CLAIMS

1. An artificial nucleic acid molecule comprising
   a. at least one coding region encoding at least one CRISPR-associated protein;
   b. at least one 5′ untranslated region (5′ UTR) element derived from a 5' UTR of an HSD17B4 gene; and
   c. at least one 3′ untranslated region (3′ UTR) element derived from a 3' UTR of a GNAS gene.

2. The artificial nucleic acid molecule according to claim 1, wherein each of said genes comprises the naturally occurring DNA sequence, and homologs, variants, fragments, and corresponding RNA sequences thereof.

3. The artificial nucleic acid molecule according to any claim 1 or 2, wherein
   - said 5′UTR element derived from a HSD17B4 gene comprises or consists of a DNA sequence according to SEQ ID NO: 1 or a DNA sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the nucleic acid sequence according to SEQ ID NO: 1, or a fragment or a variant thereof; or an RNA sequence according to SEQ ID NO: 2, or an RNA sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the nucleic acid sequence according to SEQ ID NO: 2, or a fragment or a variant thereof; and
   - said 3′UTR element derived from a GNAS gene comprises or consists of a DNA sequence according to SEQ ID NO: 29, or a DNA sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the nucleic acid sequence according to SEQ ID NO: 29, or a fragment or variant thereof; an RNA sequence according to SEQ ID NO: 30, or an RNA sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the nucleic acid sequence according to SEQ ID NO: 30, or a fragment or a variant thereof.

4. The artificial nucleic acid molecule according to any one of claims 1 to 3, wherein the CRISPR-associated protein comprises CRISPR-associated wild-type proteins, homologs, variants, fragments and derivatives thereof, wherein said CRISPR-associated protein is preferably selected from Cas9, Cpf1 (Cas12), C2c1, C2c3, Cas13, CasX or CasY.

5. The artificial nucleic acid molecule according to any one of claims 1 to 4, said artificial nucleic acid comprising a nucleic acid sequence encoding a CRISPR-associated protein comprising or consisting of an amino acid sequence according to any one of SEQ ID NOs: 428-441; 10999-11001; 442-1345, or an amino acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the amino acid sequence according to any

one of SEQ ID NOs: 428-441; 10999-11001; 442-1345, or a variant or fragment of any of these sequences, wherein said CRISPR-associated protein derivatives preferably comprise at least one further effector domain, optionally selected from KRAB, CSD, WRPW, VP64, p65AD and Mxi.

6. The artificial nucleic acid molecule according to any one of claims 1 to 5 wherein said artificial nucleic acid further comprises at least one nucleic acid sequence encoding a nuclear localization signal (NLS), optionally selected from an NLS comprising or consisting of an amino acid sequence according to SEQ ID NO: 426; 427; 10575; 381; 382; 384; 11957; 11958-11964, or an amino acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the amino acid sequence according to SEQ ID NO: 426; 427; 10575; 381; 382; 384; 11957; 11958-11964, and an NLS comprising or consisting of an amino acid sequence according to SEQ ID NO: 426; 427; 10575; 381; 382; 384; 11957; 11958-11964, or an amino acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the amino acid sequence according to SEQ ID NO: 426; 427; 10575; 381; 382; 384; 11957; 11958-11964 or a NLS having an amino acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the amino acid sequence according to: 12021-14274, or wherein said said artificial nucleic acid further comprises at least one nucleic acid sequence encoding a protein or peptide tag.

7. The artificial nucleic acid molecule according to any one of claims 1 to 6, wherein the at least one coding region of said artificial nucleic acid molecule comprises or consists of a nucleic acid sequence according to any one of SEQ ID NO: 411; 2540-2553; 11117-11119; 11355-11357; 2554-3457; 1380-1393; 3700-3713; 4860-4873; 6020-6033; 7180-7193; 8340-8353; 11237-11239; 11473-11475; 11591-11593; 11709-11711; 11827-11829; 11945-11947; 1394-2297; 3714-4617; 4874-5777; 6034-6937; 7194-8097; 8354-9257; 412; 3474-3887; 2314-2327; 4634-4647; 5794-5807; 6954-6967; 8114-8127; 413-425; 3490-3503; 3506-3519; 3522-3535; 3538-3551; 3554-3567; 3570-3583; 3586-3599; 3602-3615; 3618-3631; 3634-3647; 3650-3663; 3666-3679; 3682-3695; 9514-9527; 9626-9639; 9738-9751; 9850-9863; 9962-9975, 10074-10087; 10186-10199; 10298-10311; 2330-2343; 2346-2359; 2362-2375; 2378-2391; 2394-2407; 2410-2423; 2426-2439; 2442-2455; 2458-2471; 2474-2487; 2490-2503; 2506-2519; 2522-2535; 9498-9511; 9610-9623; 9722-9735; 9834-9847; 9946-9959; 10058-10071; 10170-10183-10282-10295; 4650-4663; 4666-4679; 4682-4695; 4698-4711; 4714-4727; 4730-4743; 4746-4759; 4762-4775; 4778-4791; 4794-4807; 4810-4823; 4826-4839; 4842-4855; 9530-9543; 9642-9655; 9754 -9767; 9866 -9879; 9978-9991; 10090-10103; 10202-10215; 10314-10327; 5810-5823; 5826-5839; 5842-5855; 5858-5871; 5874-5887; 5890-5903; 5906-5919; 5922-5935; 5938-5951; 5954-5967; 5970-5983, 5986-5999; 6002-6015; 9546-9559; 9658-9671; 9770-9783; 9882-9895; 9994-10007; 10106-10119; 10218-10231; 10330-10343; 6970-6983; 6986-6999; 7002-7015; 7018-7031; 7034-7047; 7050-7063; 7066 -7079; 7082-7095; 7098-7111; 7114-7127; 7130-7143; 7146-7159; 7162-7175; 9562-9575; 9674-9687; 9786-9799; 9898-9911; 10010-10023; 10122-10135; 10234-10247; 10346-10359; 8130-8143; 8146-8159; 8162-8175; 8178-8191; 8194-8207; 8210-8223; 8226-8239; 8242-8255; 8258-8271; 8274-8287; 8290-8302; 8306-8319; 8322-8335; 9578-9591; 9690-9703; 9802-9815; 9914-9927; 10026-10039; 10138-10151; 10250 -10263; 10362-10375; 9290-9303; 9306-9319; 9322-9335; 9338-9351; 9354-9367; 9370-9383; 9386-9399; 9402-9415; 9418-9431; 9434-9447; 9450-9463; 9466-9479; 9482-9495; 9594 -9607; 9706-9719; 9818-9831; 9930-9943; 10042-10055; 10154-10167; 10266-10279; 10378-10391; or a

nucleic acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the any one of said nucleic acid sequences, or

wherein said artificial nucleic acid molecule comprises a nucleic acid sequence according to any one of SEQ ID NOs: 10552; 3458-3459; 3460-3473; 2298-2299; 4618-4619; 5778-5779; 6938-6939; 8098-8099; 9258-9259 ; 2300-2313; 4620-4633; 5780-5793; 6940-6953; 8100-8113; 9260-9273; 3488-3489; 10396; 2328-2329; 10395; 4648-4649; 10397; 5808-5809; 10398; 6968-6969; 10399; 8128-8129; 10400; 9274-9287; 3504-3505; 3520-3521; 3536-3537; 3552-3553; 3568-3669; 3584-3585; 3600-3601; 3616-3617; 3632-3633; 3648-3649; 3664-3665; 3680-3681; 3696-3697; 9528-9529; 9640-9641; 9752-9753; 9864-9865; 9976-9977; 10088-10089; 10200-10201; 10312-10313; 10403; 10410; 10417; 10424; 10431; 10438; 10445; 10452; 10459; 10466; 10473; 10480; 10487; 10494; 10501; 10508; 10515; 10522; 10529; 10536; 10543; 2344-2345; 2360-2361; 2376-2377; 2392-2393; 2408-2409; 2424-2425; 2440-2441; 2456-2457; 2472-2473; 2489-2490; 2504-2505; 2520-2521; 2536-2537; 9512-9513; 9624-9625; 9736-9737; 9848-9849; 9960-9961; 10072-10073; 10184-10185; 10296-10297; 10402; 10409; 10416; 10423; 10430; 10437; 10444; 10451; 10458; 10465; 10472; 10479; 10486; 10493; 10500; 10507; 10514; 10521; 10528; 10535; 10542; 4664-4665; 4680-4681; 4696-4697; 4712-4713; 4728-4729; 4744-4745; 4760-4761; 4776-4777; 4792-4793; 4808-4809; 4824-4825; 4840-4841; 4856-4857; 9544-9545; 9656-9657; 9768-9769; 9880-9881; 9992-9993; 10104-10105; 10216-10217; 10328-10329; 10404; 10411; 10418; 10425; 10432; 10439; 10446; 10453; 10460; 10467; 10474; 10481; 10488; 10495; 10502; 10509; 10516; 10523; 10530; 10537; 10544; 5824-5825; 5840-5841; 5856-5857; 5872-5873; 5888-5889; 5904-5905; 5920-5921; 5936-5937; 5952-5953; 5968-5969; 5984-5985; 6000-6001; 6016-6017; 9560-9561; 9672-9673; 9784-9785; 9896-9897; 10008-10009; 10120-10121; 10232-10233; 10344-10345; 10405; 10412; 10419; 10426; 10433; 10440; 10447; 10454; 10461; 10468; 10475; 10482; 10489; 10496; 10503; 10510; 10517; 10524; 10531; 10538; 10545; 7033; 7048-7049; 7064-7065; 7080-7081; 7096-7097; 7112-7113; 7128-7129; 7144-7145; 7160-7161; 7176-7177; 9576-9577; 9688-9689; 9800-9801; 9912-9913; 10024-10025; 10136-10137; 10248-10249; 10360-10361; 10406; 10413; 10420; 10427; 10434; 10441; 10448; 10455; 10462; 10469; 10476; 10483; 10490; 10497; 10504; 10511; 10518; 10525; 10532; 10539; 10546; 8144-8145; 8160-8160; 8176-8177; 8192-8193; 8208-8209; 8224-8225; 8240-8241; 8256-8257; 8272-8273; 8288 -8289; 8304-8305; 8320-8321; 8336-8337; 9592-9593; 9704-9705; 9816-9817; 9928-9929; 10040-10041; 10152-10153; 10264-10265; 10376-10377; 10407; 10414; 10421; 10428; 10435; 10442; 10449; 10456; 10463; 10470; 10477; 10484; 10491; 10498; 10505; 10512; 10519; 10526; 10533; 10540; 10547; 9288-9289; 10401; 10553; 10582-10583; 10579-10580; 10585-10586; 10588-10589; 10591-10592; 10594-10595; 10597-10598; 10554-10574; 10601; 10602; 10615; 10616; 10629; 10630; 10643; 10644; 10657; 10658; 10671; 10672; 10685; 10686; 10699; 10700; 10713; 10714; 10727; 10728; 10741; 10742; 10755; 10756; 10769; 10770; 10783; 10784; 10797; 10798; 10811; 10812; 10825; 10826; 10839; 10840; 10853; 10854; 10867; 10868; 10881; 10882; 10603; 10604; 10617; 10618; 10631; 10632; 10645; 10646; 10659; 10660; 10673; 10674; 10687; 10688; 10701; 10702; 10715; 10716; 10729; 10730; 10743; 10744; 10757; 10758; 10771; 10772; 10785; 10786; 10799; 10800; 10813; 10814; 10827; 10828; 10841; 10842; 10855; 10856; 10869; 10870; 10883; 10884; 10605; 10606; 10619; 10620; 10633; 10634; 10647; 10648; 10661; 10662; 10675; 10676; 10689; 10690; 10703; 10704; 10717; 10718; 10731; 10732; 10745; 10746; 10759; 10760; 10773; 10774; 10787; 10788; 10801; 10802; 10815; 10816; 10829; 10830; 10843; 10844; 10857; 10858; 10871; 10872; 10885;

10886; 10607; 10608; 10621; 10622; 10635; 10636; 10649; 10650; 10663; 10664; 10677; 10678; 10691; 10692; 10705; 10706; 10719; 10720; 10733; 10734; 10747; 10748; 10761; 10762; 10775; 10776; 10789; 10790; 10803; 10804; 10817; 10818; 10831; 10832; 10845; 10846; 10859; 10860; 10873; 10874; 10887; 10888; 10609; 10610; 10623; 10624; 10637; 10638; 10651; 10652; 10665; 10666; 10679; 10680; 10693; 10694; 10707; 10708; 10721; 10722; 10735; 10736; 10749; 10750; 10763; 10764; 10777; 10778; 10791; 10792; 10805; 10806; 10819; 10820; 10833; 10834; 10847; 10848; 10861; 10862; 10875; 10876; 10889; 10890; 10611; 10612; 10625; 10626; 10639; 10640; 10653; 10654; 10667; 10668; 10681; 10682; 10695; 10696; 10709; 10710; 10723; 10724; 10737; 10738; 10751; 10752; 10765; 10766; 10779; 10780; 10793; 10794; 10807; 10808; 10821; 10822; 10835; 10836; 10849; 10850; 10863; 10864; 10877; 10878; 10891; 10892; 9304-9305; 9320-9321; 9336-9337; 9352-9353; 9368-9369; 9384-9385; 9400-9401; 9416-9417; 9432-9433; 9448-9449; 9464-9465; 9480-9481; 9496-9497; 9608-9609; 9720-9721; 9832-9833; 9944-9945; 10056-10057; 10168-10169; 10280-10281; 10392-10393; 10408; 10415; 10422; 10429; 10436; 10443; 10450; 10457; 10464; 10471; 10478; 10485; 10492; 10499; 10506; 10513; 10520; 10527; 10534; 10541; 10548 , or a nucleic acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the any one of said nucleic acid sequences, or wherein said artificial nucleic acid molecule comprises or consists of a nucleic acid sequence according to any one of SEQ ID NOs: 11011-11042; 11249-1128011131-11162; 11367-11398; 11485- 11516; 11603-11634; 11721-11752; 11839-11870; 11044-11116; 11282-11354; 11164-11236; 11400-11472; 11518-11590; 11636-11708; 11754-11826; 11872-11944; 11011-11042; 11249-11280; 11044-11116; 11282-11354 11131-11162; 11367-11398; 11485- 11516; 11603-11634; 11721-11752; 11839-11870; 11164-11236; 11400-11472; 11518-11590; 11636-11708; 11754-11826; 11872-11944; 11120-11122; 11240; 11241; 11358; 11359; 11476; 11477; 11594; 11595; 11712; 11713; 11830; 11831; 11948; 11949; 11123-11130; 11360-11366; 11242-11248; 11478-11484; 11596-11602; 11714-11720; 11832-11838; 11950-11956 , or a nucleic acid sequence having, in increasing order of preference, at least 50%, 60%, 70%, 80%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the any one of said nucleic acid sequences.

8. The artificial nucleic acid molecule according to any one of claims 1 to 7, wherein said artificial nucleic acid molecule is an RNA, wherein the RNA is preferably mono-, bi-, or multicistronic, and/or wherein the RNA preferably is an mRNA, a viral RNA or a replicon RNA.

9. The artificial nucleic acid, preferably RNA, according to any one of claims 1 to 8, wherein said artificial nucleic acid is a modified nucleic acid, preferably a stabilized nucleic acid, wherein more preferably

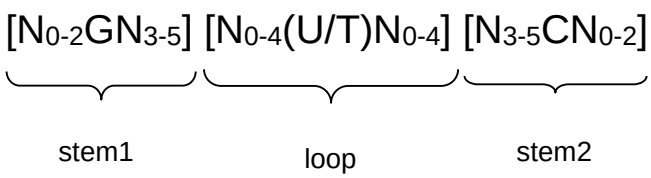
- the G/C content of the at least one coding region of the artificial nucleic acid is increased compared to the G/C content of the corresponding coding sequence of the corresponding wild-type artificial nucleic acid, and/or wherein

- the C content of the at least one coding region of the artificial nucleic acid is increased compared to the C content of the corresponding coding sequence of the corresponding wild-type artificial nucleic acid, and/or wherein

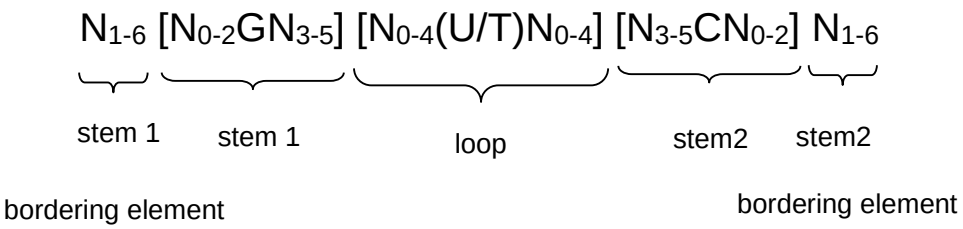
- the codons in the at least one coding region of the artificial nucleic acid are adapted to human codon usage, wherein the codon adaptation index (CAI) is preferably increased or maximised in the at least one coding sequence of the artificial nucleic acid,

- wherein the amino acid sequence encoded by the artificial nucleic acid is preferably not being modified compared to the amino acid sequence encoded by the corresponding wild-type artificial nucleic acid, and/or which comprises a 5'-CAP structure, preferably m7GpppN or Cap1, and/or which comprises at least one histone stem-loop, wherein the at least one histone stem-loop preferably comprises a nucleic acid sequence according to the following formulae (I) or (II):

formula (I) (stem-loop sequence without stem bordering elements):



formula (II) (stem-loop sequence with stem bordering elements):



wherein:

stem1 or stem2 bordering elements N_{1-6}	is a consecutive sequence of 1 to 6, preferably of 2 to 6, more preferably of 2 to 5, even more preferably of 3 to 5, most preferably of 4 to 5 or 5 N, wherein each N is independently from another selected from a nucleotide selected from A, U, T, G and C, or a nucleotide analogue thereof;
stem1 [$N_{0-2}GN_{3-5}$]	is reverse complementary or partially reverse complementary with element stem2, and is a consecutive sequence between of 5 to 7 nucleotides; wherein N_{0-2} is a consecutive sequence of 0 to 2, preferably of 0 to 1, more preferably of 1 N, wherein each N is independently from another selected from a nucleotide

	selected from A, U, T, G and C or a nucleotide analogue thereof;
	wherein N_{3-5} is a consecutive sequence of 3 to 5, preferably of 4 to 5, more preferably of 4 N, wherein each N is independently from another selected from a nucleotide selected from A, U, T, G and C or a nucleotide analogue thereof, and
	wherein G is guanosine or an analogue thereof, and may be optionally replaced by a cytidine or an analogue thereof, provided that its complementary nucleotide cytidine in stem2 is replaced by guanosine;
loop sequence $[N_{0-4}(U/T)N_{0-4}]$	is located between elements stem1 and stem2, and is a consecutive sequence of 3 to 5 nucleotides, more preferably of 4 nucleotides;
	wherein each N_{0-4} is independent from another a consecutive sequence of 0 to 4, preferably of 1 to 3, more preferably of 1 to 2 N, wherein each N is independently from another selected from a nucleotide selected from A, U, T, G and C or a nucleotide analogue thereof; and
	wherein U/T represents uridine, or optionally thymidine;
stem2 $[N_{3-5}CN_{0-2}]$	is reverse complementary or partially reverse complementary with element stem1, and is a consecutive sequence between of 5 to 7 nucleotides;
	wherein N_{3-5} is a consecutive sequence of 3 to 5, preferably of 4 to 5, more preferably of 4 N, wherein each N is independently from another selected from a nucleotide selected from A, U, T, G and C or a nucleotide analogue thereof;
	wherein N_{0-2} is a consecutive sequence of 0 to 2, preferably of 0 to 1, more preferably of 1 N, wherein each N is independently from another selected from a nucleotide selected from A, U, T, G and C or a nucleotide analogue thereof; and

wherein C is cytidine or an analogue thereof, and may be optionally replaced by a guanosine or an analogue thereof provided that its complementary nucleotide guanosine in stem1 is replaced by cytidine;

wherein

stem1 and stem2 are capable of base pairing with each other

forming a reverse complementary sequence, wherein base pairing may occur between stem1 and stem2, or

forming a partially reverse complementary sequence, wherein an incomplete base pairing may occur between stem1 and stem2, or wherein the at least one histone stem-loop preferably comprises a nucleic acid sequence according to the following formulae (Ia) or (IIa):

formula (Ia) (stem-loop sequence without stem bordering elements):

$$\underbrace{[N_{0-1}GN_{3-5}]}_{\text{stem 1}}\ \underbrace{[N_{1-3}(U/T)N_{0-2}]}_{\text{loop}}\ \underbrace{[N_{3-5}CN_{0-1}]}_{\text{stem2}}$$

formula (IIa) (stem-loop sequence with stem bordering elements):

$$\underbrace{N_{2-5}}_{\text{stem 1}}\ \underbrace{[N_{0-1}GN_{3-5}]}_{\text{stem 1}}\ \underbrace{[N_{1-3}(U/T)N_{0-2}]}_{\text{loop}}\ \underbrace{[N_{3-5}CN_{0-1}]}_{\text{stem2}}\ \underbrace{N_{2-5}}_{\text{stem2}}$$

bordering element bordering element

10. The artificial nucleic acid, preferably RNA, according to any one of claims 1 to 9, which comprises, preferably in 5’ to 3’ direction, the following elements:

a) a 5’-CAP structure, preferably m7GpppN or Cap1

b) a 5'-UTR element, which comprises or consists of a nucleic acid sequence, which is derived from a 5'-UTR as defined in any one of claims 1 to 5, preferably comprising an nucleic acid sequence corresponding to the nucleic acid sequence according to SEQ ID NO: 1 or a homolog, fragment or variant thereof,

c) at least one coding sequence as defined in any one of claims 7 to 13

d) a 3'-UTR element, which comprises or consists of a nucleic acid sequence, which is derived from a 3'-UTR as defined in any one of claims 1 to 5, preferably comprising a nucleic acid sequence

corresponding to the nucleic acid sequence according to SEQ ID NO: 29 or a homolog, a fragment or a variant thereof,

e) optionally a poly(A) tail, preferably consisting of 10 to 1000, 10 to 500, 10 to 300, 10 to 200, 10 to 100, 40 to 80 or 50 to 70 adenosine nucleotides,

f) optionally a poly(C) tail, preferably consisting of 10 to 200, 10 to 100, 20 to 70, 20 to 60 or 10 to 40 cytosine nucleotides, and

g) optionally a histone stem-loop (HSL).

11. Composition comprising the artificial nucleic acid molecule, preferably an RNA, according to any one of claims 1 to 9 and a pharmaceutically acceptable carrier and/or excipient.

12. The composition according to claim 11, wherein the artificial nucleic acid molecule, preferably RNA, is complexed with one or more cationic or polycationic compounds, preferably with cationic or polycationic polymers, cationic or polycationic peptides or proteins, e.g. protamine, cationic or polycationic polysaccharides and/or cationic or polycationic lipids, wherein the N/P ratio of the artificial nucleic acid molecule, preferably RNA, to the one or more cationic or polycationic peptides or proteins is preferably in the range of about 0.1 to 10, including a range of about 0.3 to 4, of about 0.5 to 2, of about 0.7 to 2 and of about 0.7 to 1.5, and/or wherein the artificial nucleic acid molecule, preferably RNA, is preferably complexed with one or more lipids, thereby forming liposomes, lipid nanoparticles and/or lipoplexes, and/or further preferably comprising at least one guide RNA (gRNA) or a nucleic acid encoding the same, said gRNA being capable of targeting the CRISPR-associated protein to a target DNA sequence of interest, or a regulatory element operably linked thereto.

13. Kit, preferably kit of parts, comprising the artificial nucleic acid molecule, preferably RNA, according to any one of claims 1 to 10 or the composition according to claim 11 or 12, and optionally a liquid vehicle and/or optionally technical instructions with information on the administration and dosage of the artificial nucleic acid molecule or the composition, wherein the kit preferably contains as a part Ringer-Lactate solution and/or preferably further comprising a guide RNA (gRNA) or a nucleic acid encoding the same, said gRNA being capable of targeting the CRISPR-associated protein to a target DNA sequence of interest, or a regulatory element operably linked thereto.

14. The artificial nucleic acid molecule, preferably RNA, according to any one of claims 1 to 10, the composition according to any one of claims 11 or 12, or the kit according to claim 13 for use as a medicament, preferably for use in gene therapy, or preferably for use in a method of modulating the expression of a gene of interest, comprising administering to a patient in need thereof (a) said artificial nucleic acid molecule, preferably RNA, said composition or said kit and (b) a guide RNA (gRNA) or a nucleic acid encoding the same, said sgRNA being capable of targeting the CRISPR-associated protein to a gene of interest, or a regulatory element operably linked thereto, or preferably for use as a medicament or for use in gene therapy in a disease, disorder or condition amenable to treatment by expression of CRISPR-associated protein encoded by the at least one coding sequence, or preferably for use as a medicament or for use in gene therapy in a disease, disorder or condition amenable by knocking in, knocking out or manipulating a gene of interest, or by modulating the expression of a

gene of interest, wherein said disease, disorder or condition is more preferably selected from genetic diseases, cancer, autoimmune diseases, inflammatory diseases, and infectious diseases.

15. In vitro use of the artificial nucleic acid molecule, preferably RNA, according to any one of claims 1 to 10, the composition according to any one of claims 11 or 12, or the kit according to claim 13 for increasing the expression of said encoded CRISPR-associated protein.

16. An in vitro method for modulating the expression of a gene of interest comprising the steps of:

a) providing an artificial nucleic acid molecule, preferably RNA, according to any one of claims 1 to 10;

b) providing a guide RNA (gRNA) or a nucleic acid encoding the same, said gRNA being capable of targeting the CRISPR-associated protein to a target DNA sequence of interest, or a regulatory element operably linked thereto,

c) contacting a cell or a tissue with said artificial nucleic acid molecule, preferably RNA, and said gRNA or nucleic acid encoding the same under conditions suitable to modulate expression efficacy of said gene of interest.

17. An in vitro method for increasing the expression efficacy of an artificial nucleic acid molecule, preferably RNA, comprising a coding region encoding a CRISPR-associated protein, said method comprising

(a) associating said coding region with a at least one 5’ UTR element derived from a 5' UTR of an HSD17B4 gene, or from a corresponding RNA sequence, homolog, a fragment or a variant thereof;

(b) associating said coding region with at least one 3’ UTR element derived from a 3' UTR of a GNAS gene, or from a corresponding RNA sequence, homolog, a fragment or a variant thereof; and

(c) obtaining an artificial nucleic acid molecule, preferably RNA, according to any one of claims 1 to 16.