCCCAATCACTACAGCATTGTCACCGGATTGT
ATCCAGAATCTCATGGCATAATCGACAATAAGATGTATGATCCCAAATGAATGCTTCTTTTCACTTAAAAGT
AAAGAGAAATTTAATCCGGAGTGGTACAAAGGAGAACCAATTTGGGTGACAGCTAAGTATCAAGGCCTCAAG
TCTGGCACATTTTTCTGGCCAGGATCAGATGTGGAAATTAACGGAATTTCCAGACATCTATAAAATGTATAA
TGGTTCAGTGCCATTTGAAGAAAGGATTTTGGCTGTTCTTCAGTGGCTGCAGCTTCCAAAAGATGAAAGACCA
CACTTTTACACTTTGTATTTGGAAGAACCAGATTCTTCAGGTCATTATATGGACCAGTCAGCAGTGAAGTCAT
CAAAGCCTTGCAAGGGTGTATGGTATGGTGTGATGCTGATGGATGGTCTGAAAGAGCTGAACCTGCACAG
ATGCCTGAACCTCATCCTTATTTAGATCATGGCATGGAACAAGGCAGTTGTAAGAAATACATATATCTGAATA
AGTATTTGGGGGATGTTAAAAATATTAAGTTATCTATGGACCTGCAGCTCGATTGAGACCCTCTGATGTCCCA
GATAAATACTATTCATTTAACTATGAAGGCATTGCCCGAAATCTTCTTGCCGGGAACCAAACCAGCACTTCAA
ACCTTATCTGAAACATTTCTGCCTAAGCGTTTGCACTTTGCTAAGAGTGATAGAATTGAGCCCTTGACATTCTA
TTTGACCCTCAGTGGCAACTTGCATTGAATCCCTCAGAAAGGAAATATTGTGGAAGTGGATTTTCATGGCTCT
GACAATGTGTTTTCAAATATGCAAGCCCTCTTTGTTGGCTATGGACCTGGATTCAAGCATGGCATTGAGGCTG
ACACCTTTGAAAACATTGAAGTCTATAACTTGATGTGTGATTGCTGAATTTGACACCGGCTCCTAATAACGGA
ACTCATGGAAGTCTTAACCACCTTCTGAAGAATCCTGTTTATACGCCAAAGCATCCCAAAGAAGTGCACCCCT
GGTGCAGTGCCCTTCACAAGAAACCCAGAGATAACCTTGGCTGCTCATGTAACCTTCCATTTTGCCGATTG
AGGATTTTCAAACACAGTTCAATCTGACCGTGGCAGAAGAGAAGATTATTAAGCATGAAACTTTGCCCTATGG
AAGACCTAGAGTTCTCCAGAAGGAAAACACCATCTGTCTTTTCCCAGCACCAGTTTATGAGTGGATACAGCC
AAGACATCTTGATGCCCCCTTGGACATCCTATACCGTGGACAGAAATGACAGTTTCTCTACGGAAGACTTCTCC
AACTGTCTGTACCAGGACTTTAGAATTCCTCTTAGTCCTGTCCATAAATGTTCATTTTATAAAAATAACACCAA
GTGAGTTACGGGTTCCTCTCCCCACCACAACCTGAATAAGAATTCAAGTGAATATATTCTGAAGCCTTGCTTAC
TACAAATATAGTGCCAATGTACCAGAGTTTTCAAGTTATATGGCGCTACTTTCATGACACCCTCTTGCGAAAGT
ATGCAGAAGAAAGAAATGGTGTCAATGTCGTGAGTGGTCCTGTGTTTGACTTTGATTATGATGGACGTTGTGA
TTCCTTGGAGAATTTGAGGCAAAAAAGAAGAGTCATCCGTAACCAAGAAATTTTGATTCCAACCTCATTTCTTCA
TTGTGCTGACAAGCTGTAAAGATACATCTCAGACGCCTTTGCACTGTGAAAACCTGGACACCTTGGCTTTCATT
TTGCCTCACAGGACTGATAACAGCGAGAGCTGTGTGCATGGGAAGCATGACTCCTCATGGGTTGAAGAATTG
TTGATGTTGCACAGAGCACGGATCACAGACGTCGAGCACATCACTGGACTCAGCTTTTATCAACAAAGAAAAG
AGCCAGTTTCAGACATTTTGAAGTTGAAAACACATTTGCCAACCTTTAGCCAAGAAGAT (SEQ ID NO:9)

Fig. 9

sNPP1

IGVLLTQRTLLSLVLALLFPSMASMPSCAKEVKSCKGRCFERTFGNCRCDAAACVELGNCCLDYQETCIEPE
HIWTCNKFRCGEKRLTRSLCACSDDCCKDKGDCCINYSSVCQGEKSWVEEPCESINEPQCPAGFETPPTLLF
SLDGFRAEYLHTWGGLLPVISKLLKCGTYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIDNKMYPKMN
ASFSLKSKEKFNPEWYKGEPWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYKMYNGSVPFEEILAVLQ
WLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGMMLMDGLKELNLHRCLNLILISDHG
MEQGSCKKYIYLNKYLGDVKNIKVIYGPAARLRPSDVPDKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPK
RLHFAKSDRIEPLTFYLDPQWQLALNPSEKCYGSGFHGSDNVFSNMQALFVGYPGPGFKHGIEADTFENI
EVYNLMCDLLNLTPAPNNGTHGSLNHLLKNPVYTPKHPKEVHPLVQCPFTRNPRDNLGCSCNPSILPIED
FQTQFNLTVAEEKIHKHETLPYGRPRVLQKENTICLLSQHQFMSGYSQDILMPLWTSYTVDRNDSFSTEDF
SNCLYQDFRIPLSPVHKCSFYKNNTKVSYGFLSPPQLNKNSSGIYSEALLTTNIVPMYQSFQVIWRYFHDTL
LRKYAEERNGVNVVSGPVDFDYDGRCDLENLRQKRRVIRNQEILIPTHFFIVLTSCKDTSQTPLHCENLD
TLAFILPHRTDNSESCVHGKHDSSWVEELLMLHRARITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFSQE
D (SEQ ID NO:10)

Fig. 10

TAGsNPP1 (N-terminus D8)

ATGGGTGTA CTGCTCACACAGAGGACGCTGCTCAGTCTGGTCCTTGCACTCCTGTTTCCAAGCATGGCGAGCA
TGGATGACGATGATGACGACGATGACCCAAGTTGTGCCAAAGAAGTTAAAAGTTGCAAAGGTCGCTGTTTCG
AGAGAACATTTGGGAACTGTCGCTGTGATGCTGCCTGTGTTGAGCTTGGAAGCTGCTGTTGGATTACCAGGA
GACGTGCATAGAACCAGAACATATATGGACTTGCAACAAATTCAGGTGTGGTGAGAAAAGATTGACCAGAAG
CCTCTGTGCCTGTTTCAAGTATTGCAAGGACAAGGGCGACTGCTGCATCAACTACAGTTCAGTGTGTCAAGGT
GAGAAAAGTTGGGTGGAAGAACCATTGTGAGAGCATTAAATGAGCCACAGTGCCCAGCAGGGTTTGAAACGCC
TCCTACACTCTGTTTCTTTGGATGGATTGAGGGCAGAAATATTTGCACACTTGGGGTGGACTTCTTCTGTTAT
TAGCAAACTCAAAAAATGTGGAACATATACTAAAAACATGAGACCGGTGTATCCAACAAAACTTTCCCAAT
CACTACAGCATTGTCAACGGATTGTATCCAGAATCTCATGGCATAATCGACAATAAGATGTATGATCCCAAAAT
GAATGCTTCTTTTCACTTAAAAGTAAAGAGAAAATTAATCCGGAGTGGTACAAAGGAGAACCAATTTGGGTC
ACAGCTAAGTATCAAGGCCTCAAGTCTGGCACATTTTCTGGCCAGGATCAGATGTGGAAATTAACGGAATTT
TCCCAGACATCTATAAAATGTATAATGGTTCAGTGCCATTTGAAGAAAGGATTTTGGCTGTTCTTCAGTGGCTG
CAGCTTCCAAAAGATGAAAGACCACACTTTTACACTTTGTATTTGGAAGAACCAGATTCTTCAGGTCAATCATA
TGGACCAGTCAGCAGTGAAGTCATCAAAGCCTTGACAGAGGGTTGATGGTATGGTTGGTATGCTGATGGATGG
TCTGAAAGAGCTGAACTTGACAGATGCCTGAACCTCATCCTATTTTCAAGTATGGCATGGAACAAGGCAGT
TGTAAGAAATACATATATCTGAATAAGTATTTGGGGGATGTTAAAAATATTAAAGTTATCTATGGACCTGCAG
CTCGATTGAGACCTCTGATGTCCAGATAAAATACTATTCAATTAAGTATGAAGGCATTGCCCGAAATCTTCTT
GCCGGGAACCAACCAGCACTTCAAACCTTATCTGAAACATTTCTTGCTAAGCGTTTGCACTTTGCTAAGAGT
GATAGAATTGAGCCCTTGACATTCTATTTGGACCCTCAGTGGCAACTTGCAATTGAATCCCTCAGAAAGGAAAT
ATTGTGGAAGTGGATTTTCAAGCTCTGACAATGTGTTTCAAATATGCAAGCCCTCTTGTGGCTATGGACCT
GGATTCAAGCATGGCATTGAGGCTGACACCTTTGAAAACATTGAAGTCTATAACTTGATGTGTGATTTGCTGA
ATTTGACACCGGCTCCTAATAACGGAACCTCATGGAAGTCTTAACACCTTCTGAAGAATCCTGTTTATACGCCA
AAGCATCCCAAGAAGTGACCCCTGCTGAGTGCCCTTCAAGAAACCCAGAGATAACCTTGGCTGCT
CATGTAACCTTCCATTTTGGCGATTGAGGATTTCAAACACAGTTCATCTGACCGTGGCAGAGAGAGAAGATT
ATTAAGCATGAACTTTGCCCTATGGAAGACCTAGAGTTCTCCAGAAGGAAAACACCATCTGTCTTCTTTCCCA
GCACCAGTTTATGAGTGGATACAGCCAAGACATCTTGATGCCCTTTGGACATCCTATACCGTGGACAGAAAT
GACAGTTTCTCTACGGAAGACTTCTCCAAGTGTCTGTACCAGGACTTTAGAATTCCTCTTAGTCTGTCCATAAA
TGTTCAATTTATAAAAATAACACCAAAGTGAGTTACGGGTTCTCTCCCCACCACAAGTGAATAAGAATTCAAG
TGGAATATATTCTGAAGCCTTGCTTACTACAAATATAGTGCCAATGTACCAGAGTTTTCAAGTTATATGGCGCT
ACTTTCATGACACCTCTTGCGAAAGTATGCAGAAGAAAGAAATGGTGTCAATGTCGTCAAGTGGTCCTGTGTT
TGACTTTGATTATGATGGACGTTGTGATTCTTGGAGAATTTGAGGCCAAAAAGAGATCATCCGTAACCAA
GAAATTTGATTCCAAGTCAATTTCTTCAATGTGCTGACAAGCTGTAAAGATACATCTCAGACGCTTTGCACTGT
GAAAACCTGGACACCTTGGCTTTCAATTTGCCTCACAGGACTGATAACAGCGAGAGCTGTGTGCATGGGAAGC
ATGACTCCTCATGGGTTGAAGAATTGTTGATGTTGCACAGAGCACGGATCACAGACGTCGAGCACATCACTGG
ACTCAGCTTTTATCAACAAAGAAAAGAGCCAGTTTCAGACATTTTGAAGTTGAAAACACATTTGCCAACCTTTA
GCCAAGAAGAT (SEQ ID NO:11)

Fig. 11

TAGsNPP1 (N-terminus D8)

IGVLLTQRTLLSLVLALLFPSMASM**DDDDDDDD**PSCAKEVKSCKGRCFERTFGNCRCDAAACVELGNCCLDYQETCIEPEHIWTCNKFRCGEKRLTRSLCACSDDCCKDKGDCCINYSSVCQGEKSWVEEPCESINEPQCPAGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLKCCGTYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPEWYKGEPiWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYKMYNGSVPFEERILAVLQWLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGMMLMDGLKELNLHRCLNLILISDHGMEQGSCKKYIYNKYLGDVKNIKVIYGPAARLRPSDVPDKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNPSEKCYGSGFHGSDNVFSNMQALFVGYPGPFKHGIEADTFENIEVYNLMCDLLNLTPAPNNGTHGSLNHLLKNPVYTPKHPKEVHPLVQC PFTRNPRDNLGCSCNPSILPIEDFQTQFNLTVAEEKIIKHETLPYGRPRVLQKENTICLLSQHQFMSGYSQDILMPLWTSYTVDRNDSFSTEDFSNCLYQDFRIPLSPVHKCSFYKNNTKVSYGFLSPPQLNKNSSGIYSEALLTTNIVPMYQSFQVIWRYFHDTLLRKYAEERNGVNVVSGPVDFDYDGRCDLENLRQKRRVIRNQEILIPTHFFIVLTSCKDTSQTPLHCENLDTLAFILPHRTDNSESCVHGKHDSSWVEELLMLHRARITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFSQED (SEQ ID NO:12)

Fig. 12

TAGsNPP1 (C-terminus D8)

GTGGGTGTACTGCTCACACAGAGGACGCTGCTCAGTCTGGTCCTTGCACTCCTGTTTCCAAGCATGGCGAGCA
TGCCAAGTTGTGCCAAAGAAGTTAAAAGTTGCAAAGGTCGCTGTTTCGAGAGAACATTTGGGAACTGTCGCT
GTGATGCTGCCTGTGTTGAGCTTGAAACTGCTGTTTGGATTACCAGGAGACGTGCATAGAACCAGAACATAT
ATGGACTTGCAACAAATTCAGGTGTGGTGAGAAAAGATTGACCAGAAGCCTCTGTGCCTGTTGAGATGATTGC
AAGGACAAGGGCGACTGCTGCATCAACTACAGTTCAGTGTGTCAAGGTGAGAAAAGTTGGGTGGAAGAACC
ATGTGAGAGCATTAAATGAGCCACAGTGCCAGCAGGGTTTGAAACGCCTCCTACACTCTTGTTTTCTTTGGATG
GATTCAGGGCAGAATATTTGCACACTTGGGGTGGACTTCTTCTGTTATTAGCAAACCTCAAAAAATGTGGAAC
ATATACTAAAAACATGAGACCGGTGTATCCAACAAAACTTTCCCAATCACTACAGCATTGTCACCGGATTGT
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AAAGAGAAATTTAATCCGGAGTGGTACAAAGGAGAACCAATTTGGGTCACAGCTAAGTATCAAGGCCTCAAG
TCTGGCACATTTTTCTGGCCAGGATCAGATGTGGAATTAACGGAATTTCCAGACATCTATAAAATGTATAA
TGGTTCAGTGCCATTTGAAGAAAGGATTTGGCTGTTCTTCAGTGGCTGCAGCTTCCAAAAGATGAAAGACCA
CACTTTTACACTTTGTATTGGAAGAACCAGATTCTTCAGGTCATTATATGGACCAGTCAGCAGTGAAGTCAT
CAAAGCCTTGCAAGGGTGTATGGTATGGTTGGTATGCTGATGGATGGTCTGAAAGAGCTGAACTTGACAG
ATGCCTGAACCTCATCCTTATTTAGATCATGGCATGGAACAAGGCAGTTGTAAGAAATACATATATCTGAATA
AGTATTTGGGGGATGTTAAAAATATTAAAGTTATCTATGGACCTGCAGCTCGATTGAGACCCTCTGATGTCCCA
GATAAATACTATTCATTTAACTATGAAGGCATTGCCCGAAATCTTCTTGCCGGAACCAAACCAGCACTTCAA
ACCTTATCTGAAACATTTCTTGCCTAAGCGTTTGCACCTTGCTAAGAGTGATAGAATTGAGCCCTTGACATTCTA
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GACAATGTGTTTTCAAATATGCAAGCCCTCTTTGTTGGCTATGGACCTGGATTCAAGCATGGCATTGAGGCTG
ACACCTTTGAAAACATTGAAGTCTATAACTTGATGTGTGATTGCTGAATTTGACACCGGCTCCTAATAACGGA
ACTCATGGAAGTCTTAACCACCTTCTGAAGAATCCTGTTTATACGCCAAAGCATCCCAAAGAAGTGCACCCCT
GGTGCAGTGCCCTTCACAAGAAACCCAGAGATAACCTTGGCTGCTCATGTAACCTTCCATTTTGCCGATTG
AGGATTTTCAAACACAGTTCAATCTGACCGTGGCAGAAGAGAAGATTATTAAGCATGAACTTTGCCCTATGG
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AAGACATCTTGATGCCCTTTGGACATCCTATACCGTGGACAGAAATGACAGTTTCTCTACGGAAGACTTCTCC
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GTGAGTTACGGGTTCTCTCCCCACCACAACCTGAATAAGAATTCAAGTGGAATATATTCTGAAGCCTTGCTTAC
TACAAATATAGTGCCAATGTACCAGAGTTTTCAAGTTATATGGCGCTACTTTCATGACACCCTCTTGCAGAAAGT
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TTCCTTGGAGAATTTGAGGCAAAAAGAGAGTCATCCGTAACCAAGAAATTTGATTCCAACCTCATTTCTTCA
TTGTGCTGACAAGCTGTAAAGATACATCTCAGACGCCTTTGCACTGTGAAAACCTGGACACCTTGGCTTTCATT
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TTGATGTTGCACAGAGCACGGATCACAGACGTCGAGCACATCACTGGACTCAGCTTTTATCAACAAAGAAAAG
AGCCAGTTTCAGACATTTTGAAGTTGAAAACACATTTGCCAACCTTTAGCCAAGAAGATGATGACGATGATGA
CGACGATTGA (SEQ ID NO:13)

Fig. 13

TAGsNPP1 (C-terminus D8; signal peptide sequence underlined and the targeting moiety in bold)

QGVLLTQRTLLSLVLALLFPSMASMPSCAKEVKSCKGRCFERTFGNCRCDAAACVELGNCCLDYQETCIEPEHIWTCN
KFRCGEKRLTRSLCACSDDCCKDKGDCCINYSSVCQGEKSWVEEPCESINEPQCPAGFETPPTLLFSLDGFRAEYLHT
WGGLLPVISKLKCGTYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPEWYKG
EPIWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYKMYNGSVPFEEERILAVLQWLQLPKDERPHFYTLYLEEPDSSGH
SYGPVSSEVIKALQRVDGMVGMMLMDGLKELNLHRCNLILISDHGMEQGSCKKYIYLNKYLGDVKNIKVIYGPAARL
RPSDVPDKYYSFNYEGIARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPPQWQLALNPSEKCYCGSGFH
GSDNVFSNMQALFVGYPGFGKHGIEADTFENIEVYNLMCDLLNLTAPNNGTHGSLNHLLKNPVYTPKHPKEVHP
LVQCPFTRNPRDNLGCSCNPILPIEDFQTQFNLTVAEEKIIKHETLPYGRPRVLQKENTICLLSQHQFMSGYSQDIL
MPLWTSYTVDRNDSFSTEDFSNCLYQDFRIPLSPVHKCSFYKNNTKVSYGFLSPPQLNKNSSGIYSEALLTTNIVPMY
QSFQVIWRYFHDTLRKYAEERNGVNVVSGPVFDFDYDGRCDSENLRQKRRVIRNQEILIPTHFFIVLTSCKDTSTQ
PLHCENLDTLAFILPHRTDNSESCVHGKHDSSWVEELMLHRARITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFS
QE**DDDDDDDD** (SEQ ID NO:14)

Fig. 14

Linker peptide

GGGGSGGGGS (SEQ ID NO:15)

Fig. 15

The amino acid sequence of the Fc region

EPKSCDKTHTCPPCPAPEAAGAPSVFLFPPKPKDTLMISRTPEVTCVVVDVSH EDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISK
AKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSGSFFLYS
KLTVDKSRWQ QGNVFSCSVMHEALHNHYTQKSLSLSPGK (SEQ ID NO:16)

Fig. 16**The amino acid sequence of TAGsssNPP1 (N-terminus D8) + Fc + Linker**

IGVLLTQRTLSLVLALLFPSMASMEPKSCDKTHTCPPCPAPEAAGAPSVFLFPPKPKDTLMISRTPEVTCV
VVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALP
APIEKTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDS
DGSFFLYS KLTVDKSRWQ QGNVFSCSVM HEALHNHYTQ KSLSLSPGK **DDDDDDDD**
GGGGSGGGGSAGFETPPTLLFSLDGFRAEYLHTWGGLLPVISKLKCGTYTKNMRPVYPTKTFPNHYSIVT
GLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPEWYKGEPWVTAKYQGLKSGTFFWPGSDVEINGIFPDI
YKMYNGSVPFEERILAVLQWLQLPKDERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGMMLMD
GLKELNLHRCLNLILISDHGMEQGSCKKYIYLNKYLGDVKNKVIYGPAARLRPSDVPDKYYSFNYESGIARNL
SCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNPSEKCYCGSGFHGSDNVFSNMQALF
VGYGPGFKHGIEADTFENIEVYNLMCDLLNLTPAPNNGTHGSL (SEQ ID NO:17)

Fig. 17

The amino acid sequence of TAGsssNPP1 (C-terminus D8) + Fc + Linker

IGVLLTQRTLLSLVLALLFPSMASMEPKSCDKTHTCPPCPAPEAAGAPSVFLFPPKPKDTLMISRTPEVTCV
VVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPA
PIEKTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSD
GSFFLYSKLTVDKSRWQQGNVFSVCSVMHEALHNHYTQKSLSLSPGKAGFETPPTLLFSLDGFRAEYLHTW
GGLLPVISKLKCGTYTKNMRPVYPTKTFPNHYSIVTGLYPESHGIIDNKMYDPKMNASFSLKSKEKFNPE
WYKGEPWVTAKYQGLKSGTFFWPGSDVEINGIFPDYKMYNGSVPFEEIRILAVLQWLQLPKDERPHFYT
LYLEEDSSGHSYGPVSSEVIKALQRVDGMVGMLMDGLKELNLHRCNLILISDHGMEQGSCKKYYLNKY
LGDVKNIKVIYGPAARLRPSDVPDKYYSFNYEGIARNLSCREPNQHFQPYLKHFLPKRLHFAKSDRIEPLTFYL
DPQWQLALNPSEKCYGSGFHGSDNVFSNMQALFVGYPGFGKHGIEADTFENIEVYNLMCDLLNLTAP
NNGTHGSLGGGGSGGGGS **DDDDDDDD** (SEQ ID NO: 18)

Fig. 18

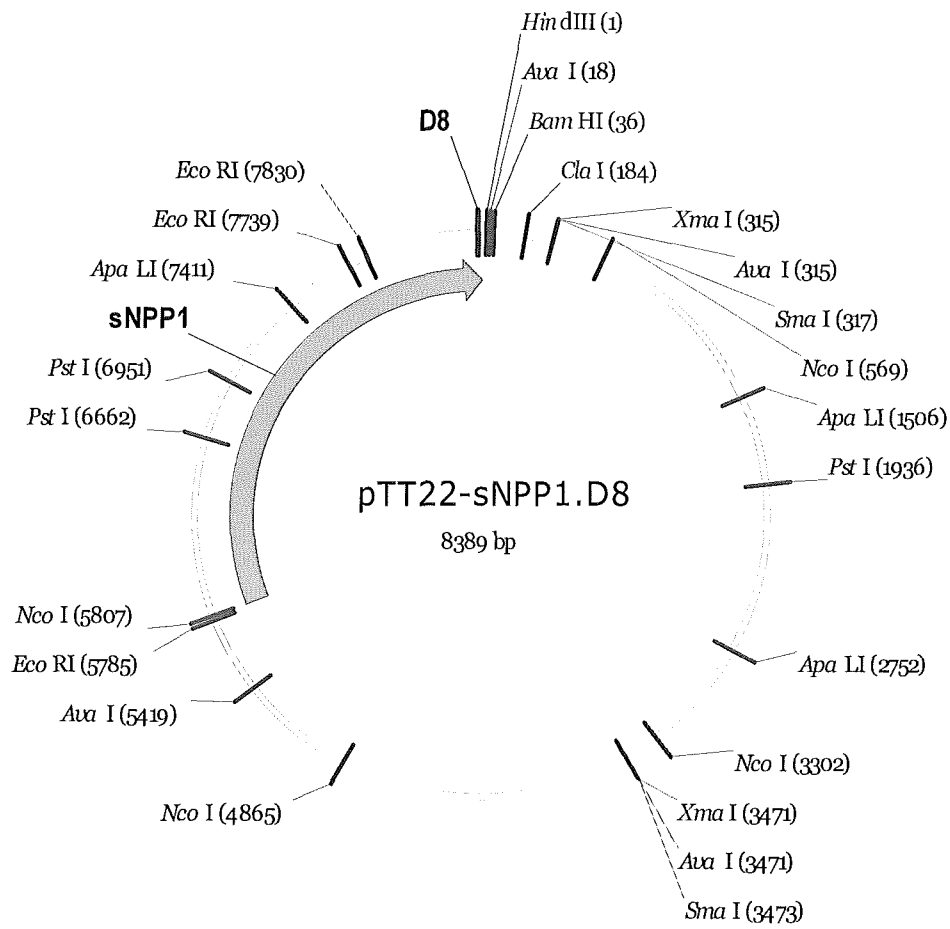


Fig. 19

Western Analysis

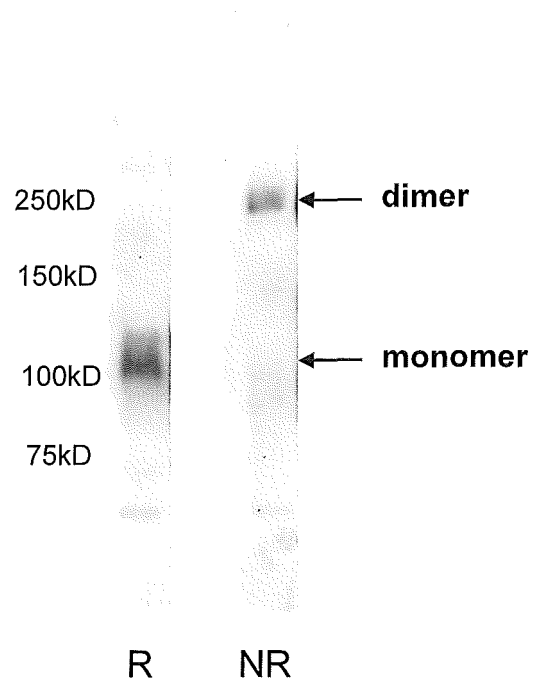


Fig. 20

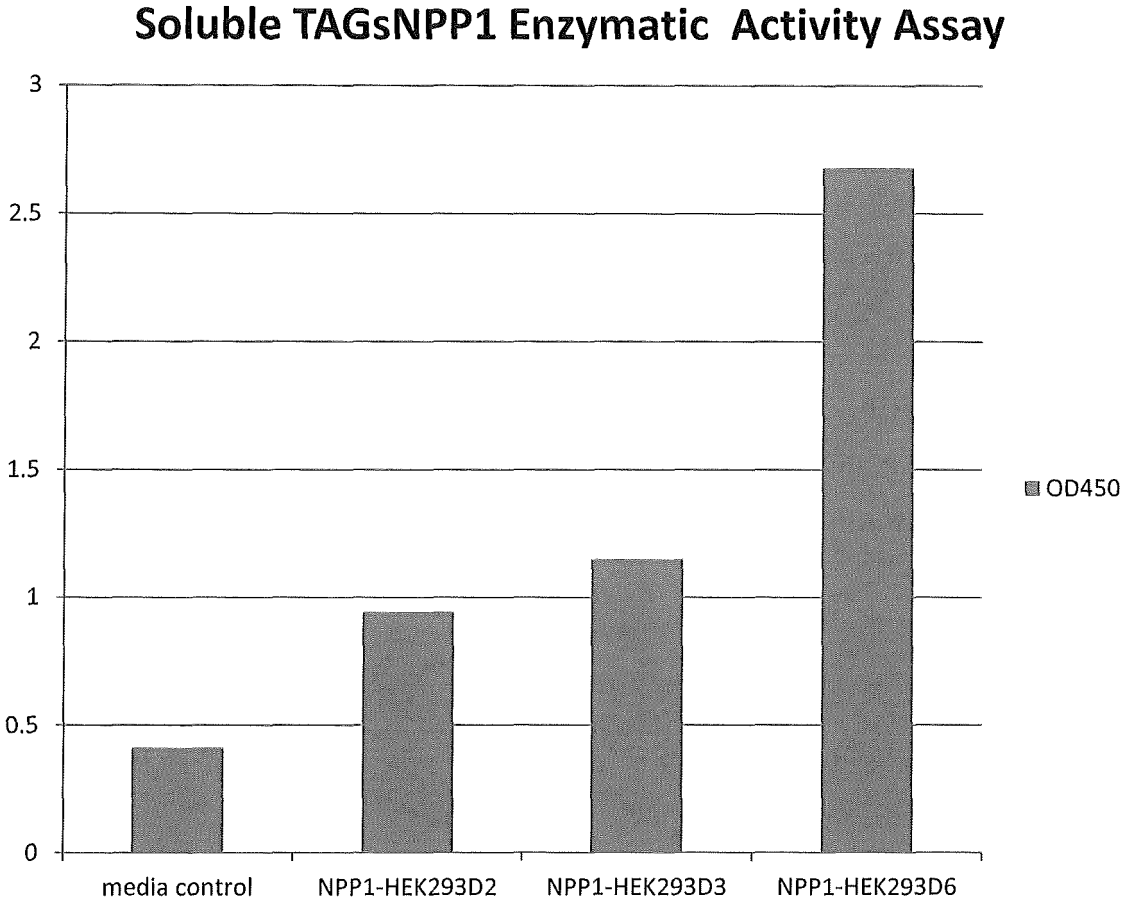


Fig. 21

Recombinant NPP1 fusion proteins

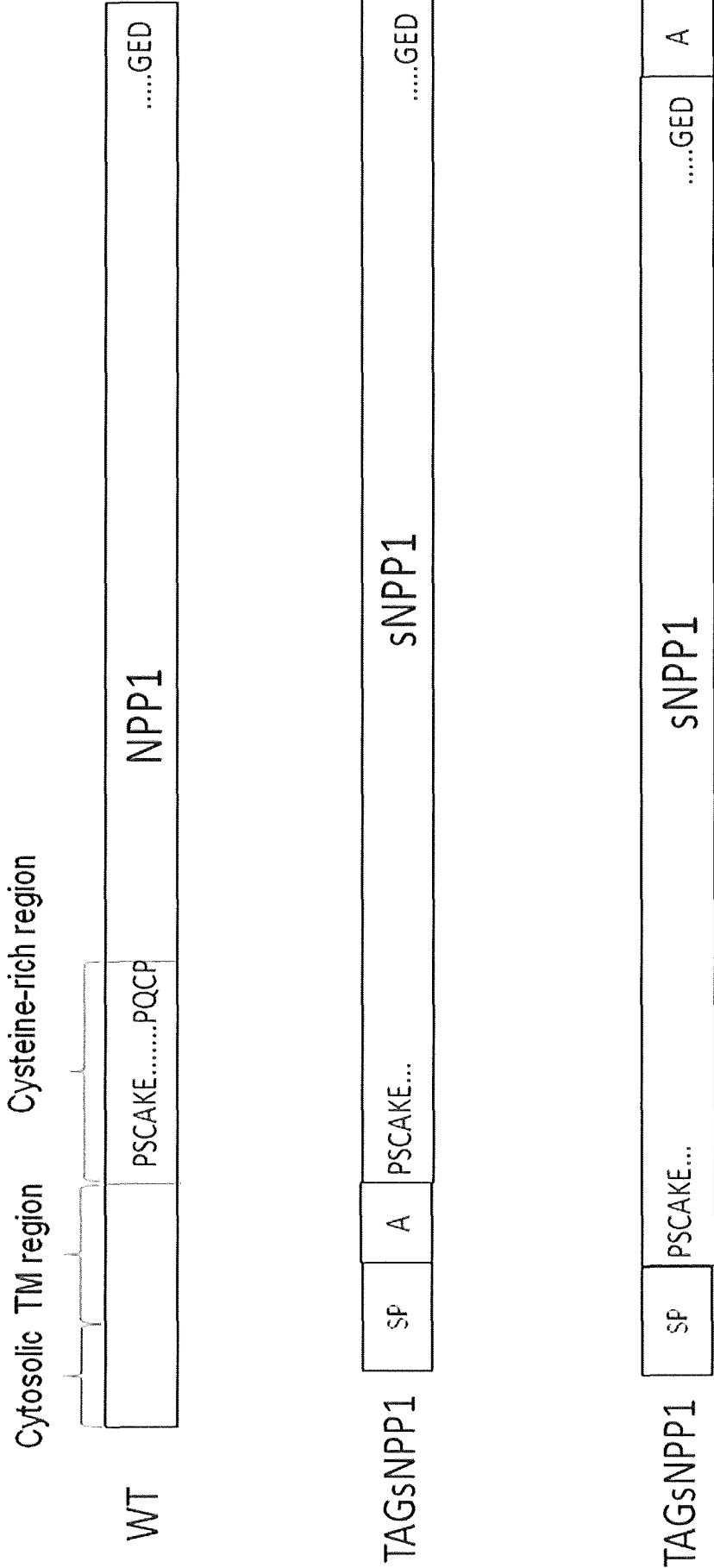


Fig. 22A

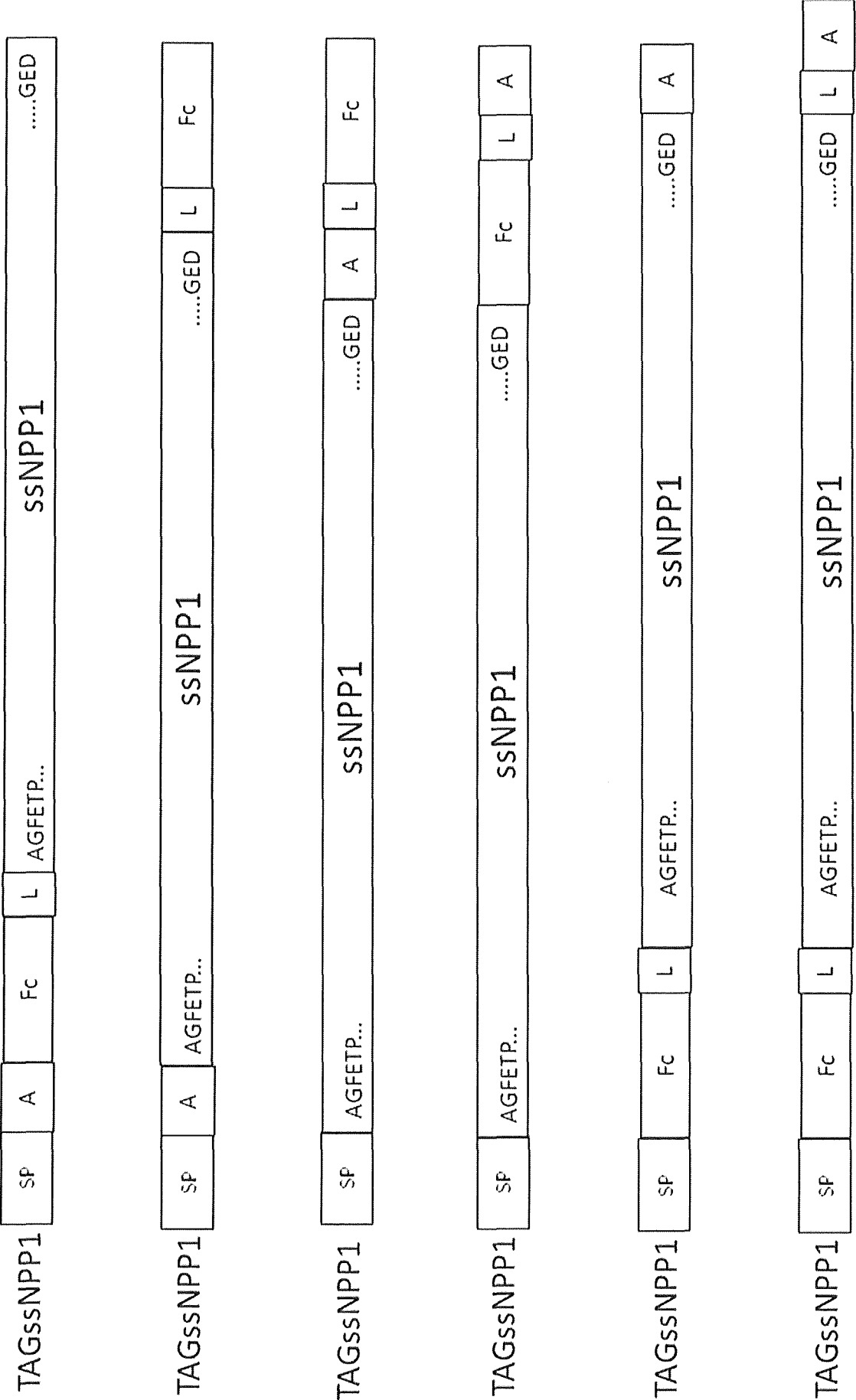


Fig. 22B

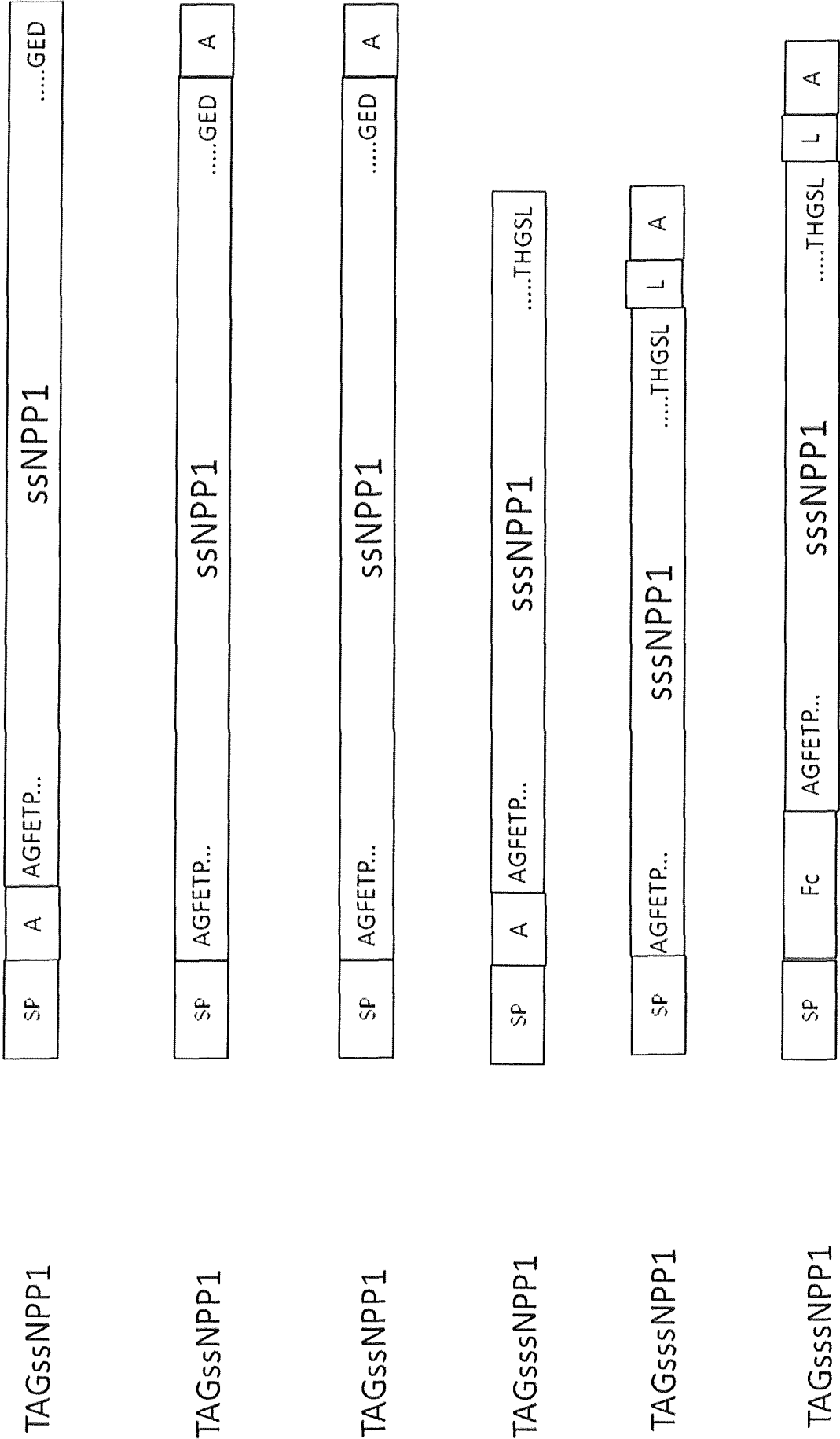


Fig. 22C

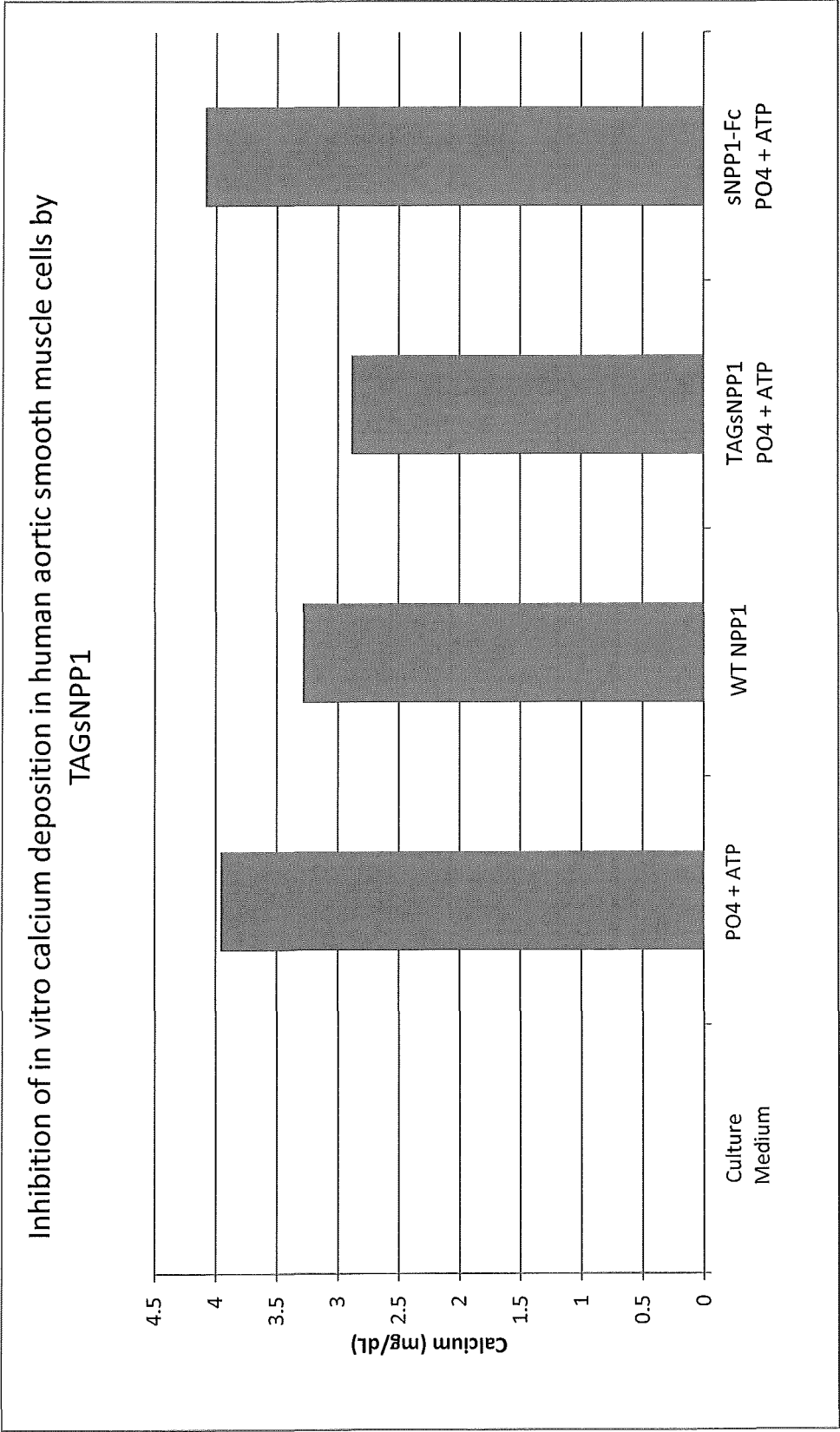


Fig. 23

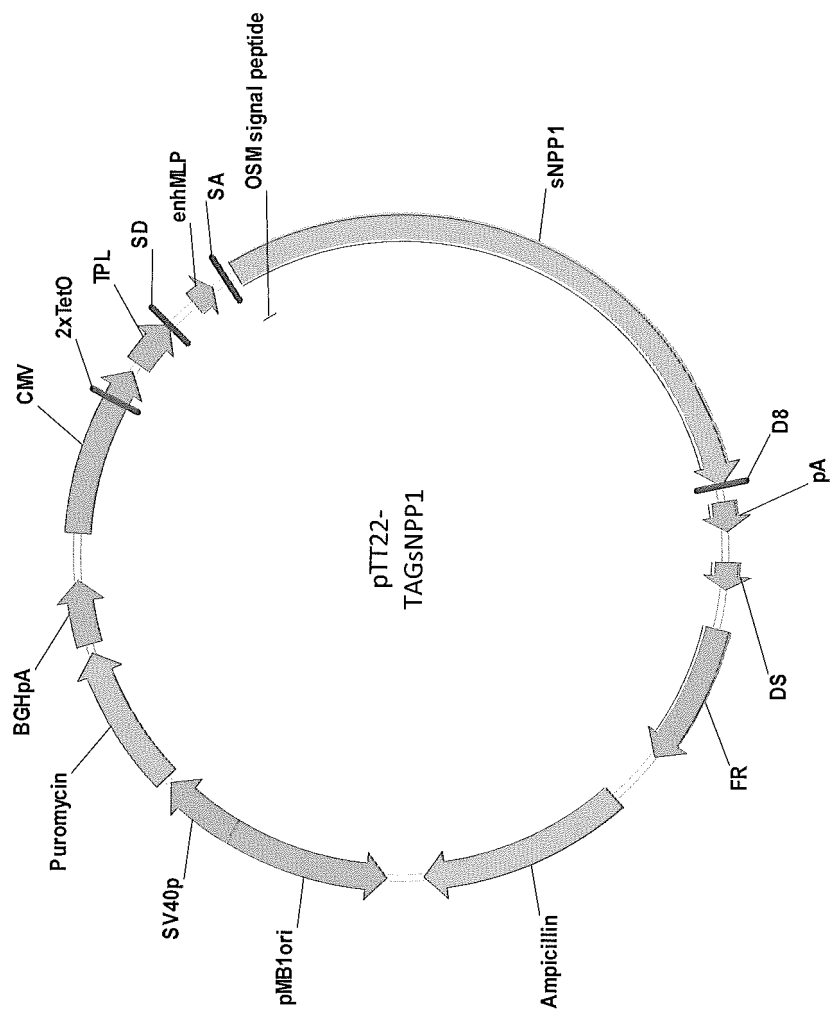


Fig. 24

DNA sequence of TAGSNPP1 (D8)

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 gagcgtgcatagaaccagaaacataataggacttgcaacaaattcaggtgtggtgagaaaaagattgaccagaagcctctgtgcctgttcagatgat
 tgaaggacaaagggcactgctgcatcaactacagttcagtggtcaaggtgagaaaagttgggtggaagaaacatgtgagagcattaatgagcca
 cagtgcccagcaggggttgaaacgcctcctacactctgtttctttggatggattcagggcagaattattgcacacttgggtggacttcttccct
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 ggattgtatccagaattcctcatggcataaatacgaataaagatgatcccaaaatgaatgcttcccttttcaactaaaaagtaagagaaaattaat
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 agacctctgatgtcccagataaatactattcatttaactatgaaggcattgcccgaattcttcttgcgggaaaccaaaccagcacttcaaacct
 tatctgaaacatttcttgccctaagcgtttgcactttgctaagagtgaataatgagcccttgacattctatttggaccctcagtggaacttgca
 ttgaatccctcagaaaaggaaatatttggaaagtggatttcatggctctgacaattgttttcaaatatgcaagccctcttcttggctatggacct
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 ggaactcatggaagtcttaaccaccttctgaagaatcctgtttatacgccaaagcatcccaagaaagtgacccccctggtgcagtgcccccttcaca
 agaaacccagagataaaccttggtgctcatgtaacccttccatttggcgattgaggttttcaaacacagttcaatctgacctggcagaagag
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 aataagaaattcaagtggaatataattctgaagccttgcttactacaaatagtgccaatgtaccagagtttcaagttatatggcgctactttcat
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Fig. 25

(SEQ ID NO: 19)

Amino Acid sequence of TAGsNPP1(D8)

MGVLLTQRTLLSLVLAALLFPSMASMPSCAKEVKSCKGRCFERTFGNCRCDAAACVELGNCCLDYQETCIEPEHIWTCNKFRCEKRI~~TRSL~~CACSDDD
 CKDKGDCCINYSVVCQGEKSWVEEPCESINEPQCPAGFETPTLLFSLDGFRAEY~~LHTWG~~LLPVISKLKCGTYTKNMRPVYPTKTFPNHYSIVT
 GLYPESHGIDNKMYPDPMNASFSLKSKKEKFNPEWYKGEPIWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYKMYNGSVPFEE~~RI~~LAVLQWLQLPK
 DERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGM~~MDGLKELN~~LHRCNLILISDHGMEQGSCKK~~YI~~YLNKYLGDVKNIKVIYGPAA~~RL~~
 RPSDVPDKYYSFN~~YEG~~IARNLSCREPNQHFKPYLKHFLPKRLHFAKSDRIEPLTFYLDPQWQLALNPSE~~RKY~~CGSGFHGSDNVFSNMQALFVG~~YGP~~
 GFKHGIEADTFENIEVYNLMCDLLNLTAPNNGTHGSLNHL~~LKNPV~~YTPKHPKEVHPLVQCPFTRNPRDNLGCSCNPSILPIEDFQTQFNLTVAEE
 KIIKHETLPYGRPRVLQKENTICLLSQHQFMSGYSQDILMPLWTSYTVDRNDSFSTEDFSNCLYQDFRIP~~LS~~PVHKCSFYKNNTKVSYGFLSP~~PQL~~
 NKNSSGIYSEALLTTNIVPMYQSFQVIWRYFFHDTLLRKYAEERNGVNVSGPVDFDYDGRCD~~SL~~ENLRQKRRVIRNQEILIPTHFFIVLTSCKDT
 SQTPLHCENLDTLAFILPHRTDNSESCVHGKHDSSWVEELLMLHRARITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFSQEDDDDDDDDD

(SEQ ID NO: 20)

Fig. 26

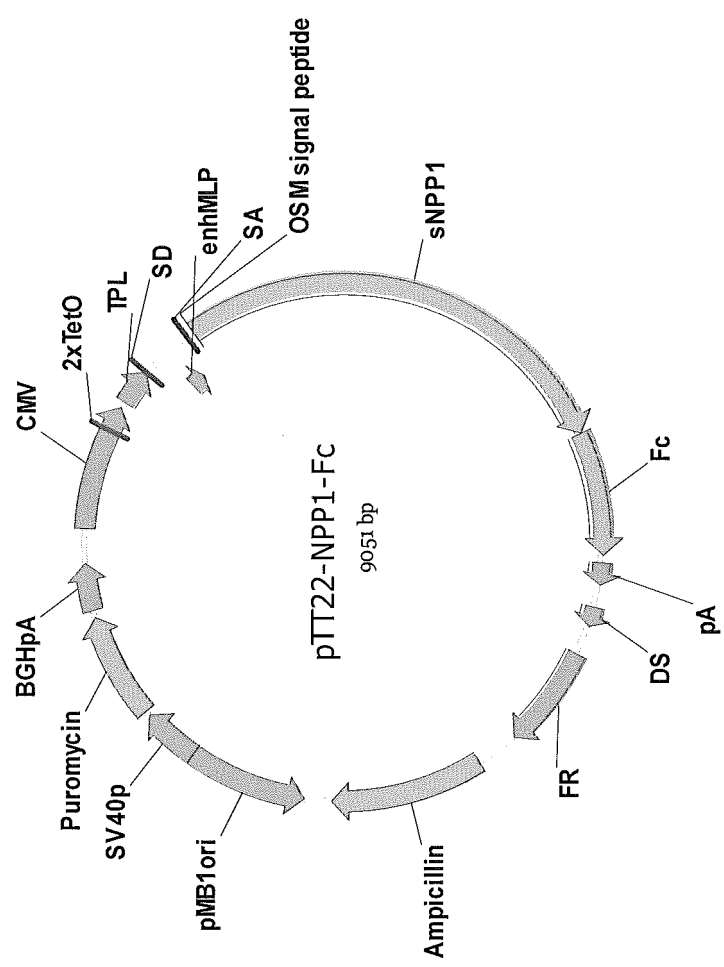


Fig. 27

ATGGGTGTA CTGCTCACAGAGGACGTGCTCAGTCTGGTCTTGCACTCTGTTTCCAAAGCATGGCGAGCATGCCAAGTTGTGCCAAAGAAGTTAAAAGTTCGCTGTTTCGAGA
 GAACATTTGGGAACTGTGCTGTGATGCTGCCTGTGTTGAGCTTGGAACTGCTGTTGGATTACCAAGGAGACGTGCATAGAACCAAGAACATATATGAGCTTGCAACAAATTCAGGTGTGGTGA
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 AAAAATGTGGAAACATATACTAAAAACATGAGACCGGTGTATCAACAAAAAACTTCCCAATCACTACAGCATTTGTACCAGATTGTATCCAGAAATCTCATGGCATATCGACATAAAGATGTAT
 GATCCCAAAATGAATGCTCTTTCACTTAAAGTAAAGAGAAAAATTAATCCGGAGTGTACAAAGGAGAACCAATTTGGGTACAGCTAAGTATCAAGGCCTCAAGTCTGGCACATTTTCTG
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 CGTGGAGGTGCATAATGCCAAGACAAAGCCCGGGAGGAGCAGTACACAGCACGTACCGTGTGGTACGCTCCTCACCGTCTGCACCGAGTGGCTGAATGGCAAGGAGTACAAAGTCA
 AGGTCTCCAAACAAAGGCCCTCCAGGCCCTCATCGAGAAAAACCATCTCCAAAGCCAAAGGGCAGCCCGAGAACCAAGGTGTACACCTTGCCCTCCATCCCGGAGGAGATGACCAAGAACCCAGG
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Fig. 28

MGVLLTQRTLLSLVLALLFPSMASMPSCAKEVKSCKGRCFERTFGNCRCDAAACVELGNCCLDYQETCIEPEHIWTCNKFRCEKRLTRSLCACSD
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GLYPESHGII DNKMYDPKMNASFLKSKKEKFNPEWYKGEPIWVTAKYQGLKSGTFFWPGSDVEINGIFPDIYKMYNGSVPFEEERILAVLQWLQLPK
DERPHFYTLYLEEPDSSGHSYGPVSSEVIKALQRVDGMVGMMLDGLKELNLHRCNLILISDHGMEQGSCKKIYLNKYLGDVKNIKVIYGPAAARL
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GFKHGIEADTFENIEVYNLMCDLLNLTPAPNNGTHGSLNHLKKNPVYTPKHPKEVHPLVQCPFTRNPRDNIGCSCNPSILPIEDFQQTQFNLTVAEE
KIIKHETLPYGRPRVLQKENTICLLSQHQFMSGYSQDILMPLWTSYTVDRNDSFSTEDFSNCLYQDFRIPLSPVHKCSFYKNNTKVSYGFLSPPQL
NKNSSGIYSEALLTTNIVPMYQSFQVIWRYFHDITLLRKYAEERNGVNVSGPVDFDYDGRCDLENLRQRRVIRNQEILIPTHFFIVLTSCKDT
SQTPLHCENLDTLAFILPHRTDNSESCVHGKHDSSWVEELLMLHRARITDVEHITGLSFYQQRKEPVSDILKLKTHLPTFSQEDEPKSCDKTHTCP
PCPAPELLGGPSVFLFPPKPKDTLMI SRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKV
SNKALPAPIEKTISKAKGQPREPQVYVTLPPSRREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQ
GNVFSCSVMEALHNHYTQKSLSLSPGK (SEQ ID NO: 22)

Fig. 29