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(54) Title: PROMOTERS FOR ENHANCING EXPRESSION IN POXVIRUSES

(57) Abstract: The present invention relates to one or more promoters and/or expression cassettes that can be used for enhancing expression of a heterologous gene, such as Brachyury. In particular, the one or more promoters and/or expression cassettes enhance expression of heterologous genes as part of a viral vector, such as a poxvirus.



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PROMOTERS FOR ENHANCING EXPRESSION IN POXVIRUSES

FIELD OF THE INVENTION

[001] The present invention relates to one or more novel promoters of protein expression in poxviruses, especially avipoxviruses such as fowlpoxvirus and canarypoxvirus. The invention further relates to polynucleotides comprising said promoter, in particular, polynucleotides comprising said promoter and a nucleic acid to be expressed; vectors comprising the same; host cells comprising the above constructs; and compositions comprising any of the above. Additionally the invention relates to one or more novel polypeptides operably linked to the one or more promoters. More particularly, the one or more novel polypeptides are related to the Brachyury protein.

BACKGROUND OF THE INVENTION

[002] Recombinant poxviruses have been used as vaccines for infectious organisms and, more recently, for tumors. Mastrangelo et al. J Clin Invest. 2000;105(8):1031–1034. Two of these poxvirus groups, avipoxvirus and orthopoxvirus, have been shown to be effective at battling tumors and have been involved with potential cancer treatments. *Id.*

[003] One exemplary avipoxvirus species, fowlpox, has been shown to be a safe vehicle for human administrations as fowlpox virus enters mammalian cells and expresses proteins, but replicates abortively. Skinner et al. Expert Rev Vaccines. 2005 Feb;4(1):63-76. Additionally, the use of fowlpox virus as a vehicle for expression is being evaluated in numerous clinical trials of vaccines against cancer, malaria, tuberculosis, AIDS, and EBOLA. *Id.*

[004] Recombinant poxviruses, such as fowlpox, has been used to express a wide range of inserted genes, including several infectious disease and tumor associated genes such as p97,

HER-2/neu, p53 and ETA (Paoletti, et al., 1993). One exemplary tumor antigen that is recently being studied is Brachyury (also known as “T”).

[005] Brachyury was identified in mice as a dominant short tail mutant that is also a recessive lethal; homozygous T/T embryos die in mid-gestation due to a failure of posterior mesoderm formation (Chesley, J. Exp. Zool., 70: 429-459, 1935). The murine Brachyury gene has been cloned (Herrmann et al., Nature (Lond.), 343: 617-622, 1990), as well as the homologs in other species, such as humans. The expression of the human homologue of the mouse Brachyury was detected by RT-PCR in the notochord remnant, the nucleus pulposus, of human abortuses at 14-15 weeks gestation (Edwards et al., Genome Res., 6: 226-233, 1996).

[006] Brachyury has generally proved to be a valuable marker for recognition of mesodermal differentiation (Herrmann et al., Trends Genet., 10: 280-286, 1994). For example, apart from expression in embryos themselves, Brachyury has been reported to be activated during the differentiation of certain murine EC and ES cell lines differentiating along mesodermal lineages in vitro (see, for example, Bain et al., Biochem. Biophys. Res. Commun., 223: 691-694, 1996). In humans, Brachyury has been shown to be expressed in teratocarcinomas (Gokhele et al., Cell Growth and Differentiation 11:157-62, 2000), chordomas (Vujovic et al., J. Pathol. 2: 157-65, 2006) and hemangioblastomas (Glasker et al., Cancer Res. 66: 4167-4172, 2006).

[007] More recently, it has been described that poxviruses expressing Brachyury can be effective as an active immunotherapeutic against tumors. (*See*, WO 2014/043535).

[008] There is clearly a substantial unmet medical need for improving infectious disease and cancer treatments, including active immunotherapies and vaccines. Based on the above, a

need in the art exists for improving expression of antigens, like Brachyury, used in active immunotherapies. The present invention fulfills this need.

BRIEF SUMMARY OF THE INVENTION

[009] The present invention provides one or more promoters, nucleic acids, expression cassettes, recombinant peptides, and recombinant poxviruses associated with enhancements in expression of coding sequences and antigens incorporated as part of poxviruses

[010] In one aspect of the invention, there is an expression cassette comprising:

- a. a promoter comprising a nucleic sequence having at least 70% identity to any one of SEQ ID NOs: 1-10, and 77; and
- b. a coding sequence operably linked to the promoter;

wherein expression of the coding sequence is controlled by the promoter.

[011] In further aspects of the present invention, the expression cassette can be incorporated as part of a vector such as a virus or plasmid, for enhanced expression of the coding sequence therein. Preferably, the expression cassette is part of a poxvirus, such as but not limited to, orthopoxvirus and avipoxvirus. More preferably, the expression cassette is an avipoxvirus such as fowlpoxvirus. In still further aspects, the expression cassette is not an expression cassette that naturally occurs in the genome of a poxvirus.

[012] In additional aspects, there are one or more promoters comprising or consisting of a) a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-10, b) a subsequence of any one of SEQ ID NOs: 1-10, and 77, or c) a derivative sequence of any one of SEQ ID NOs: 1-10, and 77, wherein the derivative has one or more substitutions, deletions, and/or insertions, and wherein the derivative sequence is active as a poxvirus promoter and/or active in a poxvirus infected cell.

[013] In still additional aspects, the present invention includes one or more nucleic acid sequences encoding one or more novel Brachyury proteins selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In yet further aspects, the present invention includes one more novel nucleic acid sequences selected from the group consisting of: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

[014] In still further aspects, the present invention includes an expression cassette comprising:

- a. a promoter comprising a nucleic acid sequence having at least 70% identity to any one of SEQ ID NOs: 1-10, and 77; and
- b. a coding sequence operably linked to the promoter, wherein the coding sequences includes either i) a nucleic acid encoding a Brachyury protein selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71 or ii) comprises or consists of a nucleic acid having at least 70% identity to any one of the nucleic acids selected from the group consisting of: SEQ ID NOs 12, 14-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69; wherein expression of the coding sequence is controlled by the promoter.

[015] Additional objects and advantages of the invention will be set forth in part in the description which follows, and in part will be obvious from the description or may be learned by practice of the invention. The objects and advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

[016] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[017] Figure 1 illustrates expression of the Brachyury protein in human dendritic cells (DCs) infected with the non-recombinant virus FPV-WT, or recombinant viruses FPV-mBN343A, FPV-mBN344A, or FPV-mBN345A. A western blot analysis was performed using rabbit monoclonal anti-Brachyury antibody as detailed in Example 1.

[018] Figure 2 illustrates expression of the Brachyury protein in human dendritic cells (DCs) infected with non-recombinant viruses MVA-WT or FPV-WT or recombinant viruses MVA-Brachyury-TRICOM, FPV-mBN249B, FPV-mBN281A clone 32, FPV-mBN281A clone 35, FPV-mBN343A, FPV-mBN344A, FPV-mBN345A, FPV-mBN354A, or FPV-mBN355A. A western blot analysis was performed using rabbit monoclonal anti-Brachyury antibody as detailed in Example 2.

[019] Figure 3 depicts the relative expression of Brachyury protein compared to GAPDH from western blot analysis of human dendritic cells (DCs) infected with non-recombinant viruses MVA-WT or FPV-WT or recombinant viruses MVA-Brachyury-TRICOM, FPV-mBN249B, FPV-mBN281A clone 32, FPV-mBN281A clone 35, FPV-mBN343A, FPV-mBN344A, FPV-mBN345A, FPV-mBN354A, or FPV-mBN355A, as detailed in Example 2.

[020] Figure 4 illustrates expression of Brachyury and TRICOM proteins in CMMT cells (a rhesus macaque mammary tumor cell line) infected with the recombinant viruses MVA-Brachyury-TRICOM, FPV-mBN249B, FPV-mBN343A, or FPV-mBN345A assessed by flow

cytometry using fluorescently labeled antibodies specific for each protein, as described in Example 3.

[021] Figure 5 depicts median expression levels of Brachyury protein in CMMT cells (a rhesus macaque mammary tumor cell line) infected with the recombinant viruses MVA-Brachyury-TRICOM, FPV-mBN249B, FPV-mBN343A, or FPV-mBN345A assessed by flow cytometry, as described in Example 3.

[022] Figure 6 depicts expression of Brachyury and TRICOM proteins in CMMT cells (a rhesus macaque mammary tumor cell line) infected with a recombinant virus FPV-mBN345B assessed by flow cytometry, as described in Example 4.

DETAILED DESCRIPTION OF THE INVENTION

[023] The invention is based on the surprising determination that the promoter sequences as set out in SEQ ID NOs:1-10, and 77 enhance expression of the tumor antigen Brachyury. Shown in Figures 1-6 and described in more detail herein, expression of Brachyury antigen is enhanced when using promoters of present invention. Expression is further enhanced when the promoters and Brachyury antigen are used as part of a recombinant poxvirus.

[024] In at least one aspect, the various embodiments of the present disclosure were created as a result of insufficient expression levels of Brachyury protein using known Vaccinia promoters, such as PrS and Vaccinia virus 40k (VV-40K). In trying to enhance Brachyury expression levels, the present inventors analyzed various vaccinia promoters and associated proteins (e.g., VV-40k, I3, etc.) and any possible homologues in FPV. The inventors realized that some FPV homologous sequences were previously discovered. *See, e.g.,* Zantinge, J Gen Virol. 1996 Apr;77 (Pt 4):603-14 and Gene FPV 088 at NCBI Reference Sequence: NP_039051.1, Afonso, C.L et al., J. Virol. 74 (8), 3815-3831 (2000).

[025] In an initial attempt to enhance Brachyury expression, a possible promoter region of Gene FPV 088 at NCBI Reference Sequence: NP_039051.1 was constructed with Brachyury by the inventors and tested yielding undesired results (*see, e.g.*, Figures 1 and 2 at mBN344A) promoter. The inventors created a subsequent promoter with an addition of nucleotides from the ORF of Gene FPV 088, which similarly yielded undesired results. (*see, e.g.*, Figures 1 and 2 at mBN354A). Further constructs were created by the present inventors with yet additional nucleotides from the ORF of Gene FPV 088, which, as described and illustrated herein, enhance expression of the tumor antigen Brachyury.

[026] Thus, in various embodiments, the present invention is directed to one or more nucleic acid sequences, one or more promoters comprising the nucleic acids sequences, one or more expression cassettes comprising the nucleic acids, one or more peptides and/or peptide sequences for enhancing/expression of coding sequences and/or nucleic acids in expression vectors such as, but not limited to, plasmids, recombinant virus and so forth. In further embodiments, the present invention is directed to one or more recombinant poxviruses comprising one or more of the nucleic acid sequences, promoters, expression cassettes, and/or peptides and/or peptide sequences described herein.

[027] Additionally, in various embodiments of the invention, there are one or more nucleic acids sequences encoding brachyury polypeptides. In one embodiment, the one or more nucleic acids encoding a brachyury polypeptide are selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. The nucleotide sequences encoding the brachyury polypeptides according to the present invention are selected from the group consisting of: SEQ ID NOs: 12,

14-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

Definitions

[028] It must be noted that, as used herein, the singular forms "a", "an", and "the", include plural references unless the context clearly indicates otherwise. Thus, for example, reference to "an epitope" includes one or more of epitopes and reference to "the method" includes reference to equivalent steps and methods known to those of ordinary skill in the art that could be modified or substituted for the methods described herein.

[029] Unless otherwise indicated, the term "at least" preceding a series of elements is to be understood to refer to every element in the series. Those skilled in the art will recognize, or be able to ascertain using no more than routine experimentation, many equivalents to the specific embodiments of the invention described herein. Such equivalents are intended to be encompassed by the present invention.

[030] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integer or step. When used herein the term "comprising" can be substituted with the term "containing" or "including" or sometimes when used herein with the term "having". Any of the aforementioned terms (comprising, containing, including, having), though less preferred, whenever used herein in the context of an aspect or embodiment of the present invention can be substituted with the term "consisting of". When used herein "consisting of" excludes any element, step, or ingredient not specified in the

claim element. When used herein, "consisting essentially of" does not exclude materials or steps that do not materially affect the basic and novel characteristics of the claim.

[031] As used herein, the conjunctive term "and/or" between multiple recited elements is understood as encompassing both individual and combined options. For instance, where two elements are conjoined by "and/or", a first option refers to the applicability of the first element without the second. A second option refers to the applicability of the second element without the first. A third option refers to the applicability of the first and second elements together. Any one of these options is understood to fall within the meaning, and therefore satisfy the requirement of the term "and/or" as used herein. Concurrent applicability of more than one of the options is also understood to fall within the meaning, and therefore satisfy the requirement of the term "and/or."

[032] As used herein, the term "promoter" denotes a regulatory region of nucleic acid, usually DNA, located upstream of the sequence of a nucleic acid to be expressed, which contains specific DNA sequence elements, that are recognized and bound e.g. by protein transcription factors and polymerases responsible for synthesizing the RNA from the coding region of the gene being promoted. As promoters are typically immediately adjacent to the gene in question, positions in the promoter are designated relative to the transcriptional start site, where transcription of DNA begins for a particular gene (i.e., positions upstream are negative numbers counting back from -1, for example -100 is a position 100 base pairs upstream). Thus, the promoter sequence may comprise nucleotides until position -1. However, nucleotides from position +1 are not part of the promoter, i.e. in this regard it has to be noted that the translation initiation codon (ATG or AUG) is not part of the promoter. Thus, SEQ ID NOS: 1-10, and 77 are polynucleotides comprising promoters of the invention.

[033] As used herein, the term “enhancing” or “enhanced” when used with respect to expression levels of a coding sequence, nucleic acid, protein, and/or antigen, refers to an increase in expression of a coding sequence, nucleic acid, protein, and/or antigen when associated with and/or as part of one or more of the promoters, expression cassettes, nucleic acids, proteins, and/or vectors of the present invention relative to expression levels of a coding sequence, nucleic acids, protein, and/or antigen when associated with and/or as part of one or more of the promoters known in the art, such as PrS or VV-40k.

[034] As used herein, a nucleotide sequence having “essentially the same expression characteristics” as the nucleotide sequence set out in SEQ ID NOs: 1-10, and 77 will exhibit at least 70%, preferably at least 80%, even more preferably at least 90% of the promoter activity of SEQ ID NOs: 1-10, and 77, as measured by amount of recombinant protein produced. Whether or not a promoter sequence in question has “essentially the same expression characteristics” as any of SEQ ID NOs: 1-10, and 77 may be readily determined by one of ordinary skill in the art using the methods set forth in Examples 1-4 of the present application. The promoters according to the present invention are preferably active as poxvirus promoters, preferably avipoxvirus or active as promoters in poxvirus infected cells, preferably avipoxvirus infected cells. The avipoxvirus is preferably Fowlpox virus. “Active as pox virus promoter” means that the promoter is able to direct the expression of a gene to which it is operably linked in a pox virus after infection of cells with said virus. The cells are preferably cells that allow late and/or early and/or early/late expression of the poxvirus. “A promoter active in poxvirus infected cells” includes also the situation in which the promoter is not part of a poxvirus genome, e.g. part of a plasmid or linear polynucleotide or a non-poxvirus viral genome; in such a situation the promoter according to the present invention is active if the cell comprising the promoter also comprises a

poxvirus genome, e.g. if the cell is infected with a poxvirus. Under these circumstances the viral RNA polymerase recognizes the promoter according to the present invention and the expression of the gene/coding sequence that is linked to the promoter is activated.

[035] As used herein, the term “derived from the nucleic acid set out in SEQ ID NOs: 1-10, and 77” means that the nucleotide sequence of SEQ ID NOs: 1-10, and 77 is taken as a basis for effecting the nucleotide modifications specified, for example, at least one nucleotide addition, deletion, substitution and/or inversion. The term “derived” includes the possibility, for example, of actually modifying the physical sequence corresponding to SEQ ID NOs: 1-10, and 77 by known methods, for example, error-prone PCR. The term “derived” additionally includes the possibility of performing modifications on the sequence of SEQ ID NOs: 1-10, and 77 in silico, and then synthesizing the thus determined sequence as a physical nucleic acid. For example, the term “derived” encompasses the possibility of using any known computer program for the analysis of nucleic acid sequences with regard to, for example, hybridization stability and the possibility of any secondary nucleic acid structure in modifying the starting sequence of SEQ ID NOs: 1-10, and 77. Preferably, not more than 10, 9, 8, 7, 6, 5, 4, 3, 2 or 1 nucleotides have been added, deleted, substituted and/or inverted from the nucleic acids of SEQ ID NOs: 1-10, and 77. Furthermore, addition, insertion or deletion of at least one nucleotide should not result to a start codon of the nucleic acid to be expressed.

[036] As used herein, the terms “expressed”, “express”, “expression” and the like denote the transcription alone as well as both the transcription and translation of a sequence of interest. Thus, in referring to expression of a nucleic acid present in the form of DNA, the product resulting from this expression may be either RNA (resulting from transcription alone of the sequence to be expressed) or a polypeptide sequence (resulting from both transcription and

translation of the sequence to be expressed). The term “expression” thus also includes the possibility that both RNA and polypeptide product result from said expression and remain together in the same shared milieu. For example, this is the case when the mRNA persists following its translation into polypeptide product.

[037] As used herein, the term “expression cassette” is defined as a part of a vector or recombinant virus typically used for cloning and/or transformation. An expression cassette is typically comprised of a) one or more coding sequences (e.g., , open reading frame (ORF), genes, nucleic acids encoding a protein and/or antigen), and b) sequences controlling expression the one or more coding sequences. Additionally, an expression cassette may comprise a 3’ untranslated region that in eukaryotes usually contain a polyadenylation site.

[038] The term "recombinant" means a polynucleotide or polypeptide of semi-synthetic, or synthetic origin which either does not occur in nature or is linked to another polynucleotide in an arrangement not found in nature.

[039] One aspect of the invention includes promoters with nucleic acids having at least 70%, preferably 75%, 80%, 85%, 90% or 95% identity with SEQ ID NOs: 1-10, and 77 and having essentially the same expression characteristics as SEQ ID NOs: 1-10, and 77.

[040] "Percent (%) sequence homology or identity" with respect to nucleic acid sequences described herein is defined as the percentage of nucleotides in a candidate sequence that are identical with the nucleotides in the reference sequence (i.e., the nucleic acid sequence from which it is derived), after aligning the sequences and introducing gaps, if necessary, to achieve the maximum percent sequence identity, and not considering any conservative substitutions as part of the sequence identity. Alignment for purposes of determining percent nucleotide sequence identity or homology can be achieved in various ways that are within the

skill in the art, for example, using publically available computer software such as BLAST, ALIGN, or Megalign (DNASTAR) software. Those skilled in the art can determine appropriate parameters for measuring alignment, including any algorithms needed to achieve maximum alignment over the full length of the sequences being compared.

[041] For example, an appropriate alignment for nucleic acid sequences is provided by the local homology algorithm of Smith and Waterman, (1981), Advances in Applied Mathematics 2:482- 489. This algorithm can be applied to amino acid sequences by using the scoring matrix developed by Dayhoff, Atlas of Protein Sequences and Structure, M. O. Dayhoff ed., 5 suppl. 3:353-358, National Biomedical Research Foundation, Washington, D.C., USA, and normalized by Gribskov (1986), Nucl. Acids Res. 14(6):6745-6763. An exemplary implementation of this algorithm to determine percent identity of a sequence is provided by the Genetics Computer Group (Madison, Wis.) in the "BestFit" utility application. The default parameters for this method are described in the Wisconsin Sequence Analysis Package Program Manual, Version 8 (1995) (available from Genetics Computer Group, Madison, Wis.). A preferred method of establishing percent identity in the context of the present invention is to use the MPSRCH package of programs copyrighted by the University of Edinburgh, developed by John F. Collins and Shane S. Sturrok, and distributed by IntelliGenetics, Inc. (Mountain View, Calif). From this suite of packages the Smith-Waterman algorithm can be employed where default parameters are used for the scoring table (for example, gap open penalty of 12, gap extension penalty of one, and a gap of six). From the data generated the "Match" value reflects "sequence identity." Other suitable programs for calculating the percent identity or similarity between sequences are generally known in the art, for example, another alignment program is BLAST, used with default parameters. For example, BLASTN and BLASTP can be used using

the following default parameters: genetic code=standard; filter=none; strand=both; cutoff=60; expect=10; Matrix=BLOSUM62; Descriptions=50 sequences; sort by=HIGH SCORE; Databases=non- redundant, GenBank+EMBL+DDBJ+PDB+ GenBank CDS translations+Swiss protein+Spupdate+PIR. Details of these programs can be found at the following internet address: [http:// http://blast.ncbi.nlm.nih.gov/](http://blast.ncbi.nlm.nih.gov/).

Promoters and Nucleic Acid Sequences

[042] In one embodiment, the present disclosure includes a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-10, and 77.

[043] In another embodiment, the present disclosure includes a nucleic acid sequence having at least 70% identity with a nucleic acid selected from the group consisting of SEQ ID NOs: 1-10, and 77 and having essentially the same expression characteristics as a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-10, and 77. In further embodiments, there is a nucleic acid sequence having at least 75%, 80%, 85%, 90%, or 95% identity with a nucleic acid selected from the group consisting of SEQ ID NOs: 1-10, and 77 and having essentially the same expression characteristics as a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-10, and 77.

[044] In yet additional embodiment, there is a nucleic acid having a nucleotide sequence derived from the nucleic acid set out in SEQ ID NOs: 1-10, and 77, comprising at least one nucleotide addition, deletion, substitution and/or inversion as compared to the nucleotide sequence of SEQ ID NOs: 1-10, and 77 and having essentially the same expression characteristics as the nucleic acid of SEQ ID NOs: 1-10, and 77.

[045] In still an additional embodiment, there is a nucleic acid having a nucleotide sequence capable of hybridizing to a nucleic acid sequence selected from the group consisting of

SEQ ID NOs: 1-10, and 77, and having essentially the same expression characteristics as a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-10, and 77.

[046] In one aspect of the invention, there is a promoter for enhancing the expression of a coding and/or gene sequence, the promoter selected from the group consisting of:

- a) a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 1-10, and 77 or a subsequence thereof;
- b) a nucleic acid having a nucleotide sequence derived from the nucleic acid set out in (a), comprising at least one nucleotide addition, deletion, substitution and/or inversion as compared to the nucleotide sequence of (a) and having essentially the same expression characteristics as the nucleic acid of (a);
- c) a nucleic acid sequence having at least 70% identity with the nucleic acid of (a) and having essentially the same expression characteristics as the nucleic acid of (a); and
- d) a nucleic acid capable of hybridizing to a nucleic acid sequence of (a), (b) or (c) and having essentially the same expression characteristics as the nucleic acid of (a).
- e) a nucleic acid sequence comprising SEQ ID NOs: 3, 4, 5, 6, 7, 8, or 9, wherein the nucleic acid sequence includes up to 245 nucleotides.

[047] A further aspect of the invention relates to a nucleic acid capable of hybridizing to a nucleic acid sequence of (a), (b) or (c) and having essentially the same expression characteristics as the nucleic acid of (a). The term “capable of hybridizing” means hybridization in conditions in which any portion of the nucleic acid of (a), (b) or (c) is able to hybridize to another DNA sequence to allow detection and isolation of any DNA sequence having essentially the same expression characteristics as the nucleic acid of (a). The hybridization is carried out in stringent conditions; the more stringent the conditions, the more likely partially complementary

sequences are to be forced apart, i.e. higher stringency lowers the probability of hybridization. In practice, the term “stringent conditions” means hybridization conditions with high temperature (e.g. 65° C.) and/or low salt concentration (e.g. 0.1×SSC). Increasing the temperature and/or decreasing the salt concentration increases the stringency. Under stringent conditions hybridization will occur only if there is at least 70% or preferably at least 75, 80, 85, 90 or 95% identity between the sequences. Hybridization can be carried out as set out in Ausubel et al. (2002) Short Protocols in Molecular Biology Vol. 1 5th ed. Canada.

[048] Preferably, the promoter and/or nucleic acid of the invention has a length of up to and including 245 or 242 nucleotides. Also, the promoter and/or nucleic acid of the invention has a length of up to and including 232 or 215 nucleotides. More preferably, the promoter of the invention has a length of up to and including 212, 200, or a length of up to and including 195 nucleotides, or a length of up to and including 183, or a length of up to and including 170 or 167 nucleotides. In one embodiment, the nucleic acid of (b), (c) or (d), as set out above, comprises about 50-250 nucleotides, about 60-220 nucleotides, about 70-200 nucleotides, about 80-190 nucleotides, or about 90-180 nucleotides.

[049] Alternatively it is within the scope of the present invention to use a derivative of these promoters, which may be a subsequence of the sequences as defined in anyone of SEQ ID NOs: 1-10, and 77. The term “subsequence of the sequences according to anyone of SEQ ID NOs: 1-10, and 77” refers to shorter fragments of anyone of SEQ ID NO: 1 to 10, and 77 that are still active as a promoter, in particular as promoter in an orthopoxvirus, such as FPV, or in an orthopoxvirus, such as FPV, infected cells.

[050] In various embodiments, exemplary subsequences of SEQ ID NO:9 are selected from SEQ ID NOs:2-8. In one aspect, SEQ ID NOs: 4 or 5 are preferred subsequence of SEQ ID

NO: 9. In other aspects, subsequences of SEQ ID NO: 8 include SEQ ID NOs: 2-7, subsequences of SEQ ID NO:7 include SEQ ID NO:s 2-6, subsequences of SEQ ID NO:6 includes SEQ ID NOs: 2-5, subsequences of SEQ ID NO:5 include SEQ ID NOs: 2-4 subsequences of SEQ ID NO:6 includes SEQ ID NOs: 2-5, subsequences of SEQ ID NO:5 include SEQ ID NOs: 2-4, subsequences of SEQ ID NO: 4 includes SEQ ID NOs: 2-3, and subsequences of SEQ ID NO: 3 includes SEQ ID NO: 2.

[051] The derivative of the promoter comprising or consisting of a nucleotide sequence of anyone of SEQ ID NOs: 1-10, and 77 or subsequences thereof, can also be a sequence that has one or more nucleotide substitutions, deletions and/or insertions with respect to any one of the sequences of SEQ ID NOs: 1-10, and 77. The derivatives according to the present invention are still active as a promoter, in particular as orthopoxvirus and/or avipoxvirus promoter in an orthopoxvirus and/or avipoxvirus virus infected cells, more preferably as an avipoxvirus promoter in avipoxvirus infected cells. In the derivatives according to the present invention deletions, substitutions and insertions may be combined in one sequence.

[052] Preferably the derivative has a homology of at least 40%, more preferably of at least 60%, even more preferably of at least 80%, most preferably of at least 90% when compared to anyone of the sequence of SEQ ID NOs: 1-10, and 77 or subsequences thereof, as described herein.

Brachyury proteins

[053] In several aspects of the present invention, the inventors' determined that as a result of synthesizing the various promoters described herein, the inventors' created one or more recombinant Brachyury proteins. In particular, the one or more recombinant Brachyury proteins are fusion proteins resulting from the combination of one or more of the promoters of the

invention and the Brachyury protein. It is contemplated that one or more of the recombinant Brachyury proteins can be useful as a part of a vaccine, pharmaceutical or other therapeutic composition.

[054] Thus, in various aspects, the invention includes one or more synthetic and novel recombinant Brachyury proteins and/or synthetic and novel nucleic acids encoding recombinant Brachyury proteins.

[055] In one embodiment, there are one or more nucleic acids sequences having at least 70% identity to a nucleic acid encoding a Brachyury protein, wherein the Brachyury protein is selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In additional embodiments, there are one or more nucleic acids having at least 75%, 80%, 85%, 90%, or 95% identity to a nucleic acid encoding a Brachyury protein, wherein the Brachyury protein is selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71.

[056] In various other embodiments of the invention, there are one or more Brachyury proteins selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In further embodiments, there are one or more Brachyury proteins having at least 70% identity with a peptide selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In still further embodiments, there is a peptide having at least 75%, 80%, 85%, 90%, or 95% identity with a peptide selected from the group consisting of SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71.

[057] In another embodiment, there are one or more nucleic acids sequences encoding a Brachyury protein, the nucleic acid sequence selected from the group consisting of: SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

[058] In other embodiments, there are one or more nucleic acid sequences having at least 70% identity with a nucleic acid selected from the group consisting of SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69 and having essentially the same expression characteristics as a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69. In further embodiments, there is a nucleic acid sequence having at least 75%, 80%, 85%, 90%, or 95% identity with a nucleic acid selected from the group consisting of SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69 and having essentially the same expression characteristics as a nucleic acid sequence selected from the group consisting of SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

[059] In a preferred embodiment, there are one or more nucleic acid sequences selected from the group consisting of SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

Expression Cassettes

[060] According to a further embodiment, the present invention refers to an expression cassette comprising one or more of the promoters and/or Brachyury recombinant proteins and/or nucleic acids according to the present invention.

[061] In one embodiment, there is an expression cassette comprising a promoter having at least 70% identity with a nucleic acid selected from the group consisting of SEQ ID NOs: 1-10 and a nucleic acid encoding a Brachyury peptide selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In an another embodiment, there is an expression cassette comprising a promoter selected from the group consisting of SEQ ID NOs: 1-10, and 77 and/or a nucleic acid encoding a Brachyury peptide, wherein the nucleic acid is selected from the group consisting of: SEQ ID NOs: 12, 14-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

[062] In a preferred embodiment, there is an expression cassette comprising a nucleic acid sequence at least 70% homologous to a nucleic acid sequence selected from the group consisting of: SEQ ID NOs: 72-76. In further embodiments, there is an expression cassette comprising a nucleic acid sequence having at least 75%, 80%, 85%, 90%, or 95% identity with a nucleic acid selected from the group consisting of SEQ ID NOs: 72-76.

[063] In a more preferred embodiment, there is an expression cassette comprising SEQ ID NO: 72.

[064] In a more preferred embodiment, there is an expression cassette comprising SEQ ID NO: 73.

[065] In a more preferred embodiment, there is an expression cassette comprising SEQ ID NO: 74.

Recombinant Poxviruses

[066] According to a further embodiment the nucleic acids, promoters, recombinant proteins, and/or expression cassettes according to the present invention may be part of a vector.

The term “vector” refers to any vectors known to the person skilled in the art. A vector can be a plasmid vector such as pBR322 or a vector of the pUC series. More preferably the vector is a recombinant virus. In the context of the present invention the term “virus” or “recombinant virus” refers to an infectious virus comprising a viral genome. In this case the nucleic acids, promoters, recombinant proteins, and/or expression cassettes of the present invention are part of the viral genome of the respective recombinant virus. The recombinant viral genome is packaged and the obtained recombinant viruses can be used for the infection of cells and cell lines, in particular for the infection of living animals including humans. Typical recombinant viruses that may be used according to the present invention are adenoviral vectors, retroviral vectors or vectors on the basis of the adeno associated virus 2 (AAV2). Most preferred are poxviral vectors.

[067] In several embodiments, the nucleic acids, promoters, polypeptides, and expression cassettes according to the present invention are preferably active as poxviral promoters or active as promoters in poxvirus infected cells. The poxvirus is preferably an avipoxvirus or an orthopoxvirus. More preferably, the poxvirus is an avipoxvirus.

[068] The term "avipoxvirus" refers to any avipoxvirus, such as Fowlpoxvirus, Canarypoxvirus, Uncopoxvirus, Mynahpoxvirus, Pigeonpoxvirus, Psittacinepoxvirus, Quailpoxvirus, Peacockpoxvirus, Penguinpoxvirus, Sparrowpoxvirus, Starlingpoxvirus and Turkeypoxvirus. Preferred avipoxviruses are Canarypoxvirus and Fowlpoxvirus.

[069] An example of a canarypox virus is strain Rentschler. A plaque purified Canarypox strain termed ALVAC (U.S. Pat. No. 5,766,598) was deposited under the terms of the Budapest treaty with the American Type Culture Collection (ATCC), accession number VR-

2547. Another Canarypox strain is the commercial canarypox vaccine strain designated LF2 CEP 524 24 10 75, available from Institute Merieux, Inc.

[070] Examples of a Fowlpox virus are strains FP-1, FP-5, TROVAC (U.S. Pat. No. 5,766,598), and POXVAC-TC (U.S. Patent 7,410,644). FP-1 is a Duvette strain modified to be used as a vaccine in one-day old chickens. The strain is a commercial fowlpox virus vaccine strain designated O DCEP 25/CEP67/2309 October 1980 and is available from Institute Merieux, Inc. FP-5 is a commercial fowlpox virus vaccine strain of chicken embryo origin available from American Scientific Laboratories (Division of Schering Corp.) Madison, Wis., United States Veterinary License No. 165, serial No. 30321.

[071] In certain embodiments, the recombinant FPV comprises a nucleic acid sequence selected from the group consisting of: SEQ ID NOs: 1-10, and 77. In various additional embodiments, the recombinant FPV comprises an expression cassette comprising a nucleic acid sequence selected from SEQ ID NOs: 72-76. In a more preferred embodiment, the recombinant FPV comprises an expression cassette comprising a nucleic acid sequence selected from SEQ ID NOs: 72, 73, and 74.

[072] In other embodiments, the recombinant FPV comprises a nucleic acid encoding a brachyury antigen selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In further embodiments, the recombinant FPV comprises a Brachyury peptide selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In further embodiments, the recombinant FPV comprises a nucleic acid selected from the group consisting of: SEQ ID NOs: 12, 14-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

In more preferred embodiments, , the recombinant FPV comprises a Brachyury peptide selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71 and/or a nucleic acid selected from the group consisting of: SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

[073] In the various other embodiments of the present disclosure, the recombinant poxvirus is an orthopoxvirus such as, but not limited to, a vaccinia virus, a Modified Vaccinia Virus Ankara (MVA), or MVA-BN.

[074] Examples of vaccinia virus strains are the strains Temple of Heaven, Copenhagen, Paris, Budapest, Dairen, Gam, MRIVP, Per, Tashkent, TBK, Tom, Bern, Patwadangar, BIEM, B-15, Lister, EM-63, New York City Board of Health, Elstree, Ikeda and WR. A preferred vaccinia virus (VV) strain is the Wyeth (DRYVAX) strain (U.S. Patent 7,410,644). Another preferred VV strain is MVA (Sutter, G. et al. [1994], Vaccine 12: 1032-40). Another preferred VV strain is MVA-BN.

[075] Examples of MVA virus strains that are useful in the practice of the present invention and that have been deposited in compliance with the requirements of the Budapest Treaty are strains MVA 572, deposited at the European Collection of Animal Cell Cultures (ECACC), Vaccine Research and Production Laboratory, Public Health Laboratory Service, Centre for Applied Microbiology and Research, Porton Down, Salisbury, Wiltshire SP4 0JG, United Kingdom, with the deposition number ECACC 94012707 on January 27, 1994, and MVA 575, deposited under ECACC 00120707 on December 7, 2000. MVA-BN, deposited on Aug. 30, 2000 at the European Collection of Cell Cultures (ECACC) under number V00083008, and its derivatives, are additional exemplary strains.

[076] Although MVA-BN is preferred for its higher safety (less replication competent), all MVAs are suitable for this invention. According to an embodiment of the present invention, the MVA strain is MVA-BN and its derivatives. A definition of MVA-BN and its derivatives is given in PCT/EP01/13628 which is incorporated by reference herein.

[077] In one embodiment, the invention encompasses recombinant orthopoxviruses, preferably a vaccinia virus (VV), a Wyeth strain, ACAM 1000, ACAM 2000, MVA, or MVA-BN for cancer therapy. Recombinant orthopoxviruses are generated by insertion of heterologous sequences into an orthopoxvirus.

[078] In certain embodiments, the MVA is MVA-BN, deposited on Aug. 30, 2000, at the European Collection of Cell Cultures (ECACC) under number V00083008, and described in International PCT publication WO2002042480 (see also e.g. U.S. Pat. Nos. 6,761,893 and 6,913,752), which are incorporated by reference herein.

[079] In certain embodiments, a recombinant MVA is a derivative of MVA-BN. Such "derivatives" include viruses exhibiting essentially the same replication characteristics as the deposited strain (ECACC No. V00083008), but exhibiting differences in one or more parts of its genome. Viruses having the same "replication characteristics" as the deposited virus are viruses that replicate with similar amplification ratios as the deposited strain in CEF cells and the cell lines, HeLa, HaCat and 143B; and that show similar replication characteristics *in vivo*, as determined, for example, in the AGR129 transgenic mouse model.

[080] In certain embodiments, the recombinant orthopoxvirus comprises a nucleic acid selected from the group consisting of: SEQ ID NOs: 1-10, and 77. In various additional embodiments, the recombinant orthopoxvirus comprises an expression cassette comprising a nucleic acid sequence selected from SEQ ID NOs: 72-76. In a more preferred embodiment, the

recombinant orthopoxvirus comprises an expression cassette comprising a nucleic acid sequence selected from SEQ ID NOs: 72, 73, and 74.

[081] In other embodiments, the recombinant orthopoxvirus comprises a nucleic acid encoding a brachyury antigen selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71. In further embodiments, the recombinant orthopoxvirus comprises a nucleic acid selected from the group consisting of: SEQ ID NOs: 12, 14-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69. In more preferred embodiments, the recombinant orthopoxvirus comprises a Brachyury peptide selected from the group consisting of: SEQ ID NOs: 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63, 66-67, 70, and 71 and/or a nucleic acid selected from the group consisting of: SEQ ID NOs: 16-17, 20-21, 24-25, 28-29, 32-33, 36-37, 40-41, 44-45, 48-49, 52-53, 56-57, 60-61, 64-65, 68, and 69.

[082] Methods are known to the person skilled in the art how the expression cassette or the promoter according to the present invention can be inserted into a viral genome, in particular into the genome of a poxvirus, most preferably into the genome of an orthopoxvirus and/or FPV. For example, the expression cassette or the promoter or derivative thereof according to the present invention may be inserted into the genome of a poxvirus by homologous recombination. To this end a nucleic acid is transfected into a permissive cell line such as CEF or BHK cells, wherein the nucleic acid comprises the expression cassette or the promoter or derivative thereof according to the present invention flanked by nucleotide stretches that are homologous to the region of the poxviral genome in which the expression cassette or the promoter or derivative thereof according to the present invention is to be inserted. The cells are infected by the poxvirus

and in the infected cells homologous recombination occurs between the nucleic acid and the viral genome. Alternatively, it is also possible to first infect the cells with a poxvirus and then to transfect the nucleic acid into the infected cells. Again recombination occurs in the cells. The recombinant poxvirus is then selected by methods known in the prior art. The construction of recombinant poxvirus is not restricted to this particular method. Instead, any suitable method known to the person skilled in the art may be used to this end.

[083] The expression cassette or the promoter according to the present invention may be introduced into any suitable part of the virus or viral vector, in particular into a viral genome. In case of an orthopoxvirus and an avipoxvirus, the insertion may be made into non-essential parts of the viral genome or into an intergenic region of the viral genome. The term “intergenic region” refers preferably to those parts of the viral genome located between two adjacent genes that do not comprise coding sequences. If the virus is an orthopoxvirus and an avipoxvirus the insertion may also be made into a deletion site of the viral genome. The term “deletion site” refers to those parts of the viral genome that are deleted with respect to the genome of a naturally occurring orthopoxvirus or avipoxvirus. However, the insertion sites are not restricted to these preferred insertion sites in the orthopoxvirus and an avipoxvirus genome, since it is within the scope of the present invention that the expression cassette may be inserted anywhere in the viral genome as long as it is possible to obtain recombinants that can be amplified and propagated in at least one cell culture system, such as Chicken Embryo Fibroblasts (CEF cells).

[084] The promoter according to the present invention may be used to express a gene that is already part of the vector, e.g. the genome of an orthopoxvirus and/or an avipoxvirus. Such a gene may be a gene that is naturally part of the viral genome or a foreign gene that has already been inserted into the vector. In these cases the promoter according to the present

invention is inserted upstream of the gene in the vector, the expression of which is to be controlled by the promoter.

Vaccines and/or Compositions

[085] According to a further embodiment the invention concerns the vector according to the present invention as vaccine or medicament. In more general term the invention relates to a vaccine or pharmaceutical composition comprising an expression cassette, a DNA or a vector according to the present invention. Methods are known to the person skilled in the art how the vaccine or pharmaceutical composition can be administered to the animal or human body. In case of DNA and recombinant plasmid vectors the DNA and the vector can simply be administered by injection. If the vaccine or composition is a recombinant virus such as an orthopoxvirus or an avipoxvirus, in particular a recombinant MVA or recombinant FPV, it may also be administered to the animal or human body according to the knowledge of the person skilled in the art, e.g. by intra venous, intra muscular, intra nasal, intra dermal or subcutaneous administration. Further details on the amount of virus administered are given below.

[086] The pharmaceutical composition or the vaccine may generally include one or more pharmaceutical acceptable and/or approved carriers, additives, antibiotics, preservatives, adjuvants, diluents and/or stabilizers in addition to the promoter, expression cassette or vector according to the present invention. Such auxiliary substances can be water, saline, glycerol, ethanol, wetting or emulsifying agents, pH buffering substances, or the like. Suitable carriers are typically large, slowly metabolized molecules such as proteins, polysaccharides, polylactic acids, polyglycolic acids, polymeric amino acids, amino acid copolymers, lipid aggregates, or the like.

[087] For the preparation of pharmaceutical compositions or vaccines, the DNA, expression cassette or vector according to the present invention, in particular a recombinant

orthopoxvirus or avipoxvirus such as recombinant MVA or recombinant FPV is converted into a physiologically acceptable form. For MVA and FPV, this can be done based on the experience in the preparation of poxvirus vaccines used for vaccination against smallpox (as described by Stickl, H. et al. [1974] Dtsch. med. Wschr. 99, 2386-2392). For example, the purified virus is stored at -80°C . with a titre of 5×10^8 TCID₅₀/ml formulated in about 10 mM Tris, 140 mM NaCl pH 7.4. For the preparation of vaccine shots, e.g., 10^1 - 10^9 particles of the recombinant virus according to the present invention are lyophilized in phosphate-buffered saline (PBS) in the presence of 2% peptone and 1% human albumin in an ampoule, preferably a glass ampoule. Alternatively, the vaccine shots can be produced by stepwise freeze-drying of the virus in a formulation. This formulation can contain additional additives such as mannitol, dextran, sugar, glycine, lactose or polyvinylpyrrolidone or other additives such as antioxidants or inert gas, stabilizers or recombinant proteins (e.g. human serum albumin) suitable for in vivo administration. A typical virus containing formulation suitable for freeze-drying comprises 10 mM Tris-buffer, 140 mM NaCl, 18.9 g/l Dextran (MW 36000-40000), 45 g/l Sucrose, 0.108 g/l L-glutamic acid mono potassium salt monohydrate pH 7.4. The glass ampoule is then sealed and can be stored between 4°C . and room temperature for several months. However, as long as no need exists the ampoule is stored preferably at temperatures below -20°C .

[088] For vaccination or therapy the lyophilisate or the freeze-dried product can be dissolved in 0.1 to 0.5 ml of an aqueous solution, preferably water, physiological saline or Tris buffer, and administered either systemically or locally, i.e. by parenteral, intramuscular or any other path of administration known to the skilled practitioner. The mode of administration, the dose and the number of administrations can be optimized by those skilled in the art in a known manner.

[089] In one or more embodiments, the invention further concerns a method for introducing a coding sequence into a target cell, such as human cell for therapeutic purposes, comprising the introduction of the nucleic acids, promoters, recombinant proteins, and/or expression cassettes according to the present invention into the target cell. Exemplary human target cells can include antigen presenting cells (APCs) such as dendritic cells, macrophages and other non APC'S such as fibroblasts, tumor cells, and so forth.

[090] The invention further relates to a method for producing a peptide, protein and/or virus comprising the infection of a host cell with a recombinant virus according to the present invention, followed by the cultivation of the infected host cell under suitable conditions, and further followed by the isolation and/or enrichment of the peptide and/or protein and/or viruses produced by said host cell. If it is intended to produce, i.e. amplify the virus according to the present invention the cell has to be a cell in which the virus is able to replicate. For poxviruses, in particular MVA, suitable cells are CEF (chicken embryonic fibroblast) or BHK (baby hamster kidney) cells. For avipoxviruses, such as fowlpoxvirus, suitable cells include CEF or CED (chicken embryonic dermal) cells. If it is intended to produce a peptide/protein encoded by the recombinant virus according to the present invention the cell may be any cell that can be infected by the recombinant virus vector and that allows the expression of the virus encoded proteins/peptides.

[091] The invention further relates to a method for producing a peptide, protein and/or virus comprising the transfection of a cell with the expression cassette, a nucleic acid, promoter, recombinant protein, and/or expression cassette DNA according to the present invention, followed by the infection of the cell with a poxvirus. The infected host cell is cultivated under suitable conditions. A further step comprises the isolation and/or enrichment of the peptide

and/or protein and/or viruses produced by said host cell. The step of infecting the cells with a poxvirus may be made before or after the step of transfection of the cells.

[092] The invention further relates to cells comprising a nucleic acid, promoter, recombinant protein, and/or expression cassette according to the present invention. In particular the invention relates to cells infected with the recombinant virus according to the present invention.

Examples

[093] The following examples further illustrate the present invention. It will be understood by a person of skill in the art that the provided examples in no way may be interpreted as limiting the applicability of the technology.

Example 1: Expression of Brachyury in Human DCs infected with recombinant fowlpox viruses

[094] To identify expression of Brachyury protein, human dendritic cells (DC) were infected with a positive control virus, recombinant MVA comprising Brachyury and TRICOM, at a multiplicity of infection (MOI) of 2.5. Human DCs were also infected with a negative control non-recombinant fowlpox (FPV-WT) or recombinant fowlpox virus strains comprising of a Brachyury expression cassette and TRICOM in accordance with the present disclosure. Each FPV strain, (listed in more detail in Table 1) including FPV-WT, FPV-mBN343A, FPV-mBN344A, and FPV-mBN345A were used to infect DCs with an MOI of 20. FPVBrachyury expression was detected via western blot analysis performed with a rabbit monoclonal anti-Brachyury antibody. The housekeeping protein glyceraldehyde 3-phosphate dehydrogenase (GAPDH) was also detected via western blot analysis as a loading control.

Table 1.
virus strains

<u>Recombinant FPV strain</u>	<u>Expression Cassette</u>
FPV-mBN343A	SEQ ID NO: 74
FPV-mBN344A	SEQ ID NO: 75
FPV-mBN345A	SEQ ID NO: 72
FPV-mBN354A	SEQ ID NO: 76
FPV-mBN355A	SEQ ID NO: 73

Brachyury expression cassette and TRICOM

Recombinant fowlpox
comprising a

[095] Results are shown in Figure 1. Expression of Brachyury was detected with the FPV-mBN343A and FPV-mBN345 recombinant FPVs, but was not detected using the FPV-mBN344A recombinant FPV. Brachyury expression was also detected with MVA-Brachyury-TRICOM. Similar loading of samples was demonstrated by GAPDH expression.

Example 2: Expression of Brachyury in Human DCs infected with recombinant fowlpox viruses

[096] Expression-levels of Brachyury protein were also compared between additional recombinant FPV strains expressing Brachyury with different promoters. Human dendritic cells (DC) were infected with an MOI of 5 of the positive control recombinant MVA comprising Brachyury and TRICOM, and the negative control non-recombinant strain MVA-WT. Human DCs were also infected with a recombinant FPVs comprising of a Brachyury expression cassette and TRICOM in accordance with the present disclosure (e.g, FPV-mBN343A, FPV-mBN344A, FPV-mBN345A, FPV-mBN354A, FPV-mBN355A, See Table 1). Human DCs were additionally infected with a recombinant Fowlpoxvirus (FPV) comprising a Brachyury expression cassette having either a Vaccinia Virus (VV)-40k promoter or a PrS promoter. The non-recombinant FPV-WT strain served as a negative control. All of the FPVs were used at an MOI of 40. Brachyury expression was detected via western blot analysis performed with a rabbit monoclonal anti-Brachyury antibody. GAPDH was also detected as a loading control.

[097] Results are shown in Figure 2. Expression of Brachyury was detected with the FPV-mBN343A and FPV-mBN345A recombinant FPVs, but was not detected using the FPV-mBN344A and FPV-mBN354A recombinant FPV. More particularly, expression of Brachyury was detected at lower levels for the recombinant FPVs having the VV-40k or PrS promoters driving Brachyury (i.e., FVP-mBN281A, FVP-mBN249B). No Brachyury expression was detected in the negative controls (uninfected DCs, MVA-WT, or FPV-WT). Similar loading of samples was demonstrated by GAPDH expression.

[098] The Brachyury expression levels from the Western blot shown in Example 2 were normalized relative to expression of the housekeeping gene GAPDH, which is expected to be expressed at equivalent levels between cells. The intensity of each Brachyury and GAPDH band was measured and a ratio was calculated between the intensity of the Brachyury and GAPDH bands within the same sample.

[099] Results are shown in Figure 3. Among the FPV constructs, the highest expression of Brachyury relative to GAPDH was detected in DCs infected with FPV-mBN355A. Moderate relative Brachyury expression was detected in DCs infected with FPV-mBN343A or FPV-mBN345A. The lowest relative Brachyury expression was detected from the recombinant FPVs having the VV-40k or PrS promoters driving Brachyury (i.e., FVP-mBN281A, FVP-mBN249B). Highest relative expression of Brachyury was observed from infection with the positive control virus MVA-Brachyury-TRICOM; no Brachyury expression was detected in the negative control samples. Therefore, among the recombinant FPV strains, superior expression of Brachyury was induced by vectors driving Brachyury expression from the FPV-mBN355, FPV-mBN345, or FPV-mBN344 promoters.

Example 3: Expression of Brachyury and TRICOM in CMMT cells infected with recombinant fowlpox viruses

[0100] Expression of the Brachyury and TRICOM proteins was also assessed by flow cytometry using fluorescently labeled antibodies specific for each protein. CMMT cells (a rhesus macaque mammary tumor cell line) were infected with the positive control recombinant MVA comprising Brachyury and TRICOM, or with a recombinant FPVs comprising of a Brachyury expression cassette and TRICOM in accordance with the present disclosure (e.g, FPV-mBN343A, FPV-mBN345A), or with the recombinant FPV having the PrS promoter driving Brachyury (FVP-mBN249B). Cells were infected with an MOI below 1, so that a mixture of uninfected and infected cells were analyzed. Uninfected CMMT cells served as a negative control.

[0101] FACS samples were acquired on the BD LSRII or Fortessa and analyzed using BD FACSDIVA software (BD Bioscience, San Jose, CA) or FlowJo (TreeStar Inc., Ashland, OR).

[0102] Results are shown in Figure 4. Histograms of the signals detected for Brachyury and the three TRICOM proteins (CD80, CD54, and CD58) were plotted, and gates were drawn where positive signal was detected (black lines). Among the FPV constructs, the highest expression of Brachyury (shown by the biggest shift in signal along the x-axis) was detected in CMMT cells infected with FPV-mBN343A or FPV-mBN345A. The lowest Brachyury expression was detected from the recombinant FPV with the PrS promoter driving Brachyury (i.e., FVP-mBN281A, FVP-mBN249B). Similar expression levels of the TRICOM proteins were detected among the FPV constructs. Expression of Brachyury and the TRICOM proteins were also observed from infection with the positive control virus MVA-Brachyury-TRICOM.

[0103] To quantify the expression level of Brachyury in infected cells the median fluorescence intensity (MFI) was calculated for the Brachyury-positive cells gated in Figure 4.

[0104] Results are shown in Figure 5. Among the FPV constructs, the highest Brachyury MFI was detected in CMMT cells infected with FPV-mBN343A or FPV-mBN345A. The lowest Brachyury MFI was detected from the recombinant FPV with the PrS promoter driving Brachyury (FVP-mBN249B). The highest Brachyury MFI of all tested constructs was in cells infected with the positive control virus MVA-Brachyury-TRICOM. Therefore, the median expression level of Brachyury in infected CMMT cells was higher from vectors driving Brachyury expression from the FPV-mBN345 or FPV-mBN344 promoters than from the PrS promoter.

Example 4: Expression of Brachyury from FPV-mBN345B

[0105] The drug selection cassette used to initially generate the recombinant FPV-mBN345A strain was removed to generate a recombinant vector suitable for clinical development. This was accomplished by passaging the virus on chicken embryonic fibroblast (CEF) cells without drug selection, plaque purifying individual clones, and identifying clones lacking the selection cassette by PCR and DNA sequencing. This resulted in generation of FPV-mBN345B which comprises of a Brachyury expression cassette driven by the I3+15aa promoter and TRICOM, but does not contain the drug selection cassette.

[0106] Expression of Brachyury and the TRICOM proteins from FPV-mBN345B was confirmed in CMMT cells by infecting them with FPV-BN345B at an MOI of 0.625 to infect a subset of cells, or of 40 to infect all cells.

[0107] Results are shown in Figure 6. Histograms of the signals detected for Brachyury and the three TRICOM proteins (CD80, CD54, and CD58) were plotted with a red lines for

samples infected with an MOI of 0.625 and blue lines for samples infected with an MOI of 40. Uninfected cells served as a negative control (black lines). At the MOI of 0.625, expression of Brachyury and the three TRICOM proteins was detected as a peak shifted to the right of the taller peak from uninfected cells. At the MOI of 40, expression of Brachyury and TRICOM was detected in all cells as a peak shifted to the right of the uninfected cells.

[0108] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

CLAIMS

We claim:

1. An expression cassette for expressing a coding sequence in a vector, the expression cassette comprising:

- (a) a nucleic acid sequence comprising a promoter and selected from:
 - (i) a nucleic acid sequence having at least 85% sequence identity to SEQ ID NO: 9 or derivative of SEQ ID NO:9;
 - (ii) a subsequence of SEQ ID NO:9; and
 - (iii) a sequence that differs from the sequence set forth in SEQ ID NO:9 by the addition, insertion, or deletion of not more than 10 nucleotides;

wherein the promoter is active as a poxvirus promoter and/or active in a poxvirus infected cell; and

- (b) a heterologous coding sequence encoding a Brachyury antigen operably linked to the promoter.

2. The expression cassette of claim 1, wherein the nucleic acid comprising a promoter comprises a subsequence of SEQ ID NO: 9 having at least 85% sequence identity to any one of SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, or SEQ ID NO: 8.

3. The expression cassette of claim 2, wherein the nucleic acid sequence comprising said promoter has a sequence that differs from the sequence set forth in SEQ ID NO:6 by the addition, insertion, or deletion of not more than 10 nucleotides.

4. The expression cassette of claim 3, wherein the nucleic acid comprising said promoter comprises the sequence set forth in SEQ ID NO:6.

5. The expression cassette of claim 4, wherein the heterologous coding sequence comprises the sequence set forth in SEQ ID NO:15.

6. The expression cassette of claim 4, wherein the heterologous coding sequence differs from the sequence set forth in SEQ ID NO:12 by the addition, insertion, or deletion of not more than 10 nucleotides.
7. The expression cassette of claim 6, wherein the subsequence of SEQ ID NO: 9 comprises SEQ ID NO: 5.
8. The expression cassette of claim 3, wherein the subsequence of SEQ ID NO: 9 comprises a nucleic acid having at least 85% sequence identity to SEQ ID NO: 6.
9. The expression cassette of claim 8, wherein the subsequence of SEQ ID NO: 9 comprises SEQ ID NO: 6.
10. The expression cassette of claim 3, wherein the subsequence of SEQ ID NO:9 has a length of up to 232 nucleotides.
11. The expression cassette of claim 1, wherein the heterologous coding sequence encodes a fusion protein comprising Brachyury protein.
12. The expression cassette of claim 11, wherein said Brachyury protein comprises an L254V mutation.
13. The expression cassette of claim 11, wherein the heterologous coding sequence comprises a nucleic acid sequence selected from the group consisting of SEQ ID NO: 11 and SEQ ID NO:13.
14. The expression cassette of claim 11, wherein the heterologous coding sequence comprises a nucleic acid encoding a Brachyury fusion protein having at least 90% identity to SEQ ID NO: 18 or SEQ ID NO:19.
15. The expression cassette of claim 11, wherein the heterologous coding sequence comprises a nucleic acid encoding a Brachyury fusion protein having at least 90% sequence identity to SEQ ID NO:22 or SEQ ID NO:23.

16. The expression cassette of claim 11, wherein the heterologous coding sequence comprises a nucleic acid sequence encoding a Brachyury fusion protein having at least 90% sequence identity to a sequence selected from the group consisting of: SEQ ID NOs: 11, 13, 18-19, 22-23, 26-27, 30-31, 34-35, 38-39, 42-43, 46-47, 50-51, 54-55, 58-59, 62-63 66-67, 70, and 71.

17. The expression cassette of claim 1, wherein the expression cassette comprises a nucleic acid sequence having at least 90% sequence identity to SEQ ID NO: 72 or SEQ ID NO: 73.

18. The expression cassette of claim 17 that comprises the nucleic acid sequence set forth in SEQ ID NO:72.

19. A poxviral vector comprising the expression cassette of claim 1, wherein the poxvirus is an avipox virus.

20. The poxviral vector of claim 19, wherein the avipox virus is a fowlpox virus.

21. A nucleic acid comprising a promoter operably linked to a sequence encoding Brachyury antigen and selected from:

(a) a nucleic acid having at least 85% sequence identity to SEQ ID NO: 9 or a derivative of SEQ ID NO:9;

(b) a subsequence of SEQ ID NO:9 or a derivative of the subsequence of SEQ ID NO:9; and

(c) a sequence that differs from the sequence set forth in SEQ ID NO:9 by the addition, insertion, or deletion of not more than 10 nucleotides;

wherein the derivative of SEQ ID NO:9 and the derivative of the subsequence of SEQ ID NO:9 are defined by having one or more substitutions, deletions, and/or insertions, and wherein the promoter is active as a poxvirus promoter and/or active in a poxvirus infected cell.

22. The nucleic acid of claim 21, wherein the subsequence of SEQ ID NO: 9 has at least 85% identity to any one of SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, and SEQ ID NO: 8.

23. The nucleic acid of claim 21, wherein the sequence encoding Brachyury antigen comprises the sequence set forth in SEQ ID NO:49.

24. The nucleic acid of claim 23, wherein the subsequence of SEQ ID NO: 9 has at least 85% identity to SEQ ID NO: 4.

25. The nucleic acid of claim 23, wherein the subsequence of SEQ ID NO: 9 has at least 85% identity to SEQ ID NO: 6.

26. The nucleic acid of claim 23, wherein the subsequence of SEQ ID NO: 9 is SEQ ID NO: 6.

27. A method for expressing a Brachyury antigen coding sequence in a vector, the method comprising:

- (a) providing an expression cassette comprising a nucleic acid sequence comprising a promoter and selected from:
 - (i) a nucleic acid sequence having at least 85% sequence identity to SEQ ID NO: 9 or a derivative of SEQ ID NO: 9; and
 - (ii) a subsequence of SEQ ID NO:9 or a derivative of the subsequence of SEQ ID NO:9; and
 - (iii) a sequence that differs from the sequence set forth in SEQ ID NO:9 by the addition, insertion, or deletion of not more than 10 nucleotides;

wherein the derivative of SEQ ID NO:9 and the derivative of the subsequence of SEQ ID NO:9 are defined by having one or more substitutions, deletions, and/or insertions, and wherein the promoter is active as a poxvirus promoter and/or active in a poxvirus infected cell; and

- (c) operably linking the promoter to a Brachyury antigen coding sequence;
- and
- (d) incorporating the promoter and the coding sequence into the vector.

28. The method of claim 27, wherein the nucleic acid sequence is a subsequence of SEQ ID NO: 9 having at least 85% sequence identity to any one of SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, or SEQ ID NO: 8.

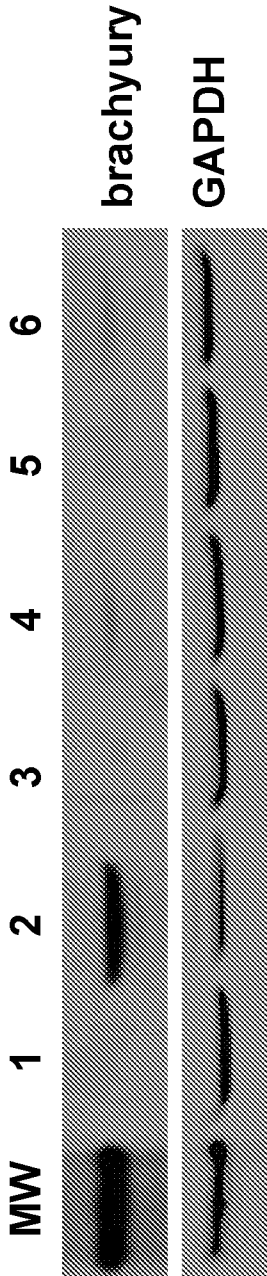
29. The method of claim 28, wherein the nucleic acid sequence has at least 85% sequence identity to any one of SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6.

30. The method of claim 29, wherein the vector is a viral vector selected from an orthopox virus and an avipox virus.

31. The method of claim 30, wherein the vector is an orthopox virus that is MVA-BN.

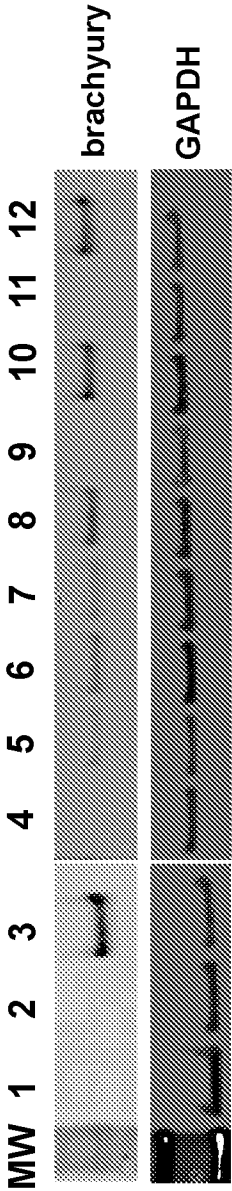
32. The method of claim 30, wherein the avipox virus is a fowlpox virus.

Figure 1
Expression of Brachyury in human DCs



- 1. Uninfected DCs
- 2. MVA-Brachyury-TRICOM
- 3. FPV-WT
- 4. FPV-mBN343A
- 5. FPV-mBN344A
- 6. FPV-mBN345A

Figure 2
Expression of Brachyury in human DCs



- 1 Uninfected DCs
- 2 MVA-WT
- 3 MVA-Brachyury-TRICOM
- 4 FPV-WT
- 5 FPV-mBN249B
- 6 FPV-mBN281A, cl 32
- 7 FPV-mBN281A, cl 35
- 8 FPV-mBN343A
- 9 FPV-mBN344A
- 10 FPV-mBN345A
- 11 FPV-mBN354A
- 12 FPV-mBN355A

Figure 3
Relative expression of Brachyury

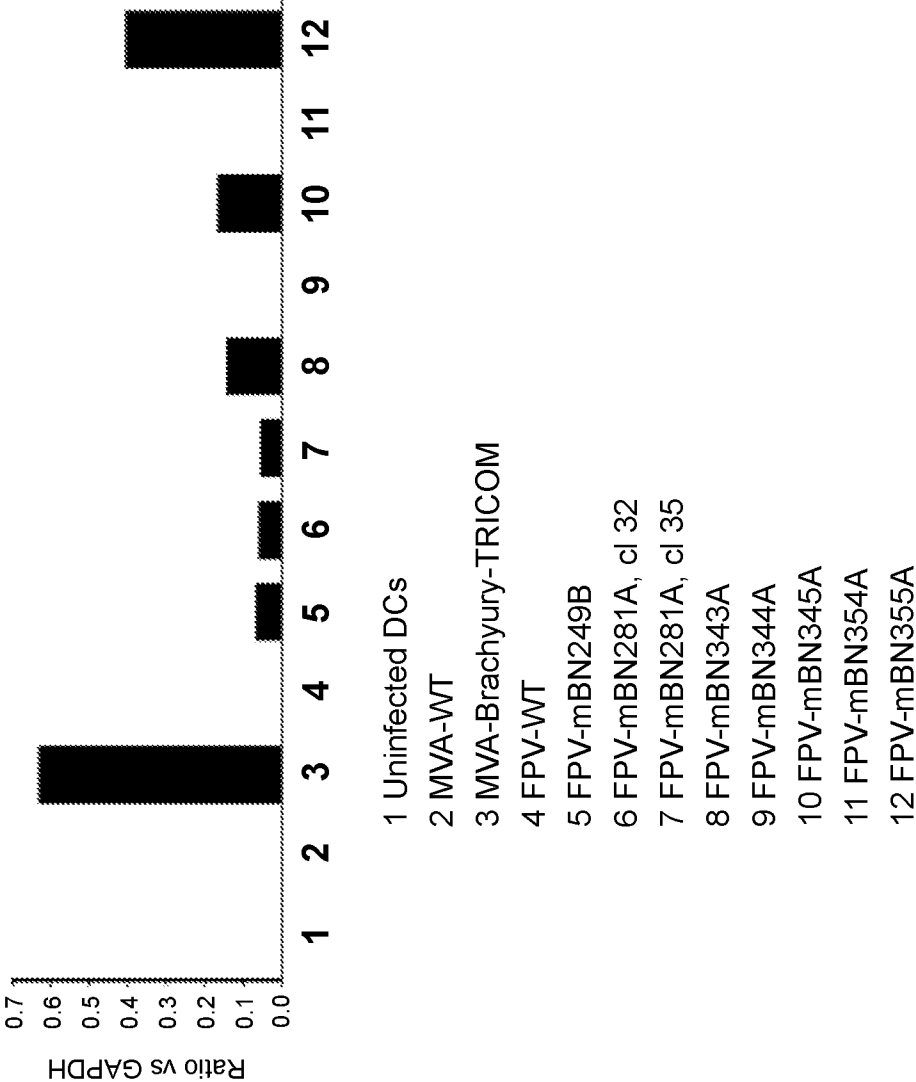


Figure 4
Expression of Brachyury and TRICOM in CMVT cells

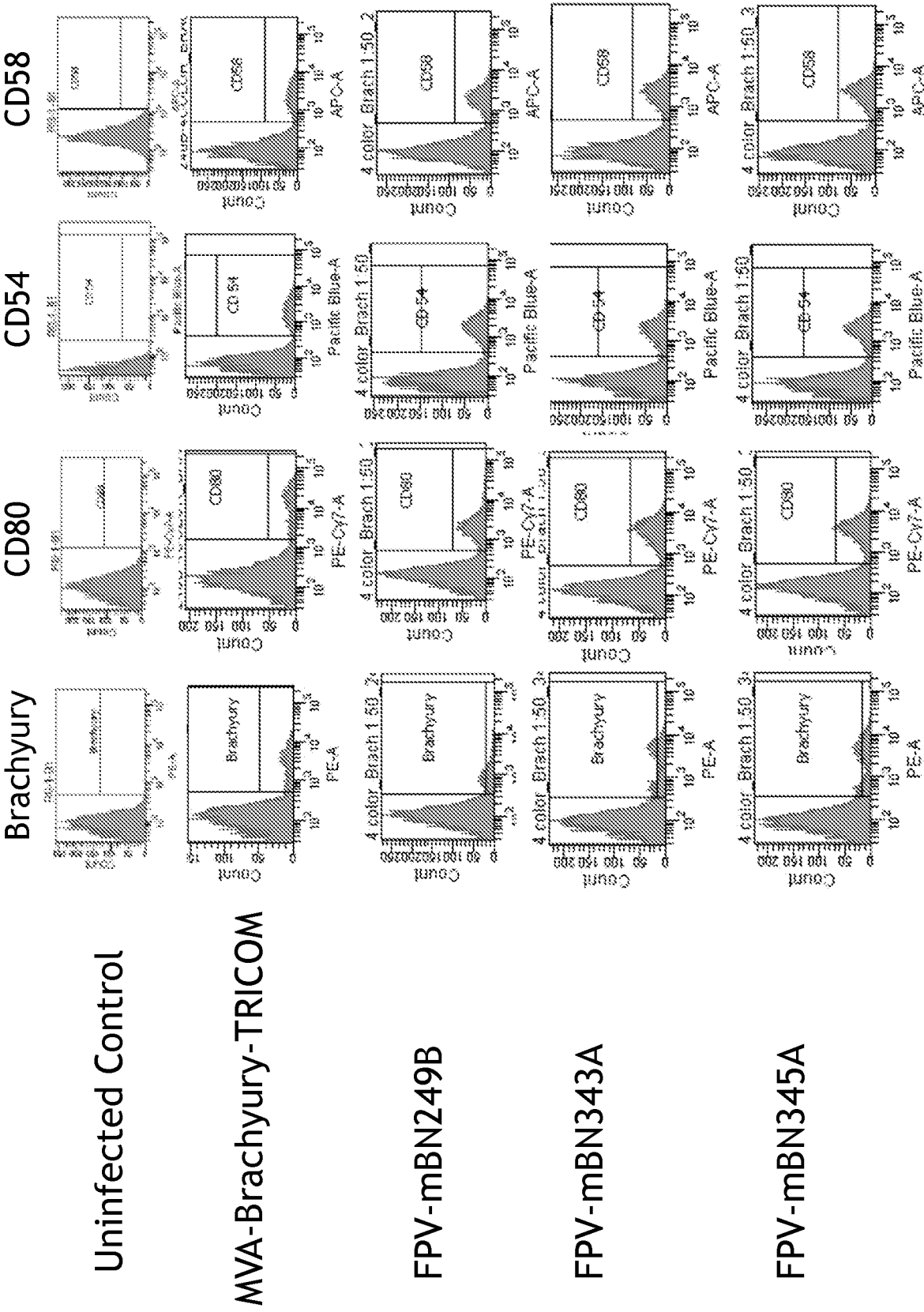
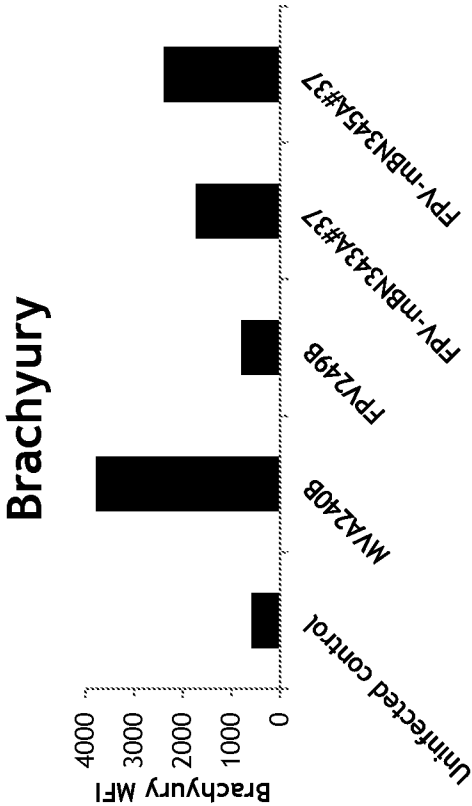


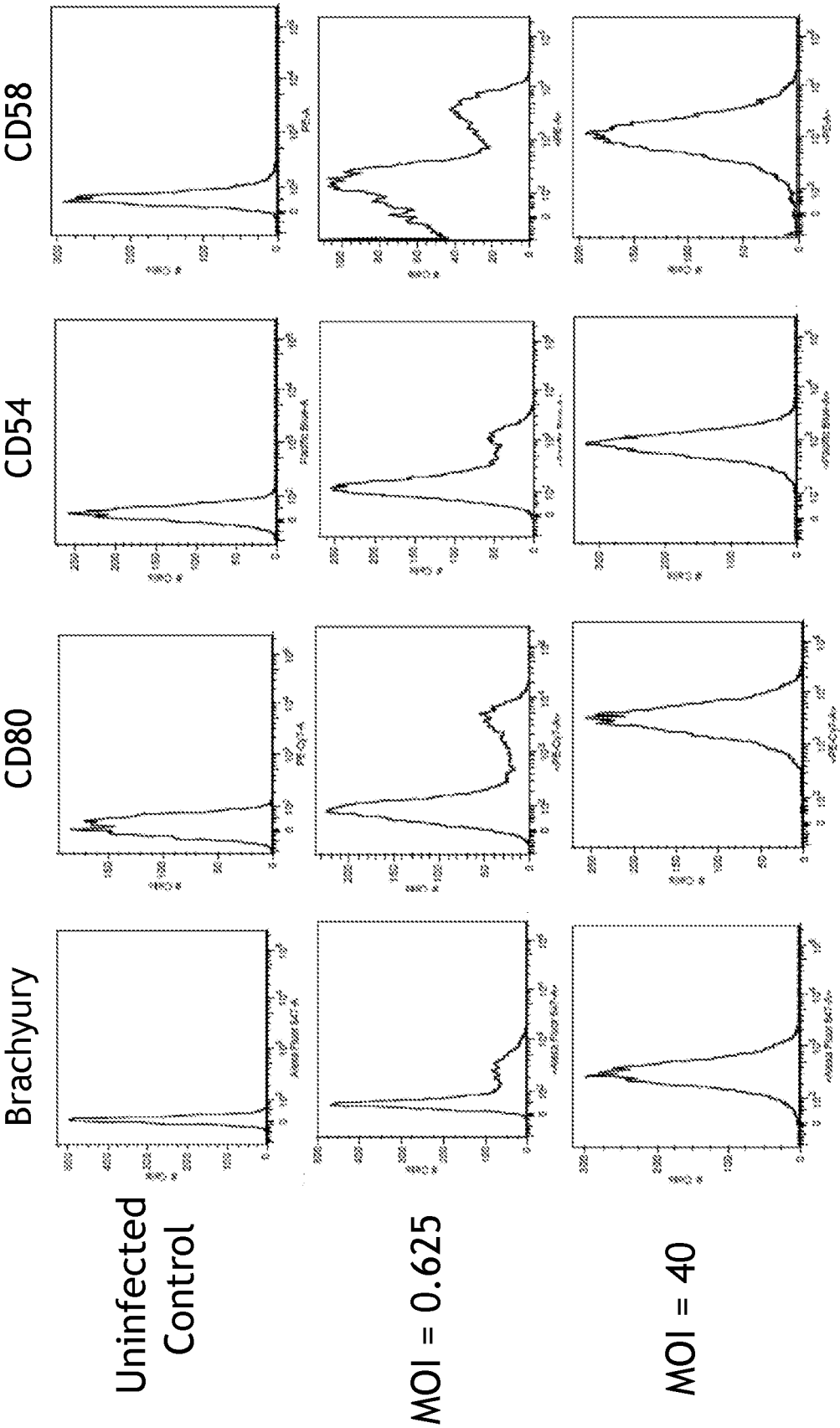
Figure 5

Brachyury Expression Level in CMMT cells



Median fluorescence intensity (MFI)	
	Brachyury
Uninfected control	584
MVA240B	3783
FPV249B	788
FPV-mBN343A#37	1732
FPV-mBN345A#37	2391

Figure 6
Expression of Brachyury and TRICOM from FPV-mBN345B



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Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val
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Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser
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Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly
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Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp
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Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu
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Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser
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Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser
 20 25 30

Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu
 35 40 45

Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val
 50 55 60

Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser
 65 70 75 80

Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala
 85 90 95

BNIT0010PCT_sequencelisting

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

BNIT0010PCT_sequencelisting

Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr
370 375 380

Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu
385 390 395 400

Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp
405 410 415

Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro
420 425 430

Pro Ser Met
435

<210> 14
<211> 1308
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Brachyury protein Isoform 1 with L254V

<400> 14
atgagctccc ctggcaccga gagcgcggga aagagcctgc agtaccgagt ggaccacctg 60
ctgagcgccg tggagaatga gctgcaggcg ggcagcgaga agggcgaccc cacagagcgc 120
gaactgcgcg tgggcctgga ggagagcgag ctgtggctgc gcttcaagga gctcaccaat 180
gagatgatcg tgaccaagaa cggcaggagg atgtttccgg tgctgaaggt gaacgtgtct 240
ggcctggacc ccaacgccat gtactccttc ctgctggact tcgtggcggc ggacaaccac 300
cgctggaagt acgtgaacgg ggaatgggtg ccggggggca agccggagcc gcaggcgccc 360
agctgcgtct acatccaccc cgactcgccc aacttcgggg cccactggat gaaggctccc 420
gtctccttca gcaaagtcaa gctcaccaac aagctcaacg gagggggcca gatcatgctg 480
aactccttgc ataagtatga gcctcgaatc cacatagtga gagttggggg tccacagcgc 540
atgatcacca gccactgctt ccctgagacc cagttcatag cggtgactgc ttatcagaac 600
gaggagatca cagctcttaa aattaagtac aatccatttg caaaggcttt cttgatgca 660
aaggaaagaa gtgatcacia agagatgatg gaggaacccg gagacagcca gcaacctggg 720
tactcccaat ggggggtggct tcttcttga accagcaccg tttgtccacc tgcaaactct 780
catcctcagt ttggaggtgc cctctccctc ccctccacgc acagctgtga caggtaccca 840
accctgagga gccaccggtc ctcaccctac cccagcccct atgctcatcg gaacaattct 900
ccaacctatt ctgacaactc acctgcatgt ttatccatgc tgcaatccca tgacaattgg 960
tccagccttg gaatgcctgc ccatcccagc atgctccccg tgagccacaa tgccagccca 1020
cctaccagct ccagtcagta ccccagcctg tggctctgtga gcaacggcgc cgtcaccccg 1080
ggctcccagg cagcagccgt gtccaacggg ctggggggcc agttcttccg gggctcccc 1140

BNIT0010PCT_sequencelisting

gcgcactaca caccctcac ccatccggtc tcggcgccct cttcctcggg atccccactg	1200
tacgaagggg cggccgcggc cacagacatc gtggacagcc agtacgacgc cgcagcccaa	1260
ggccgcctca tagcctcatg gacacctgtg tcgccacctt ccatgtga	1308

<210> 15
 <211> 1305
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding Brachyury protein Isoform 1 with L254V without 5' atg sequence

<400> 15 agtccccctg gcaccgagag cgcgggaaag agcctgcagt accgagtgga ccacctgctg	60
agcgccgtgg agaattgagct gcaggcgggc agcgagaagg ggcacccac agagcgcgaa	120
ctgcgcgtgg gcctggagga gagcgagctg tggctgcgt tcaaggagct caccaatgag	180
atgatcgtga ccaagaacgg caggaggatg tttccggtgc tgaagggtgaa cgtgtctggc	240
ctggaccca acgccatgta ctcttctctg ctggacttcg tggcggcgga caaccaccgc	300
tggaagtacg tgaacgggga atgggtgccg gggggcaagc cggagccgca ggcgccagc	360
tgcgtctaca tccacccga ctgcaccaac ttcggggccc actggatgaa ggctcccgtc	420
tccttcagca aagtcaagct caccaacaag ctcaacggag ggggccagat catgctgaac	480
tccttgcata agtatgagcc tcgaatccac atagttagag ttgggggtcc acagcgcag	540
atcaccagcc actgcttccc tgagaccag ttcatagcgg tgactgctta tcagaacgag	600
gagatcacag ctcttaaaat taagtacaat ccatttgcaa aggctttcct tgatgcaaag	660
gaaagaagtg atcacaaga gatgatggag gaaccggag acagccagca acctgggtac	720
tccaatggg ggtggcttct tcctggaacc agcaccgttt gtccacctgc aaatcctcat	780
cctcagtttg gaggtgccct ctccctcccc tccacgcaca gctgtgacag gtaccaaac	840
ctgaggagcc accggtcctc accctacccc agcccctatg ctcatcgga caattctcca	900
acctattctg acaactcacc tgcatgttta tccatgctgc aatcccatga caattggtcc	960
agccttgga tgctgccc tcccagcatg ctccccgtga gccacaatgc cagccacct	1020
accagctcca gtcagtacc cagcctgtgg tctgtgagca acggcgccgt cccccgggc	1080
tcccaggcag cagccgtgtc caacgggctg ggggccag tcttccggg ctccccgcg	1140
cactacacac ccctaccca tccggtctcg gcgccctctt cctcgggatc cccactgtac	1200
gaaggggagg ccgcggccac agacatcgtg gacagccagt acgacgccgc agcccaaggc	1260
cgcctcatag cctcatggac acctgtgtcg ccaccttcca tgtga	1305

<210> 16
 <211> 1323
 <212> DNA
 <213> Artificial Sequence

BNIT0010PCT_sequencelisting

<220>

<223> Coding sequence encoding fusion protein comprising Brachyury
(L254V) Protein plus addition of 15 nucleotides from Gene FPV 088

<400> 16

```

atgaaaaata acttgatgag ctcccctggc accgagagcg cgggaaagag cctgcagtac      60
cgagtggacc acctgctgag cgccgtggag aatgagctgc aggcgggcag cgagaagggc      120
gacccacag agcgcgaact gcgctggggc ctggaggaga gcgagctgtg gctgcgcttc      180
aaggagctca ccaatgagat gatcgtgacc aagaacggca ggaggatggt tccggtgctg      240
aaggtgaacg tgtctggcct ggacccaac gccatgtact ccttcctgct ggacttcgtg      300
gcggcggaca accaccgctg gaagtacgtg aacggggaat ggggtgccggg gggcaagccg      360
gagccgcagg cgcccagctg cgtctacatc caccgact cgccaactt cggggccac      420
tggtgaagg ctccgctc cttcagcaaa gtcaagctca ccaacaagct caacggaggg      480
ggccagatca tgctgaactc cttgcataag tatgagcctc gaatccacat agtgagagtt      540
gggggtccac agcgcagatg caccagccac tgcttcctg agaccagtt catagcgggtg      600
actgcttatc agaacgagga gatcacagct cttaaaatta agtacaatcc atttgcaaag      660
gctttccttg atgcaaagga aagaagtgat cacaagaga tgatggagga acccgagac      720
agccagcaac ctgggtactc ccaatggggg tggcttcttc ctggaaccag caccgtttgt      780
ccacctgcaa atcctcatcc tcagtttga ggtgccctct ccctccctc cagcacagc      840
tgtgacaggt acccaaccct gaggagccac cggctctcac cctacccag cccctatgct      900
catcggaaca attctccaac ctattctgac aactcacctg catgtttatc catgctgcaa      960
tcccatgaca attggtccag ccttggaaatg cctgcccac ccagcatgct ccccgtagc      1020
cacaatgcca gccacctac cagctccagt cagtaccca gcctgtggtc tgtgagcaac      1080
ggcgccgtca ccccggtc ccaggcagca gccgtgtcca acgggctggg ggcccagttc      1140
ttccggggct ccccgcgca ctacacacc ctcaccatc cggctctggc gccctcttcc      1200
tcgggatccc cactgtacga agggcgggc gcggccacag acatcgtgga cagccagtac      1260
gacgccgag cccaaggccg cctcatagcc tcatggacac ctgtgtcgcc accttccatg      1320
tga                                                                 1323

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<210> 17

<211> 1320

<212> DNA

<213> Artificial Sequence

<220>

<223> Coding sequence encoding fusion protein comprising Brachyury
(L254V) Protein plus addition of 15 nucleotides from Gene FPV 088
without Brachyury protein atg start codon

<400> 17

```

atgaaaaata acttgagctc ccctggcacc gagagcgcg gaaagagcct gcagtaccga      60
gtggaccacc tgctgagcgc cgtggagaat gagctgcagg cgggcagcga gaagggcgac      120
cccacagagc gcgaactgcg cgtgggcctg gaggagagcg agctgtggct gcgcttcaag      180

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BNIT0010PCT_sequencelisting

gagctcacca atgagatgat cgtgaccaag aacggcagga ggatgtttcc ggtgctgaag 240
 gtgaacgtgt ctggcctgga ccccaacgcc atgtactcct tcctgctgga cttcgtggcg 300
 gcggacaacc accgctggaa gtacgtgaac ggggaatggg tgccgggggg caagccggag 360
 ccgcaggcgc ccagctgcgt ctacatccac cccgactcgc ccaacttcgg ggcccactgg 420
 atgaaggctc ccgtctcctt cagcaaagtc aagctcacca acaagctcaa cggagggggc 480
 cagatcatgc tgaactcctt gcataagtat gagcctcgaa tccacatagt gagagttggg 540
 ggtccacagc gcatgatcac cagccactgc ttccctgaga ccagttcat agcggtgact 600
 gcttatcaga acgaggagat cacagctctt aaaattaagt acaatccatt tgcaaaggct 660
 ttctttgatg caaaggaaag aagtgatcac aaagagatga tggaggaacc cggagacagc 720
 cagcaacctg ggtactccca atgggggtgg cttcttcctg gaaccagcac cgtttgtcca 780
 cctgcaaadc ctatcctca gtttgagggt gccctctccc tcccctccac gcacagctgt 840
 gacaggtacc caaccctgag gagccaccgg tcctcacctt accccagccc ctatgctcat 900
 cggaacaatt ctccaaccta ttctgacaac tcacctgcat gtttatccat gctgcaatcc 960
 catgacaatt ggtccagcct tggaatgcct gcccatccca gcatgctccc cgtgagccac 1020
 aatgccagcc cacctaccag ctccagtcag taccacagcc tgtgggtctgt gagcaacggc 1080
 gccgtcacc cggggtccca ggcagcagcc gtgtccaacg ggctgggggc ccagttcttc 1140
 cgggggtccc ccgcgcacta cacaccctc acccatccgg tctcggcgcc ctcttcctcg 1200
 ggatccccac tgtacgaagg ggcggccgcg gccacagaca tcgtggacag ccagtacgac 1260
 gccgcagccc aaggccgcct catagcctca tggacacctg tgtcgccacc ttccatgtga 1320

<210> 18
 <211> 440
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury (L254V) Protein encoded by
 SEQ ID NO:16

<400> 18

Met Lys Asn Asn Leu Met Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys
 1 5 10 15

Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu
 20 25 30

Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg
 35 40 45

Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr
 50 55 60

Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu

				70				75				80			
Lys	Val	Asn	Val	Ser 85	Gly	Leu	Asp	Pro	Asn 90	Ala	Met	Tyr	Ser	Phe 95	Leu
Leu	Asp	Phe	Val 100	Ala	Ala	Asp	Asn 105	His	Arg	Trp	Lys	Tyr	Val 110	Asn	Gly
Glu	Trp	Val 115	Pro	Gly	Gly	Lys	Pro 120	Glu	Pro	Gln	Ala	Pro 125	Ser	Cys	Val
Tyr	Ile 130	His	Pro	Asp	Ser	Pro 135	Asn	Phe	Gly	Ala	His 140	Trp	Met	Lys	Ala
Pro 145	Val	Ser	Phe	Ser	Lys 150	Val	Lys	Leu	Thr	Asn 155	Lys	Leu	Asn	Gly	Gly 160
Gly	Gln	Ile	Met	Leu 165	Asn	Ser	Leu	His	Lys 170	Tyr	Glu	Pro	Arg	Ile 175	His
Ile	Val	Arg	Val 180	Gly	Gly	Pro	Gln	Arg 185	Met	Ile	Thr	Ser	His 190	Cys	Phe
Pro	Glu	Thr 195	Gln	Phe	Ile	Ala	Val 200	Thr	Ala	Tyr	Gln	Asn 205	Glu	Glu	Ile
Thr	Ala 210	Leu	Lys	Ile	Lys	Tyr 215	Asn	Pro	Phe	Ala	Lys 220	Ala	Phe	Leu	Asp
Ala 225	Lys	Glu	Arg	Ser	Asp 230	His	Lys	Glu	Met	Met 235	Glu	Glu	Pro	Gly	Asp 240
Ser	Gln	Gln	Pro	Gly 245	Tyr	Ser	Gln	Trp	Gly 250	Trp	Leu	Leu	Pro	Gly 255	Thr
Ser	Thr	Val	Cys 260	Pro	Pro	Ala	Asn 265	Pro	His	Pro	Gln	Phe	Gly 270	Gly	Ala
Leu	Ser	Leu 275	Pro	Ser	Thr	His	Ser 280	Cys	Asp	Arg	Tyr	Pro 285	Thr	Leu	Arg
Ser	His 290	Arg	Ser	Ser	Pro	Tyr 295	Pro	Ser	Pro	Tyr	Ala 300	His	Arg	Asn	Asn
Ser 305	Pro	Thr	Tyr	Ser	Asp 310	Asn	Ser	Pro	Ala	Cys 315	Leu	Ser	Met	Leu	Gln 320
Ser	His	Asp	Asn	Trp 325	Ser	Ser	Leu	Gly	Met 330	Pro	Ala	His	Pro	Ser 335	Met
Leu	Pro	Val	Ser	His	Asn	Ala	Ser	Pro	Pro	Thr	Ser	Ser	Ser	Gln	Tyr

BNIT0010PCT_sequencelisting

340

345

350

Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln
 355 360 365

Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser
 370 375 380

Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser
 385 390 395 400

Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val
 405 410 415

Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp
 420 425 430

Thr Pro Val Ser Pro Pro Ser Met
 435 440

<210> 19

<211> 439

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
 SEQ ID NO:17 plus addition of 15 nucleotides from Gene FPV 088
 without Brachyury atg start codon.

<400> 19

Met Lys Asn Asn Leu Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser
 1 5 10 15

Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu
 20 25 30

Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val
 35 40 45

Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn
 50 55 60

Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys
 65 70 75 80

Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu
 85 90 95

Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu
 100 105 110

Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr

BNIT0010PCT_sequence1isting

115

120

125

Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro
 130 135 140

Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly
 145 150 155 160

Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile
 165 170 175

Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro
 180 185 190

Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr
 195 200 205

Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala
 210 215 220

Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser
 225 230 235 240

Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser
 245 250 255

Thr Val Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu
 260 265 270

Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser
 275 280 285

His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser
 290 295 300

Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser
 305 310 315 320

His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu
 325 330 335

Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro
 340 345 350

Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala
 355 360 365

Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro
 370 375 380

Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser
 Page 14

385 390 395 400

Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr
420 425 430

<210>	20
<211>	1353
<212>	DNA
<213>	Artificial Sequence

<220>
<223> Coding sequence encoding fusion protein comprising Brachyury (L254V) Protein plus addition of 45 nucleotides from Gene FPV 088

<400>	20						
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accgagagcg	cgggaaagag	cctgcagtac	cgagtggacc	acctgctgag	cgccgtggag		120
aatgagctgc	aggcgggcag	cgagaagggc	gaccccacag	agcgcgaact	gcgcgtgggc		180
ctggaggaga	gcgagctgtg	gctgcgcttc	aaggagctca	ccaatgagat	gatcgtgacc		240
aagaacggca	ggaggatgtt	tccggtgctg	aaggatgaacg	tgtctggcct	ggaccccaac		300
gccatgtact	ccttcctgct	ggacttcgtg	gcggcggaca	accaccgctg	gaagtacgtg		360
aacggggaat	gggtgccggg	gggcaagccg	gagccgcagg	cgcccagctg	cgtctacatc		420
caccccgact	cgcccaactt	cgggggccac	tggatgaagg	ctcccgtctc	cttcagcaaa		480
gtcaagctca	ccaacaagct	caacggaggg	ggccagatca	tgctgaactc	cttgcataag		540
tatgagcctc	gaatccacat	agtgagagtt	gggggtccac	agcgcgatgat	caccagccac		600
tgcttccctg	agaccagtt	catagcggtg	actgcttata	agaacgagga	gatcacagct		660
cttaaaatta	agtacaatcc	atttgcaaag	gctttccttg	atgcaaagga	aagaagtgat		720
cacaaagaga	tgatggagga	acccgagac	agccagcaac	ctgggtactc	ccaatggggg		780
tggtcttctt	ctggaaccag	caccgtttgt	ccacctgcaa	atcctcatcc	tcagtttgga		840
ggtgccctct	ccctcccctc	cacgcacagc	tgtgacaggt	acccaaccct	gaggagccac		900
cggtcctcac	cctaccccag	cccctatgct	catcggaaca	attctccaac	ctattctgac		960
aactcacctg	catgtttatc	catgctgcaa	tcccatgaca	attggtccag	ccttggaatg		1020
cctgcccata	ccagcatgct	ccccgtgagc	cacaatgcca	gcccacctac	cagctccagt		1080
cagtacccca	gcctgtggtc	tgtgagcaac	ggcgccgtca	ccccgggctc	ccaggcagca		1140
gccgtgtcca	acgggctggg	ggcccagttc	ttccggggct	ccccgcgcga	ctacacaccc		1200
ctcaccatac	cggtctcggc	gccctcttcc	tcgggatccc	cactgtacga	aggggcggcc		1260
gcggccacag	acatcggtga	cagccagtac	gacgccgcag	cccaaggccg	cctcatagcc		1320

BNIT0010PCT_sequencelisting

tcatggacac ctgtgtcgcc accttccatg tga 1353

<210> 21
 <211> 1350
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding fusion protein comprising Brachyury
 (L254V) Protein plus addition of 45 nucleotides from Gene FPV 088
 without Brachyury atg

<400> 21
 atgaaaaata acttgtatga agaaaaaatg aacatgagta agaaaagctc ccctggcacc 60
 gagagcgcg gaaagagcct gcagtaccga gtggaccacc tgctgagcgc cgtggagaat 120
 gagctgcagg cgggcagcga gaagggcgac cccacagagc gcgaactgcg cgtgggcctg 180
 gaggagagcg agctgtggct gcgcttcaag gagctcacca atgagatgat cgtgaccaag 240
 aacggcagga ggatgtttcc ggtgctgaag gtgaacgtgt ctggcctgga cccaacgcc 300
 atgtactcct tcctgctgga cttcgtggcg gcggacaacc accgctggaa gtacgtgaac 360
 ggggaatggg tgccgggggg caagccggag ccgcaggcgc ccagctgcgt ctacatccac 420
 cccgactcgc ccaacttcgg ggcccactgg atgaaggctc ccgtctcctt cagcaaagtc 480
 aagctcacca acaagctcaa cggagggggc cagatcatgc tgaactcctt gcataagtat 540
 gagcctcgaa tccacatagt gagagttggg ggtccacagc gcatgatcac cagccactgc 600
 ttccctgaga cccagttcat agcggtgact gcttatcaga acgaggagat cacagctctt 660
 aaaattaagt acaatccatt tgcaaaggct ttccttgatg caaaggaaag aagtgatcac 720
 aaagagatga tggaggaacc cggagacagc cagcaacctg ggtactcca atgggggtgg 780
 cttcttcctg gaaccagcac cgtttgtcca cctgcaaatc ctcactcctca gtttggaggt 840
 gccctctccc tcccctccac gcacagctgt gacagggtacc caaccctgag gagccaccgg 900
 tcctcacct accccagccc ctatgctcat cggaacaatt ctccaacctt ttctgacaac 960
 tcacctgcat gtttatccat gctgcaatcc catgacaatt ggtccagcct tggaatgcct 1020
 gcccatccca gcatgctccc cgtgagccac aatgccagcc cacctaccag ctccagtcag 1080
 taccagcc tgtggtctgt gagcaacggc gccgtcacc cgggctcca ggcagcagcc 1140
 gtgtccaacg ggctgggggc ccagttcttc cggggctccc ccgcgcacta cacaccctc 1200
 acccatccgg tctcggcgcc ctcttcctcg ggatccccac tgtacgaagg ggcggccgcg 1260
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 tggacacctg tgcgccacc ttccatgtga 1350

<210> 22
 <211> 450
 <212> PRT
 <213> Artificial Sequence

<220>

BNIT0010PCT_sequencelisting

<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO:20

<400> 22

Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Met
1 5 10 15

Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val
20 25 30

Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu
35 40 45

Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser
50 55 60

Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr
65 70 75 80

Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly
85 90 95

Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala
100 105 110

Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly
115 120 125

Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser
130 135 140

Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser Lys
145 150 155 160

Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn
165 170 175

Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly Gly
180 185 190

Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile
195 200 205

Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys
210 215 220

Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp
225 230 235 240

His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr
245 250 255

BNIT0010PCT_sequencelisting

Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Val Cys Pro Pro
260 265 270

Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr
275 280 285

His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro
290 295 300

Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp
305 310 315 320

Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser
325 330 335

Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His Asn
340 345 350

Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val
355 360 365

Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn
370 375 380

Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro
385 390 395 400

Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr
405 410 415

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

Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro
435 440 445

Ser Met
450

<210> 23
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO:21

<400> 23

Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Ser
1 5 10 15

BNIT0010PCT_sequence_listing

Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp
20 25 30

His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys
35 40 45

Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu
50 55 60

Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys
65 70 75 80

Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu
85 90 95

Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp
100 105 110

Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys
115 120 125

Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro
130 135 140

Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val
145 150 155 160

Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn Ser
165 170 175

Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly Gly Pro
180 185 190

Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala
195 200 205

Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr
210 215 220

Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His
225 230 235 240

Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser
245 250 255

Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Val Cys Pro Pro Ala
260 265 270

Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His
275 280 285

BNIT0010PCT_sequence listing

Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr
290 295 300

Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn
305 310 315 320

Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser
325 330 335

Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His Asn Ala
340 345 350

Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser
355 360 365

Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn Gly
370 375 380

Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu
385 390 395 400

Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu
405 410 415

Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala
420 425 430

Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser
435 440 445

Met

<210> 24
<211> 1326
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding fusion protein comprising Brachyury
(L254V) Protein plus addition of 18 nucleotides from Gene FPV 088

<400> 24
atgaacatga gtaagaaaat gagctcccct ggcaccgaga ggcgaggaaa gagcctgcag 60
taccgagtgg accacctgct gagcgccgtg gagaatgagc tgcaggcggg cagcgagaag 120
ggcgacccca cagagcgca actgcgcgtg ggcctggagg agagcgagct gtggctgcgc 180
ttcaaggagc tcaccaatga gatgatcgtg accaagaacg gcaggaggat gtttccggtg 240
ctgaaggtga acgtgtctgg cctggacccc aacgccatgt actccttcct gctggacttc 300
gtggcggcgg acaaccaccg ctggaagtac gtgaacgggg aatgggtgcc ggggggcaag 360
ccggagccgc aggcgcccag ctgcgtctac atccaccccg actcgcccaa cttcggggcc 420

BNIT0010PCT_sequencelisting

cactggatga aggtctccgt ctccttcagc aaagtcaagc tcaccaacaa gctcaacgga	480
ggggggccaga tcatgctgaa ctccttgcac aagtatgagc ctcgaatcca catagtgaga	540
gttgggggtc cacagcgcat gatcaccagc cactgtcttc ctgagacca gttcatagcg	600
gtgactgctt atcagaacga ggagatcaca gctcttaaaa ttaagtacaa tccatttgca	660
aaggctttcc ttgatgcaaa ggaaagaagt gatcacaaag agatgatgga ggaacccgga	720
gacagccagc aacctgggta ctcccaatgg gggtggcttc ttcctggaac cagcaccgtt	780
tgtccacctg caaatcctca tcctcagttt ggaggtgccc tctccctccc ctccacgcac	840
agctgtgaca ggtacccaac cctgaggagc caccggctct caccctaccc cagcccctat	900
gctcatcgga acaattctcc aacctattct gacaactcac ctgcatgttt atccatgctg	960
caatcccatg acaattggtc cagccttggga atgcctgccc atcccagcat gctccccgtg	1020
agccacaatg ccagcccacc taccagctcc agtcagtacc ccagcctgtg gtctgtgagc	1080
aacggcgccg tcaccccggg ctcccaggca gcagccgtgt ccaacgggct gggggcccag	1140
ttcttccggg gctccccgc gcactacaca cccctcacc atccggtctc ggcgcctct	1200
tcctcgggat cccactgta cgaagggcg gccgcggcca cagacatcgt ggacagccag	1260
tacgacgccg cagccaagg ccgcctcata gcctcatgga cacctgtgtc gccaccttcc	1320
atgtga	1326

<210> 25
 <211> 1323
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding fusion protein comprising Brachyury
 (L254V) Protein plus addition of 18 nucleotides from Gene FPV 088
 without Brachyury atg

<400> 25	
atgaacatga gtaagaaaag ctcccctggc accgagagcg cgggaaagag cctgcagtac	60
cgagtggacc acctgctgag cgccgtggag aatgagctgc aggcgggcag cgagaagggc	120
gacccacag agcgcgaact gcgcgtgggc ctggaggaga gcgagctgtg gctgcgcttc	180
aaggagctca ccaatgagat gatcgtgacc aagaacggca ggaggatgtt tccggtgctg	240
aaggtgaacg tgtctggcct ggacccaac gccatgtact ccttctgct ggacttcgtg	300
gcggcggaca accaccgtg gaagtacgtg aacggggaat gggtgccggg gggcaagccg	360
gagccgcagg cgcccagctg cgtctacatc caccgact cgcccaactt cggggccac	420
tggatgaagg ctcccgtctc cttcagcaaa gtcaagctca ccaacaagct caacggaggg	480
ggccagatca tgctgaactc cttgcataag tatgagcctc gaatccacat agtgagagtt	540
gggggtccac agcgcagat caccagccac tgcttcctg agaccagtt catagcgggtg	600
actgcttatc agaacgagga gatcacagct cttaaaatta agtacaatcc atttgcaaag	660
gctttccttg atgcaaagga aagaagtgat caciaagaga tgatggagga acccgagac	720

BNIT0010PCT_sequencelisting

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agccagcaac ctgggtactc ccaatggggg tggcttcttc ctggaaccag caccgtttgt      780
ccacctgcaa atcctcatcc tcagtttggg ggtgccctct ccctcccctc cagcacagc      840
tgtgacaggt acccaaccct gaggagccac cggtcctcac cctaccccag cccctatgct      900
catcggaaca attctccaac ctattctgac aactcacctg catgtttatc catgctgcaa      960
tcccatgaca attggtccag ccttggaatg cctgcccata ccagcatgct ccccgtagac     1020
cacaatgcca gccacctac cagctccagt cagtacccca gcctgtggtc tgtgagcaac     1080
ggcgccgtca ccccgggctc ccaggcagca gccgtgtcca acgggctggg ggcccagttc     1140
ttccgggggt cccccgcgca ctacacacc ctcaccatac cggctctcggc gccctcttcc     1200
tcgggatccc cactgtacga aggggcgggc gcggccacag acatcgtgga cagccagtac     1260
gacgccgcag cccaaggccg cctcatagcc tcatggacac ctgtgtcgcc accttccatg     1320
tga                                                                    1323

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<210> 26
 <211> 441
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury (L254V) Protein encoded by
 SEQ ID NO:24

<400> 26

Met Asn Met Ser Lys Lys Met Ser Ser Pro Gly Thr Glu Ser Ala Gly
 1 5 10 15

Lys Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn
 20 25 30

Glu Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu
 35 40 45

Arg Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu
 50 55 60

Thr Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val
 65 70 75 80

Leu Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe
 85 90 95

Leu Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn
 100 105 110

Gly Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys
 115 120 125

Val Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys
 130 135 140

BNIT0010PCT_sequencelisting

Ala Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly
145 150 155 160

Gly Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile
165 170 175

His Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys
180 185 190

Phe Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu
195 200 205

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

Asp Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly
225 230 235 240

Asp Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly
245 250 255

Thr Ser Thr Val Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly
260 265 270

Ala Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu
275 280 285

Arg Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn
290 295 300

Asn Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu
305 310 315 320

Gln Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser
325 330 335

Met Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln
340 345 350

Tyr Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser
355 360 365

Gln Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly
370 375 380

Ser Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser
385 390 395 400

Ser Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile
405 410 415

BNIT0010PCT_sequencelisting

Val Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser
420 425 430

Trp Thr Pro Val Ser Pro Pro Ser Met
435 440

<210> 27
<211> 440
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO:25

<400> 27

Met Asn Met Ser Lys Lys Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys
1 5 10 15

Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu
20 25 30

Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg
35 40 45

Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr
50 55 60

Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu
65 70 75 80

Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu
85 90 95

Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly
100 105 110

Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val
115 120 125

Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala
130 135 140

Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly
145 150 155 160

Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His
165 170 175

Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe
180 185 190

BNIT0010PCT_sequencelisting

Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile
195 200 205

Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp
210 215 220

Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp
225 230 235 240

Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr
245 250 255

Ser Thr Val Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala
260 265 270

Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg
275 280 285

Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn
290 295 300

Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln
305 310 315 320

Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met
325 330 335

Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr
340 345 350

Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln
355 360 365

Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser
370 375 380

Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser
385 390 395 400

Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val
405 410 415

Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp
420 425 430

Thr Pro Val Ser Pro Pro Ser Met
435 440

<210> 28
<211> 1320
<212> DNA

BNIT0010PCT_sequence1isting

<213> Artificial Sequence

<220>

<223> Coding sequence encoding Fusion protein comprising Brachyury (L254V) Protein plus addition of 12 nucleotides from Gene FPV 088

<400> 28

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atgagtaaga aaatgagctc ccctggcacc gagagcgcg gaaagagcct gcagtaccga      60
gtggaccacc tgctgagcgc cgtggagaat gagctgcagg cgggcagcga gaagggcgac      120
cccacagagc gcgaactgcg cgtgggcctg gaggagagcg agctgtggct gcgcttcaag      180
gagctcacca atgagatgat cgtgaccaag aacggcagga ggatgtttcc ggtgctgaag      240
gtgaacgtgt ctggcctgga ccccaacgcc atgtactcct tcctgctgga cttcgtggcg      300
gcggacaacc accgctggaa gtacgtgaac ggggaatggg tgccgggggg caagccggag      360
ccgcaggcgc ccagctgcgt ctacatccac ccgactcgc ccaacttcgg ggcccactgg      420
atgaaggctc ccgtctcctt cagcaaagtc aagctcacca acaagctcaa cggagggggc      480
cagatcatgc tgaactcctt gcataagtat gagcctcgaa tccacatagt gagagttggg      540
gggccacagc gcatgatcac cagccactgc ttccctgaga ccagttcat agcggtgact      600
gcttatcaga acgaggagat cacagctctt aaaattaagt acaatccatt tgcaaaggct      660
ttccttgatg caaaggaaag aagtgatcac aaagagatga tggaggaacc cggagacagc      720
cagcaacctg ggtactccca atgggggtgg cttcttcctg gaaccagcac cgtttgtcca      780
cctgcaaadc ctatcctca gtttgagggt gccctctccc tcccctccac gcacagctgt      840
gacaggtacc caaccctgag gagccaccgg tcctcacctt accccagccc ctatgctcat      900
cggaacaatt ctccaaccta ttctgacaac tcacctgcat gtttatccat gctgcaatcc      960
catgacaatt ggtccagcct tggaatgcct gcccatccca gcatgctccc cgtgagccac     1020
aatgccagcc cacctaccag ctccagtcag taccacagcc tgtgggtctgt gagcaacggc     1080
gccgtcacc cgggctccca ggcagcagcc gtgtccaacg ggctgggggc ccagttcttc     1140
cggggctccc ccgcgacta cacaccctc acccatccgg tctcggcgcc ctcttctctg     1200
ggatccccac tgtacgaagg ggcggccgcg gccacagaca tcgtggacag ccagtacgac     1260
gccgcagccc aaggccgcct catagcctca tggacacctg tgtcgccacc ttccatgtga     1320

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<210> 29

<211> 1317

<212> DNA

<213> Artificial Sequence

<220>

<223> Coding sequence encoding Fusion protein comprising Brachyury (L254V) Protein plus addition of 12 nucleotides from Gene FPV 088 without Brachyury atg start codon

<400> 29

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atgagtaaga aaagctcccc tggcaccgag agcgcgggaa agagcctgca gtaccgagtg      60
gaccacctgc tgagcgccgt ggagaatgag ctgcaggcgg gcagcgagaa gggcgacccc      120
acagagcgcg aactgcgcgt gggcctggag gagagcgagc tgtggctgcg cttcaaggag      180

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BNIT0010PCT_sequencelisting

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ctcaccaatg agatgatcgt gaccaagaac ggcaggagga tgtttccggt gctgaagggtg      240
aacgtgtctg gcctggaccc caacgccatg tactccttcc tgctggactt cgtggcgggcg      300
gacaaccacc gctggaagta cgtgaacggg gaatgggtgc cgggggggcaa gccggagccg      360
caggcgccca gctgcgtcta catccacccc gactcgccca acttcggggc cactgggatg      420
aaggctcccg tctccttcag caaagtcaag ctcaccaaca agctcaacgg agggggccag      480
atcatgctga actccttgca taagtatgag cctcgaatcc acatagtgag agttgggggt      540
ccacagcgca tgatcaccag cactgcttc cctgagaccc agttcatagc ggtgactgct      600
tatcagaacg aggagatcac agctcttaaa attaagtaca atccatttgc aaaggctttc      660
cttgatgcaa aggaaagaag tgatcacaaa gagatgatgg aggaaccggg agacagccag      720
caacctgggt actcccaatg ggggtggctt cttcctggaa ccagcaccgt ttgtccacct      780
gcaaatcctc atcctcagtt tggaggtgcc ctctccctcc cctccacgca cagctgtgac      840
aggtacccaa ccctgaggag ccaccgggtcc tcaccctacc ccagccccta tgctcatcgg      900
aacaattctc caacctattc tgacaactca cctgcatggt tatccatgct gcaatcccat      960
gacaattggt ccagccttgg aatgcctgcc catcccagca tgctccccgt gagccacaat     1020
gccagcccac ctaccagctc cagtcagtac cccagcctgt ggtctgtgag caacggcgcc     1080
gtcaccgccg gctcccaggc agcagccgtg tccaacgggc tggggggcca gttcttccgg     1140
ggctcccccg cgcactacac acccctcacc catccggtct cggcgccctc ttcctcgga     1200
tccccactgt acgaaggggc ggccgcggcc acagacatcg tggacagcca gtacgacgcc     1260
gcagcccaag gccgcctcat agcctcatgg acacctgtgt cgccaccttc catgtga      1317
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<210> 30
 <211> 439
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury (L254V) Protein encoded by
 SEQ ID NO:28

<400> 30

Met Ser Lys Lys Met Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser
 1 5 10 15

Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu
 20 25 30

Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val
 35 40 45

Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn
 50 55 60

Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys

				70				75				80			
Val	Asn	Val	Ser	Gly 85	Leu	Asp	Pro	Asn	Ala 90	Met	Tyr	Ser	Phe	Leu 95	Leu
Asp	Phe	Val	Ala 100	Ala	Asp	Asn	His	Arg 105	Trp	Lys	Tyr	Val	Asn 110	Gly	Glu
Trp	Val	Pro 115	Gly	Gly	Lys	Pro	Glu 120	Pro	Gln	Ala	Pro	Ser 125	Cys	Val	Tyr
Ile	His 130	Pro	Asp	Ser	Pro	Asn 135	Phe	Gly	Ala	His	Trp 140	Met	Lys	Ala	Pro
Val 145	Ser	Phe	Ser	Lys	Val 150	Lys	Leu	Thr	Asn	Lys 155	Leu	Asn	Gly	Gly	Gly 160
Gln	Ile	Met	Leu	Asn 165	Ser	Leu	His	Lys	Tyr 170	Glu	Pro	Arg	Ile	His 175	Ile
Val	Arg	Val	Gly 180	Gly	Pro	Gln	Arg	Met 185	Ile	Thr	Ser	His	Cys 190	Phe	Pro
Glu	Thr	Gln 195	Phe	Ile	Ala	Val	Thr 200	Ala	Tyr	Gln	Asn	Glu 205	Glu	Ile	Thr
Ala	Leu 210	Lys	Ile	Lys	Tyr	Asn 215	Pro	Phe	Ala	Lys	Ala 220	Phe	Leu	Asp	Ala
Lys 225	Glu	Arg	Ser	Asp	His 230	Lys	Glu	Met	Met	Glu 235	Glu	Pro	Gly	Asp	Ser 240
Gln	Gln	Pro	Gly	Tyr 245	Ser	Gln	Trp	Gly	Trp 250	Leu	Leu	Pro	Gly	Thr 255	Ser
Thr	Val	Cys	Pro 260	Pro	Ala	Asn	Pro	His 265	Pro	Gln	Phe	Gly	Gly 270	Ala	Leu
Ser	Leu	Pro 275	Ser	Thr	His	Ser	Cys 280	Asp	Arg	Tyr	Pro	Thr 285	Leu	Arg	Ser
His	Arg 290	Ser	Ser	Pro	Tyr	Pro 295	Ser	Pro	Tyr	Ala	His 300	Arg	Asn	Asn	Ser
Pro 305	Thr	Tyr	Ser	Asp	Asn 310	Ser	Pro	Ala	Cys	Leu 315	Ser	Met	Leu	Gln	Ser 320
His	Asp	Asn	Trp	Ser 325	Ser	Leu	Gly	Met	Pro 330	Ala	His	Pro	Ser	Met 335	Leu
Pro	Val	Ser	His	Asn	Ala	Ser	Pro	Pro	Thr	Ser	Ser	Ser	Gln	Tyr	Pro

BNIT0010PCT_sequencelisting

340

345

350

Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala
 355 360 365

Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro
 370 375 380

Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser
 385 390 395 400

Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp
 405 410 415

Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr
 420 425 430

Pro Val Ser Pro Pro Ser Met
 435

<210> 31

<211> 438

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
 SEQ ID NO:29

<400> 31

Met Ser Lys Lys Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu
 1 5 10 15

Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln
 20 25 30

Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly
 35 40 45

Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu
 50 55 60

Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val
 65 70 75 80

Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp
 85 90 95

Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp
 100 105 110

Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile
 115 120 125

BNIT0010PCT_sequencelisting

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

BNIT0010PCT_sequencelisting

Ser Pro Leu Tyr Glu Gly Ala Ala Ala Thr Asp Ile Val Asp Ser
405 410 415

Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro
420 425 430

Val Ser Pro Pro Ser Met
435

<210> 32
<211> 1386
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury
(L254V) Protein plus addition of 75 nucleotides from Gene FPV 088
and an atc

<400> 32
atgaaaaata acttgtatga agaaaaaatg aacatgagta agaaacaagt aaaaactcaa 60
agtaaattgta ataatatcat gagctcccct ggcaccgaga gcgcgggaaa gagcctgcag 120
taccgagtgg accacctgct gagcgccgtg gagaatgagc tgcaggcggg cagcgagaag 180
ggcgaccca cagagcgga actgcgcgtg ggcctggagg agagcgagct gtggctgcgc 240
ttcaaggagc tcaccaatga gatgatcgtg accaagaacg gcaggaggat gtttcgggtg 300
ctgaaggatga acgtgtctgg cctggacccc aacgccatgt actccttcct gctggacttc 360
gtggcggcgg acaaccaccg ctggaagtac gtgaacgggg aatgggtgcc ggggggcaag 420
ccggagccgc aggcgcccag ctgcgtctac atccaccccg actcgcccaa cttcggggcc 480
cactggatga aggctcccg tctccttcagc aaagtcaagc tcaccaacaa gctcaacgga 540
gggggcccaga tcatgctgaa ctccttgcag aagtatgagc ctggaatcca catagtgaga 600
gttgggggtc cacagcgcat gatcaccagc cactgcttcc ctgagacca gttcatagcg 660
gtgactgctt atcagaacga ggagatcaca gctcttaaaa ttaagtacaa tccatttgca 720
aaggctttcc ttgatgcaaa ggaaagaagt gatcacaag agatgatgga ggaacccgga 780
gacagccagc aacctgggta ctcccaatgg ggggtggcttc ttcctggaac cagcaccgtt 840
tgtccacctg caaatcctca tctcagttt ggaggtgccc tctccctccc ctccacgcac 900
agctgtgaca ggtacccaac cctgaggagc caccggtcct caccctaccc cagcccctat 960
gctcatcgga acaattctcc aacctattct gacaactcac ctgcatgttt atccatgctg 1020
caatcccatg acaattggc cagccttgga atgcctgccc atcccagcat gctccccgtg 1080
agccacaatg ccagcccacc taccagctcc agtcagtacc ccagcctgtg gtctgtgagc 1140
aacggcgccg tcaccccggg ctcccaggca gcagccgtgt ccaacgggct gggggcccag 1200
ttcttccggg gctccccgc gcactacaca cccctcacc atccggtctc ggcgcctct 1260
tcctcgggat cccactgta cgaaggggcg gccgcggcca cagacatcgt ggacagccag 1320

BNIT0010PCT_sequencelisting

tacgacgccg cagcccaagg ccgcctcata gcctcatgga cacctgtgtc gccaccttcc 1380
atgtga 1386

<210> 33
<211> 1383
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury
(L254V) Protein plus addition of 75 nucleotides from Gene FPV 088
and an atc, without Brachyury atg start codon

<400> 33
atgaaaaata acttgatga agaaaaaatg aacatgagta agaaacaagt aaaaactcaa 60
agtaaatgta ataatatcag ctcccctggc accgagagcg cgggaaagag cctgcagtac 120
cgagtggacc acctgctgag cgccgtggag aatgagctgc aggcgggcag cgagaagggc 180
gacccacag agcggaact gcgcgtgggc ctggaggaga gcgagctgtg gctgcgcttc 240
aaggagctca ccaatgagat gatcgtgacc aagaacggca ggaggatgtt tccggtgctg 300
aaggtgaacg tgtctggcct ggacccaac gccatgtact ccttcctgct ggacttcgtg 360
gcggcggaca accaccgctg gaagtacgtg aacggggaat gggtgccggg gggcaagccg 420
gagccgcagg cgccagctg cgtctacatc caccgact cgcccaactt cggggccac 480
tggatgaagg ctccgtctc cttcagcaa gtcaagctca ccaacaagct caacggaggg 540
ggccagatca tgctgaactc cttgcataag tatgagcctc gaatccacat agtgagagtt 600
gggggtccac agcgcatgat caccagccac tgcttcctg agaccagtt catagcggtg 660
actgcttatc agaacgagga gatcacagct cttaaaatta agtacaatcc atttgcaaag 720
gctttccttg atgcaaagga aagaagtgat cacaagaga tgatggagga acccgagac 780
agccagcaac ctgggtactc ccaatggggg tggcttcttc ctggaaccag caccgtttgt 840
ccactgcaa atcctcatcc tcagtttga ggtgccctct cctcccctc cagcacagc 900
tgtgacaggt acccaaccct gaggagccac cggtcctcac cctacccag cccctatgct 960
catcggaaca attctccaac ctattctgac aactcacctg catgtttatc catgctgcaa 1020
tccatgaca attggtccag ccttgaatg cctgcccac ccagcatgct ccccgtagc 1080
cacaatgcca gccacctac cagctccagt cagtaccca gcctgtggtc tgtgagcaac 1140
ggcgccgtca ccccggtc ccaggcagca gccgtgtcca acgggctggg ggccagttc 1200
ttccggggct ccccgcgca ctacacacc ctcaccatc cggctctcggc gccctcttc 1260
tcgggatccc cactgtacga agggcggcc gcggccacag acatcgtgga cagccagtac 1320
gacgccgag cccaaggccg cctcatagcc tcatggacac ctgtgtcgcc accttccatg 1380
tga 1383

<210> 34
<211> 461

BNIT0010PCT_sequencelisting

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO: 32

<400> 34

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Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Gln
 1          5          10          15

Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Met Ser Ser Pro Gly Thr
      20          25          30

Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser
      35          40          45

Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr
 50          55          60

Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg
65          70          75          80

Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg
      85          90          95

Met Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala
      100          105          110

Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp
      115          120          125

Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln
      130          135          140

Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala
      145          150          155          160

His Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn
      165          170          175

Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr
      180          185          190

Glu Pro Arg Ile His Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile
      195          200          205

Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr
      210          215          220

Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala
      225          230          235          240

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BNIT0010PCT_sequencelisting

Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His Lys Glu Met Met
245 250 255

Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp
260 265 270

Leu Leu Pro Gly Thr Ser Thr Val Cys Pro Pro Ala Asn Pro His Pro
275 280 285

Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg
290 295 300

Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr
305 310 315 320

Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys
325 330 335

Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro
340 345 350

Ala His Pro Ser Met Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr
355 360 365

Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val
370 375 380

Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln
385 390 395 400

Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu Thr His Pro Val
405 410 415

Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala
420 425 430

Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg
435 440 445

Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser Met
450 455 460

<210> 35
<211> 460
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO: 33

<400> 35

BNIT0010PCT_sequence_listing

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Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Gln
1      5      10      15

Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Ser Ser Pro Gly Thr Glu
      20      25      30

Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala
      35      40      45

Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu
      50      55      60

Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe
65      70      75      80

Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met
      85      90      95

Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met
      100      105      110

Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys
      115      120      125

Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala
      130      135      140

Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His
145      150      155      160

Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys
      165      170      175

Leu Asn Gly Gly Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu
      180      185      190

Pro Arg Ile His Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr
      195      200      205

Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln
      210      215      220

Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys
225      230      235      240

Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu
      245      250      255

Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu
      260      265      270

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BNIT0010PCT_sequencelisting

Leu Pro Gly Thr Ser Thr Val Cys Pro Pro Ala Asn Pro His Pro Gln
275 280 285

Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr
290 295 300

Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala
305 310 315 320

His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu
325 330 335

Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala
340 345 350

His Pro Ser Met Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser
355 360 365

Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr
370 375 380

Pro Gly Ser Gln Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe
385 390 395 400

Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser
405 410 415

Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala
420 425 430

Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu
435 440 445

Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser Met
450 455 460

<210> 36
<211> 1359
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury
(L254V) Protein plus addition of 48 nucleotides from Gene FPV 088
and an atc

<400> 36
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cctggcaccg agagcgcggg aaagagcctg cagtaccgag tggaccacct gctgagcgcc 120
gtggagaatg agctgcaggc gggcagcgag aagggcgacc ccacagagcg cgaactgcgc 180
gtgggcctgg aggagagcga gctgtggctg cgcttcaagg agctcaccaa tgagatgatc 240
gtgaccaaga acggcaggag gatgtttccg gtgctgaagg tgaacgtgtc tggcctggac 300

BNIT0010PCT_sequencelisting

cccaacgcca	tgtactcctt	cctgctggac	ttcgtggcgg	cggacaacca	ccgctggaag	360
tacgtgaacg	gggaatgggt	gccggggggc	aagccggagc	cgcagggcgc	cagctgcgtc	420
tacatccacc	ccgactcgcc	caacttcggg	gccactgga	tgaaggctcc	cgtctccttc	480
agcaaagtca	agctcaccaa	caagctcaac	ggagggggcc	agatcatgct	gaactccttg	540
cataagtatg	agcctcgaat	ccacatagtg	agagttgggg	gtccacagcg	catgatcacc	600
agccactgct	tccctgagac	ccagttcata	gcggtgactg	cttatcagaa	cgaggagatc	660
acagctctta	aaattaagta	caatccattt	gcaaaggctt	tccttgatgc	aaaggaaaga	720
agtgatcaca	aagagatgat	ggaggaaccc	ggagacagcc	agcaacctgg	gtactcccaa	780
tgggggtggc	ttcttcctgg	aaccagcacc	gtttgtccac	ctgcaaattc	tcatacctcag	840
tttggagggtg	ccctctccct	cccctccacg	cacagctgtg	acaggtaccc	aaccctgagg	900
agccaccggt	cctcaccccta	ccccagcccc	tatgctcatc	ggaacaattc	tccaacctat	960
tctgacaact	cacctgcatg	tttatccatg	ctgcaatccc	atgacaattg	gtccagcctt	1020
ggaatgcctg	cccatcccag	catgctcccc	gtgagccaca	atgccagccc	acctaccagc	1080
tccagtcagt	accccagcct	gtggtctgtg	agcaacggcg	ccgtcacccc	gggctcccag	1140
gcagcagccg	tgtccaacgg	gctggggggc	cagttcttcc	ggggctcccc	cgcgactac	1200
acacccctca	cccatccggt	ctcggcgccc	tcttcctcgg	gatccccact	gtacgaaggg	1260
gcggccgcgg	ccacagacat	cgtggacagc	cagtacgacg	ccgcagccca	aggccgcctc	1320
atagcctcat	ggacacctgt	gtcgccacct	tccatgtga			1359

<210> 37
 <211> 1356
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding Fusion protein comprising Brachyury (L254V) Protein plus addition of 48 nucleotides from Gene FPV 088 and an atc, without Brachyury atg start codon

<400> 37	
atgaacatga	gtaagaaaca agtaaaaact caaagtaa at gtaataatat cagctcccct 60
ggcaccgaga	gcgcgggaaa gagcctgcag taccgagtgg accacctgct gagcgccgtg 120
gagaatgagc	tgcaggcggg cagcgagaag ggcgacccca cagagcgcgga actgcgcggtg 180
ggcctggagg	agagcgagct gtggctgcgc ttcaaggagc tcaccaatga gatgatcgtg 240
accaagaacg	gcaggaggat gtttccggtg ctgaaggatga acgtgtcttg cctggacccc 300
aacgccatgt	actccttcct gctggacttc gtggcgggcg acaaccaccg ctggaagtac 360
gtgaacgggg	aatgggtgcc ggggggcaag ccggagccgc aggcgcccag ctgcgtctac 420
atccaccccg	actcgcccaa cttcggggcc cactggatga aggctcccgt ctccttcagc 480
aaagtcaagc	tcaccaacaa gctcaacgga gggggccaga tcatgctgaa ctccttgc at 540
aagtatgagc	ctcgaatcca catagtgaga gttgggggtc cacagcgcat gatcaccagc 600

BNIT0010PCT_sequencelisting

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cactgcttcc ctgagaccca gttcatagcg gtgactgctt atcagaacga ggagatcaca      660
gctcttaaaa ttaagtacaa tccatttgca aaggctttcc ttgatgcaaa ggaaagaagt      720
gatcacaaaag agatgatgga ggaacccgga gacagccagc aacctgggta ctcccaatgg      780
gggtggcttc ttcctggaac cagcaccgtt tgtccacctg caaatcctca tcctcagttt      840
ggaggtgccc tctccctccc ctccacgcac agctgtgaca ggtaccaaac cctgaggagc      900
caccggtcct caccctaccc cagcccctat gctcatcgga acaattctcc aacctattct      960
gacaactcac ctgcatgttt atccatgctg caatcccatg acaattgggc cagccttgga     1020
atgcctgccc atcccagcat gctccccgtg agccacaatg ccagcccacc taccagctcc     1080
agtcagtacc ccagcctgtg gtctgtgagc aacggcgccg tcaccccggg ctcccaggga     1140
gcagccgtgt ccaacgggct gggggcccag ttcttcgggg gctccccgcg gcactacaca     1200
cccctcacc atccggtctc ggcgccctct tcctcgggat cccactgta cgaaggggcg     1260
gccgcggcca cagacatcgt ggacagccag tacgacgccg cagcccaagg ccgcctcata     1320
gcctcatgga cacctgtgtc gccaccttcc atgtga                                1356

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<210> 38
 <211> 452
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury (L254V) Protein encoded by
 SEQ ID NO:36

<400> 38

Met Asn Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn
 1 5 10 15

Ile Met Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr
 20 25 30

Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly
 35 40 45

Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu
 50 55 60

Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile
 65 70 75 80

Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val
 85 90 95

Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val
 100 105 110

Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro

BNIT0010PCT_sequence1isting

115

120

125

Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro
 130 135 140

Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe
 145 150 155 160

Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met
 165 170 175

Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val
 180 185 190

Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln
 195 200 205

Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys
 210 215 220

Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg
 225 230 235 240

Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro
 245 250 255

Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Val Cys
 260 265 270

Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro
 275 280 285

Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser
 290 295 300

Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr
 305 310 315 320

Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn
 325 330 335

Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser
 340 345 350

His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp
 355 360 365

Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val
 370 375 380

Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr
 Page 39

385 BNIT0010PCT_sequencelisting 400

Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr
420 425 430

Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser
435 440 445

Pro Pro Ser Met
450

<213> Artificial Sequence

<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO:37

<400> 39

Met Asn Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn
1 5 10 15

Ile Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg
20 25 30

Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser
35 40 45

Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu
50 55 60

Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val
65 70 75 80

Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser
85 90 95

Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala
100 105 110

Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly
115 120 125

Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp
130 135 140

Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser
145 150 155 160

BNIT0010PCT_sequencelisting

Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu
 165 170 175
 Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly
 180 185 190
 Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe
 195 200 205
 Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile
 210 215 220
 Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser
 225 230 235 240
 Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly
 245 250 255
 Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Val Cys Pro
 260 265 270
 Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser
 275 280 285
 Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser
 290 295 300
 Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser
 305 310 315 320
 Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp
 325 330 335
 Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His
 340 345 350
 Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser
 355 360 365
 Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser
 370 375 380
 Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr
 385 390 395 400
 Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu
 405 410 415
 Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp
 420 425 430

BNIT0010PCT_sequencelisting

Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro
435 440 445

Pro Ser Met
450

<210> 40
<211> 1353
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury (L254V) Protein plus addition of 42 nucleotides from Gene FPV 088 and an atc

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<400> 40
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accgagagcg cgaggaaagag cctgcagtac cgagtggacc acctgctgag cgccgtggag      120
aatgagctgc aggcgggcag cgagaagggc gacccacag agcgcgaaact gcgcgtgggc      180
ctggaggaga gcgagctgtg gctgcgcttc aaggagctca ccaatgagat gatcgtgacc      240
aagaacggca ggaggatgtt tccggtgctg aagggtgaacg tgtctggcct ggaccccaac      300
gcatgtact ccttcctgct ggacttcgtg gcggcggaca accaccgctg gaagtacgtg      360
aacggggaat ggggtgccggg gggcaagccg gagccgcagg cgcccagctg cgtctacatc      420
caccgccact cgcccaactt cggggcccac tggatgaagg ctcccgcttc cttcagcaaa      480
gtcaagctca ccaacaagct caacggaggg ggccagatca tgctgaactc cttgcataag      540
tatgagcctc gaatccacat agtgagagtt gggggtccac agcgcatgat caccagccac      600
tgcttccttg agaccagtt catagcggtg actgcttata agaacgagga gatcacagct      660
cttaaaatta agtacaatcc atttgcaaag gctttccttg atgcaaagga aagaagtgat      720
caciaagaga tgatggagga acccgagagc agccagcaac ctgggtactc ccaatggggg      780
tggtttcttc ctggaaccag caccgtttgt ccacctgcaa atcctcatcc tcagtttgga      840
ggtgccctct ccctcccctc cacgcacagc tgtgacaggt acccaaccct gaggagccac      900
cggtcctcac cctaccccag cccctatgct catcggaaca attctccaac ctattctgac      960
aactcacctg catgtttatc catgctgcaa tcccatgaca attggtccag ccttggaatg     1020
cctgcccata ccagcatgct ccccgtagc cacaatgcca gccacctac cagctccagt     1080
cagtaccca gcctgtggtc tgtgagcaac ggcgccgtca ccccgggctc ccaggcagca     1140
gccgtgtcca acgggctggg ggcccagttc ttccggggct ccccgcgca ctacacaccc     1200
ctcaccatac cgggtctcggc gccctcttcc tcgggatccc cactgtacga aggggcggcc     1260
gcggccacag acatcgtgga cagccagtac gacgccgcag cccaaggccg cctcatagcc     1320
tcatggacac ctgtgtcgcc accttccatg tga                                     1353
```

BNIT0010PCT_sequencelisting

<210> 41
 <211> 1350
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding Fusion protein comprising Brachyury (L254V) Protein plus addition of 42 nucleotides from Gene FPV 088 and an atc, without Brachyury atg start codon

<400> 41
 atgagtaaga aacaagtaaa aactcaaagt aaatgtaata atatcagctc ccctggcacc 60
 gagagcgcgg gaaagagcct gcagtaccga gtggaccacc tgctgagcgc cgtggagaat 120
 gagctgcagg cgggcagcga gaagggcgac cccacagagc gcgaactgcg cgtgggcctg 180
 gaggagagcg agctgtggct gcgcttcaag gagctcacca atgagatgat cgtgaccaag 240
 aacggcagga ggatgtttcc ggtgctgaag gtgaacgtgt ctggcctgga cccaacgcc 300
 atgtactcct tcctgctgga cttcgtggcg gcggacaacc accgctggaa gtacgtgaac 360
 ggggaatggg tgccgggggg caagccggag ccgcaggcgc ccagctgcgt ctacatccac 420
 cccgactcgc ccaacttcgg ggcccactgg atgaaggctc ccgtctcctt cagcaaagtc 480
 aagctcacca acaagctcaa cggagggggc cagatcatgc tgaactcctt gcataagtat 540
 gagcctcgaa tccacatagt gagagttagg ggtccacagc gcatgatcac cagccactgc 600
 ttccctgaga cccagttcat agcggtgact gcttatcaga acgaggagat cacagctcct 660
 aaaattaagt acaatccatt tgcaaaggct ttccttgatg caaaggaaag aagtgatcac 720
 aaagagatga tggaggaacc cggagacagc cagcaacctg ggtactcca atgggggtgg 780
 cttcttcctg gaaccagcac cgtttgtcca cctgcaaatc ctcatcctca gtttgagagt 840
 gccctctccc tcccctccac gcacagctgt gacaggtacc caaccctgag gagccaccgg 900
 tcctcaccct accccagccc ctatgctcat cggaacaatt ctccaacctt ttctgacaac 960
 tcacctgcat gtttatccat gctgcaatcc catgacaatt ggtccagcct tggaatgcct 1020
 gccatccca gcatgctccc cgtgagccac aatgccagcc cacctaccag ctccagtcag 1080
 taccacagcc tgtggtctgt gagcaacggc gccgtcacc cgggctccca ggcagcagcc 1140
 gtgtccaacg ggctgggggc ccagttcttc cggggctccc ccgcgcacta cacaccctc 1200
 acccatccgg tctcggcgc ctcttcctcg ggatccccac tgtacgaagg ggcggccgcg 1260
 gccacagaca tcgtggacag ccagtagcgc gccgcagccc aaggccgcct catagcctca 1320
 tggacacctg tgtcgccacc ttccatgtga 1350

<210> 42
 <211> 450
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury (L254V) Protein encoded by SEQ ID NO:40

<400> 42

BNIT0010PCT_sequencelisting

Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Met
 1 5 10 15
 Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val
 20 25 30
 Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu
 35 40 45
 Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser
 50 55 60
 Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr
 65 70 75 80
 Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly
 85 90 95
 Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala
 100 105 110
 Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly
 115 120 125
 Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser
 130 135 140
 Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser Lys
 145 150 155 160
 Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn
 165 170 175
 Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly Gly
 180 185 190
 Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile
 195 200 205
 Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys
 210 215 220
 Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp
 225 230 235 240
 His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr
 245 250 255
 Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Val Cys Pro Pro
 260 265 270

BNIT0010PCT_sequencelisting

Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr
275 280 285

His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro
290 295 300

Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp
305 310 315 320

Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser
325 330 335

Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His Asn
340 345 350

Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val
355 360 365

Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn
370 375 380

Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro
385 390 395 400

Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr
405 410 415

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

Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro
435 440 445

Ser Met
450

<210> 43

<211> 449

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury (L254V) Protein encoded by
SEQ ID NO:41

<400> 43

Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Ser
1 5 10 15

Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp
20 25 30

BNIT0010PCT_sequence1isting

His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys
35 40 45

Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu
50 55 60

Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys
65 70 75 80

Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu
85 90 95

Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp
100 105 110

Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys
115 120 125

Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro
130 135 140

Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val
145 150 155 160

Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn Ser
165 170 175

Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly Gly Pro
180 185 190

Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala
195 200 205

Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr
210 215 220

Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His
225 230 235 240

Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser
245 250 255

Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Val Cys Pro Pro Ala
260 265 270

Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His
275 280 285

Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr
290 295 300

BNIT0010PCT_sequence listing

Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn
305 310 315 320

Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser
325 330 335

Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His Asn Ala
340 345 350

Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser
355 360 365

Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn Gly
370 375 380

Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu
385 390 395 400

Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu
405 410 415

Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala
420 425 430

Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser
435 440 445

Met

<210> 44
<211> 1323
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding fusion protein comprising Brachyury
protein Isoform 1 plus addition of 15 nucleotides from Gene FPV
088

<400> 44
atgaaaaata acttgatgag ctcccctggc accgagagcg cgggaaagag cctgcagtac 60
cgagtggacc acctgctgag cgccgtggag aatgagctgc aggcgggcag cgagaagggc 120
gacccacag agcgcgaact gcgcgtgggc ctggaggaga gcgagctgtg gctgcgcttc 180
aaggagctca ccaatgagat gatcgtgacc aagaacggca ggaggatgtt tccggtgctg 240
aaggtgaacg tgtctggcct ggacccaac gccatgtact ccttcctgct ggacttcgtg 300
gcggcggaca accaccgctg gaagtacgtg aacggggaat gggtgccggg gggcaagccg 360
gagccgcagg cgcccagctg cgtctacatc caccgact cgcccaactt cggggccac 420
tggatgaagg ctccgctc cttcagcaaa gtcaagctca ccaacaagct caacggaggg 480
ggccagatca tgctgaactc cttgcataag tatgagcctc gaatccacat agtgagagtt 540

BNIT0010PCT_sequencelisting

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gggggtccac agcgcgatgat caccagccac tgcttccttg agaccagtt catagcggtg      600
actgcttatc agaacgagga gatcacagct cttaaaatta agtacaatcc atttgcaaaa      660
gctttccttg atgcaaagga aagaagtgat cacaaagaga tgatggagga acccgagagac      720
agccagcaac ctgggtactc ccaatggggg tggcttcttc ctggaaccag caccgtttgt      780
ccacctgcaa atcctcatcc tcagtttgga ggtgccctct cctccccctc cagcacagc      840
tgtgacaggt acccaaccct gaggagccac cggtcctcac cctaccccag cccctatgct      900
catcggaaca attctccaac ctattctgac aactcacctg catgtttatc catgctgcaa      960
tcccatgaca attggtccag ccttggaatg cctgcccata ccagcatgct ccccgtagac     1020
cacaatgcca gccacctac cagctccagt cagtacccca gcctgtggtc tgtgagcaac     1080
ggcgccgtca ccccgggctc ccaggcagca gccgtgtcca acgggctggg ggcccagttc     1140
ttccgggggt cccccgcga ctacacacc ctcacccata cggctctggc gccctcttcc     1200
tcgggatccc cactgtacga aggggcgggc gcggccacag acatcgtgga cagccagtac     1260
gacgccgag cccaaggccg cctcatagcc tcatggacac ctgtgtcgcc accttccatg     1320
tga                                                                    1323

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<210> 45
 <211> 1320
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding fusion protein comprising Brachyury protein Isoform 1 plus addition of 15 nucleotides from Gene FPV 088 without Brachyury protein atg start codon

```

<400> 45
atgaaaaata acttgagctc ccctggcacc gagagcgcg gaaagagcct gcagtaccga      60
gtggaccacc tgctgagcgc cgtggagaat gagctgcagg cgggcagcga gaagggcgac     120
cccacagagc gcgaactgcg cgtgggcctg gaggagagcg agctgtggct gcgcttcaag     180
gagctacca atgagatgat cgtgaccaag aacggcagga ggatgtttcc ggtgctgaag     240
gtgaacgtgt ctggcctgga cccaacgcc atgtactcct tcctgctgga cttcgtggcg     300
gcggacaacc accgctggaa gtacgtgaac ggggaatggg tgccgggggg caagccggag     360
ccgcaggcgc ccagctgcgt ctacatccac cccgactcgc ccaacttcgg ggcccactgg     420
atgaaggctc ccgtctcctt cagcaaagtc aagctcacca acaagctcaa cggagggggc     480
cagatcatgc tgaactcctt gcataagtat gagcctcgaa tccacatagt gagagttggg     540
ggccacagc gcatgacac cagccactgc ttccctgaga cccagttcat agcggtgact     600
gcttatcaga acgaggagat cacagctctt aaaattaagt acaatccatt tgcaaaagct     660
ttccttgatg caaaggaaag aagtgatcac aaagagatga tggaggaacc cggagacagc     720
cagcaacctg ggtactccca atgggggtgg cttcttcttg gaaccagcac cgtttgtcca     780
cctgcaaadc ctatcctca gtttgagggt gccctctccc tcccctccac gcacagctgt     840

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BNIT0010PCT_sequencelisting

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gacaggtacc caaccctgag gagccaccgg tcctcacctt accccagccc ctatgctcat      900
cggaacaatt ctccaaccta ttctgacaac tcacctgcat gtttatccat gctgcaatcc      960
catgacaatt ggtccagcct tggaatgcct gcccatccca gcatgctccc cgtgagccac     1020
aatgccagcc cacctaccag ctccagtcag taccacagcc tgtggtctgt gagcaacggc     1080
gccgtcaccc cgggctccca ggcagcagcc gtgtccaacg ggctgggggc ccagttcttc     1140
cggggctccc ccgcgcacta cacaccctc acccatccgg tctcggcgcc ctcttcctcg     1200
ggatccccac tgtacgaagg ggcggccgcg gccacagaca tcgtggacag ccagtacgac     1260
gccgcagccc aaggccgcct catagcctca tggacacctg tgtcgccacc ttccatgtga     1320

```

<210> 46

<211> 440

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:44

<400> 46

Met Lys Asn Asn Leu Met Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys
1 5 10 15

Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu
20 25 30

Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg
35 40 45

Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr
50 55 60

Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu
65 70 75 80

Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu
85 90 95

Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly
100 105 110

Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val
115 120 125

Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala
130 135 140

Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly
145 150 155 160

BNIT0010PCT_sequencelisting

Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His
165 170 175

Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe
180 185 190

Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile
195 200 205

Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp
210 215 220

Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp
225 230 235 240

Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr
245 250 255

Ser Thr Leu Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala
260 265 270

Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg
275 280 285

Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn
290 295 300

Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln
305 310 315 320

Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met
325 330 335

Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr
340 345 350

Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln
355 360 365

Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser
370 375 380

Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser
385 390 395 400

Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val
405 410 415

Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp
420 425 430

BNIT0010PCT_sequencelisting

Thr Pro Val Ser Pro Pro Ser Met
435 440

<210> 47
<211> 439
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:45

<400> 47

Met Lys Asn Asn Leu Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser
1 5 10 15

Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu
20 25 30

Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val
35 40 45

Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn
50 55 60

Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys
65 70 75 80

Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu
85 90 95

Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu
100 105 110

Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr
115 120 125

Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro
130 135 140

Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly
145 150 155 160

Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile
165 170 175

Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro
180 185 190

Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr
195 200 205

BNIT0010PCT_sequence_listing

Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala
210 215 220

Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser
225 230 235 240

Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser
245 250 255

Thr Leu Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu
260 265 270

Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser
275 280 285

His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser
290 295 300

Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser
305 310 315 320

His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu
325 330 335

Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro
340 345 350

Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala
355 360 365

Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro
370 375 380

Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser
385 390 395 400

Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Thr Asp Ile Val Asp
405 410 415

Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr
420 425 430

Pro Val Ser Pro Pro Ser Met
435

<210> 48

<211> 1353

<212> DNA

<213> Artificial Sequence

<220>

<223> Coding sequence encoding fusion protein comprising Brachyury protein Isoform 1 plus addition of 45 nucleotides from Gene FPV

BNIT0010PCT_sequencelisting

088

```

<400> 48
atgaaaaata acttgatga agaaaaaatg aacatgagta agaaaatgag ctcccctggc      60
accgagagcg cgggaaagag cctgcagtac cgagtggacc acctgctgag cgccgtggag      120
aatgagctgc aggcgggcag cgagaagggc gacccacag agcggaact gcgcgtgggc      180
ctggaggaga gcgagctgtg gctgcgcttc aaggagctca ccaatgagat gatcgtgacc      240
aagaacggca ggaggatgtt tccggtgctg aaggatgaac tgtctggcct ggaccccaac      300
gccatgtact ccttcctgct ggacttcgtg gcggcggaca accaccgctg gaagtacgtg      360
aacggggaat ggggtgccggg gggcaagccg gagccgcagg cggccagctg cgtctacatc      420
caccgagact cgcccaactt cggggcccac tggatgaagg ctcccgtctc cttcagcaaa      480
gtcaagctca ccaacaagct caacggaggg ggccagatca tgctgaactc cttgcataag      540
tatgagcctc gaatccacat agtgagagtt gggggtccac agcgcatgat caccagccac      600
tgcttccctg agaccagtt catagcggtg actgcttctc agaacgagga gatcacagct      660
cttaaaatta agtacaatcc atttgcaaag gctttccttg atgcaaagga aagaagtgat      720
caciaagaga tgatggagga acccgagagc agccagcaac ctgggtactc ccaatggggg      780
tggttctctc ctggaaccag caccgtttgt ccacctgcaa atcctcatcc tcagtttgga      840
ggtgccctct ccctcccctc cacgcacagc tgtgacaggt acccaaccct gaggagccac      900
cggtcctcac cctacccag cccctatgct catcggaaca attctccaac ctattctgac      960
aactcacctg catgtttatc catgctgcaa tcccatgaca attggtccag ccttggaatg     1020
cctgcccac cagcatgct ccccgtagc cacaatgcca gccacctac cagctccagt     1080
cagtaccca gcctgtggtc tgtgagcaac ggcgcgctca ccccgggctc ccaggcagca     1140
gccgtgtcca acgggctggg ggcccagttc ttccggggct ccccgcgca ctacacaccc     1200
ctcaccacac cgggtctcggc gccctcttcc tcgggatccc cactgtacga aggggcggcc     1260
gcggccacag acatcgtgga cagccagtac gacgccgag cccaaggccg cctcatagcc     1320
tcatggacac ctgtgtcgcc accttccatg tga                                  1353

```

```

<210> 49
<211> 1350
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Coding sequence encoding fusion protein comprising Brachyury
      protein Isoform 1 plus addition of 45 nucleotides from Gene FPV
      088 without Brachyury atg

```

```

<400> 49
atgaaaaata acttgatga agaaaaaatg aacatgagta agaaaagctc ccctggcacc      60
gagagcgcg gaaagagcct gcagtaccga gtggaccacc tgctgagcgc cgtggagaat      120
gagctgcagg cgggcagcga gaagggcgac cccacagagc gcgaactgcg cgtgggcctg      180
gaggagagcg agctgtggct gcgcttcaag gagctcacca atgagatgat cgtgaccaag      240

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BNIT0010PCT_sequencelisting

```

aacggcagga ggatgtttcc ggtgctgaag gtgaacgtgt ctggcctgga cccaacgcc      300
atgtactcct tcctgctgga cttcgtggcg gcggaacaacc accgctggaa gtacgtgaac      360
ggggaatggg tgccgggggg caagccggag ccgcaggcgc ccagctgcgt ctacatccac      420
cccgactcgc ccaacttcgg ggcccactgg atgaaggctc ccgtctcctt cagcaaagtc      480
aagctcacca acaagctcaa cggagggggc cagatcatgc tgaactcctt gcataagtat      540
gagcctcgaa tccacatagt gagagtggg ggtccacagc gcatgatcac cagccactgc      600
ttccctgaga ccagttcat agcggtgact gcttatcaga acgaggagat cacagctcctt      660
aaaattaagt acaatccatt tgcaaaagct ttccttgatg caaaggaaag aagtgatcac      720
aaagagatga tggaggaacc cggagacagc cagcaacctg ggtactccca atgggggtgg      780
cttcttcctg gaaccagcac cgtttgtcca cctgcaaatc ctcatcctca gtttgagggt      840
gccctctccc tcccctccac gcacagctgt gacaggtacc caaccctgag gagccaccgg      900
tcctcaccct accccagccc ctatgctcat cggaacaatt ctccaaccta ttctgacaac      960
tcacctgcat gtttatccat gctgcaatcc catgacaatt ggtccagcct tggaatgcct     1020
gcccatccca gcatgtcccc cgtgagccac aatgccagcc cacctaccag ctccagtcag     1080
taccacagcc tgtggtctgt gagcaacggc gccgtcacc cgggctccca ggcagcagcc     1140
gtgtccaacg ggctgggggc ccagttcttc cggggctccc ccgcgcacta cacaccctc     1200
accatccgg tctcggcgcc ctcttcctcg ggatccccac tgtacgaagg ggcggccgcg     1260
gccacagaca tcgtggacag ccagtacgac gccgcagccc aaggccgcct catagcctca     1320
tggacacctg tgtcgccacc ttccatgtga                                     1350

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<210> 50
 <211> 450
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
 SEQ ID NO:48

<400> 50

Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Met
 1 5 10 15

Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val
 20 25 30

Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu
 35 40 45

Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser
 50 55 60

Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr

BNIT0010PCT_sequence1isting

65					70						75				80
Lys	Asn	Gly	Arg	Arg	Met	Phe	Pro	Val	Leu	Lys	Val	Asn	Val	Ser	Gly
				85					90					95	
Leu	Asp	Pro	Asn	Ala	Met	Tyr	Ser	Phe	Leu	Leu	Asp	Phe	Val	Ala	Ala
			100					105					110		
Asp	Asn	His	Arg	Trp	Lys	Tyr	Val	Asn	Gly	Glu	Trp	Val	Pro	Gly	Gly
		115					120					125			
Lys	Pro	Glu	Pro	Gln	Ala	Pro	Ser	Cys	Val	Tyr	Ile	His	Pro	Asp	Ser
	130					135					140				
Pro	Asn	Phe	Gly	Ala	His	Trp	Met	Lys	Ala	Pro	Val	Ser	Phe	Ser	Lys
145					150					155					160
Val	Lys	Leu	Thr	Asn	Lys	Leu	Asn	Gly	Gly	Gly	Gln	Ile	Met	Leu	Asn
				165					170					175	
Ser	Leu	His	Lys	Tyr	Glu	Pro	Arg	Ile	His	Ile	Val	Arg	Val	Gly	Gly
			180					185					190		
Pro	Gln	Arg	Met	Ile	Thr	Ser	His	Cys	Phe	Pro	Glu	Thr	Gln	Phe	Ile
		195					200					205			
Ala	Val	Thr	Ala	Tyr	Gln	Asn	Glu	Glu	Ile	Thr	Ala	Leu	Lys	Ile	Lys
	210					215					220				
Tyr	Asn	Pro	Phe	Ala	Lys	Ala	Phe	Leu	Asp	Ala	Lys	Glu	Arg	Ser	Asp
225					230					235					240
His	Lys	Glu	Met	Met	Glu	Glu	Pro	Gly	Asp	Ser	Gln	Gln	Pro	Gly	Tyr
				245					250					255	
Ser	Gln	Trp	Gly	Trp	Leu	Leu	Pro	Gly	Thr	Ser	Thr	Leu	Cys	Pro	Pro
			260					265					270		
Ala	Asn	Pro	His	Pro	Gln	Phe	Gly	Gly	Ala	Leu	Ser	Leu	Pro	Ser	Thr
		275					280					285			
His	Ser	Cys	Asp	Arg	Tyr	Pro	Thr	Leu	Arg	Ser	His	Arg	Ser	Ser	Pro
	290					295					300				
Tyr	Pro	Ser	Pro	Tyr	Ala	His	Arg	Asn	Asn	Ser	Pro	Thr	Tyr	Ser	Asp
305					310					315					320
Asn	Ser	Pro	Ala	Cys	Leu	Ser	Met	Leu	Gln	Ser	His	Asp	Asn	Trp	Ser
				325					330					335	
Ser	Leu	Gly	Met	Pro	Ala	His	Pro	Ser	Met	Leu	Pro	Val	Ser	His	Asn

BNIT0010PCT_sequence listing

340

345

350

Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val
355 360 365

Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn
370 375 380

Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro
385 390 395 400

Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr
405 410 415

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

Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro
435 440 445

Ser Met
450

<210> 51
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:49

<400> 51

Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Ser
1 5 10 15

Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp
20 25 30

His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys
35 40 45

Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu
50 55 60

Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys
65 70 75 80

Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu
85 90 95

Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp
100 105 110

BNIT0010PCT_sequencelisting

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

BNIT0010PCT_sequencelisting

Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu
385 390 395 400

Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu
405 410 415

Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala
420 425 430

Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser
435 440 445

Met

<210> 52
<211> 1326
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding fusion protein comprising Brachyury protein Isoform 1 plus addition of 18 nucleotides from Gene FPV 088

<400> 52
atgaacatga gtaagaaaat gagctcccct ggcaccgaga gcgcgggaaa gagcctgcag 60
taccgagtgg accacctgct gagcgccgtg gagaatgagc tgcaggcggg cagcgagaag 120
ggcgaccca cagagcgga actgcgcgtg ggcctggagg agagcgagct gtggctgcgc 180
ttcaaggagc tcaccaatga gatgatcgtg accaagaacg gcaggaggat gtttccggtg 240
ctgaaggatga acgtgtcttg cctggacccc aacgccatgt actccttcct gctggacttc 300
gtggcgggcg acaaccaccg ctggaagtac gtgaacgggg aatgggtgcc ggggggcaag 360
ccggagccgc aggcgcccag ctgcgtctac atccaccccg actcgcccaa cttcggggcc 420
cactggatga aggctcccg tctccttcagc aaagtcaagc tcaccaacaa gctcaacgga 480
ggggggccaga tcatgctgaa ctccttgcac aagtatgagc ctggaatcca catagtgaga 540
gttgggggtc cacagcgcat gatcaccagc cactgcttcc ctgagacca gttcatagcg 600
gtgactgctt atcagaacga ggagatcaca gctcttaaaa ttaagtacaa tccatttgca 660
aaggctttcc ttgatgcaaa ggaaagaagt gatcacaag agatgatgga ggaacccgga 720
gacagccagc aacctgggta ctcccaatgg ggggtggcttc ttcctggaac cagcaccgtt 780
tgtccacctg caaatcctca tctcagttt ggaggtgccc tctccctccc ctccacgcac 840
agctgtgaca ggtacccaac cctgaggagc caccggtcct caccctaccc cagcccctat 900
gctcatcgga acaattctcc aacctattct gacaactcac ctgcatgttt atccatgctg 960
caatcccatg acaattggc cagccttgga atgcctgccc atcccagcat gctccccgtg 1020
agccacaatg ccagcccacc taccagctcc agtcagtacc ccagcctgtg gtctgtgagc 1080

BNIT0010PCT_sequencelisting

```

aacggcgccg tcaccccggg ctcccaggca gcagccgtgt ccaacgggct gggggcccag      1140
ttcttccggg gtcccccgc gcactacaca cccctcacc atccggtctc ggcgccctct      1200
tcctcgggat cccactgta cgaaggggcg gccgcggcca cagacatcgt ggacagccag      1260
tacgacgccg cagcccaagg ccgcctcata gcctcatgga cacctgtgtc gccaccttcc      1320
atgtga                                           1326

```

```

<210> 53
<211> 1323
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Coding sequence encoding fusion protein comprising Brachyury
      protein Isoform 1 plus addition of 18 nucleotides from Gene FPV
      088 without brachyury atg

```

```

<400> 53
atgaacatga gtaagaaaag ctcccctggc accgagagcg cgggaaagag cctgcagtac      60
cgagtggacc acctgctgag cgccgtggag aatgagctgc aggcgggcag cgagaagggc      120
gaccccacag agcgcgaact gcgcgtgggc ctggaggaga gcgagctgtg gctgcgcttc      180
aaggagctca ccaatgagat gatcgtgacc aagaacggca ggaggatgtt tccggtgctg      240
aagggtgaacg tgtctggcct ggacccaac gccatgtact ccttcctgct ggacttcgtg      300
gcggcggaaca accaccgctg gaagtacgtg aacggggaat ggggtgccggg gggcaagccg      360
gagccgcagg cgcccagctg cgtctacatc caccgact cgcccaactt cggggccac      420
tggaatgaagg ctccgtctc cttcagcaaa gtcaagctca ccaacaagct caacggaggg      480
ggccagatca tgctgaactc cttgcataag tatgagcctc gaatccacat agtgagagtt      540
gggggtccac agcgcattgat caccagccac tgcttccttg agaccagtt catagcgggtg      600
actgcttatc agaacgagga gatcacagct cttaaaatta agtacaatcc atttgcaaaa      660
gctttccttg atgcaaagga aagaagtgat caaaagaga tgatggagga acccgagac      720
agccagcaac ctgggtactc ccaatggggg tggcttcttc ctggaaccag caccgtttgt      780
ccacctgcaa atcctcatcc tcagtttgga ggtgccctct ccctcccctc cagcacagc      840
tgtgacaggt acccaaccct gaggagccac cggtcctcac cctacccag cccctatgct      900
catcggaaca attctccaac ctattctgac aactcacctg catgtttatc catgctgcaa      960
tcccatgaca attggtccag cttggaatg cctgcccata ccagcatgct ccccgtagac     1020
cacaatgcca gccacctac cagctccagt cagtaccca gcctgtggtc tgtgagcaac     1080
ggcgccgtca ccccgggctc ccaggcagca gccgtgtcca acgggctggg ggcccagttc     1140
ttccgggggt ccccgcgca ctacacacc ctcaccatac cgggtctcggc gccctcttcc     1200
tcgggatccc cactgtacga aggggcggcc gcggccacag acatcgtgga cagccagtac     1260
gacgccgcag cccaaggccg cctcatagcc tcatggacac ctgtgtcgcc accttccatg     1320
tga                                           1323

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BNIT0010PCT_sequencelisting

<210> 54
 <211> 441
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
 SEQ ID NO:52

<400> 54

Met Asn Met Ser Lys Lys Met Ser Ser Pro Gly Thr Glu Ser Ala Gly
 1 5 10 15

Lys Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn
 20 25 30

Glu Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu
 35 40 45

Arg Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu
 50 55 60

Thr Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val
 65 70 75 80

Leu Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe
 85 90 95

Leu Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn
 100 105 110

Gly Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys
 115 120 125

Val Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys
 130 135 140

Ala Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly
 145 150 155 160

Gly Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile
 165 170 175

His Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys
 180 185 190

Phe Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu
 195 200 205

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

BNIT0010PCT_sequencelisting

Asp Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly
225 230 235 240

Asp Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly
245 250 255

Thr Ser Thr Leu Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly
260 265 270

Ala Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu
275 280 285

Arg Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn
290 295 300

Asn Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu
305 310 315 320

Gln Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser
325 330 335

Met Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln
340 345 350

Tyr Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser
355 360 365

Gln Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly
370 375 380

Ser Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser
385 390 395 400

Ser Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile
405 410 415

Val Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser
420 425 430

Trp Thr Pro Val Ser Pro Pro Ser Met
435 440

<210> 55
<211> 440
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:53

<400> 55

BNIT0010PCT_sequence_listing

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Met Asn Met Ser Lys Lys Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys
1      5      10      15

Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu
20      25      30

Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg
35      40      45

Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr
50      55      60

Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu
65      70      75      80

Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu
85      90      95

Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly
100     105     110

Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val
115     120     125

Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala
130     135     140

Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly
145     150     155     160

Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His
165     170     175

Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe
180     185     190

Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile
195     200     205

Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp
210     215     220

Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp
225     230     235     240

Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr
245     250     255

Ser Thr Leu Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala
260     265     270

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BNIT0010PCT_sequencelisting

Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg
275 280 285

Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn
290 295 300

Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln
305 310 315 320

Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met
325 330 335

Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr
340 345 350

Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln
355 360 365

Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser
370 375 380

Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser
385 390 395 400

Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val
405 410 415

Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp
420 425 430

Thr Pro Val Ser Pro Pro Ser Met
435 440

<210> 56

<211> 1320

<212> DNA

<213> Artificial Sequence

<220>

<223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 12 nucleotides from Gene FPV 088

<400> 56

atgagtaaga aaatgagctc ccctggcacc gagagcgcg gaaagagcct gcagtaccga 60

gtggaccacc tgctgagcgc cgtggagaat gagctgcagg cgggcagcga gaagggcgac 120

cccacagagc gcgaactgcg cgtgggcctg gaggagagcg agctgtggct gcgcttcaag 180

gagctacca atgagatgat cgtgaccaag aacggcagga ggatgtttcc ggtgctgaag 240

gtgaacgtgt ctggcctgga cccaacgcc atgtactcct tcctgctgga cttcgtggcg 300

gcggacaacc accgctggaa gtacgtgaac ggggaatggg tgccgggggg caagccggag 360

ccgcaggcgc ccagctgcgt ctacatccac cccgactcgc ccaacttcgg ggcccactgg 420

BNIT0010PCT_sequencelisting

atgaaggctc	ccgtctcctt	cagcaaagtc	aagctcacca	acaagctcaa	cggagggggc	480
cagatcatgc	tgaactcctt	gcataagtat	gagcctcgaa	tccacatagt	gagagttggg	540
ggtccacagc	gcatgatcac	cagccactgc	ttccctgaga	cccagttcat	agcggtgact	600
gcttatcaga	acgaggagat	cacagctctt	aaaattaagt	acaatccatt	tgcaaaagct	660
ttccttgatg	caaaggaaag	aagtgatcac	aaagagatga	tggaggaacc	cggagacagc	720
cagcaacctg	ggtactccca	atgggggtgg	cttcttcctg	gaaccagcac	cgtttgtcca	780
cctgcaaadc	ctcatcctca	gtttggaggt	gccctctccc	tcccctccac	gcacagctgt	840
gacaggtacc	caaccctgag	gagccaccgg	tcctcaccct	accccagccc	ctatgctcat	900
cggaacaatt	ctccaaccta	ttctgacaac	tcacctgcat	gtttatccat	gctgcaatcc	960
catgacaatt	ggtccagcct	tggaatgcct	gcccattcca	gcatgctccc	cgtgagccac	1020
aatgccagcc	cacctaccag	ctccagtcag	taccccagcc	tgtgggtctgt	gagcaacggc	1080
gccgtcacc	cgggctccca	ggcagcagcc	gtgtccaacg	ggctgggggc	ccagttcttc	1140
cggggctccc	ccgcgcacta	cacaccctc	acccatccgg	tctcggcgcc	ctcttcctcg	1200
ggatccccac	tgtacgaagg	ggcggccg	gccacagaca	tcgtggacag	ccagtacgac	1260
gccgcagccc	aaggccgcct	catagcctca	tggacacctg	tgctgccacc	ttccatgtga	1320

<210> 57

<211> 1317

<212> DNA

<213> Artificial Sequence

<220>

<223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 12 nucleotides from Gene FPV 088 without Brachyury atg start codon

<400> 57

atgagtaaga	aaagctcccc	tggcaccgag	agcgcgggaa	agagcctgca	gtaccgagtg	60
gaccacctgc	tgagcgccgt	ggagaatgag	ctgcaggcgg	gcagcgagaa	gggcgacccc	120
acagagcgcg	aactgcgcgt	gggcctggag	gagagcgagc	tgtggctg	cttcaaggag	180
ctcaccaatg	agatgatcgt	gaccaagaac	ggcaggagga	tgtttccggg	gctgaagggtg	240
aacgtgtctg	gcctggaccc	caacgccatg	tactccttcc	tgctggactt	cgtggcggcg	300
gacaaccacc	gctggaagta	cgtgaacggg	gaatgggtgc	cggggggcaa	gccggagccg	360
caggcgccca	gctgcgtcta	catccacccc	gactcgccca	acttcggggc	ccactggatg	420
aaggctcccc	tctccttcag	caaagtcaag	ctcaccaaca	agctcaacgg	agggggccag	480
atcatgctga	actccttgca	taagtatgag	cctcgaatcc	acatagtgag	agttgggggt	540
ccacagcgca	tgatcaccag	ccactgcttc	cctgagaccc	agttcatagc	ggtgactgct	600
tatcagaacg	aggagatcac	agctcttaaa	attaagtaca	atccatttgc	aaaagctttc	660
cttgatgcaa	aggaaagaag	tgatcacaaa	gagatgatgg	aggaaccggg	agacagccag	720
caacctgggt	actcccaatg	ggggtggctt	cttcttgtaa	ccagcacccg	ttgtccacct	780

BNIT0010PCT_sequencelisting

gcaaatcctc atcctcagtt tggaggtgcc ctctccctcc cctccacgca cagctgtgac 840
 aggtacccaa ccctgaggag ccaccggtcc tcaccctacc ccagccccta tgctcatcgg 900
 aacaattctc caacctattc tgacaactca cctgcatggt tatccatgct gcaatcccat 960
 gacaattggt ccagccttgg aatgcctgcc catcccagca tgctccccgt gagccacaat 1020
 gccagcccac ctaccagctc cagtcagtac cccagcctgt ggtctgtgag caacggcgcc 1080
 gtcaccccgg gctcccaggc agcagccgtg tccaacgggc tggggggcca gttcttccgg 1140
 ggctcccccg cgactacac acccctcacc catccggtct cggcgcctc ttcctcggga 1200
 tccccactgt acgaaggggc ggccgcgcc acagacatcg tggacagcca gtacgacgcc 1260
 gcagcccaag gccgcctcat agcctcatgg acacctgtgt cgccaccttc catgtga 1317

<210> 58

<211> 439

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
 SEQ ID NO: 56

<400> 58

Met Ser Lys Lys Met Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser
 1 5 10 15

Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu
 20 25 30

Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val
 35 40 45

Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn
 50 55 60

Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys
 65 70 75 80

Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu
 85 90 95

Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu
 100 105 110

Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr
 115 120 125

Ile His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro
 130 135 140

Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly

BNIT0010PCT_sequencelisting

145 150 155 160
 Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile
 165 170 175
 Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro
 180 185 190
 Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr
 195 200 205
 Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala
 210 215 220
 Lys Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser
 225 230 235 240
 Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser
 245 250 255
 Thr Leu Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu
 260 265 270
 Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser
 275 280 285
 His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser
 290 295 300
 Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser
 305 310 315 320
 His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu
 325 330 335
 Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro
 340 345 350
 Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala
 355 360 365
 Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro
 370 375 380
 Ala His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser
 385 390 395 400
 Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp
 405 410 415
 Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr
 415 420 425

BNIT0010PCT_sequence_listing

420

425

430

Pro Val Ser Pro Pro Ser Met
435

<210> 59
<211> 438
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:57

<400> 59

Met Ser Lys Lys Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu
1 5 10 15

Gln Tyr Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln
20 25 30

Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly
35 40 45

Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu
50 55 60

Met Ile Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val
65 70 75 80

Asn Val Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp
85 90 95

Phe Val Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp
100 105 110

Val Pro Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile
115 120 125

His Pro Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val
130 135 140

Ser Phe Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln
145 150 155 160

Ile Met Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val
165 170 175

Arg Val Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu
180 185 190

Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala
195 200 205

BNIT0010PCT_sequencelisting

Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys
210 215 220

Glu Arg Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln
225 230 235 240

Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr
245 250 255

Leu Cys Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser
260 265 270

Leu Pro Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His
275 280 285

Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro
290 295 300

Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His
305 310 315 320

Asp Asn Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro
325 330 335

Val Ser His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser
340 345 350

Leu Trp Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala
355 360 365

Ala Val Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala
370 375 380

His Tyr Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly
385 390 395 400

Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser
405 410 415

Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro
420 425 430

Val Ser Pro Pro Ser Met
435

<210> 60
<211> 1386
<212> DNA
<213> Artificial Sequence

<220>

BNIT0010PCT_sequencelisting

<223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 75 nucleotides from Gene FPV 088 and an atc

```

<400> 60
atgaaaaata acttgtatga agaaaaaatg aacatgagta agaaacaagt aaaaactcaa      60
agtaaatgta ataatatcat gagctcccct ggcaccgaga gcgcgggaaa gagcctgcag      120
taccgagtgg accacctgct gagcgccgtg gagaatgagc tgcagggcggg cagcgagaag      180
ggcgacccca cagagcgcga actgcgcgtg ggcctggagg agagcgagct gtggctgcgc      240
ttcaaggagc tcaccaatga gatgatcgtg accaagaacg gcaggaggat gtttccggtg      300
ctgaagggtga acgtgtctgg cctggacccc aacgccatgt actccttcct gctggacttc      360
gtggcgggcg acaaccaccg ctggaagtac gtgaacgggg aatgggtgcc ggggggcaag      420
ccggagccgc aggcgcccag ctgctgtctac atccaccccg actcgcccaa cttcggggcc      480
cactggatga aggtctccgt ctccttcagc aaagtcaagc tcaccaacaa gctcaacgga      540
gggggcccaga tcatgctgaa ctccttgcac aagtatgagc ctcgaatcca catagtgaga      600
gttgggggtc cacagcgcat gatcaccagc cactgcttcc ctgagacca gttcatagcg      660
gtgactgctt atcagaacga ggagatcaca gctcttaaaa ttaagtacaa tccatttgca      720
aaagctttcc ttgatgcaaa ggaaagaagt gatcacaag agatgatgga ggaacccgga      780
gacagccagc aacctgggta ctcccaatgg ggggtggcttc ttcctggaac cagcaccgtt      840
tgtccacctg caaatcctca tcctcagttt ggaggtgccc tctccctccc ctccacgcac      900
agctgtgaca ggtacccaac cctgaggagc caccggtcct caccctacc cagcccctat      960
gctcatcgga acaattctcc aacctattct gacaactcac ctgcatgttt atccatgctg     1020
caatcccatg acaattggtc cagccttgga atgcctgccc atcccagcat gctccccgtg     1080
agccacaatg ccagcccacc taccagctcc agtcagtacc ccagcctgtg gtctgtgagc     1140
aacggcgccg tcaccccggg ctcccaggca gcagccgtgt ccaacgggct gggggcccag     1200
ttcttccggg gctccccgc gactacaca cccctcacc atccggtctc ggcgcctct     1260
tcctcgggat cccactgta cgaagggcg gccgcggcca cagacatcgt ggacagccag     1320
tacgacgccg cagcccaagg ccgcctcata gcctcatgga cacctgtgtc gccaccttcc     1380
atgtga                                           1386

```

<210> 61
 <211> 1383
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 75 nucleotides from Gene FPV 088 and an atc, without Brachyury atg start codon

```

<400> 61
atgaaaaata acttgtatga agaaaaaatg aacatgagta agaaacaagt aaaaactcaa      60
agtaaatgta ataatatcag ctcccctggc accgagagcg cgggaaagag cctgcagtac      120

```

BNIT0010PCT_sequencelisting

```

cgagtggacc acctgctgag cgccgtggag aatgagctgc aggcgggcag cgagaagggc      180
gaccccacag agcgcggaact gcgcgtgggc ctggaggaga gcgagctgtg gctgcgcttc      240
aaggagctca ccaatgagat gatcgtgacc aagaacggca ggaggatgtt tccggtgctg      300
aaggtgaacg tgtctggcct ggaccccaac gccatgtact ccttcctgct ggacttcgtg      360
gcggcgggaca accaccgctg gaagtacgtg aacggggaat gggtgccggg gggcaagccg      420
gagccgcagg cgcccagctg cgtctacatc caccgagact cgcccaactt cggggcccac      480
tggatgaagg ctcccgcttc cttcagcaaa gtcaagctca ccaacaagct caacggaggg      540
ggccagatca tgctgaactc cttgcataag tatgagcctc gaatccacat agtgagagtt      600
gggggtccac agcgcatgat caccagccac tgcttccttg agaccagtt catagcgggtg      660
actgcttatc agaacgagga gatcacagct cttaaaatta agtacaatcc atttgcaaaa      720
gctttccttg atgcaaagga aagaagtgat cacaagaga tgatggagga acccgagac      780
agccagcaac ctgggtactc ccaatggggg tggcttcttc ctggaaccag caccgtttgt      840
ccacctgcaa atcctcatcc tcagtttgga ggtgccctct ccctcccctc cagcacagc      900
tgtgacaggt acccaaccct gaggagccac cggtcctcac cctacccag cccctatgct      960
catcggaaca attctccaac ctattctgac aactcacctg catgtttatc catgctgcaa     1020
tcccatgaca attggtccag ccttggaatg cctgcccata ccagcatgct ccccgtagac     1080
cacaatgcca gccacctac cagctccagt cagtacccca gcctgtggtc tgtgagcaac     1140
ggcgccgtca ccccgggctc ccaggcagca gccgtgtcca acgggctggg ggcccagttc     1200
ttccggggct ccccgcgca ctacacacc ctcaccatac cggctctggc gccctcttcc     1260
tcgggatccc cactgtacga aggggcggcc gcggccacag acatcgtgga cagccagtac     1320
gacgccgcag cccaaggccg cctcatagcc tcatggacac ctgtgtcgcc accttccatg     1380
tga                                                                    1383

```

<210> 62
 <211> 461
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
 SEQ ID NO:60

<400> 62

Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Gln
 1 5 10 15

Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Met Ser Ser Pro Gly Thr
 20 25 30

Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser
 35 40 45

BNIT0010PCT_sequence1isting

Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr
50 55 60

Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg
65 70 75 80

Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg
85 90 95

Met Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala
100 105 110

Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp
115 120 125

Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln
130 135 140

Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala
145 150 155 160

His Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn
165 170 175

Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr
180 185 190

Glu Pro Arg Ile His Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile
195 200 205

Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr
210 215 220

Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala
225 230 235 240

Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His Lys Glu Met Met
245 250 255

Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp
260 265 270

Leu Leu Pro Gly Thr Ser Thr Leu Cys Pro Pro Ala Asn Pro His Pro
275 280 285

Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg
290 295 300

Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr
305 310 315 320

BNIT0010PCT_sequencelisting

Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys
325 330 335

Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro
340 345 350

Ala His Pro Ser Met Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr
355 360 365

Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val
370 375 380

Thr Pro Gly Ser Gln Ala Ala Val Ser Asn Gly Leu Gly Ala Gln
385 390 395 400

Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu Thr His Pro Val
405 410 415

Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala
420 425 430

Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg
435 440 445

Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser Met
450 455 460

<210> 63
<211> 460
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:61

<400> 63

Met Lys Asn Asn Leu Tyr Glu Glu Lys Met Asn Met Ser Lys Lys Gln
1 5 10 15

Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Ser Ser Pro Gly Thr Glu
20 25 30

Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp His Leu Leu Ser Ala
35 40 45

Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys Gly Asp Pro Thr Glu
50 55 60

Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu Leu Trp Leu Arg Phe
65 70 75 80

BNIT0010PCT_sequence_listing

Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys Asn Gly Arg Arg Met
85 90 95

Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu Asp Pro Asn Ala Met
100 105 110

Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp Asn His Arg Trp Lys
115 120 125

Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys Pro Glu Pro Gln Ala
130 135 140

Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro Asn Phe Gly Ala His
145 150 155 160

Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val Lys Leu Thr Asn Lys
165 170 175

Leu Asn Gly Gly Gly Gln Ile Met Leu Asn Ser Leu His Lys Tyr Glu
180 185 190

Pro Arg Ile His Ile Val Arg Val Gly Gly Pro Gln Arg Met Ile Thr
195 200 205

Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala Val Thr Ala Tyr Gln
210 215 220

Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr Asn Pro Phe Ala Lys
225 230 235 240

Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His Lys Glu Met Met Glu
245 250 255

Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser Gln Trp Gly Trp Leu
260 265 270

Leu Pro Gly Thr Ser Thr Leu Cys Pro Pro Ala Asn Pro His Pro Gln
275 280 285

Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His Ser Cys Asp Arg Tyr
290 295 300

Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr Pro Ser Pro Tyr Ala
305 310 315 320

His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn Ser Pro Ala Cys Leu
325 330 335

Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser Leu Gly Met Pro Ala
340 345 350

BNIT0010PCT_sequence1isting

His Pro Ser Met Leu Pro Val Ser His Asn Ala Ser Pro Pro Thr Ser
355 360 365

Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser Asn Gly Ala Val Thr
370 375 380

Pro Gly Ser Gln Ala Ala Ala Val Ser Asn Gly Leu Gly Ala Gln Phe
385 390 395 400

Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu Thr His Pro Val Ser
405 410 415

Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu Gly Ala Ala Ala Ala
420 425 430

Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala Ala Gln Gly Arg Leu
435 440 445

Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser Met
450 455 460

<210> 64
<211> 1359
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 48 nucleotides from Gene FPV 088 and an atc

<400> 64
atgaacatga gtaagaaaca agtaaaaact caaagtaaata gtaataatat catgagctcc 60
cctggcaccg agagcgcggg aaagagcctg cagtaccgag tggaccacct gctgagcgcc 120
gtggagaatg agctgcaggc gggcagcgag aagggcgacc ccacagagcg cgaactgcgc 180
gtgggcctgg aggagagcga gctgtggctg cgcttcaagg agctcaccaa tgagatgata 240
gtgaccaaga acggcaggag gatgtttccg gtgctgaagg tgaacgtgtc tggcctggac 300
cccaacgcca tgtactcctt cctgctggac ttcgtggcgg cggacaacca ccgctggaag 360
tacgtgaacg gggaatgggt gccggggggc aagccggagc cgcaggcgcc cagctgcgtc 420
tacatccacc ccgactcgcc caacttcggg gccactgga tgaaggctcc cgtctccttc 480
agcaaagtca agctcaccaa caagctcaac ggagggggcc agatcatgct gaactccttg 540
cataagtatg agcctcgaat ccacatagt agagttgggg gtccacagcg catgatcacc 600
agccactgct tccctgagac ccagttcata gcggtgactg cttatcagaa cgaggagatc 660
acagctctta aaattaagta caatccattt gcaaaagctt tccttgatgc aaaggaaaga 720
agtgatcaca aagagatgat ggaggaaccc ggagacagcc agcaacctgg gtactcccaa 780
tgggggtggc ttcttcctgg aaccagcacc gtttgtccac ctgcaaatac tcatacctcag 840
tttggagggtg ccctctccct cccctccacg cacagctgtg acaggtaacc aaccctgagg 900

BNIT0010PCT_sequencelisting

```
agccaccggt cctcacccta ccccagcccc tatgctcatc ggaacaattc tccaacctat      960
tctgacaact cacctgcatg tttatccatg ctgcaatccc atgacaattg gtccagcctt      1020
ggaatgcctg cccatcccag catgctcccc gtgagccaca atgccagccc acctaccagc      1080
tccagtcagt accccagcct gtgggtctgtg agcaacggcg ccgtcacccc gggctcccag      1140
gcagcagccg tgtccaacgg gctggggggcc cagttcttcc ggggctcccc cgcgactac      1200
acaccctca cccatccggt ctcggcgccc tcttcctcgg gatccccact gtacgaaggg      1260
gcggccgcg ccacagacat cgtggacagc cagtacgacg ccgcagccca aggccgcctc      1320
atagcctcat ggacacctgt gtcgccacct tccatgtga      1359
```

<210> 65
 <211> 1356
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 48 nucleotides from Gene FPV 088 and an atc, without Brachyury atg start codon

```
<400> 65
atgaacatga gtaagaaaca agtaaaaact caaagtaa atgtaataat cagctcccct      60
ggcaccgaga gcgcgggaaa gagcctgcag taccgagtgg accacctgct gagcgccgtg      120
gagaatgagc tgcaggcggg cagcgagaag ggcgaccca cagagcgcgga actgcgcgtg      180
ggcctggagg agagcgagct gtggctgctg ttcaaggagc tcaccaatga gatgatcgtg      240
accaagaacg gcaggaggat gtttccggtg ctgaaggatga acgtgtcttg cctggacccc      300
aacgccatgt actccttctt gctggacttc gtggcgggcg acaaccaccg ctggaagtac      360
gtgaacgggg aatgggtgcc ggggggcaag ccggagccgc aggcgcccag ctgcgtctac      420
atccaccccg actcgcccaa cttcggggcc cactggatga aggctcccgt ctccttcagc      480
aaagtcaagc tcaccaacaa gctcaacgga gggggccaga tcatgctgaa ctccttgcat      540
aagtatgagc ctcgaatcca catagtgaga gttgggggtc cacagcgcat gatcaccagc      600
cactgcttcc ctgagaccca gttcatagcg gtgactgctt atcagaacga ggagatcaca      660
gctcttaaaa ttaagtacaa tccatttgca aaagctttcc ttgatgcaaa ggaaagaagt      720
gatcaciaaag agatgatgga ggaacccgga gacagccagc aacctgggta ctcccaatgg      780
gggtggcttc ttcttggaac cagcaccgtt tgtccacctg caaatcctca tcctcagttt      840
ggagtgctcc tctccctccc ctccacgcac agctgtgaca ggtacccaac cctgaggagc      900
caccggtcct caccctaccc cagcccctat gctcatcgga acaattctcc aacctattct      960
gacaactcac ctgcatgttt atccatgctg caatcccatg acaattgggt cagccttgga      1020
atgcctgccc atcccagcat gctccccgtg agccacaatg ccagcccacc taccagctcc      1080
agtcagtacc ccagcctgtg gtctgtgagc aacggcgccg tcaccccggt ctcccaggca      1140
gcagccgtgt ccaacgggct gggggcccag ttcttcgggg gctccccgcg gcactacaca      1200
```

BNIT0010PCT_sequencelisting

```

ccccacccc atccggtctc ggcgccctct tcctcgggat cccactgta cgaaggggcg      1260
gccgcggcca cagacatcgt ggacagccag tacgacgccg cagcccaagg ccgcctcata      1320
gcctcatgga cacctgtgtc gccaccttcc atgtga                                1356

```

```

<210> 66
<211> 452
<212> PRT
<213> Artificial Sequence

```

```

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
      SEQ ID NO:64

```

```

<400> 66

```

```

Met Asn Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn
1          5          10          15

```

```

Ile Met Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr
          20          25          30

```

```

Arg Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly
          35          40          45

```

```

Ser Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu
          50          55          60

```

```

Glu Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile
65          70          75          80

```

```

Val Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val
          85          90          95

```

```

Ser Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val
          100          105          110

```

```

Ala Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro
          115          120          125

```

```

Gly Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro
130          135          140

```

```

Asp Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe
145          150          155          160

```

```

Ser Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met
          165          170          175

```

```

Leu Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val
          180          185          190

```

```

Gly Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln

```

BNIT0010PCT_sequence1isting

195

200

205

Phe Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys
 210 215 220

Ile Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg
 225 230 235 240

Ser Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro
 245 250 255

Gly Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Leu Cys
 260 265 270

Pro Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro
 275 280 285

Ser Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser
 290 295 300

Ser Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr
 305 310 315 320

Ser Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn
 325 330 335

Trp Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser
 340 345 350

His Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp
 355 360 365

Ser Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val
 370 375 380

Ser Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr
 385 390 395 400

Thr Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro
 405 410 415

Leu Tyr Glu Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr
 420 425 430

Asp Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser
 435 440 445

Pro Pro Ser Met
 450

<210> 67

BNIT0010PCT_sequencelisting

<211> 451
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
 SEQ ID NO:65

<400> 67

Met Asn Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn
 1 5 10 15

Ile Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg
 20 25 30

Val Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser
 35 40 45

Glu Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu
 50 55 60

Ser Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val
 65 70 75 80

Thr Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser
 85 90 95

Gly Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala
 100 105 110

Ala Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly
 115 120 125

Gly Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp
 130 135 140

Ser Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser
 145 150 155 160

Lys Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu
 165 170 175

Asn Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly
 180 185 190

Gly Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe
 195 200 205

Ile Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile
 210 215 220

Lys Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser
 225 230 235 240

BNIT0010PCT_sequencelisting

Asp His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly
245 250 255

Tyr Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Leu Cys Pro
260 265 270

Pro Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser
275 280 285

Thr His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser
290 295 300

Pro Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser
305 310 315 320

Asp Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp
325 330 335

Ser Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His
340 345 350

Asn Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser
355 360 365

Val Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser
370 375 380

Asn Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr
385 390 395 400

Pro Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu
405 410 415

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

Ala Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro
435 440 445

Pro Ser Met
450

<210> 68
<211> 1353
<212> DNA
<213> Artificial Sequence

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury protein Isoform 1 plus addition of 42 nucleotides from Gene FPV 088 and an atc

BNIT0010PCT_sequence1isting

```

<400> 68
atgagtaaga aacaagtaaa aactcaaagt aaatgtaata atatcatgag ctcccctggc      60
accgagagcg cgggaaagag cctgcagtac cgagtggacc acctgctgag cgccgtggag      120
aatgagctgc aggcgggagc cgagaagggc gacccacag agcggaact gcgcgtgggc      180
ctggaggaga gcgagctgtg gctgcgcttc aaggagctca ccaatgagat gatcgtgacc      240
aagaacggca ggaggatgtt tccggtgctg aagggtgaacg tgtctggcct ggacccaac      300
gccatgtact ccttcctgct ggacttcgtg gcggcggaca accaccgctg gaagtacgtg      360
aacggggaat ggggtgccggg gggcaagccg gagccgcagg cgcccagctg cgtctacatc      420
caccccgact cgcccaactt cggggccac tggatgaagg ctcccgtctc cttcagcaaa      480
gtcaagctca ccaacaagct caacggaggg ggccagatca tgctgaactc cttgcataag      540
tatgagcctc gaatccacat agtgagagtt gggggtccac agcgcatgat caccagccac      600
tgcttcctg agaccagtt catagcgtg actgcttata agaacgagga gatcacagct      660
cttaaaatta agtacaatcc atttgcaaaa gctttccttg atgcaaagga aagaagtgat      720
caciaagaga tgatggagga acccgagagc agccagcaac ctgggtactc ccaatggggg      780
tggtttcttc ctggaaccag caccgtttgt ccacctgcaa atcctcatcc tcagtttgga      840
ggtgccctct ccctcccctc cacgcacagc tgtgacaggt acccaaccct gaggagccac      900
cggtcctcac cctacccag cccctatgct catcggaaca attctccaac ctattctgac      960
aactcacctg catgtttatc catgctgcaa tcccatgaca attggtccag ctttggaatg     1020
cctgcccata ccagcatgct ccccgtagc cacaatgcca gccacctac cagctccagt     1080
cagtaccca gcctgtggtc tgtgagcaac ggcgccgtca ccccgggctc ccaggcagca     1140
gccgtgtcca acgggctggg ggcccagttc ttccggggct ccccgcgca ctacacaccc     1200
ctcacccatc cggctctggc gccctcttcc tcgggatccc cactgtacga aggggcggcc     1260
gcggccacag acatcgtgga cagccagtac gacgccgag cccaaggccg cctcatagcc     1320
tcatggacac ctgtgtcgcc accttccatg tga                                     1353

```

```

<210> 69
<211> 1350
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Coding sequence encoding Fusion protein comprising Brachyury
protein Isoform 1 plus addition of 42 nucleotides from Gene FPV
088 and an atc, without Brachyury atg start codon

```

```

<400> 69
atgagtaaga aacaagtaaa aactcaaagt aaatgtaata atatcagctc ccctggcacc      60
gagagcgcgg gaaagagcct gcagtaccga gtggaccacc tgctgagcgc cgtggagaat      120
gagctgcagg cgggcagcga gaagggcgac cccacagagc gcgaactgcg cgtgggcctg      180
gaggagagcg agctgtggct gcgcttcaag gagctcacca atgagatgat cgtgaccaag      240
aacggcagga ggatgtttcc ggtgctgaag gtgaacgtgt ctggcctgga cccaacgcc      300

```


BNIT0010PCT_sequencelisting

```

atgtactcct tcctgctgga cttcgtggcg gcggacaacc accgctggaa gtacgtgaac      360
gggggaatggg tgccggggggg caagccggag ccgcaggcgc ccagctgcgt ctacatccac      420
cccgactcgc ccaacttcgg ggcccactgg atgaaggctc ccgtctcctt cagcaaagtc      480
aagctcacca acaagctcaa cggagggggc cagatcatgc tgaactcctt gcataagtat      540
gagcctcgaa tccacatagt gagagttagg ggtccacagc gcatgatcac cagccactgc      600
ttccctgaga cccagttcat agcggtgact gcttatcaga acgaggagat cacagctctt      660
aaaattaagt acaatccatt tgcaaaagct ttccttgatg caaaggaaag aagtgatcac      720
aaagagatga tggaggaacc cggagacagc cagcaacctg ggtactccca atgggggtgg      780
cttcttcctg gaaccagcac cgtttgtcca cctgcaaatc ctcatcctca gtttggaggt      840
gccctctccc tcccctccac gcacagctgt gacaggtacc caaccctgag gagccaccgg      900
tcctcaccct accccagccc ctatgctcat cggaacaatt ctccaaccta ttctgacaac      960
tcacctgcat gtttatccat gctgcaatcc catgacaatt ggtccagcct tggaatgcct     1020
gcccattcca gcatgctccc cgtgagccac aatgccagcc cacctaccag ctccagtcag     1080
taccctcagc tgtggtctgt gagcaacggc gccgtcacc cgggctccca ggcagcagcc     1140
gtgtccaacg ggctgggggc ccagttcttc cggggctccc ccgcgcacta cacaccctc     1200
acccatccgg tctcggcgcc ctcttcctcg ggatccccac tgtacgaagg ggcggccgcg     1260
gccacagaca tcgtggacag ccagtacgac gccgcagccc aaggccgcct catagcctca     1320
tggacacctg tgtcgccacc ttccatgtga                                     1350

```

<210> 70

<211> 450

<212> PRT

<213> Artificial Sequence

<220>

<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:68

<400> 70

```

Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Met
1           5           10          15

```

```

Ser Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val
          20          25          30

```

```

Asp His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu
          35          40          45

```

```

Lys Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser
          50          55          60

```

```

Glu Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr
65          70          75          80

```

BNIT0010PCT_sequencelisting

Lys Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly
 85 90 95
 Leu Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala
 100 105 110
 Asp Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly
 115 120 125
 Lys Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser
 130 135 140
 Pro Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser Lys
 145 150 155 160
 Val Lys Leu Thr Asn Lys Leu Asn Gly Gly Gly Gln Ile Met Leu Asn
 165 170 175
 Ser Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly Gly
 180 185 190
 Pro Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile
 195 200 205
 Ala Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys
 210 215 220
 Tyr Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp
 225 230 235 240
 His Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr
 245 250 255
 Ser Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Leu Cys Pro Pro
 260 265 270
 Ala Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr
 275 280 285
 His Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro
 290 295 300
 Tyr Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp
 305 310 315 320
 Asn Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser
 325 330 335
 Ser Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His Asn
 340 345 350

BNIT0010PCT_sequencelisting

Ala Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val
355 360 365

Ser Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn
370 375 380

Gly Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro
385 390 395 400

Leu Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr
405 410 415

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

Ala Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro
435 440 445

Ser Met
450

<210> 71
<211> 449
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion protein comprising Brachyury protein Isoform 1 encoded by
SEQ ID NO:69

<400> 71

Met Ser Lys Lys Gln Val Lys Thr Gln Ser Lys Cys Asn Asn Ile Ser
1 5 10 15

Ser Pro Gly Thr Glu Ser Ala Gly Lys Ser Leu Gln Tyr Arg Val Asp
20 25 30

His Leu Leu Ser Ala Val Glu Asn Glu Leu Gln Ala Gly Ser Glu Lys
35 40 45

Gly Asp Pro Thr Glu Arg Glu Leu Arg Val Gly Leu Glu Glu Ser Glu
50 55 60

Leu Trp Leu Arg Phe Lys Glu Leu Thr Asn Glu Met Ile Val Thr Lys
65 70 75 80

Asn Gly Arg Arg Met Phe Pro Val Leu Lys Val Asn Val Ser Gly Leu
85 90 95

Asp Pro Asn Ala Met Tyr Ser Phe Leu Leu Asp Phe Val Ala Ala Asp
100 105 110

BNIT0010PCT_sequence1isting

Asn His Arg Trp Lys Tyr Val Asn Gly Glu Trp Val Pro Gly Gly Lys
115 120 125

Pro Glu Pro Gln Ala Pro Ser Cys Val Tyr Ile His Pro Asp Ser Pro
130 135 140

Asn Phe Gly Ala His Trp Met Lys Ala Pro Val Ser Phe Ser Lys Val
145 150 155 160

Lys Leu Thr Asn Lys Leu Asn Gly Gly Glu Ile Met Leu Asn Ser
165 170 175

Leu His Lys Tyr Glu Pro Arg Ile His Ile Val Arg Val Gly Gly Pro
180 185 190

Gln Arg Met Ile Thr Ser His Cys Phe Pro Glu Thr Gln Phe Ile Ala
195 200 205

Val Thr Ala Tyr Gln Asn Glu Glu Ile Thr Ala Leu Lys Ile Lys Tyr
210 215 220

Asn Pro Phe Ala Lys Ala Phe Leu Asp Ala Lys Glu Arg Ser Asp His
225 230 235 240

Lys Glu Met Met Glu Glu Pro Gly Asp Ser Gln Gln Pro Gly Tyr Ser
245 250 255

Gln Trp Gly Trp Leu Leu Pro Gly Thr Ser Thr Leu Cys Pro Pro Ala
260 265 270

Asn Pro His Pro Gln Phe Gly Gly Ala Leu Ser Leu Pro Ser Thr His
275 280 285

Ser Cys Asp Arg Tyr Pro Thr Leu Arg Ser His Arg Ser Ser Pro Tyr
290 295 300

Pro Ser Pro Tyr Ala His Arg Asn Asn Ser Pro Thr Tyr Ser Asp Asn
305 310 315 320

Ser Pro Ala Cys Leu Ser Met Leu Gln Ser His Asp Asn Trp Ser Ser
325 330 335

Leu Gly Met Pro Ala His Pro Ser Met Leu Pro Val Ser His Asn Ala
340 345 350

Ser Pro Pro Thr Ser Ser Ser Gln Tyr Pro Ser Leu Trp Ser Val Ser
355 360 365

Asn Gly Ala Val Thr Pro Gly Ser Gln Ala Ala Ala Val Ser Asn Gly
370 375 380

BNIT0010PCT_sequencelisting

Leu Gly Ala Gln Phe Phe Arg Gly Ser Pro Ala His Tyr Thr Pro Leu
385 390 395 400

Thr His Pro Val Ser Ala Pro Ser Ser Ser Gly Ser Pro Leu Tyr Glu
405 410 415

Gly Ala Ala Ala Ala Thr Asp Ile Val Asp Ser Gln Tyr Asp Ala Ala
420 425 430

Ala Gln Gly Arg Leu Ile Ala Ser Trp Thr Pro Val Ser Pro Pro Ser
435 440 445

Met

<210> 72
<211> 1516
<212> DNA
<213> Artificial Sequence

<220>
<223> Expression Cassette found in mBN345 - Promoter + cDNA encoding
Fusion protein comprising Brachyury (L254V) Protein

<400> 72
atccgtacag gtttgtttct gaaattcact ttgtaagata cataattaac aaattcaggg 60
ggaaaaatct ttacaaaatt agtatagaag ctatagatat atcaaaaggt agacaacaaa 120
taatcagaac ctaatTTTTT tatcaaaaaa ttaaaatata aataaaatga aaaataactt 180
gtatgaagaa aaaatgaaca tgagtaagaa aagctccctt ggcaccgaga gcgcgggaaa 240
gagcctgcag taccgagtgg accacctgct gagcgccgtg gagaatgagc tgcaggcggg 300
cagcgagaag ggcgacccca cagagcgcgga actgcgcggtg ggcctggagg agagcgagct 360
gtggctgcgc ttcaaggagc tcaccaatga gatgatcgtg accaagaacg gcaggaggat 420
gtttccggtg ctgaagggtga acgtgtcttg cctggacccc aacgccatgt actccttctt 480
gctggacttc gtggcggcgg acaaccaccg ctggaagtac gtgaacgggg aatgggtgcc 540
ggggggcaag ccggagccgc aggcgccag ctgcgtctac atccaccccg actcgcccaa 600
cttcggggcc cactggatga aggtcccgt ctccttcagc aaagtcaagc tcaccaacaa 660
gctcaacgga gggggccaga tcatgctgaa ctccttgcac aagtatgagc ctcgaatcca 720
catagtgaag gttgggggtc cacagcgcat gatcaccagc cactgcttcc ctgagaccca 780
gttcatagcg gtgactgctt atcagaacga ggagatcaca gctcttaaaa ttaagtacaa 840
tccatttgca aaggctttcc ttgatgcaaa ggaaagaagt gatcacaag agatgatgga 900
ggaacccgga gacagccagc aacctgggta ctcccaatgg ggggtggcttc ttcctggaac 960
cagcaccgtt tgtccacctg caaatcctca tcctcagttt ggaggtgccc tctccctccc 1020
ctccacgcac agctgtgaca ggtaccaac cctgaggagc caccggtcct caccctaccc 1080
cagcccctat gctcatcgga acaattctcc aacctattct gacaactcac ctgcatgttt 1140

BNIT0010PCT_sequencelisting

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atccatgctg caatcccatg acaattgggtc cagccttgga atgcctgccc atcccagcat 1200
gctccccgtg agccacaatg ccagcccacc taccagctcc agtcagtacc ccagcctgtg 1260
gtctgtgagc aacggcgccg tcaccccggtg ctcccaggca gcagccgtgt ccaacgggct 1320
gggggcccag ttcttccggg gctccccgc gcactacaca cccctcacc atccggtctc 1380
ggcgccctct tcctcgggat cccactgta cgaaggggcg gccgcgcca cagacatcgt 1440
ggacagccag tacgacgccg cagcccaagg ccgcctcata gcctcatgga cacctgtgtc 1500
gccaccttcc atgtga 1516

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<210> 73

<211> 1552

<212> DNA

<213> Artificial Sequence

<220>

<223> Expression Cassette found in mBN355 - Promoter + cDNA encoding
Fusion protein comprising Brachyury (L254V) Protein

<400> 73

```

atccgtacag gtttgtttct gaaattcact ttgtaagata cataattaac aaattcaggg 60
ggaaaaatct ttacaaaatt agtatagaag ctatagatat atcaaaaggt agacaacaaa 120
taatcagaac ctaatTTTTT tatcaaaaaa ttaaaatata aataaaatga aaaataactt 180
gtatgaagaa aaaatgaaca tgagtaagaa acaagtaaaa actcaaagta aatgtaataa 240
tatcatgagc tcccctggca ccgagagcgc gggaaagagc ctgcagtacc gagtggacca 300
cctgtctgagc gccgtggaga atgagctgca ggcgggcagc gagaagggcg accccacaga 360
gcgcgaactg cgcgtgggcc tggaggagag cgagctgtgg ctgcgcttca aggagctcac 420
caatgagatg atcgtgacca agaacggcag gaggatgttt ccggtgctga aggtgaacgt 480
gtctggcctg gacccaacg ccatgtactc cttcctgctg gacttcgtgg cggcggacaa 540
ccaccgctgg aagtacgtga acggggaatg ggtgccgggg ggcaagccgg agccgcaggc 600
gccagctgc gtctacatcc accccgactc gcccaacttc ggggccact ggatgaaggc 660
tcccgctctc ttacagcaaag tcaagctcac caacaagctc aacggagggg gccagatcat 720
gctgaactcc ttgcataagt atgagcctcg aatccacata gtgagagttg ggggtccaca 780
gcgcatgatc accagccact gttccctga gaccagttc atagcgggtga ctgcttatca 840
gaacgaggag atcacagctc ttaaaattaa gtacaatcca ttgcaaagg ctttccttga 900
tgcaaaggaa agaagtgatc acaaagagat gatggaggaa cccggagaca gccagcaacc 960
tgggtactcc caatgggggt ggcttcttcc tggaaccagc accgtttgtc cacctgcaaa 1020
tcctcatcct cagtttggag gtgccctctc cctcccctcc acgcacagct gtgacaggta 1080
cccaaccctg aggagccacc ggtcctcacc ctaccccagc ccctatgctc atcggaacaa 1140
ttctccaacc tattctgaca actcacctgc atgtttatcc atgctgcaat cccatgacaa 1200
ttggtccagc cttggaatgc ctgccatcc cagcatgctc cccgtgagcc acaatgccag 1260
cccacctacc agctccagtc agtaccacag cctgtggtct gtgagcaacg gcgccgtcac 1320

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BNIT0010PCT_sequencelisting

cccggtctcc	caggcagcag	ccgtgtccaa	cggtctgggg	gccagttct	tccggggctc	1380
ccccgcgcac	tacacacccc	tcacccatcc	ggtctcggcg	ccctcttcct	cgggatcccc	1440
actgtacgaa	ggggcggccg	cggccacaga	catcgtggac	agccagtacg	acgccgcagc	1500
ccaaggccgc	ctcatagcct	catggacacc	tgtgtcgcca	ccttccatgt	ga	1552

<210> 74
 <211> 1464
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Expression Cassette found in mBN343 - Promoter + cDNA encoding
 Fusion protein comprising Brachyury (L254V) Protein

<400> 74	
taatgtatag	aactaattta taataaacat agtaaataatg ggtaacttct taatagccat 60
aattaaaatt	gaaaaaaaaa tatlattata aaacgtaaac gaacaaaaaa cattaattga 120
tcccccccct	gtctcccccc tccagattga gcaatcatga gctcccctgg caccgagagc 180
gcgggaaaga	gcctgcagta ccgagtggac cacctgctga gcgccgtgga gaatgagctg 240
caggcgggca	gcgagaaggg cgacccaca gagcggaac tgcgcgtggg cctggaggag 300
agcgagctgt	ggctgcgctt caaggagctc accaatgaga tgatcgtgac caagaacggc 360
aggaggatgt	ttccgggtgt gaaggtgaac gtgtctggcc tggaccccaa cgccatgtac 420
tccttcctgc	tggacttcgt ggcggcggac aaccaccgct ggaagtacgt gaacggggaa 480
tgggtgccgg	ggggcaagcc ggagccgag gcgcccagct gcgtctacat ccaccccgac 540
tcgcccact	tcggggccca ctggatgaag gctcccgtct ccttcagcaa agtcaagctc 600
accaacaagc	tcaacggagg gggccagatc atgctgaact ccttgcataa gtatgagcct 660
cgaatccaca	tagtgagagt tgggggtcca cagcgcatga tcaccagcca ctgcttcctt 720
gagaccagct	tcatacggtt gactgcttat cagaacgagg agatcacagc tcttaaaatt 780
aagtacaatc	catttgcaaa ggctttcctt gatgcaaagg aaagaagtga tcacaaagag 840
atgatggagg	aaccgggaga cagccagcaa cctgggtact cccaatgggg gtggcttctt 900
cctggaacca	gcaccgtttg tccacctgca aatcctcatc ctcagtttgg aggtgccctc 960
tccctcccct	ccacgcacag ctgtgacagg tacccaaccc tgaggagcca ccggtcctca 1020
ccctaccca	gcccctatgc tcatcggaac aattctccaa cctattctga caactcacct 1080
gcattgttat	ccatgctgca atcccatgac aattgggtcca gccttggaat gcctgcccatt 1140
cccagcatgc	tccccgtgag ccacaatgcc agcccaccta ccagctccag tcagtacccc 1200
agcctgtggt	ctgtgagcaa cggcgccgtc accccgggct cccaggcagc agccgtgtcc 1260
aacgggctgg	ggggccagtt cttccggggc tccccgcgc actacacacc cctcacccat 1320
ccggtctcgg	cgccctcttc ctcgggatcc ccaactgtacg aaggggcggc cgcgccaca 1380
gacatcgtgg	acagccagta cgacgccga gcccaaggcc gcctcatagc ctcatggaca 1440

cctgtgtcgc caccttccat gtga

1464

<210> 75
 <211> 1478
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Expression Cassette found in mBN344 - Promoter + cDNA encoding
 Fusion protein comprising Brachyury (L254V) Protein

<400> 75
 tatccgtaca ggtttgtttc tgaaattcac tttgtaagat acataattaa caaattcagg 60
 gggaaaaatc ttacaaaaat tagtatagaa gctatagata tatcaaaagg tagacaacaa 120
 ataatcagaa cctaattttt ttatcaaaaa attaaaatat aaataaaatc atgagctccc 180
 ctggcaccga gagcgcgga aagagcctgc agtaccgagt ggaccacctg ctgagcgccg 240
 tggagaatga gctgcaggcg ggcagcgaga agggcgaccc cacagagcgc gaactgcgcg 300
 tgggcctgga ggagagcgag ctgtggctgc gcttcaagga gctcaccaat gagatgatcg 360
 tgaccaagaa cggcaggagg atgtttccgg tgctgaaggt gaacgtgtct ggcctggacc 420
 ccaacgccat gtactccttc ctgctggact tcgtggcggc ggacaaccac cgctggaagt 480
 acgtgaacgg ggaatgggtg ccggggggca agccggagcc gcaggcgccc agctgcgtct 540
 acatccacc cgcactcgcc aacttcgggg cccactggat gaaggctccc gtctccttca 600
 gcaaagtcaa gtcaccaac aagctcaacg gagggggcca gatcatgctg aactccttgc 660
 ataagtatga gcctcgaatc cacatagtga gagttggggg tccacagcgc atgatcacca 720
 gccactgctt ccctgagacc cagttcatag cggtgactgc ttatcagaac gaggagatca 780
 cagctcttaa aattaagtac aatccatttg caaaggcttt ccttgatgca aaggaaagaa 840
 gtgatcacia agagatgatg gaggaacccg gagacagcca gcaacctggg tactcccaat 900
 ggggggtggct tcttcctgga accagcaccg tttgtccacc tgcaaatacct catcctcagt 960
 ttggaggtgc cctctccctc ccctccacgc acagctgtga caggtacca accctgagga 1020
 gccaccggtc ctcaccctac cccagcccct atgctcatcg gaacaattct ccaacctatt 1080
 ctgacaactc acctgcatgt ttatccatgc tgcaatccca tgacaattgg tccagccttg 1140
 gaatgcctgc ccatcccagc atgctccccg tgagccacaa tgccagccca cctaccagct 1200
 ccagtcatga cccagcctg tggctctgtga gcaacggcgc cgtcaccctg ggctcccagg 1260
 cagcagccgt gtccaacggg ctggggggccc agttcttccg gggctcccc gcgcactaca 1320
 caccctcac ccatccggtc tcggcgccct cttcctcggg atccccactg tacgaagggg 1380
 cggccgcggc cacagacatc gtggacagcc agtacgacgc cgcagcccaa ggccgcctca 1440
 tagcctcatg gacacctgtg tcgccacctt ccatgtga 1478

<210> 76
 <211> 1486
 <212> DNA
 <213> Artificial Sequence

BNIT0010PCT_sequencelisting

<220>

<223> Expression Cassette found in mBN354 - Promoter + cDNA encoding
Fusion protein comprising Brachyury (L254V) Protein

<400> 76

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ggaaaaaatct ttacaaaatt agtatagaag ctatagatat atcaaaaggt agacaacaaa      120
taatcagaac ctaatttttt tatcaaaaaa ttaaaatata aataaaatga aaaataactt      180
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