Claims

1. An artificial ~~nucleic acid~~mRNA molecule comprising

   a. at least one open reading frame (ORF); ~~and~~

   b. at least one 3'-untranslated region element (3'-UTR element) comprising

      a nucleic acid sequence which is derived from the 3'-UTR of a ribosomal protein S9 (RPS9) gene or from a functional variant of the 3'-UTR of a ribosomal protein S9 (RPS9) gene~~.~~, wherein said functional variant is at least 80% identical to said 3'-UTR of a ribosomal protein S9 (RPS9) gene; and

   c. a poly(A) sequence or a polyadenylation signal;

   wherein the 3'-UTR is heterologous to the ORF.

2. The artificial ~~nucleic acid~~mRNA molecule according to claim 1, wherein the at least one 3'-UTR element enhances, stabilizes and/or prolongs protein production from said artificial ~~nucleic acid~~mRNA molecule.

3. ~~The artificial nucleic acid molecule according to claim 1 or 2, wherein the 3'-UTR is heterologous to the ORF.~~

4. ~~The artificial nucleic acid~~mRNA molecule according to any one of claims 1 to ~~3~~2, wherein the at least one 3'-UTR element comprises a nucleic acid sequence which is derived from the 3'-UTR of a eukaryotic ribosomal protein S9 (RPS9) gene, preferably from the 3'-UTR of a vertebrate ribosomal protein S9 (RPS9) gene, more preferably from the 3'-UTR of a mammalian ribosomal protein S9 (RPS9) gene, even more preferably from the 3'-UTR of a primate ribosomal protein S9 (RPS9) gene, in particular of a human ribosomal protein S9 (RPS9) gene, or of a rodent ribosomal protein S9 (RPS9) gene, in particular of a murine ribosomal protein S9 (RPS9) gene.

~~5~~4. The artificial ~~nucleic acid~~mRNA molecule according to any one of claims 1 to ~~4~~3, wherein the open reading frame (ORF) does not encode a reporter gene or is not derived from a reporter gene, wherein the reporter gene is preferably not selected from group consisting of globin proteins (particularly beta-globin), luciferase protein,

beta-glucuronidase (GUS) and GFP proteins or variants thereof, preferably not EGFP, or variants exhibiting at least 70% sequence identity to a globin protein, a luciferase protein, or a GFP protein~~.~~;

~~6. The artificial nucleic acid molecule according to any one of claims 1 to 5, wherein~~ the open reading frame (ORF) does not encode a ribosomal protein, preferably ~~does~~ not ~~encode~~ an eukaryotic ribosomal protein~~.~~

~~7. The artificial nucleic acid molecule according to any one of claims 1 to 6~~, wherein the ~~open reading frame (ORF) does not encode a human or a plant~~ ribosomal protein~~, in particular human.~~ is preferably not selected from ribosomal protein S6 (RPS6), ~~human~~ ribosomal protein L36a-like (RPL36AL) or ~~Arabidopsis~~ ribosomal protein S16 (RPS16~~).~~); or

~~8. The artificial nucleic acid molecule according to any one of claims 1 to 7, wherein the open reading frame (ORF) does not encode ribosomal protein S6 (RPS6), ribosomal protein L36a-like (RPL36AL) or ribosomal protein S16 (RPS16).~~

~~9. The artificial nucleic acid molecule according to any one of claims 1 to 8,~~ wherein the 3'-UTR is not derived from a virus.

~~10~~5. The artificial ~~nucleic acid~~mRNA molecule according to any one of claims 1 to ~~9, wherein the 3'-UTR, preferably the artificial nucleic acid molecule, does not comprise a poly(A) sequence or a polyadenylation signal,~~

~~or~~

~~wherein the 3'-UTR, preferably the artificial nucleic acid molecule, further comprises a poly(A) sequence and/or a polyadenylation signal.~~

~~11. The artificial nucleic acid molecule according to claim 10~~4, wherein the poly(A) sequence or the polyadenylation signal is located 3'-terminal to the 3'-UTR element.

~~12~~6. The artificial ~~nucleic acid molecule according to claim 10 or 11, wherein the polyadenylation signal comprises the consensus sequence NN(U/T)ANA, with N = A or U, preferably AA(U/T)AAA or A(U/T)(U/T)AAA.~~

~~13. The artificial nucleic acid molecule according to any one of claims 10 to 12, wherein the polyadenylation signal, preferably the consensus sequence NNUANA, is located less than about 50 nucleotides downstream of the 3'-terminus of the 3'-UTR element.~~

~~14. The artificial nucleic acid molecule according to any one of claims 10 to 13, wherein the poly(A) sequence has a length of about 20 to about 300 adenine nucleotides, preferably of about 40 to about 200 adenine nucleotides, more preferably of about 50 to about 100 adenine nucleotides, even more preferably of about 60 to about 70 adenine nucleotides.~~

~~15. The artificial nucleic acid~~mRNA molecule according to any one of claims 1 to ~~14~~5, wherein the nucleic acid comprises an additional 5'-terminal element, preferably a 5'-UTR, a promoter, or a 5'-UTR and a promoter containing-sequence, more preferably a 5'-UTR, even more preferably a 5'-UTR that does not comprise a 5' TOP motif.

~~16~~7. The artificial ~~nucleic acid molecule according to claim 15, wherein the 5'-UTR is a 5'-TOP UTR.~~

~~17. The artificial nucleic acid molecule according to claim 15 or 16, wherein the 5' UTR does not comprise a 5' TOP motif.~~

~~18. The artificial nucleic acid~~mRNA molecule according to any one of claims 1 to ~~17,~~ ~~wherein the artificial nucleic acid molecule further comprises a 5'-UTR and wherein all of the 3'-UTR, the ORF and the 5'-UTR are heterologous to each other.~~

~~19. The artificial nucleic acid molecule according to any one of claims 1 to 18, wherein the at least one 3'-UTR element comprises a nucleic acid sequence which is derived from the 3'-UTR of a sequence selected from the group consisting of ribosomal protein L9 (RPL9), ribosomal protein L3 (RPL3), ribosomal protein L4 (RPL4), ribosomal protein L5 (RPL5), ribosomal protein L6 (RPL6), ribosomal protein L7 (RPL7), ribosomal protein L7a (RPL7A), ribosomal protein L11 (RPL11), ribosomal protein L12 (RPL12), ribosomal protein L13 (RPL13), ribosomal protein L23 (RPL23),~~

~~ribosomal protein L18 (RPL18), ribosomal protein L18a (RPL18A), ribosomal protein L19 (RPL19), ribosomal protein L21 (RPL21), ribosomal protein L22 (RPL22), ribosomal protein L23a (RPL23A), ribosomal protein L17 (RPL17), ribosomal protein L24 (RPL24), ribosomal protein L26 (RPL26), ribosomal protein L27 (RPL27), ribosomal protein L30 (RPL30), ribosomal protein L27a (RPL27A), ribosomal protein L28 (RPL28), ribosomal protein L29 (RPL29), ribosomal protein L31 (RPL31), ribosomal protein L32 (RPL32), ribosomal protein L35a (RPL35A), ribosomal protein L37 (RPL37), ribosomal protein L37a (RPL37A), ribosomal protein L38 (RPL38), ribosomal protein L39 (RPL39), ribosomal protein, large, P0 (RPLP0), ribosomal protein, large, P1 (RPLP1), ribosomal protein, large, P2 (RPLP2), ribosomal protein S3 (RPS3), ribosomal protein S3A (RPS3A), ribosomal protein S4, X-linked (RPS4X), ribosomal protein S4, Y-linked 1 (RPS4Y1), ribosomal protein S5 (RPS5), ribosomal protein S6 (RPS6), ribosomal protein S7 (RPS7), ribosomal protein S8 (RPS8), ribosomal protein S9 (RPS9), ribosomal protein S10 (RPS10), ribosomal protein S11 (RPS11), ribosomal protein S12 (RPS12), ribosomal protein S13 (RPS13), ribosomal protein S15 (RPS15), ribosomal protein S15a (RPS15A), ribosomal protein S16 (RPS16), ribosomal protein S19 (RPS19), ribosomal protein S20 (RPS20), ribosomal protein S21 (RPS21), ribosomal protein S23 (RPS23), ribosomal protein S25 (RPS25), ribosomal protein S26 (RPS26), ribosomal protein S27 (RPS27), ribosomal protein S27a (RPS27a), ribosomal protein S28 (RPS28), ribosomal protein S29 (RPS29), ribosomal protein L15 (RPL15), ribosomal protein S2 (RPS2), ribosomal protein L14 (RPL14), ribosomal protein S14 (RPS14), ribosomal protein L10 (RPL10), ribosomal protein L10a (RPL10A), ribosomal protein L35 (RPL35), ribosomal protein L13a (RPL13A), ribosomal protein L36 (RPL36), ribosomal protein L36a (RPL36A), ribosomal protein L41 (RPL41), ribosomal protein S18 (RPS18), ribosomal protein S24 (RPS24), ribosomal protein L8 (RPL8), ribosomal protein L34 (RPL34), ribosomal protein S17 (RPS17), ribosomal protein SA (RPSA), ubiquitin A-52 residue ribosomal protein fusion product 1 (UBA52), Finkel-Biskis-Reilly murine sarcoma virus (FBR-MuSV) ubiquitously expressed (FAU), ribosomal protein L22-like 1 (RPL22L1), ribosomal protein S17 (RPS17), ribosomal protein L39-like (RPL39L), ribosomal protein L10-like (RPL10L), ribosomal protein L36a-like (RPL36AL), ribosomal protein L3-like~~

~~(RPL3L), ribosomal protein S27-like (RPS27L), ribosomal protein L26-like 1 (RPL26L1), ribosomal protein L7-like 1 (RPL7L1), ribosomal protein L13a pseudogene (RPL13AP), ribosomal protein L37a pseudogene 8 (RPL37AP8), ribosomal protein S10 pseudogene 5 (RPS10P5), ribosomal protein S26 pseudogene 11 (RPS26P11), ribosomal protein L39 pseudogene 5 (RPL39P5), ribosomal protein, large, P0 pseudogene 6 (RPLP0P6) and ribosomal protein L36 pseudogene 14 (RPL36P14).~~

~~20. The artificial nucleic acid molecule according to any one of claims 1 to 19~~6, wherein the at least one 3'-UTR element comprises or consists of a nucleic acid sequence which has an identity of at least about 1, 2, 3, 4, 5, 10, 15, 20, 30 or 40%, preferably of at least about 50%, preferably of at least about 60%, preferably of at least about 70%, more preferably of at least about 80%, more preferably of at least about 90%, even more preferably of at least about 95%, even more preferably of at least about 99% to a nucleic acid sequence selected from the group consisting of SEQ ID NOs:~~10 to 205~~ 1, 2, 58 and 161, or wherein the at least one 3'-UTR element comprises or consists of a fragment of a nucleic acid sequence which has an identity of at least about 40%, preferably of at least about 50%, preferably of at least about 60%, preferably of at least about 70%, more preferably of at least about 80%, more preferably of at least about 90%, even more preferably of at least about 95%, even more preferably of at least about 99% to a nucleic acid sequence selected from the group consisting of SEQ ID NOs:~~10 to 205~~ 1, 2, 58 and 161.

~~21~~8. The artificial ~~nucleic acid molecule according to claim 20, wherein the fragment exhibits a length of between 3 and about 500 nucleotides, preferably of between 5 and about 150 nucleotides, more preferably of between 10 and 100 nucleotides, even more preferably of between 15 and 90, most preferably of between 20 and 70.~~

~~22. The artificial nucleic acid~~mRNA molecule according to any one of claims 1 to ~~21, wherein the at least one 3'-UTR element exhibits a length of between 3 and about 500 nucleotides, preferably of between 5 and about 150 nucleotides, more preferably of between 10 and 100 nucleotides, even more preferably of between 15 and 90, most preferably of between 20 and 70.~~

~~23. The artificial nucleic acid molecule according to any one of claims 1 to 22~~7, further comprising a 5'-cap structure, a poly(C) sequence, a histone stem-loop, and/or an IRES-motif.

~~24~~9. The artificial ~~nucleic acid~~mRNA molecule according to any one of claims 1 to ~~23~~8, wherein the ~~histone stem-loop comprises a sequence according to SEQ ID NO:5.~~

~~25. The~~ artificial ~~nucleic acid molecule according to any one of claims 1 to 24, wherein the artificial nucleic acid~~mRNA molecule, preferably the open reading frame, is at least partially G/C modified, preferably wherein the G/C content of the open reading frame is increased compared to the wild type open reading frame~~.~~

~~26. The artificial nucleic acid molecule according to any one of claims 1 to 25,~~, and/or wherein the open reading frame comprises a codon-optimized region, preferably, wherein the open reading frame is codon-optimized.

~~27. The artificial nucleic acid molecule according to any one of claims 1 to 26, which is an RNA, preferably an mRNA molecule.~~

~~28~~10. A vector comprising

a. an open reading frame and/or a cloning site; and

b. at least one 3'-untranslated region element (3'-UTR element) comprising a nucleic acid sequence which is derived from the 3'-UTR of a ribosomal protein S9 (RPS9) gene or from a functional variant of the 3'-UTR of a ribosomal protein S9 (RPS9) gene~~.~~, wherein said functional variant is at least 80% identical to said 3'-UTR of a ribosomal protein S9 (RPS9) gene; and

~~29~~c. a poly(A) sequence or a polyadenylation signal;

wherein the 3'-UTR is heterologous to the open reading frame.

11. The vector according to claim ~~28~~10, wherein the open reading frame or the at least one 3'-UTR element ~~comprises or consists of a nucleic acid sequence which is derived from the 3'-UTR of a eukaryotic ribosomal protein gene, preferably from the 3'-UTR of a vertebrate ribosomal protein gene, more preferably from the 3'-UTR of a mammalian~~

~~ribosomal protein gene, even more preferably from~~ is characterized by any one of the ~~3'-UTR of a primate ribosomal protein gene,~~features as defined in ~~particular of a human ribosomal protein gene~~any one of claims 1 to 10 with respect to the artificial mRNA molecule.

~~30. The vector according to claim 28 or 29, wherein the open reading frame (ORF) does not encode a reporter gene or is not derived from a reporter gene, wherein the reporter gene is preferably not selected from group consisting of globin proteins (particularly beta-globin), luciferase protein, beta-glucuronidase (GUS) and GFP proteins or variants thereof, preferably not EGFP, or variants exhibiting at least 70% sequence identity to a globin protein, a luciferase protein, or a GFP protein.~~

~~31. The vector according to any one of claims 28 to 30, wherein the open reading frame (ORF) does not encode human ribosomal protein S6 (RPS6), human ribosomal protein L36a-like (RPL36AL) or Arabidopsis ribosomal protein S16 (RPS16).~~

~~32. The vector according to any one of claims 28 to 31, wherein the open reading frame (ORF) does not encode ribosomal protein S6 (RPS6), ribosomal protein L36a-like (RPL36AL) or ribosomal protein S16 (RPS16).~~

~~33~~12. The vector according to claim 10 or 11, which is a plasmid vector or a viral vector, preferably a plasmid vector.

13. The vector according to any one of claims ~~28 to 32, wherein the open reading frame (ORF) does not encode a ribosomal protein gene, preferably does not encode an eukaryotic ribosomal protein gene~~11 to 12, which comprises an artificial mRNA molecule according to any one of claims 1-9.

~~34. The vector~~14. A cell comprising the artificial mRNA molecule according to any one of claims ~~28 to 33, wherein the 3'-UTR is not derived from a virus.~~

~~35. The~~1-9 or the vector according to any one of claims ~~28 to 34, wherein the vector comprises an additional 5'-element, preferably a 5'-UTR, a promoter, or a 5'-UTR and a promoter containing sequence~~10 to 13.

~~36. The vector according to claim 35, wherein the 5'-UTR is a 5'-TOP UTR.~~

~~37. The vector according to claim 35 or 36, wherein the 5'-UTR does not comprise a 5' TOP motif.~~

~~38. The vector~~15. A pharmaceutical composition comprising the artificial mRNA molecule according to any one of claims ~~28 to 37, wherein~~1-9, the ~~3'-UTR is heterologous~~vector according to any one of claims 10 to 13, or the ~~ORF~~cell according to claim 14.

~~39~~16. The ~~vector~~ artificial mRNA molecule according to any one of claims ~~28 to 38, wherein~~1-9, the ~~artificial nucleic acid molecule further comprises a 5'-UTR and wherein all of the 3'-UTR, the ORF and the 5'-UTR are heterologous to each other.~~

~~40. The~~ vector according to any one of claims ~~28 to 39, wherein the 3'-UTR, preferably the vector, does not comprise a poly(A) sequence or a polyadenylation signal,~~

~~or~~

~~wherein the 3'-UTR, preferably the vector, further comprises a poly(A) sequence and/or a polyadenylation signal.~~

~~41. The vector~~10 to 13, the cell according to claim ~~40, wherein the poly(A) sequence or the polyadenylation signal is located 3' of the 3'-UTR element.~~

~~42. The vector~~14, or the pharmaceutical composition according to claim ~~40 or 41, wherein the polyadenylation signal comprises the consensus sequence NN(U/T)ANA, with N = A or U, preferably AA(U/T)AAA or A(U/T)(U/T)AAA.~~

~~43. The vector according to any one of claims 40 to 42, wherein the polyadenylation signal, preferably the consensus sequence NNUANA, is located less than about 50 nucleotides downstream of the 3'-end of the 3'-UTR element.~~

~~44. The vector according to any one of claims 40 to 43, wherein the poly(A) sequence has a length of about 20 to about 300 adenine nucleotides, preferably of about 40 to about 200 adenine nucleotides, more preferably of about 50 to about 100 adenine nucleotides, even more preferably of about 60 to about 70 adenine nucleotides.~~

45. The vector according to any one of claims 28 to 44, wherein the at least one 3'-UTR element comprises or consists of a nucleic acid sequence which is derived from the 3'-UTR of a sequence selected from the group consisting of ribosomal protein L9 (RPL9), ribosomal protein L3 (RPL3), ribosomal protein L4 (RPL4), ribosomal protein L5 (RPL5), ribosomal protein L6 (RPL6), ribosomal protein L7 (RPL7), ribosomal protein L7a (RPL7A), ribosomal protein L11 (RPL11), ribosomal protein L12 (RPL12), ribosomal protein L13 (RPL13), ribosomal protein L23 (RPL23), ribosomal protein L18 (RPL18), ribosomal protein L18a (RPL18A), ribosomal protein L19 (RPL19), ribosomal protein L21 (RPL21), ribosomal protein L22 (RPL22), ribosomal protein L23a (RPL23A), ribosomal protein L17 (RPL17), ribosomal protein L24 (RPL24), ribosomal protein L26 (RPL26), ribosomal protein L27 (RPL27), ribosomal protein L30 (RPL30), ribosomal protein L27a (RPL27A), ribosomal protein L28 (RPL28), ribosomal protein L29 (RPL29), ribosomal protein L31 (RPL31), ribosomal protein L32 (RPL32), ribosomal protein L35a (RPL35A), ribosomal protein L37 (RPL37), ribosomal protein L37a (RPL37A), ribosomal protein L38 (RPL38), ribosomal protein L39 (RPL39), ribosomal protein, large, P0 (RPLP0), ribosomal protein, large, P1 (RPLP1), ribosomal protein, large, P2 (RPLP2), ribosomal protein S3 (RPS3), ribosomal protein S3A (RPS3A), ribosomal protein S4, X-linked (RPS4X), ribosomal protein S4, Y-linked 1 (RPS4Y1), ribosomal protein S5 (RPS5), ribosomal protein S6 (RPS6), ribosomal protein S7 (RPS7), ribosomal protein S8 (RPS8), ribosomal protein S9 (RPS9), ribosomal protein S10 (RPS10), ribosomal protein S11 (RPS11), ribosomal protein S12 (RPS12), ribosomal protein S13 (RPS13), ribosomal protein S15 (RPS15), ribosomal protein S15a (RPS15A), ribosomal protein S16 (RPS16), ribosomal protein S19 (RPS19), ribosomal protein S20 (RPS20), ribosomal protein S21 (RPS21), ribosomal protein S23 (RPS23), ribosomal protein S25 (RPS25), ribosomal protein S26 (RPS26), ribosomal protein S27 (RPS27), ribosomal protein S27a (RPS27a), ribosomal protein S28 (RPS28), ribosomal protein S29 (RPS29), ribosomal protein L15 (RPL15), ribosomal protein S2 (RPS2), ribosomal protein L14 (RPL14), ribosomal protein S14 (RPS14), ribosomal protein L10 (RPL10), ribosomal protein L10a (RPL10A), ribosomal protein L35 (RPL35), ribosomal protein L13a (RPL13A), ribosomal protein L36 (RPL36), ribosomal protein L36a (RPL36A),

~~ribosomal protein L41 (RPL41), ribosomal protein S18 (RPS18), ribosomal protein S24 (RPS24), ribosomal protein L8 (RPL8), ribosomal protein L34 (RPL34), ribosomal protein S17 (RPS17), ribosomal protein SA (RPSA), ubiquitin A-52 residue ribosomal protein fusion product 1 (UBA52), Finkel Biskis Reilly murine sarcoma virus (FBR-MuSV) ubiquitously expressed (FAU), ribosomal protein L22-like 1 (RPL22L1), ribosomal protein S17 (RPS17), ribosomal protein L39-like (RPL39L), ribosomal protein L10-like (RPL10L), ribosomal protein L36a-like (RPL36AL), ribosomal protein L3-like (RPL3L), ribosomal protein S27-like (RPS27L), ribosomal protein L26-like 1 (RPL26L1), ribosomal protein L7-like 1 (RPL7L1), ribosomal protein L13a pseudogene (RPL13AP), ribosomal protein L37a pseudogene 8 (RPL37AP8), ribosomal protein S10 pseudogene 5 (RPS10P5), ribosomal protein S26 pseudogene 11 (RPS26P11), ribosomal protein L39 pseudogene 5 (RPL39P5), ribosomal protein, large, P0 pseudogene 6 (RPLP0P6) and ribosomal protein L36 pseudogene 14 (RPL36P14).~~

~~46. The vector according to any one of claims 28 to 45, wherein the at least one 3'-UTR element comprises or consists of a nucleic acid sequence which has an identity of at least about 40%, preferably of at least about 50%, preferably of at least about 60%, preferably of at least about 70%, more preferably of at least about 80%, more preferably of at least about 90%, even more preferably of at least about 95%, even more preferably of at least about 99% to a sequence selected from the group consisting of SEQ ID NOs:10 to 205 or wherein the at least one 3'-UTR element comprises or consists of a fragment of a nucleic acid sequence which has an identity of at least about 40%, preferably of at least about 50%, preferably of at least about 60%, preferably of at least about 70%, more preferably of at least about 80%, more preferably of at least about 90%, even more preferably of at least about 95%, even more preferably of at least about 99% to a sequence selected from the group consisting of SEQ ID NOs:10 to 205.~~

~~47. The vector according to claim 46, wherein the fragment exhibits a length of between 3 and about 500 nucleotides, preferably of between 5 and about 150 nucleotides, more preferably of between 10 and 100 nucleotides, even more preferably of between~~ 15 ~~and 90, most preferably of between 20 and 70.~~ <u>for use as a medicament.</u>

~~48. The vector according to any one of claims 28-47, wherein the at least one 3'-UTR element exhibits a length of between 3 and about 500 nucleotides, preferably of between 5 and about 150 nucleotides, more preferably of between 10 and 100 nucleotides, even more preferably of between 15 and 90, most preferably of between 20 and 70.~~

~~49. The vector according to any one of claims 28 to 48, further comprising a poly(C) sequence, a histone stem-loop, and/or an IRES-motif.~~

~~50. The vector according to any one of claims 28 to 49, which is at least partially G/C modified, preferably wherein the open reading frame is at least partially G/C modified, preferably wherein the G/C content of the open reading frame is increased compared to the wild type open reading frame.~~

~~51. The vector according to any one of claims 28 to 50, wherein the open reading frame comprises a codon-optimized region, preferably wherein the open reading frame is codon-optimized.~~

~~52. The vector according to any one of claims 28 to 51, which is a DNA vector.~~

~~53. The vector according to any one of claims 28 to 52, which is a plasmid vector or a viral vector, preferably a plasmid vector.~~

~~54. The vector according to any one of claims 28 to 53, which comprises an artificial nucleic acid~~17. The artificial mRNA molecule according to any one of claims 1-~~25.~~

~~55. The~~9, the vector according to any one of claims ~~28~~10 to ~~54, which is a circular molecule.~~

~~56. The vector according to claim 55, wherein the poly(A) sequence~~13, the ~~poly(C) sequence, the histone stem loop or the 3'-UTR element of the coding strand is followed in 5'→3' direction by a restriction site for linearization of the circular vector molecule.~~

~~57. A cell comprising the artificial nucleic acid molecule according to any one of claims 1-27 or the vector according to any one of claims 28 to 56.~~

~~58. The cell according to claim 57, which is a mammalian cell.~~

~~59. The~~ cell according to claim ~~57 or 58, which is a cell of a mammalian subject, preferably an isolated cell of a mammalian subject, preferably of a human subject.~~

~~60. A pharmaceutical composition comprising the artificial nucleic acid molecule according to any one of claims 1-27, the vector according to any one of claims 28 to 56, or the cell according to any one of claims 57 to 59.~~

~~61. The pharmaceutical composition according to claim 60, further comprising one or more pharmaceutically acceptable vehicles, diluents and/or excipients and/or one or more adjuvants.~~

~~62. The artificial nucleic acid molecule according to any one of claims 1-27, the vector according to any one of claims 28 to 56, the cell according to any one of claims 57 to 59~~14, or the pharmaceutical composition according to claim ~~60 or 61 for use as a medicament.~~

~~63. The artificial nucleic acid molecule according to any one of claims 1-27, the vector according to any one of claims 28 to 56, the cell according to any one of claims 57 to 59, or the pharmaceutical composition according to claim 60 or 61~~15 for use as a vaccine or for use in gene therapy.

~~64. A method for treating or preventing a disorder comprising administering the artificial nucleic acid molecule according to any one of claims 1-27, the vector according to any one of claims 28 to 56, the cell according to any one of claims 57 to 59, or the pharmaceutical composition according to claim 60 or 61 to a subject in need thereof.~~

~~65. A method of treating or preventing a disorder comprising transfection of a cell with an artificial nucleic acid molecule according to any one of claims 1-27 or with the vector according to any one of claims 28 to 56.~~

~~66. The method according to claim 65, wherein transfection of a cell is performed *in vitro/ex vivo* and the transfected cell is administered to a subject in need thereof, preferably to a human patient.~~

~~67. The method according to claim 66, wherein the cell which is to be transfected *in vitro* is an isolated cell of the subject, preferably of the human patient.~~

~~68. The method according to any one of claims 64 to 67, which is a vaccination method or a gene therapy method.~~

~~69.~~ A18. An *in vitro* method for enhancing, stabilizing and/or prolonging protein production from an artificial nucleic acid molecule, preferably from an mRNA molecule or a vector, the method comprising the step of associating the nucleic acid molecule, preferably the artificial mRNA molecule or the vector, with an 3'-UTR element, wherein the 3'-UTR element comprises or consists of a nucleic acid sequence which is derived from the 3'-UTR of a ribosomal protein ~~gene~~S9 (RPS9) gene and wherein the artificial nucleic acid molecule is preferably characterized by any one of the features defined in any one of claims 1 to 9 with respect to the artificial mRNA molecule.

~~70~~19. Use of ~~an~~a 3'-UTR element for enhancing, stabilizing and/or prolonging protein production from a nucleic acid molecule *in vitro*, preferably from an artificial mRNA molecule or a vector, wherein the 3'-UTR element comprises or consists of a nucleic acid sequence which is derived from the 3'-UTR of a ribosomal protein ~~gene~~S9 (RPS9) gene and wherein the nucleic acid molecule is preferably characterized by any one of the features defined in any one of claims 1 to 9 with respect to the artificial mRNA molecule.

~~71. The method according to claim 69 or the use according to claim 70, wherein the 3'-UTR element comprises or consists of a nucleic acid sequence which is derived from the 3'-UTR of eukaryotic ribosomal protein gene, preferably from the 3'-UTR of a vertebrate ribosomal protein gene, more preferably from the 3'-UTR of a mammalian ribosomal protein gene, even more preferably from the 3'-UTR of a primate ribosomal protein gene, in particular of a human ribosomal protein gene.~~

~~72. The method or the use according to any one of claims 69 to 71, wherein the 3'-UTR element comprises or consists of a nucleic acid sequence which is derived from the 3'-UTR of a sequence selected from the group consisting of ribosomal protein L9 (RPL9), ribosomal protein L3 (RPL3), ribosomal protein L4 (RPL4), ribosomal protein L5 (RPL5), ribosomal protein L6 (RPL6), ribosomal protein L7 (RPL7), ribosomal protein L7a (RPL7A), ribosomal protein L11 (RPL11), ribosomal protein L12 (RPL12), ribosomal protein L13 (RPL13), ribosomal protein L23 (RPL23), ribosomal protein L18 (RPL18), ribosomal protein L18a (RPL18A), ribosomal protein L19 (RPL19),~~

~~ribosomal protein L21 (RPL21), ribosomal protein L22 (RPL22), ribosomal protein L23a (RPL23A), ribosomal protein L17 (RPL17), ribosomal protein L24 (RPL24), ribosomal protein L26 (RPL26), ribosomal protein L27 (RPL27), ribosomal protein L30 (RPL30), ribosomal protein L27a (RPL27A), ribosomal protein L28 (RPL28), ribosomal protein L29 (RPL29), ribosomal protein L31 (RPL31), ribosomal protein L32 (RPL32), ribosomal protein L35a (RPL35A), ribosomal protein L37 (RPL37), ribosomal protein L37a (RPL37A), ribosomal protein L38 (RPL38), ribosomal protein L39 (RPL39), ribosomal protein, large, P0 (RPLP0), ribosomal protein, large, P1 (RPLP1), ribosomal protein, large, P2 (RPLP2), ribosomal protein S3 (RPS3), ribosomal protein S3A (RPS3A), ribosomal protein S4, X-linked (RPS4X), ribosomal protein S4, Y-linked 1 (RPS4Y1), ribosomal protein S5 (RPS5), ribosomal protein S6 (RPS6), ribosomal protein S7 (RPS7), ribosomal protein S8 (RPS8), ribosomal protein S9 (RPS9), ribosomal protein S10 (RPS10), ribosomal protein S11 (RPS11), ribosomal protein S12 (RPS12), ribosomal protein S13 (RPS13), ribosomal protein S15 (RPS15), ribosomal protein S15a (RPS15A), ribosomal protein S16 (RPS16), ribosomal protein S19 (RPS19), ribosomal protein S20 (RPS20), ribosomal protein S21 (RPS21), ribosomal protein S23 (RPS23), ribosomal protein S25 (RPS25), ribosomal protein S26 (RPS26), ribosomal protein S27 (RPS27), ribosomal protein S27a (RPS27a), ribosomal protein S28 (RPS28), ribosomal protein S29 (RPS29), ribosomal protein L15 (RPL15), ribosomal protein S2 (RPS2), ribosomal protein L14 (RPL14), ribosomal protein S14 (RPS14), ribosomal protein L10 (RPL10), ribosomal protein L10a (RPL10A), ribosomal protein L35 (RPL35), ribosomal protein L13a (RPL13A), ribosomal protein L36 (RPL36), ribosomal protein L36a (RPL36A), ribosomal protein L41 (RPL41), ribosomal protein S18 (RPS18), ribosomal protein S24 (RPS24), ribosomal protein L8 (RPL8), ribosomal protein L34 (RPL34), ribosomal protein S17 (RPS17), ribosomal protein SA (RPSA), ubiquitin A-52 residue ribosomal protein fusion product 1 (UBA52), Finkel-Biskis-Reilly murine sarcoma virus (FBR-MuSV) ubiquitously expressed (FAU), ribosomal protein L22-like 1 (RPL22L1), ribosomal protein S17 (RPS17), ribosomal protein L39-like (RPL39L), ribosomal protein L10-like (RPL10L), ribosomal protein L36a-like (RPL36AL), ribosomal protein L3-like (RPL3L), ribosomal protein S27-like (RPS27L), ribosomal protein L26-like 1 (RPL26L1),~~

~~ribosomal protein L7-like 1 (RPL7L1), ribosomal protein L13a pseudogene (RPL13AP), ribosomal protein L37a pseudogene 8 (RPL37AP8), ribosomal protein S10 pseudogene 5 (RPS10P5), ribosomal protein S26 pseudogene 11 (RPS26P11), ribosomal protein L39 pseudogene 5 (RPL39P5), ribosomal protein, large, P0 pseudogene 6 (RPLP0P6) and ribosomal protein L36 pseudogene 14 (RPL36P14).~~

~~73. The method or the use according to any one of claims 69 to 72, wherein the 3'-UTR element comprises or consists of a nucleic acid sequence which has an identity of at least about 40%, preferably of at least about 50%, preferably of at least about 60%, preferably of at least about 70%, more preferably of at least about 80%, more preferably of at least about 90%, even more preferably of at least about 95%, even more preferably of at least about 99% to a sequence selected from the group consisting of SEQ ID NOs:10 to 205 or wherein the 3'-UTR element comprises or consists of a fragment of a nucleic acid sequence that has an identity of at least about 40%, preferably of at least about 50%, preferably of at least about 60%, preferably of at least about 70%, more preferably of at least about 80%, more preferably of at least about 90%, even more preferably of at least about 95%, even more preferably of at least about 99% to a sequence selected from the group consisting of SEQ ID NOs:10 to 205.~~

~~74. The method or the use according to claim 73, wherein the fragment exhibits a length of between 3 and about 500 nucleotides, preferably of between 5 and about 150 nucleotides, more preferably of between 10 and 100 nucleotides, even more preferably of between 15 and 90, most preferably of between 20 and 70.~~

~~75. The method or the use according to any one of claims 69 to 73, wherein the 3'-UTR element exhibits a length of between 3 and about 500 nucleotides, preferably of between 5 and about 150 nucleotides, more preferably of between 10 and 100 nucleotides, even more preferably of between 15 and 90, most preferably of between 20 and 70.~~

~~76~~20. A kit or kit of parts comprising an artificial ~~nucleic acid~~mRNA molecule according to any one of claims 1-~~27~~9, a vector according to any one of claims ~~28~~10 to ~~56~~13, a cell according to ~~any one of claims 57 to 59~~claim 14, and/or a pharmaceutical composition according to claim ~~60 or 61~~15.

~~77. The kit according to claim 76 further comprising instructions for use, cells for transfection, an adjuvant, a means for administration of the pharmaceutical composition, a pharmaceutically acceptable carrier and/or a pharmaceutically acceptable solution for dissolution or dilution of the artificial nucleic acid molecule, the vector, the cells or the pharmaceutical composition.~~