

COMPOSITIONS AND METHODS FOR TREATING LEBER'S HEREDITARY OPTIC NEUROPATHY WITH NADH DEHYDROGENASE PROTEINS

CROSS-REFERENCE

[0001] This application claims the benefit of Chinese Application No. CN201911250082.4, filed on December 9, 2019, which is incorporated herein by reference in its entirety.

REFERENCE TO A SEQUENCE LISTING

[0002] The instant application contains a Sequence Listing which has been submitted in ASCII format via EFS-Web and is hereby incorporated by reference in its entirety. Said ASCII copy, created on December 4, 2020, is named WNBT-011_01WO_SeqList_ST25.txt and is about 303 kilobytes in size.

BACKGROUND

[0003] Leber's hereditary optic neuropathy (LHON) is a mitochondrially inherited (transmitted from mother to offspring) degeneration of retinal ganglion cells (RGCs) and their axons that leads to an acute or subacute loss of central vision; this affects predominantly young adult males. LHON is only transmitted through the mother, as it is primarily due to mutations in the mitochondrial (not nuclear) genome, and only the egg contributes mitochondria to the embryo. LHON is usually due to one of three pathogenic mitochondrial DNA (mtDNA) point mutations. These mutations are at nucleotide positions 11778 G to A (G11778A), 3460 G to A (G3460A) and 14484 T to C (T14484C), respectively in the NADH dehydrogenase subunit-4 protein (ND4), NADH dehydrogenase subunit-1 protein (ND1) and NADH dehydrogenase subunit-6 protein (ND6) subunit genes of complex I of the oxidative phosphorylation chain in mitochondria. Each mutation is believed to have significant risk of permanent loss of vision. It typically progresses within several weeks to several months without pain, until the binocular vision deteriorate to below 0.1, which seriously affects the quality of life of the patient. Two LHON mutants, G3460A and T14484C, results in the reduction of the patient's platelets isolated mitochondrial NADH dehydrogenase activity by 80%. Ninety percent of the Chinese LHON patients carry the G11778A mutation. The G11778A mutation changes an arginine into histidine in the ND4 protein, resulting the dysfunction and optic nerve damage in LHON patients. There is a need for developing compositions and methods for treating LHON with higher transfection efficiency and treatment efficacy.

SUMMARY

[0004] Disclosed here recombinant nucleic acids, pharmaceutical compositions, and methods for treating LHON. In some embodiments, disclosed herein is a recombinant nucleic acid, comprising: a mitochondrial targeting sequence; a mitochondrial protein coding sequence comprising a sequence that is at least 99% identical to SEQ ID NO: 11 or 12; and a 3'UTR nucleic acid sequence.

[0005] In some embodiments, the mitochondrial targeting sequence encodes a polypeptide comprising a peptide sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 129-159. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 2. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 3. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 4. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 5. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 1. In some embodiments, the mitochondrial protein coding sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 12. In some embodiments, the mitochondrial protein coding sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 11. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 111-125. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14. In some embodiments, the recombinant nucleic acid comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a

sequence selected from the group consisting of SEQ ID NO: 25-28, 39-42, 53-56, 67-70, and 81-84.

[0006] In some embodiments, the disclosure provides recombinant nucleic acids comprising a mitochondrial targeting sequence; a mitochondrial protein coding sequence comprising a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to SEQ ID NO: 11 or 12; and a 3'UTR nucleic acid sequence. In some embodiments, the mitochondrial targeting sequence comprises a sequence encodes a polypeptide selected from the group consisting of hsCOX10, hsCOX8, scRPM2, lcSirt5, tbNDUS7, ncQCR2, hsATP5G2, hsLACTB, spilv1, gmCOX2, crATP6, hsOPA1, hsSDHD, hsADCK3, osP0644B06.24-2, Neurospora crassa ATP9 (ncATP9), hsGHITM, hsNDUFAB1, hsATP5G3, crATP6_hsADCK3, ncATP9_ncATP9, zmLOC100282174, ncATP9_zmLOC100282174_spilv1_ncATP9, zmLOC100282174_hsADCK3_crATP6_hsATP5G3, zmLOC100282174_hsADCK3_hsATP5G3, ncATP9_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6_hsATP5G3, crATP6_hsADCK3_zmLOC100282174_hsATP5G3, hsADCK3_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6, ncATP9_zmLOC100282174_spilv1_GNFP_ncATP9, and ncATP9_zmLOC100282174_spilv1_lcSirt5_osP0644B06.24-2_hsATP5G2_ncATP9. In some embodiments, the mitochondrial targeting sequence encodes a polypeptide comprising a peptide sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 129-159. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 2 or 3. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 4. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 5. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 1. In some embodiments, the 3'UTR nucleic acid sequence is located at 3' of said mitochondrial targeting sequence. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence selected from the group consisting of hsACO2,

hsATP5B, hsAK2, hsALDH2, hsCOX10, hsUQCRRS1, hsNDUFV1, hsNDUFV2, hsSOD2, hsCOX6c, hslRP1, hsMRPS12, hsATP5J2, rnSOD2, and hsOXA1L. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 111-125. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14. In some embodiments, the mitochondrial targeting sequence is located at 5' of said 3'UTR nucleic acid sequence. In some embodiments, the mitochondrial targeting sequence is located at 3' of said mitochondrial targeting sequence. In some embodiments, the recombinant nucleic acid comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 25-28, 39-42, 53-56, 67-70, and 81-84. In some embodiments, the mitochondrial protein coding sequence encodes a mitochondrial protein comprising or consisting of a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 162.

[0007] In some embodiments, the disclosure provides recombinant nucleic acids comprising a mitochondrial protein coding sequence, wherein said mitochondrial protein coding sequence encodes a polypeptide comprising a mitochondrial protein, wherein said mitochondrial protein coding sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to SEQ ID NO: 11 or 12. In some embodiments, the recombinant nucleic acid further comprises a mitochondrial targeting sequence. In some embodiments, the mitochondrial targeting sequence comprises a sequence encodes a polypeptide selected from the group consisting of hsCOX10, hsCOX8, scRPM2, lcSirt5, tbNDUS7, ncQCR2, hsATP5G2, hsLACTB, spilv1, gmCOX2, crATP6, hsOPA1, hsSDHD, hsADCK3, osP0644B06.24-2, Neurospora crassa ATP9 (ncATP9), hsGHITM, hsNDUFAB1, hsATP5G3, crATP6_hsaADCK3, ncATP9_ncATP9, zmLOC100282174, ncATP9_zmLOC100282174_spilv1_ncATP9, zmLOC100282174_hsaADCK3_crATP6_hsaATP5G3, zmLOC100282174_hsaADCK3_hsaATP5G3, ncATP9_zmLOC100282174, hsaADCK3_zmLOC100282174_crATP6_hsaATP5G3, crATP6_hsaADCK3_zmLOC100282174_hsaATP5G3, hsaADCK3_zmLOC100282174, hsaADCK3_zmLOC100282174_crATP6, ncATP9_zmLOC100282174_spilv1_GNFP_ncATP9, and

ncATP9_zmLOC100282174_spilv1_lcSirt5_osP0644B06.24-2_hsATP5G2_ncATP9. In some embodiments, the mitochondrial targeting sequence encodes a polypeptide comprising a peptide sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 129-159. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 2. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 3. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 4. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 5. In some embodiments, the mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 1. In some embodiments, the recombinant nucleic acid further comprises a 3'UTR nucleic acid sequence. In some embodiments, the 3'UTR nucleic acid sequence is located at 3' of said mitochondrial targeting sequence. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence selected from the group consisting of hsACO2, hsATP5B, hsAK2, hsALDH2, hsCOX10, hsUQCRFS1, hsNDUFV1, hsNDUFV2, hsSOD2, hsCOX6c, hsIRP1, hsMRPS12, hsATP5J2, rnSOD2, and hsOXA1L. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 111-125. In some embodiments, the 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14. In some embodiments, the mitochondrial targeting sequence is located at 5' of said 3'UTR nucleic acid sequence. In some embodiments, the mitochondrial targeting sequence is located at 3' of said mitochondrial targeting sequence. In some embodiments, the recombinant nucleic acid comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 25-28, 39-42, 53-56, 67-70, and 81-84.

[0008] In some embodiments, the disclosure provides viral vectors comprising recombinant nucleic acid of the disclosure. In some embodiments, the viral vector is an adeno-associated virus (AAV) vector. In some embodiments, the AAV vector is selected from the group consisting of AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV9, AAV10, AAV11, AAV12, AAV13, AAV14, AAV15, and AAV16 vectors. In some embodiments, the AAV vector is a recombinant AAV (rAAV) vector. In some embodiments, the rAAV vector is rAAV2 vector.

[0009] In some embodiments, disclosed herein is a pharmaceutical composition, comprising an adeno-associated virus (AAV) comprising any recombinant nucleic acid disclosed herein. In some cases, the pharmaceutical composition further comprises a pharmaceutically acceptable excipient thereof. Also disclosed is a pharmaceutical composition, comprising the viral vector disclosed herein, and a pharmaceutically acceptable excipient thereof, wherein the viral vector comprises any recombinant nucleic acid disclosed herein.

[0010] In some cases, the pharmaceutically acceptable excipient comprises phosphate-buffered saline (PBS), α,α -trehalose dehydrate, L-histidine monohydrochloride monohydrate, polysorbate 20, NaCl, NaH₂PO₄, Na₂HPO₄, KH₂PO₄, K₂HPO₄, poloxamer 188, or any combination thereof. In some cases, the pharmaceutically acceptable excipient is selected from phosphate-buffered saline (PBS), α,α -trehalose dehydrate, L-histidine monohydrochloride monohydrate, polysorbate 20, NaCl, NaH₂PO₄, Na₂HPO₄, KH₂PO₄, K₂HPO₄, poloxamer 188, and any combination thereof. In some cases, the pharmaceutically acceptable excipient comprises poloxamer 188. In some cases, the pharmaceutically acceptable excipient comprises 0.0001%-0.01% poloxamer 188. In some cases, the pharmaceutically acceptable excipient comprises 0.001% poloxamer 188. In some cases, the pharmaceutically acceptable excipient further comprises one or more salts. In some cases, the one or more salts comprises NaCl, NaH₂PO₄, Na₂HPO₄, and KH₂PO₄. In some cases, the one or more salts comprises 80 mM NaCl, 5 mM NaH₂PO₄, 40 mM Na₂HPO₄, and 5 mM KH₂PO₄. In some cases, the pharmaceutical composition has a pH of 6-8. In some cases, the pharmaceutical composition has a pH of 7.2-7.4. In some cases, the pharmaceutical composition has a pH of 7.3. In some cases, the pharmaceutical composition has a viral titer of at least 1.0×10^{10} vg/mL. In some cases, the pharmaceutical composition has a viral titer of at least 5.0×10^{10} vg/mL.

[0011] In some cases, the pharmaceutical composition is subject to five freeze/thaw cycles, the pharmaceutical composition retains at least 60%, 70%, 80%, or 90% of a

viral titer as compared to the viral titer prior to the five freeze/thaw cycles. In some cases, the pharmaceutical composition, when administered to a patient with Leber's hereditary optic neuropathy, generates a higher average recovery of vision than a comparable pharmaceutical composition without the recombinant nucleic acid. In some cases, the pharmaceutical composition, when administered to a patient with Leber's hereditary optic neuropathy, generates a higher average recovery of vision than a comparable pharmaceutical composition comprising a recombinant nucleic acid as set forth in SEQ ID NO: 15.

[0012] In another aspect, disclosed herein is a method of treating an eye disorder, comprising administering any pharmaceutical composition disclosed herein to a patient in need thereof. In some cases, the eye disorder is Leber's hereditary optic neuropathy (LHON). In some cases, the method comprises administering the pharmaceutical composition to one or both eyes of the patient. In some cases, the pharmaceutical composition is administered via intraocular or intravitreal injection. In some cases, the pharmaceutical composition is administered via intravitreal injection. In some cases, about 0.01-0.1 mL of the pharmaceutical composition is administered via intravitreal injection. In some cases, about 0.05 mL of the pharmaceutical composition is administered via intravitreal injection.

[0013] In some cases, the method further comprises administering methylprednisolone to the patient. In some cases, the methylprednisolone is administered prior to the intravitreal injection of the pharmaceutical composition. In some cases, the methylprednisolone is administered orally. In some cases, the methylprednisolone is administered daily for at least 1, 2, 3, 4, 5, 6, or 7 days prior to the intravitreal injection of the pharmaceutical composition. In some cases, the methylprednisolone is administered daily. In some cases, the a daily dosage of about 32 mg/60 kg methylprednisolone is administered. In some cases, the methylprednisolone is administered after the intravitreal injection of the pharmaceutical composition. In some cases, the method further comprises administering creatine phosphate sodium to the patient. In some cases, the creatine phosphate sodium is administered intravenously. In some cases, the methylprednisolone is administered intravenously or orally. In some cases, the method comprises administering methylprednisolone intravenously for at least one day, which is followed by administering methylprednisolone orally for at least a week. In some cases, the method comprises administering methylprednisolone intravenously for about 3 days, which is followed by administering methylprednisolone orally for at least about 6 weeks. In some cases, the methylprednisolone is administered

intravenously at a daily dose of about 80 mg/60 kg. In some cases, the administering the pharmaceutical composition generates a higher average recovery of vision than a comparable pharmaceutical composition without the recombinant nucleic acid. In some cases, the administering the pharmaceutical composition generates a higher average recovery of vision than a comparable pharmaceutical composition comprising a recombinant nucleic acid as set forth in SEQ ID NO: 25.

INCORPORATION BY REFERENCE

[0014] All publications, patents, and patent applications mentioned in this specification are herein incorporated by reference to the same extent as if each individual publication, patent, or patent application was specifically and individually indicated to be incorporated by reference.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The novel features of the invention are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present invention will be obtained by reference to the following detailed description that sets forth illustrative embodiments, in which the principles of the invention are utilized, and the accompanying drawings of which:

[0016] FIG. 1 shows the codon usage frequency of non-optimized ND1 gene;

[0017] FIG. 2 shows the codon usage frequency of optimized ND1 gene;

[0018] FIG. 3 shows sequence alignment of optimized opt_ND1 gene (SEQ ID NO: 12) and ND1 gene (SEQ ID NO: 11);

[0019] FIG. 4 shows sequence alignment of COX10-opt_ND1 (SEQ ID NO: 168) and COX10-ND1 (SEQ ID NO: 169);

[0020] FIG. 5 shows the protein expression level analysis of COX10-opt_ND1 construct and COX10-ND1 construct in human HEK293 cells. Upper figure shows Western blotting result and lower figure is a bar graph showing analysis result;

[0021] FIG. 6 shows mitochondria localization assay of ND1 protein, displaying green fluorescence signal (left), MitoTracker signal (middle) and merged signals (right) showing mitochondria co-localization;

[0022] FIG. 7 shows ND1 expression dynamics in HEK293 cells transduced with rAAV2-ND1;

[0023] FIG. 8 shows change of ND1 mRNA expression level in C57BL/6J mice intravitreally injected with rAAV2-ND1;

[0024] FIG. 9 shows the ND1 protein expression level in HEK293 cells transduced with AAV2-ND1; and

[0025] FIG. 10 shows cytokine expression analysis (1-month post-injection and 2-month post-injection) of rabbit intravitreally injected with rAAV2-ND1.

DETAILED DESCRIPTION

Definitions

[0026] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of the ordinary skill in the art to which this disclosure belongs. Although any methods and materials similar or equivalent to those described herein can be used in the practice or testing of the formulations or unit doses herein, some methods and materials are now described. Unless mentioned otherwise, the techniques employed or contemplated herein are standard methodologies. The materials, methods and examples are illustrative only and not limiting.

[0027] As used herein and in the appended claims, the singular forms “a,” “and,” and “the” include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to “a compound” includes a plurality of such agents, and reference to “the salt” includes reference to one or more salts (or to a plurality of salts) and equivalents thereof known to those skilled in the art, and so forth.

[0028] As used herein, unless otherwise indicated, the term “or” can be conjunctive or disjunctive. As used herein, unless otherwise indicated, any embodiment can be combined with any other embodiment.

[0029] As used herein, unless otherwise indicated, some inventive embodiments herein contemplate numerical ranges. When ranges are present, the ranges include the range endpoints. Additionally, every subrange and value within the range is present as if explicitly written out.

[0030] The term “about” and its grammatical equivalents in relation to a reference numerical value and its grammatical equivalents as used herein can include a range of values plus or minus 10% from that value, such as a range of values plus or minus 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, or 1% from that value. For example, the amount “about 10” includes amounts from 9 to 11.

[0031] The term “comprising” (and related terms such as “comprise” or “comprises” or “having” or “including”) is not intended to exclude that in other certain embodiments, for example, an embodiment of any composition of matter, composition, method, or

process, or the like, described herein, may “consist of” or “consist essentially of” the described features.

[0032] The term “subject” refers to a mammal that has been or will be the object of treatment, observation or experiment. The term “mammal” is intended to have its standard meaning, and encompasses humans, dogs, cats, sheep, and cows, for example. The methods described herein can be useful in both human therapy and veterinary applications. In some embodiments, the subject is a human.

[0033] The term “treating” or “treatment” encompasses administration of at least one compound disclosed herein, or a pharmaceutically acceptable salt thereof, to a mammalian subject, particularly a human subject, in need of such an administration and includes (i) arresting the development of clinical symptoms of the disease, such as cancer, (ii) bringing about a regression in the clinical symptoms of the disease, such as cancer, and/or (iii) prophylactic treatment for preventing the onset of the disease, such as cancer.

[0034] The term “therapeutically effective amount” of a chemical entity described herein refers to an amount effective, when administered to a human or non-human subject, to provide a therapeutic benefit such as amelioration of symptoms, slowing of disease progression, or prevention of disease.

[0035] As used herein, unless otherwise indicated, the terms “nucleic acid” and “polynucleotide” can be used interchangeably.

Nucleic acid and polypeptide sequences

[0036] Table 1 discloses all the nucleic acid and polypeptide sequences disclosed herein. The first column shows the SEQ ID NO of each sequence. The second column describes the nucleic acid or polypeptide construct. For example, the construct COX10-opt_ND1-3'UTR (SEQ ID NO: 27) is a nucleic acid combining the nucleic acid sequences of COX10 (SEQ ID NO: 1), opt_ND1 (SEQ ID NO: 12), and 3'UTR (SEQ ID NO: 13) (from 5' to 3') without linker between the nucleic acid sequences.

Table 1 - nucleic acid and polypeptide sequences and SEQ ID NOs

SEQ ID NO:	description	sequence
1	COX10	ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACT
2	opt_COX10	ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACA
3	opt_COX10*	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACC
4	COX8	ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTCGTTG

5	OPA1	GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCTGTGAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGGATGTGGCGA CTACGTGGGGCCGCTGTGGCCTG
6	ND4	ATGCTAAAACTAATCGTCCCAACAATTATGTTACTACCACTGACATGGCTT TCCAAAAACACATGATTTGGATCAACACAACCACCCACAGCCTAATTATT AGCATCATCCCTCTACTATTTTTTAACCAAATCAACAACAACCTATTTAGCT GTTCCCCAACCTTTTCTCCGACCCCTAACAACCCCCCTCCTAATGCTA ACTACCTGGCTCCTACCCCTCACAATCATGGCAAGCCAACGCCACTTATC CAGTGAACCACTATCACGAAAAAACTCTACCTCTCTATGCTAATCTCCCT ACAAATCTCCTTAATTATGACATTACAGCCACAGAATAATCATGTTTTAT ATCTTCTTCGAAACCACACTTATCCCCACCTTGGCTATCATCACCAGTGG GGCAACCAGCCAGAACGCGCTGAACGCAGGCACATACCTTCTATTCTACAC CCTAGTAGGCTCCCTTCCCCTACTCATCGCACTAATTTACACTCACAACAC CCTAGGCTCACTAAACATTCTACTACTCACTCTCACTGCCCAAGAACTATC AACTCCTGGGCCAACAACCTTAATGTGGCTAGCTTACACAATGGCTTTTAT GGTAAAGATGCCTCTTTACGGACTCCACTTATGGCTCCCTAAAGCCCATG TCGAAGCCCCCATCGCTGGGTCAATGGTACTTGCCGCGAGTACTCTAAAA CTAGGCGGCTATGGTATGATGCGCCTCACACTCATTCTCAACCCCTGAC AAAACACATGGCCTACCCCTTCTTGTACTATCCCTATGGGGCATGATTAT GACAAGTCCATCTGCCTACGACAAACAGACCTAAAAATCGCTCATTGCA ACTCTTCAATCAGCCACATGGCCCTCGTAGTAACAGCCATTCTCATCCAA ACCCCTGGAGCTTCACCGGCGCAGTCATTCTCATGATCGCCACGCGGC TTACATCCTCATTACTATTCTGCCTAGCAAACCTCAAACACGCACTC ACAGTCGCATCATGATCCTCTCTCAAGGACTTCAAACCTCTACTCCCACTAA TGGCTTTTTGTGGCTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCC ACTATTAACCTACTGGGAGAACTCTCTGTGCTAGTAACCACGTTCTCCTG GTCAAATATCACTCTCCTACTTACAGGACTCAACATGCTAGTCACAGCCCT ATACTCCCTCTACATGTTTACCACAACACAATGGGGCTCACTCACCACCC ACATTAACAACATGAAACCCCTCATTACACGAGAGAAAACACCCTCATGTTCA TGCACCTATCCCCATTCTCCTCCTATCCCTCAACCCCGACATCATTACC GGGTTTTCTCTTAA
7	opt_ND4	ATGCTGAAGCTGATCGTGCCCAACCATCATGCTGCTGCCTCTGACCTGGCT GAGCAAGAAACACATGATCTGGATCAACACCACCACGCACAGCCTGATCA TCAGCATCATCCCTCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTCA GCTGCAGCCCCACCTTCAGCAGCGACCCTCTGACAACACCTCTGCTGAT GCTGACCACCTGGCTGCTGCCCCCTCACAATCATGGCCTCTCAGAGACAC CTGAGCAGCGAGCCCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGA TCTCCCTGCAGATCTCTGATCATGACCTTACCGCCACCGAGCTGATC ATGTTCTACATCTTTTTCGAGACAACGCTGATCCCCACACTGGCCATCATC ACCAGATGGGGCAACCAGCCTGAGAGACTGAACGCCGGCACCTACTTTC TGTTCTACACCCTCGTGGGCAGCCTGCCACTGCTGATTGCCCTGATCTAC AOCACAAACACCCTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAG CCCAAGAGCTGAGCAACAGCTGGGCCAACAATCTGATGTGGCTGGCCTA CACAATGGCCTTCATGGTCAAGATGCCCCCTGTACGGCCTGCACCTGTGG CTGCCTAAAGCTCATGTGGAAGCCCTATCGCCGGCTCTATGGTGCTGG CTGCAGTGCTGCTGAAACTCGGCGGCTACGGCATGATGCGGCTGACCCT GATTCTGAATCCCTGACCAAGCACATGGCCTATCCATTTCTGGTGCTGA GCCTGTGGGGCATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGA TCTGAAGTCCCTGATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTG GTCACCGCCATCCTGATTCAGACCCCTTGGAGCTTTACAGGCGCCGTGAT CCTGATGATTGCCACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCA ACAGCAACTACGAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGG CCTGCAGACCCTCCTGCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTC TGGCCAATCTGGCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAG CGTGCTGGTCAACCATTACAGCTGGTCCAATATCACCCCTGCTGCTACCG GCCTGAACATGCTGGTTACAGCCCTGTACTCCCTGTACATGTTACACCAC ACACAGTGGGGAAGCCTGACACACCACATCAACAATATGAAGCCCAGCTT

		CACCCGCGAGAACACCCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGC TGTCCCTGAATCCTGATATCATCACCGGCTTCTCCAGCTGA
8	opt_ND4*	ATGCTGAAGCTGATCGTGCCCACCATCATGCTGCTGCCCTGACCTGGC TGAGCAAGAAGCACATGATCTGGATCAACACCACCACCCACAGCCTGATC ATCAGCATCATCCCCCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTC AGCTGCAGCCCCACCTTCAGCAGCGACCCCTGACCACCCCTGCTGA TGCTGACCACCTGGCTGCTGCCCTGACCATCATGGCCAGCCAGCGCCA CCTGAGCAGCGAGCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTG ATCAGCCTGCAGATCAGCCTGATCATGACCTTACCGCCACCGAGCTGAT CATGTTCTACATCTTCTTCGAGACCACCCTGATCCCCACCCTGGCCATCA TCACCCGCTGGGGCAACCAGCCCGAGCGCCTGAACGCCGGCACCTACTT CCTGTTCTACACCTGGTGGCAGCCTGCCCTGCTGATCGCCCTGATC TACACCACAACACCCTGGGCAGCCTGAACATCCTGCTGCTGACCCTGA CCGCCAGGAGCTGAGCAACAGCTGGGCCAACAACCTGATGTGGCTGG CCTACACCATGGCCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCT GTGGCTGCCCAAGGCCCAAGTGGAGGCCCTCATCGCCGGCAGCATGGT GCTGGCCGCGCTGCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCT GACCCTGATCCTGAACCCCTGACCAAGCACATGGCCTACCCCTTCCTG GTGCTGAGCCTGTGGGGCATGATCATGACCAGCAGCATCTGCCTGCGCC AGACCGACCTGAAGAGCCTGATCGCCTACAGCAGCATCAGCCACATGGC CCTGGTGGTGACCGCCATCCTGATCCAGACCCCTGGAGCTTACCGGC GCCGTGATCCTGATGATCGCCACGGCCTGACCAGCAGCCTGCTGTTCT GCCTGGCCAACAGCAACTACGAGCGCACCCACAGCCGCATCATGATCCT GAGCCAGGGCCTGCAGACCCTGCTGCCCTGATGGCCTTCTGGTGGCTG CTGGCCAGCCTGGCCAACCTGGCCCTGCCCCCACCATCAACCTGCTGG GCGAGCTGAGCGTGTGGTGACCACTTCAGCTGGAGCAACATCACCT GCTGCTGACCGGCCTGAACATGCTGGTGACCGCCCTGTACAGCCTGTAC ATGTTACCAACCACCCAGTGGGGCAGCCTGACCCACCACATCAACAAC GAAGCCCAGCTTCACCCGCGAGAACACCCTGATGTTTCATGCACCTGAGC CCCATCCTGCTGCTGAGCCTGAACCCCGACATCATCACCGGCTTCAGCA GCTAA
9	ND6	ATGATGTATGCTTTGTTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTG GGGTTTTCTTCTAAGCCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTT AGCGGTGTGGTCGGGTGTGTTATTATTCTGAATTTGGGGGAGGTTATAT GGGTTTAATGGTTTTTTAATTTATTTAGGGGGAATGATGGTTGTCTTTGG ATATACTACAGCGATGGCTATTGAGGAGTATCCTGAGGCATGGGGGTCA GGGTTGAGGTCTTGGTGAGTGTGTTTATGAGTGGGTTAGCGATGGAGGTAG GATTGGTGCTGTGGGTGAAAGAGTATGATGGGGTGGTGGTTGTGGTAAA CTTTAATAGTGTAGGAAGCTGGATGATTTATGAAGGAGAGGGGTCAGGGT TGATTCGGGAGGATCCTATTGGTGCGGGGGCTTTGTATGATTATGGGCGT TGGTTAGTAGTAGTTACTGGTTGACATTGTTTGTGTTGGTGTATATATTGTA ATTGAGATTGCTCGGGGGAATTAG
10	opt_ND6	ATGATGTACGCCCTGTTCTGCTGAGCGTGCGGCTGGTGTGGGCTTCG TGGGCTTCAGCAGCAAGCCCAGCCCCATCTACGGCGGCCTGGTGTGAT CGTGAGCGGCGTGGTGGGCTGCGTGATCATCCTGAACCTTCGGCGGCGG CTACATGGGCCTGATGGTGTCTGATCTACCTGGGCGGCATGATGGTG GTGTTCTGGCTACACCACCGCCATGGCCATCGAGGAGTACCCCGAGGCCT GGGGCAGCGGCGTGGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCC ATGGAGGTGGGCCTGGTGTGTTGGTGAAGGAGTACGACGGCGTGGTG GTGGTGGTGAACCTCAACAGCGTGGGCAGCTGGATGATCTACGAGGGCG AGGGCAGCGGCCTGATCCGCGAGGACCCATCGGCGCCGGCGCCCTGT ACGACTACGGCCGCTGGCTGGTGGTGGTGACCGGCTGGACCCTGTTCTG GGCGTGTACATCGTGATCGAGATCGCCCGCGGCAACTAA

11	ND1	<p>ATGCCCATGGCCAACCTCCTACTCCTCATTGTACCCATTCTAATCGCAATG GCATTCCCTAATGCTTACCGAACGAAAAATTCTAGGCTATATGCAACTACGC AAAGGCCCCCAACGTTGTAGGCCCTACGGGCTACTACAACCCCTTCGCTG ACGCCATGAACTCTTCACCAAAGAGCCCCCTAAACCCGCCACATCTACC ATCACCCCTCTACATCACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCT ACTATGGACCCCCCTCCCCATGCCCAACCCCTGGTCAACCTCAACCTAG GCCTCCTATTTATTCTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCT GGTCAGGGTGGGCATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCG AGCAGTAGCCCAAACAATCTCATATGAAGTCACCCCTAGCCATCATTCTACT ATCAACATTACTAATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAAC ACAAGAACACCTCTGGTTACTCCTGCCATCATGGCCCTTGGCCATGATGT GGTTTATCTCCACACTAGCAGAGACCAACCGAACCCCTTCGACCTTGCC GAAGGGGAGTCCGAAGTAGTCTCAGGCTTCAACATCGAATACGCCGCGAG GCCCCCTTCGCCCTATTCTTTCATGGCCGAATACACAAACATTATTATGATGA ACACCCTCACCACTACAATCTTCCTAGGAACAACATATGACGCACTCTCC CCTGAACTCTACACAACATATTTTGTACCAAGACCCTACTTCTAACCTCC CTGTTCTTATGGATTGGAACAGCATACCCCCGATTCCGCTACGACCAACT CATGCACCTCCTATGGAAAACTTCCTACCACTCACCTAGCATTACTTAT GTGGTATGTCTCCATGCCATTACAATCTCCAGCATTCCCCCTCAAACCTA A</p>
12	opt_ND1	<p>ATGCCCATGGCCAACCTGCTGCTGCTGATCGTGCCCATCCTGATCGCCAT GGCCTTCCTGATGCTGACCGAGCGCAAGATCCTGGGCTACATGCAGCTG CGCAAGGGGCCCAACGTTGGTGGGCCCTACGGCTGCTGCAGCCCTTC GCCGACGCCATGAAGCTGTTACCAAGGAGCCCTGAAGCCCGCCACCA GCACCATCACCCCTGTACATCACCGCCCCCACCCTGGCCCTGACCATCGC CCTGCTGCTGTGGACCCCCCTGCCATGCCCAACCCCTGGTGAACCTG AACCTGGGCCTGCTGTTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACA GCATCCTGTGGAGCGGCTGGGCCAGCAACAGCAACTACGCCCTGATCGG CGCCCTGCGCGCCGTGGCCAGACCATCAGCTACGAGGTGACCCTGGC CATCATCCTGCTGAGCACCCCTGCTGATGAGCGGCAGCTTCAACCTGAGC ACCCTGATCACCAACCCAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGC CCCTGGCCATGATGTGTTTCATCAGCACCCCTGGCCGAGACCAACCGCAC CCCCTTCGACCTGGCCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAA CATCGAGTACGCCGCCGCCCCCTTCGCCCTGTTCTTCATGGCCGAGTAC ACCAACATCATCATGATGAACACCCTGACCACCACCATCTTCCTGGGCAC CACCTACGACGCCCTGAGCCCGGAGCTGTACACCACCTACTTCGTGACC AAGACCCTGCTGCTGACCAGCCTGTTCTGTGGATCCGCACCGCCTACC CCCGCTTCGGCTACGACCAGCTGATGCACCTGCTGTGGAAGAACTTCCT GCCCCTGACCCTGGCCCTGCTGATGTGGTACGTGAGCATGCCCATCACC ATCAGCAGCATCCCCCCCCAGACCTAA</p>
13	3'UTR	<p>GAGCACTGGGACGCCACCGCCCCCTTTCCCTCCGCTGCCAGGCGAGCAT GTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACA GATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTT TAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAG TGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCT CCTCCAACCCACCCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACA CATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCAC ACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCC TCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTC GGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTT CCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAG GACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCTTGG GAGTCTCAAGCTGGACTGCCAGCCCCCTGTCCTCCCTTACCCCCATTGC GTATGAGCATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTTAC GTAAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCT GGACTTAATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCT CTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACACAGCAGCGGCTT TTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGT AACCAGCCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGT CCATCCTGATATCTCCTGAATTGAGAAATTAGCCTCCACATGTGCAATGGC</p>

		TTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGGCC AGGTGTGGTCTCGGTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTT GTGCTCCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTT GACAGGATGTTTTCGATTACTCAGTCTCCCAGGGCACTACTGGTCCGTAG GATTCGATTGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCT CTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTG CACTTATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGA GAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCT TCACATTTGTAGAAGCTTT
14	3'UTR*	GAGCACTGGGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCAT GTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTGAACAA GATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTT TAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAG TGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCT CCTCCAACCCCAACCCTCTATTCTGTTTCTTCCCTCCTCACATGGGGGTACA CATAACAGCTTCCCTTTTTGGTTCCATCCTTACCACCACACCACACGCAC ACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCC TCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTC GGAGCACCCCTTCCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTT CCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAG GACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGG GAGTCTCAAGCTGGACTGCCA
15	COX10- ND4- 3'UTR	ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCTAAAACATAATCG TCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACACATGA TTTGGATCAACACAACCACCCACAGCCTAATTATTAGCATCATCCCTCTAC TATTTTTTAACCAAATCAACAACAACCTATTTAGCTGTTCCCAACCTTTTC CTCCGACCCCTAACAACCCCTCCTAATGCTAACTACCTGGCTCCTAC CCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACCACTATCA CGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTAATTA TGACATTCACAGCCACAGAACTAATCATGTTTTATATCTTCTCGAAACCA CACTTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCCAGAA CGCCTGAACGCAGGCACATACTTCTATTCTACACCCTAGTAGGCTCCCT TCCCTACTCATCGCACTAATTTACACTCACAACACCCTAGGCTCACTAAA CATTCTACTACTCACTCTCACTGCCCAAGAACTATCAAACCTCCTGGGCCAA CAACTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCCTCT TTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGGAAGCCCCCATCG CTGGGTCAATGGTACTTGGCGCAGTACTCTTAAACTAGGCGGCTATGGT ATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGGCCTA CCCCTTCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCCATCT GCCTACGACAAACAGACCTAAAATCGCTCATTGCATACCTTCAATCAGC CACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCTT CACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCATTAC TATTCTGCCTAGCAAACCTCAAACACGAACGCACTCACAGTCGCATCATG ATCCTCTCTCAAGGACTTCAAACCTCTACTCCCACTAATGGCTTTTTGGTGG CTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCACTATTAACCTACT GGGAGAACTCTCTGTGCTAGTAACCACGTTCTCCTGGTCAAATATCACTC TCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCTACA TGTTTACCACAACACAATGGGGCTCACTCACCCACCACATTAACAACATG AAACCCCTCATTACACGAGAGAAAAACCCCTCATGTTTCATGCACCTATCCCC CATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCTTA AGAGCACTGGGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGC ATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTGAAC AAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTT TTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTC AGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCT CTCCTCCAACCCCAACCCTCTATTCTGTTTCTTCCCTCCTCACATGGGGTA CACATACACAGCTTCCCTTTTTGGTTCCATCCTTACCACACACACACGCG ACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCC

		<p>TCGGAGCACCCCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCTT GGGAGTCTCAAGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATT GCGTATGAGCATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTC ACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCC CTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTAC CTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACACAGCACGGC TTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGG CTAACCAGCCACAGAGCTCACATTCCTGTCCCTTGGGTGAAAAATACAT GTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATG GCTTTAAGAGCCAGAAGCAGGGTCTGGGAATTTGCAAGTTACCTGTGG CCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCC TTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGCTCTGAAG CTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCG TAGGATTCGATTGGTCTGGGGTAGGAGAGTTAAACAACATTTAAACAGAGT TCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGT TTGCACTTATCTGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTG GAGAACATTGCATAGGAATGTCTGGA AAAAGCTTCTACAACCTGTTACAG CCTTCACATTTGTAGAAGCTTT</p>
16	COX10- ND4- 3'UTR*	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAGAAGAACTATGCTAAAACATATCG TCCCAACAATTATGTTACTACCCTGACATGGCTTTCCAAAAACACATGA TTTGGATCAACACAACCACCCACAGCCTAATTATTAGCATCATCCCTCTAC TATTTTTTAACCAAATCAACAACAACCTATTTAGCTGTTCCCCAACCTTTTC CTCCGACCCCTAACAACCCCTCCTAATGCTAACTACCTGGCTCCTAC CCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACCACTATCA CGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTAATTA TGACATTCACAGCCACAGAATAATCATGTTTTATATCTTCTTCGAAACCA CACTTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCCAGAA CGCCTGAACGCAGGCACATACTTCTATTCTACACCTAGTAGGCTCCCT TCCCTACTCATCGCACTAATTTACACTCACAAACCCCTAGGCTCACTAAA CATTCTACTACTCACTCTCACTGCCCAAGAACTATCAAACCTCCTGGGCCAA CAACTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCCTCT TTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGCAAGCCCCCATCG CTGGGTCAATGGTACTTGCCGCAGTACTCTTAAACTAGGCGGCTATGGT ATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGGCCTA CCCCTTCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCCATCT GCCTACGACAAACAGACCTAAAATCGCTCATTGCATACTCTTCAATCAGC CACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCTT CACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCATTAC TATTCTGCCTAGCAAACCTCAAACACGAACGCACTCACAGTCGCATCATG ATCCTCTCTCAAGGACTTCAAACCTCACTCCCACTAATGGCTTTTTGGTGG CTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCCACTATTAACCTACT GGGAGAACTCTCTGTGCTAGTAACCAAGTTCTCCTGGTCAAATATCACTC TCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCTACA TGTTTACCACAACACAATGGGGCTCACTCACCCACCACATTAACAACATG AAACCCCTCATTACACGAGAAAAACCCCTCATGTTCCATGCACCTATCCCC CATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGTTTTCTCTTA AGAGCACTGGGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGC ATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAAC AAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTT TTTAAATATTACCCAAAATGCTCCCAATAAGAAATGCATCAGCTCAGTC AGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCT CTCCTCCAACCCACCCCTCTATTCTGTTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCTCTTTTGGTTCATCCTTACCACCACACCACACGC ACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGTCCCTCAAAGGCC TCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT</p>

		AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCA
17	COX10- opt_ND4- 3'UTR	ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGTTTGCCT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCTGAAGCTGATCG TGCCCAACCATCATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAACACATG ATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCATCCCTCT GCTGTTCTTCAACCAGATCAACAACAACCTGTTTCAGCTGCAGCCCCACCT TCAGCAGCGACCCTCTGACAACACCTCTGCTGATGCTGACCACCTGGCT GCTGCCCCCTACAATCATGGCCTCTCAGAGACACCTGAGCAGCGAGCCC CTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCAGATCTC TCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCTTTTT CGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGGGGCAAC CAGCCTGAGAGACTGAACGCGCGCACCTACTTTCTGTTCTACACCCTCGT GGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCCACAACACCCTG GGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGAGCA ACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGCCTTCATG GTCAAGATGCCCCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCTCATG TGGAAGCCCCCTATCGCCGGCTCTATGGTGCTGGCTGCAGTGCTGCTGAA ACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAATCCCCTG ACCAAGCACATGGCCTATCCATTTCTGGTGCTGAGCCTGTGGGCGATGAT TATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTCCCTGAT GCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCAACGCCATCCTGA TTCAGACCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATGATTGCCAC GGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAACAGCAACTACGAGC GGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGACCCTCCT GCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTGGCAC TGCCCTCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCACCAC ATTCAGCTGGTCCAATATCACCTGCTGCTCACCGGCCTGAACATGCTGG TTACAGCCCTGTACTCCCTGTACATGTTACCACCACACAGTGGGGAAGC CTGACACACCACATCAACAATATGAAGCCAGCTTCACCCGCGAGAACAC CCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCTGAATCCTG ATATCATCACCGGCTTCTCCAGCTGAGAGCACTGGGACGCCACCGCCC CTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAG AAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCCGGTGCTCA GTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCC AAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTT TCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCT GTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCTCTTTTGGTT CCATCCTTACCACCACACCACACGACACTCCACATGCCAGCAGAGTG GCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTC TGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGAC TGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAACC ATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGG GACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA GCCCCGTGCTCCTCCCTTCAACCCCATTTGCGTATGAGCATTTCAGAACTCCA AGGAGTCACAGGCATCTTTATAGTTACGTTAACATATAGACACTGTTGGA AGCAGTTCCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATACC TCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGTGGGTCCG CACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGA AGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCACAGAGCTCACATT

		<p>CCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTCA GAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTC TGGGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAAT ACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCACGGGTCTACAGAG TCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCA GTCTCCAGGGCACTACTGGTCCGTAGGATTGCGATTGGTCGGGGTAGGA GAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTG TAGGTAGATAACATCCAATCACTGTTTGCACCTATCTGAAATCTTCCCTCT TGGCTGCCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGG AAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
18	COX10- opt_ND4- 3'UTR*	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAGAAGAACTATGCTGAAGCTGATCG TGCCACCATCATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAACACATG ATCTGGATCAACACCACACGCACAGCCTGATCATCAGCATCATCCCTCT GCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCCCCACCT TCAGCAGCGACCCTCTGACAACACCTCTGCTGATGCTGACCACCTGGCT GCTGCCCCCTCACAATCATGGCCTCTCAGAGACACCTGAGCAGCGAGCCC CTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCAGATCTC TCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCTTTTT CGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGGGGCAAC CAGCCTGAGAGACTGAACGCCGGCACCTACTTTCTGTTCTACACCCTCGT GGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCCACAACACCCTGT GGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGAGCA ACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGCCTTCATG GTCAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCTCATG TGGAAGCCCCTATCGCCGGCTCTATGGTGTGGCTGCAGTGCTGCTGAA ACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAATCCCTG ACCAAGCACATGGCCTATCCATTTCTGGTGCTGAGCCTGTGGGGCATGAT TATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTCCCTGATC GCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCAACCGCCATCCTGA TTCAGACCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATTGGCCAC GGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAACAGCAACTACGAGC GGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGACCCTCCT GCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTGGCAC TGCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCACCAC ATTCAGCTGGTCCAATATCACCTGCTGCTCACCGGCCTGAACATGCTGG TTACAGCCCTGTACTCCCTGTACATGTTACACCACCACACAGTGGGGAAGC CTGACACACCACATCAACAATATGAAGCCCAGCTTCACCCGCGAGAACAC CCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCTGAATCCTG ATATCATCACCGGCTTCTCCAGCTGAGAGCACTGGGACGCCACCGCCC CTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAG AAGAGAAATTGCTGGGTTAGAACAAGATTATAAACGAATTCGGTGCTCA GTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCC AAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTT TCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCCAACCTCTATTCT GTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTGGTT CCATCCTTACCACCACACACACGCACACTCCACATGCCAGCAGAGTG GCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTC TGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGAC TGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAACC ATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGG GACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>

19	COX10- opt_ND4*- 3'UTR	ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGGCTCTGTCTGGTATCTTGAAGAAGAACTATGCTGAAGCTGATCG TGCCCACCATCATGCTGCTGCCCCCTGACCTGGCTGAGCAAGAAGCACAT GATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCATCCCC TGCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCCCCACC TTCAGCAGCGACCCCCCTGACCACCCCCCTGCTGATGCTGACCACCTGGC TGCTGCCCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGCGAGCC CCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCAGATC AGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCTT CTTCGAGACCACCTGATCCCCACCCTGGCCATCATCACCCGCTGGGGC AACCAGCCCCGAGCGCCTGAACGCCGGGCACCTACTTCTGTTCTACACCC TGGTGGGCAGCCTGCCCCCTGCTGATCGCCCTGATCTACACCCACAACAC CCTGGGCAGCCTGAACATCCTGCTGCTGACCCTGACCGCCCAGGAGCTG AGCAACAGCTGGGCCAACAACCTGATGTGGCTGGCCTACACCATGGCCT TCATGGTGAAGATGCCCCCTGTACGGCCTGCACCTGTGGCTGCCAAGGC CCACGTGGAGGCCCCCATCGCCGGCAGCATGGTGTGGCCGCCGTGCT GCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCCTGATCCTGAAC CCCCTGACCAAGCACATGGCCTACCCCTTCCTGGTGTGAGCCTGTGGG GCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAAGAG CCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACCGCC ATCCTGATCCAGACCCCCCTGGAGCTTCACCGGCGCCGTGATCCTGATGA TCGCCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAGCAA CTACGAGCGCACCCACAGCGCATCATGATCCTGAGCCAGGGCCTGCAG ACCCTGCTGCCCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGGCCA ACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGTGCT GGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGCCCTG AACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTCAACCACCACCCA GTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCTTCACC CGCGAGAACACCCTGATGTTTCATGCACCTGAGCCCCATCCTGCTGCTGA GCCTGAACCCCGACATCATCACCGGCTTCAGCAGCTAAGAGCACTGGGA CGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAAT TCTGGAACACAAGAAGAGAAATTGCTGGGTTTGAACAAGATTATAAAGC AATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACC CAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAA AAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAG CTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGAGC ATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTACGTTAACATA TAGACACTGTTGGAAGCAGTTCCCTTCTAAAAGGGTAGCCCTGGACTTAAT ACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCA CTACTGTGGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCT GTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCCAGCCC ACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGA TATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGC CAGAAGCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGG TCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCC ACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGAT GTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTCGAT TGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAA TGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCACATTATC TGAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTG CATAGGAATGTCTGGAAAAAGCTTCTACAACCTTGTTACAGCCTTCACATTT GTAGAAGCTTT
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20	COX10- opt_ND4*- 3'UTR*	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCTGAAGCTGATCG TGCCCACCATCATGCTGCTGCCCCCTGACCTGGCTGAGCAAGAAGCACAT GATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCATCCCC TGCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCCCCACC TTCAGCAGCGACCCCCCTGACCACCCCCCTGCTGATGCTGACCACCTGGC TGCTGCCCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGCGAGCC CCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCAGATC AGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCTT CTTCGAGACCACCCTGATCCCCACCCTGGCCATCATCACCCGCTGGGGC AACCAGCCCCGAGCGCCTGAACGCCGGGCACCTACTTCTGTTCTACACCC TGGTGGGCAGCCTGCCCCCTGCTGATCGCCCTGATCTACACCCACAACAC CCTGGGCAGCCTGAACATCCTGCTGCTGACCCTGACCGCCCAGGAGCTG AGCAACAGCTGGGCCAACAACCTGATGTGGCTGGCCTACACCATGGCCT TCATGGTGAAGATGCCCCCTGTACGGCCTGCACCTGTGGCTGCCAAGGC CCACGTGGAGGCCCCCCATCGCCGGCAGCATGGTGTGGCCGCCGTGCT GCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCCTGATCCTGAAC CCCCTGACCAAGCACATGGCCTACCCCTTCTGCTGCTGAGCCTGTGGG GCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAAGAG CCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACCGCC ATCCTGATCCAGACCCCCCTGGAGCTTCACCGGCGCCGTGATCCTGATGA TCGCCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAGCAA CTACGAGCGCACCCACAGCGCATCATGATCCTGAGCCAGGGCCTGCAG ACCCTGCTGCCCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGGCCA ACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGTGCT GGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGCCCTG AACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTCAACCACCACCCA GTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCTTCACC CGCGAGAACACCCTGATGTTTATGCACCTGAGCCCCATCCTGCTGCTGA GCCTGAACCCCGACATCATCACCGGCTTCAGCAGCTAAGAGGATCGGGA CGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGTGTAAT TCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACG AATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACC CAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAA AAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAG CTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCA</p>
21	COX10- ND6- 3'UTR	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGATGATGCTTTGTT TCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTAAGC CTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCGGG TGTTGTTATTATTCTGAATTTTGGGGAGGTTATATGGGTTTAAATAGGTTTTT TAATTTATTTAGGGGAATGATGGTTGTCTTTGGATATACTACAGCGATGG CTATTGAGGAGTATCCTGAGGCATGGGGGTGAGGGTTGAGGTCTTGGT GAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGTGTGGGTG AAAGAGTATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTAGGAAG CTGGATGATTTATGAAGGAGAGGGGTGAGGGTTGATTGCGGAGGATCCT ATTGGTGCGGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAGTTAC TGGTTGGACATTGTTTGTGGTGTATATATTGTAATTGAGATTGCTCGGGG GAATTAGGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTGCCAGG CGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTT AGAACAAGATTATAAACGAATTCCGGTGCTCAGTGATCATCTTGACAGTTTTT TTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCT CAGTCAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTAT</p>

		ACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCTCCTCACATGG GGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCA CACGCACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAAGT GTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAA AGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTT TGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCA ATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTT TGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCCCTTCACC CCCATTGCGTATGAGCATTTCAGAACTCCAAGGAGTCACAGGCATCTTTA TAGTTCACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGG TAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACCCTTAC TGTACCTCTGGAGTCACTACTGTGGGTCGCCACTCCTCTGCTACACAGCA CGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTG CTGGGCTAACCAGCCACAGAGCTCACATTCCTGTCCCTTGGGTGAAAAA TACATGTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTG CAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGAAGTTACC TGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTT AGTCCTTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCT TGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCACTACTG GTCCGTAGGATTCGATTGGTCTGGGGTAGGAGAGTTAAACAACATTTAAAC AGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATC ACTGTTTGCACCTATCTGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTA CTGTGGAGAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTTGT ACAGCCTTCACATTTGTAGAAGCTTT
22	COX10- ND6- 3'UTR*	ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGATGTATGCTTTGTT TCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTAAGC CTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGTCGGG TGTGTTATTATTCTGAATTTTGGGGGAGGTTATATGGGTTTAAAGGTTTTT TAATTTATTTAGGGGGAATGATGGTTGTCTTTGGATATACTACAGCGATGG CTATTGAGGAGTATCCTGAGGCATGGGGGTCAGGGGTTGAGGTCTTGGT GAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGCTGTGGGTG AAAGAGTATGATGGGGTGGTGGTTGTGGTAAACTTTAATAGTGTAGGAAG CTGGATGATTTATGAAGGAGAGGGGTCAGGGTTGATTCCGGGAGGATCCT ATTGGTGCGGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAGTTAC TGGTTGGACATTGTTTGTGGTGTATATATTGTAATTGAGATTGCTCGGGG GAATTAGGAGCACTGGGACGCCACCGCCCTTTCCCTCCGCTGCCAGG CGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTT AGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTT TTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCT CAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTAT ACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCTCCTCACATGG GGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCA CACGCACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAAGT GTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAA AGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTT TGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCA ATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTT TGCCTTGGGAGTCTCAAGCTGGACTGCCA

23	COX10- opt_ND6- 3'UTR	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAGAAGAACTATGATGTACGCCCTGT TCCTGCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCAGCAA GCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCGTGGT GGGCTGCGTGATCATCCTGAACTTCGGCGGCGGCTACATGGGCCTGATG GTGTTCTGATCTACCTGGGCGGCATGATGGTGGTGTTCGGCTACACCA CCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGCGTGG AGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGCCTGG TGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGGTGAACCTCAA CAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGGCCTGAT CCGCGAGGACCCCATCGGCGCCGGCGCCCTGTACGACTACGGCCGCTG GCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGTGGGCGTGTACATCGTG ATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCCACCGCCCT TTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAA GAGAAATTGCTGGGTTTGAACAAGATTATAAACGAATTCGGTGCTCAGT GATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAA ATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTC CCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGT TTCTTCCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCC ATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAGAGTGGC ACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTG TGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTG AGCCAGGGCCTGCATTTTGGTTTTTCCCAACCCACACATTCTCAACCAT AGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGA CTGGGGATTCCACATGTTTGCCTTGGGAGTCTAAGCTGGACTGCCAGC CCCTGTCCTCCCTTCAACCCCATTCGCTATGAGCATTTCAGAACTCCAAG GAGTCACAGGCATCTTTATAGTTCACGTTAACATATAGACACTGTTGGAAG CAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTC TGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGTGGGTGCGCA CTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAG TTAGGAAGAAGGGTGTGCTGGGCTAACCCAGCCACAGAGCTCACATTCC TGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGA AATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTG GGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATAC GGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCACGGGTCTACAGAGTC CCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAG TCTCCAGGGCACTACTGGTCCGTAGGATTTCGATTGGTCCGGGTAGGAG AGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGT AGGTAGATAACATCCAATCACTGTTTGCACTTATCTGAAATCTTCCCTCT GGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGGA AAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
24	COX10- opt_ND6- 3'UTR*	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAGAAGAACTATGATGTACGCCCTGT TCCTGCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCAGCAA GCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCGTGGT GGGCTGCGTGATCATCCTGAACTTCGGCGGCGGCTACATGGGCCTGATG GTGTTCTGATCTACCTGGGCGGCATGATGGTGGTGTTCGGCTACACCA CCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGCGTGG AGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGCCTGG TGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGGTGAACCTCAA CAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGGCCTGAT CCGCGAGGACCCCATCGGCGCCGGCGCCCTGTACGACTACGGCCGCTG GCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGTGGGCGTGTACATCGTG ATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCCACCGCCCT TTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAA GAGAAATTGCTGGGTTTGAACAAGATTATAAACGAATTCGGTGCTCAGT GATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAA ATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTC CCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGT TTCTTCCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCC</p>

		<p>ATCCTTACCACCACACCACACGCACACTCCACATGCCCAGCAGAGTGGC ACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTG TGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTG AGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAACCAT AGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGA CTGGGGATTCCACATGTTTGCTTGGGAGTCTCAAGCTGGACTGCCA</p>
25	COX10- ND1- 3'UTR	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCCCATGGCCAACC TCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAATGCTTA CCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAAGGCCCAACGTT GTAGGCCCTACGGGCTACTACAACCTTCGCTGACGCCATGAAACTCTT CACCAAGAGCCCCATAAAACCCGCCACATCTACCATCACCTCTACATCA CCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCCCCCTC CCCATGCCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTATTCT AGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTGGGCAT CAAACTCAAACCTAGCCCTGATCGGGCGCACTGCGAGCAGTAGCCCAAAC AATCTCATATGAAGTCACCCTAGCCATCATTCTACTATCAACATTACTAAT GAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACACCTCT GGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTCCACA CTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCGAAGGGGAGTCCG AACTAGTCTCAGGCTTCAACATCGAATACGCCGAGGCCCTTCGCCCTA TTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCTCACCCT ACAATCTTCTAGGAACAACATATGACGCACTCTCCCTGAACTCTACACA ACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATGGATT CGAACAGCATACCCCGATTCCGCTACGACCAACTCATGCACCTCCTATG GAAAACTTCCTACCACTCACCTAGCATTACTTATGTGGTATGTCTCCAT GCCATTACAATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGGGACG CCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCT GGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAAT TCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAA AATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAA GGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCCA CCTCTATTCTGTTTCTTCTCCTCCTACATGGGGGTACACATACACAGCTTC CTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCC CAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCT GTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCT TTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACA CATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTG CTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAG CTGGACTGCCAGCCCCTGTCTCCCTTCAACCCCTTACCGTATGAGCATT TCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTACGTTAACATATAG AACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACC AGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTA CTGTGGGTGCGCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTA TTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACAGCCACACA GAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATC TCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAG AAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTC GGTTACCAAATACGGTTACCTGCAGCTTTTGTAGTCCTTTGTGCTCCACG GGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTT TTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTGATTGG TCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTC TAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCATTATCTGAA ATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTGGAGAACATTGCATA GGAATGTCTGGAAAAAGCTTCTACAACCTTGTACAGCCTTCACATTTGTAG AAGCTTT</p>

26	COX10-ND1-3'UTR*	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCCCATGGCCAACC TCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAATGCTTA CCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAAGGCCCAACGTT GTAGGCCCCCTACGGGCTACTACAACCCCTTCGCTGACGCCATGAAACTCTT CACCAAAGAGCCCCCTAAAACCCGCCACATCTACCATCACCCCTCTACATCA CCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCCCCCTC CCCATGCCCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTTATTCT AGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTGGGCAT CAAACCTCAAACCTACGCCCTGATCGGGCGCACTGCGAGCAGTAGCCCAAAC AATCTCATATGAAGTCACCCTAGCCATCATTCTACTATCAACATTACTAAT GAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACACCTCT GGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTCCACA CTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCGAAGGGGAGTCCG AACTAGTCTCAGGCTTCAACATCGAATACGCCGAGGCCCTTCGCCCTA TTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCTCACCCT ACAATCTTCCTAGGAACAACATATGACGCACTCTCCCCTGAACTCTACACA ACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATGGATT CGAACAGCATACCCCGATTCCGCTACGACCAACTCATGCACCTCCTATG GAAAACTTCCTACCACTCACCCTAGCATTACTTATGTGGTATGTCTCCAT GCCATTACAATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGGGACG CCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCT GGAACACAAGAAGAGAAATTGCTGGGTTTGAACAAGATTATAAACGAAT TCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAA AATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAA GGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCCA CCCTCTATTCTGTTTCTTCTCCTCCTACATGGGGGTACACATACACAGCTTC CTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCC CAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCT GTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCC TTCTTTGTGACTGAGCCAGGCTGCATTTTTTGGTTTTCCCAACCCACA CATTCTCAACCATAGTCCTTCTAACAATAACCAATAGCTAGGACCCGGCTG CTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAG CTGGACTGCCA</p>
27	COX10-opt_ND1-3'UTR	<p>ATGGCCGCATCTCCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCCCATGGCCAACC TGCTGCTGCTGATCGTGCCCATCCTGATCGCCATGGCCTTCCTGATGCTG ACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCCCAAC GTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGAGCCATGAAG CTGTTACCAAGGAGCCCCCTGAAGCCCGCCACCAGCACCATCACCCCTGT ACATCACCGCCCCCACCCCTGGCCCTGACCATCGCCCTGCTGCTGTGGAC CCCCCTGCCATGCCCAACCCCTGGTGAACCTGAACCTGGGCCTGCTG TTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGGAGCG GCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCGCCCTGCGCGCCG TGGCCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGCTGAG CACCCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCACCACC CAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCTGGCCATGATGT GGTTCATCAGCACCCCTGGCCGAGACCAACCGCACCCCTTCGACCTGGC CGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTACGCCCG CGGCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCATCATGA TGAACACCCTGACCACCACCATCTTCTGGGCACCACCTACGACGCCCT GAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGCTGCTG ACCAGCCTGTTCTGTGGATCCGCACCGCCTACCCCGCTTCCGCTACG ACCAGCTGATGCACCTGCTGTGGAAGAACTTCCTGCCCTGACCCTGGC CCTGCTGATGTGGTACGTGAGCATGCCATCACCATCAGCAGCATCCCC CCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTG CCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTG GGTTTGAACAAGATTATAAACGAATTTCGGTGCTCAGTGATGATTGACA GTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCA TCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTC</p>

		<p>TTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCTCCTCA CATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACC ACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCA GAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTC CCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTG CATTTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACA ATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCA CATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCCTCCCT TCACCCCATTTGCGTATGAGCATTTCAGAACTCCAAGGAGTCACAGGCAT CTTTATAGTTTACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAA AAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACC CATTACTGTACCTCTGGAGTCACTACTGTGGGTCGCCACTCCTCTGCTAC ACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGG GTGTGCTGGGCTAACAGCCACAGAGCTCACATTCTGTCCTTGGGT GAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCA CATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGCAA GTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAG CTTTTGTAGTCTTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAA AGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCA CTACTGGTCCGTAGGATTCGATTGGTTCGGGGTAGGAGAGTTAAACAACAT TTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACAT CCAATCACTGTTTGCACCTTATCTGAAATCTTCCCTCTTGGCTGCCCCAG GTATTTACTGTGGAGAACATTGCATAGGAATGTCTGAAAAAGCTTCTACA ACTTGTTACAGCCTTACATTTGTAGAAGCTTT</p>
28	COX10- opt_ND1- 3'UTR*	<p>ATGGCCGCATCTCGCACACTCTCTCCTCACGCCTCCTGACAGGTTGCGT AGGAGGCTCTGTCTGGTATCTTGAAAGAAGAACTATGCCCATGGCCAACC TGCTGCTGCTGATCGTGCCCATCCTGATCGCCATGGCCTTCCTGATGCTG ACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCCCAAC GTGGTGGGCCCCACGGCCTGCTGCAGCCCTTCGCCGACGCCATGAAG CTGTTACCAAGGAGCCCCCTGAAGCCCCGCCACCAGCACCATCACCTGT ACATCACCGCCCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGTGGAC CCCCCTGCCCATGCCAACCCTGCTGGTGAACCTGAACCTGGGCTGCTG TTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGGAGCG GCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCGCCCTGCGCGCCG TGGCCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGCTGAG CACCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCTGATCACCACC CAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCTGGCCATGATGT GGTTCATCAGCACCTGGCCGAGACCAACCGCACCCCTTCGACCTGGC CGAGGGCGAGAGCGAGCTGGTGAACCTGCAACATCGAGTACGCCGC CGGCCCTTCGCCCTGTTCTTATGGCCGAGTACACCAACATCATATGA TGAACACCCTGACCACCATCTTCTGGGCACCACCTACGACGCCCT GAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGCTGCTG ACCAGCCTGTTCTGTGGATCCGCACCGCCTACCCCGCTTCCGCTACG ACCAGCTGATGCACCTGCTGTGGAAGAACTTCCTGCCCTGACCCTGGC CCTGCTGATGTGGTACGTGAGCATGCCATCACCATCAGCAGCATCCCC CCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTG CCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTG GGTTAGAACAAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACA GTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCA TCAGCTCAGTCAGTGAATACAAAAAGGAATTATTTTCCCTTTGAGGGTC TTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCTCCTCA CATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACC ACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCA GAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTC CCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTG CATTTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACA ATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCA CATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>

29	opt_COX1 0-ND4- 3'UTR	<p> ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCTAAAACATAATC GTCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACACATG ATTTGGATCAACACAACCACCCACAGCCTAATTATTAGCATCATCCCTCTA CTATTTTTTAACCAAATCAACAACAACCTATTTAGCTGTTCCCAACCTTTT CCTCCGACCCCTTAACAACCCCTCCTAATGCTAACTACCTGGCTCCTA CCCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACCACTATC ACGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTAATT ATGACATTACAGCCACAGAACTAATCATGTTTTATATCTTCTTCGAAACC ACACTTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCCAGA ACGCCTGAACGCAGGCACATACTTCCTATTCTACACCCTAGTAGGCTCCC TTCCCCTACTCATCGCACTAATTTACACTCACAAACCCCTAGGCTCACTAA ACATTCTACTACTCACTCTCACTGCCAAGAACTATCAAACCTCTGGGCCA ACAACTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCCTC TTTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGCAAGCCCCATC GCTGGGTCAATGGTACTTGCCGCAGTACTCTTAAACTAGGCGGCTATGG TATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGGCCT ACCCCTTCCTGTACTATCCCTATGGGGCATGATTATGACAAGCTCCATCT GCCTACGACAAACAGACCTAAAATCGCTCATTGCATACTCTTCAATCAGC CACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCTT CACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCATTAC TATTCTGCCTAGCAAACCTCAAACCTACGAACGCACTCACAGTCGCATCATG ATCCTCTCTCAAGGACTTCAAACCTTACTCCCCTAATGGCTTTTTGGTGG CTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCACTATTAACCTACT GGGAGAACTCTCTGTGCTAGTAACCAAGTTCTCCTGGTCAAATATCACTC TCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCTACA TGTTTACCACAACACAATGGGGCTCACTCACCCACCACATTAACAACATG AAACCCCTCATTACACGAGAAAAACCCCTCATGTTTCATGCACCTATCCCC CATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCTTA AGAGCACTGGGACGCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGC ATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAAC AAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTT TTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTC AGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCT CTCTCCAACCCACCCCTCTATTCTGTTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCC TCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATCAACATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCCCTTACCCCCATT GCGTATGAGCATTTTCAAGACTCCAAGGAGTCACAGGCATCTTTATAGTTC ACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCC CTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTAC CTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACACAGCACGGC TTTTCAAGGCTGATTGAGAAGGGGAAGTTAGGAAGAAGGGTGTGCTGGG CTAACCAAGCCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACAT GTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATG GCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGG CCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCC TTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAG CTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCG TAGGATTCGATTGGTGGGGTAGGAGAGTTAAACAACATTTAAACAGAGT TCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGT TTGCACTTATCTGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTG GAGAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAG CCTTCACATTTGTAGAAGCTTT </p>
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30	opt_COX1 0-ND4- 3'UTR*	<p> ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCTAAAACATAATC GTCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACACATG ATTTGGATCAACACAACCACCCACAGCCTAATTATTAGCATCATCCCTCTA CTATTTTTTAACCAAATCAACAACAACCTATTTAGCTGTTCCCAACCTTTT CCTCCGACCCCTTAACAACCCCTCCTAATGCTAACTACCTGGCTCCTA CCCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACCACTATC ACGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTAATT ATGACATTCACAGCCACAGAACTAATCATGTTTTATATCTTCTTCGAAACC ACACCTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCCAGA ACGCCTGAACGCAGGCACATACTTCCTATTCTACACCCTAGTAGGCTCCC TTCCCTACTCATCGCACTAATTTACACTCACAAACCCCTAGGCTCACTAA ACATTCTACTACTCACTCTCACTGCCAAGAACTATCAAACCTCTGGGCCA ACAACTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCCTC TTTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGCAAGCCCCATC GCTGGGTCAATGGTACTTGCCGCAGTACTCTTAAACTAGGCGGCTATGG TATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGGCCT ACCCCTTCCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCCATCT GCCTACGACAAACAGACCTAAAATCGCTCATTGCATACTCTTCAATCAGC CACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCTT CACCGGCGCAGTCATTCTCATGATCGCCCACGGGCTTACATCCTCATTAC TATTCTGCCTAGCAAACCTCAAACACGAACGCACTCACAGTCGCATCATG ATCCTCTCTCAAGGACTTCAAACCTCTACTCCCACTAATGGCTTTTTGGTGG CTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCACTATTAACCTACT GGGAGAACTCTCTGTGCTAGTAACCAAGTTCTCCTGGTCAAATATCACTC TCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCTACA TGTTTACCACAACACAATGGGGCTCACTCACCCACCACATTAACAACATG AAACCCCTCATTACACGAGAAAAACCCCTCATGTTTCATGCACCTATCCCC CATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCTTA AGAGCACTGGGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGC ATGTTGTGGTAATTCTGGAACACAAGAAGAGAAAATTGCTGGGTTTAGAAC AAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTT TTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTC AGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCT CTCCTCCAACCCACCCCTCTATTCTGTTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCC TCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCA </p>
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31	opt_COX1 0- opt_ND4- 3'UTR	ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCTGAAGCTGAT CGTGCCCAACCATCATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAACAC ATGATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCATCCC TCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCCCCA CCTTCAGCAGCGACCCCTCTGACAACACCTCTGCTGATGCTGACCACCTG GCTGCTGCCCCCTACAATCATGGCCTCTCAGAGACACCTGAGCAGCGAG CCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCAGA TCTCTCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCT TTTTCGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGGGGC AACCAGCCTGAGAGACTGAACGCCGGCACCTACTTTCTGTTCTACACCCCT CGTGGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCCACAACACC CTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGA GCAACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGCCTT CATGGTCAAGATGCCCCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCT CATGTGGAAGCCCCCTATCGCCGGCTCTATGGTGTGGCTGCAGTGCTGC TGAACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAATCC CCTGACCAAGCACATGGCCTATCCATTTCTGGTGTGAGCCTGTGGGGC ATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTCCCT GATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCACCGCCATC CTGATTACAGCCCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATGATTGC CCACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAACAGCAACTAC GAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGACCC TCCTGCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTG GCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCA CCACATTCAGCTGGTCCAATATCACCTGCTGCTCACCGGCCCTGAACATG CTGGTTACAGCCCTGTACTCCCTGTACATGTTACCAACCACACAGTGGGG AAGCCTGACACACCACATCAACAATATGAAGCCCAGCTTACCCGCGAGA ACACCCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCTGAAT CCTGATATCATCACCGGCTTCTCCAGCTGAGAGCACTGGGACGCCACCC GCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGTAATTCTGGAACA CAAGAAGAGAAATTGCTGGGTTTGAACAAGATTATAAACGAATTCCGGTG CTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCT CCCCAAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATT ATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAAACCCACCCTCT ATTCTGTTTCTTCCCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTT TGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAG AGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTA GTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCTTGTG GACTGAGCCAGGCGCTGCATTTTTGGTTTTCCCAACCCACACATTCTCA ACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCAC TGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTG CCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGAGCATTTTCAGAACT CCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACATATAGACACTGTT GGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGAT ACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGTGGGT CGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAG GGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAAGCCACAGAGCTCAC ATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAAT TCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGG TTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCA AATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACA GAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTA CTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTGATTGGTTCGGGGT AGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGG CTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGT CTGGA AAAAGCTTCTACAACCTTGTACAGCCTTCACATTTGTAGAAGCTTT
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32	opt_COX1 0- opt_ND4- 3'UTR*	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCTGAAGCTGAT CGTGCCCAACCATCATGCTGCTGCCCTCTGACCTGGCTGAGCAAGAAACAC ATGATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCATCCC TCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTTCAAGCTGCAGCCCCA CCTTCAGCAGCGACCCCTCTGACAACACCTCTGCTGATGCTGACCACTG GCTGCTGCCCCCTCACAATCATGGCCTCTCAGAGACACCTGAGCAGCGAG CCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCAGA TCTCTCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCT TTTTCGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGGGGC AACCAGCCTGAGAGACTGAACGCCGGCACCTACTTTCTGTTCTACACCCCT CGTGGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCCACAACACC CTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGA GCAACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGCCTT CATGGTCAAGATGCCCCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCT CATGTGGAAGCCCCCTATCGCCGGCTCTATGGTGTGGCTGCAGTGCTGC TGAACTCGGCCGGCTACGGCATGATGCGGCTGACCCCTGATTCTGAATCC CCTGACCAAGCACATGGCCTATCCATTTCTGGTGTGAGCCTGTGGGGC ATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTCCCT GATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCACCGCCATC CTGATTACAGACCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATGATTGC CCACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAACAGCAACTAC GAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGACCC TCCTGCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTG GCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCA CCACATTCAGCTGGTCCAATATCACCTGCTGCTCACCGGCCCTGAACATG CTGGTTACAGCCCTGTACTCCCTGTACATGTTACCAACACACAGTGCGG AAGCCTGACACACCACATCAACAATATGAAGCCAGCTTACCCGCGAGA ACACCCTGATGTTATGCATCTGAGCCCCATTCTGCTGCTGTCCCTGAAT CCTGATATCATCACCGGCTTCTCCAGCTGAGAGCACTGGGACGCCCAAC GCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGTAATTTCTGGAACA CAAGAAGAGAAATTGCTGGTTTTAGAACAAAGATTATAAACGAATTCGGTG CTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCT CCCCAAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATT ATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAAACCCACCCCTCT ATTCTGTTTCTTCCCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTT TGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAG AGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTA GTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCTTTGT GACTGAGCCAGGCGCTGCATTTTTGGTTTTCCCAACCCACACATTCTCA ACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCAC TGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTG CCA</p>
33	opt_COX1 0- opt_ND4*- 3'UTR	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCTGAAGCTGAT CGTGCCCAACCATCATGCTGCTGCCCTGACCTGGCTGAGCAAGAAGCAC ATGATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCATCCC CCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTTCAAGCTGCAGCCCCA CCTTCAGCAGCGACCCCTGACCAACCCCTGCTGATGCTGACCACTG GCTGCTGCCCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGCGA GCCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCAG ATCAGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACAT CTTCTTCGAGACCACCCTGATCCCCACCCTGGCCATCATCACCCTGG GGCAACCAGCCCGAGCGCCTGAACGCCGGCACCTACTTCTGTTCTACA CCCTGGTGGGCAGCCTGCCCTGCTGATCGCCCTGATCTACACCCACAA CACCTGGGCAGCCTGAACATCCTGCTGCTGACCCCTGACCGCCAGGAG CTGAGCAACAGCTGGGCCAACAACCTGATGTGGCTGGCCTACACCATGG CCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCTGTGTGCTGCCAA GGCCACGTGGAGGCCCCCATCGCCGGCAGCATGGTGTGGCCGCCGT GCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCCCTGATCCTG</p>

		AACCCCTGACCAAGCACATGGCCTACCCCTTCCTGGTGCTGAGCCTGT GGGGCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAA GAGCCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACC GCCATCCTGATCCAGACCCCTGGAGCTTCACCGGCGCCGTGATCCTGA TGATCGCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAAACAG CAACTACGAGCGCACCCACAGCCGCATCATGATCCTGAGCCAGGGCCTG CAGACCCTGCTGCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGG CCAACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGT GCTGGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGC CTGAACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTACACCACCAC CCAGTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCTTC ACCCGCGAGAACACCTGATGTTTCATGCACCTGAGCCCCATCCTGCTGC TGAGCCTGAACCCCGACATCATACCGGCTTCAGCAGCTAAGAGCACTG GGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGT AATTCTGGAACACAAGAAGAGAAAATTGCTGGGTTTAGAACAAAGATTATAAA CGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTA CCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACA AAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAAC CCCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACA GCTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCAC ATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGAT CTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCTCGGAGCA CCCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCACC CCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCG GCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTGGGAGTCT CAAGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGA GCATTTACAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACA TATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTA ATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGT CACTACTGTGGGTGCGCACTCCTCTGCTACACAGCAGCGCTTTTTCAAGG CTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGCTAACCAGC CCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCT GATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGA GCCAGAAGCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGT GGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCTTTGTGCTC CCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAG GATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTC GATTGGTCCGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAA AAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCACCT ATCTGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTGGAGAACA TTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACA TTTGTAGAAGCTTT
34	opt_COX1 0- opt_ND4*- 3'UTR*	ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGCGGACAATGCTGAAGCTGAT CGTGCCCAACCATCATGCTGCTGCCCTGACCTGGCTGAGCAAGAAGCAC ATGATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCATCCC CCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTTCAGCTGCAGCCCCA CCTTCAGCAGCGACCCCTGACCAACCCCTGCTGATGCTGACCACCTG GCTGCTGCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGCGA GCCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCAG ATCAGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACAT CTTCTTCGAGACCACCTGATCCCCACCCTGGCCATCATCACCCGCTGG GGCAACCAGCCCGAGCGCCTGAACGCGGCACCTACTTCTGTTCTACA CCCTGGTGGGCAGCCTGCCCTGCTGATCGCCCTGATCTACACCCACAA CACCTGGGCAGCCTGAACATCCTGCTGCTGACCTGACCGCCAGGAG CTGAGCAACAGCTGGGCCAACAACCTGATGTGGCTGGCCTACACCATGG CCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCTGTGGTGGCCCA GGCCACGTGGAGGCCCCCATCGCCGGCAGCATGGTGTGGCCGGCGT GCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCTGATCCTG AACCCCTGACCAAGCACATGGCCTACCCCTTCCTGGTGCTGAGCCTGT

		<p>GGGGCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAA GAGCCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACC GCCATCCTGATCCAGACCCCTGGAGCTTCACCGGCGCCGTGATCCTGA TGATCGCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAG CAACTACGAGCGCACCCACAGCCGCATCATGATCCTGAGCCAGGGCCTG CAGACCCTGCTGCCCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGG CCAACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGT GCTGGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGC CTGAACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTACCAACCAC CCAGTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCTTC ACCCGCGAGAACACCCTGATGTTTCATGCACCTGAGCCCCATCCTGCTGC TGAGCCTGAACCCCGACATCATACCGGCTTCAGCAGCTAAGAGCACTG GGACGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGT AATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTGAACAAGATTATAAA CGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTA CCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACA AAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAAC CCCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACA GCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACTCCAC ATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGAT CTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCA CCCCCTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACC CCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCG GCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCT CAAGCTGGACTGCCA</p>
35	opt_COX1 0-ND6- 3'UTR	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGATGTATGCTTTG TTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTAAG CCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCCG GTGTGTTATTATTCTGAATTTGGGGGAGGTTATATGGGTTAATGGTTTT TTTAATTTATTTAGGGGGAATGATGGTTGTCTTTGGATATACTACAGCGAT GGCTATTGAGGAGTATCCTGAGGCATGGGGGTCAGGGGTTGAGGTCCTG GTGAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGTGTTGGG TGAAAGAGTATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTAGGA AGCTGGATGATTTATGAAGGAGAGGGGTCAGGGTTGATTCCGGGAGGATC CTATTGGTGCGGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTATT ACTGGTTGGACATTGTTTGTGGTGTATATATTGTAATTGAGATTGCTCGG GGGAATTAGGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTGCCA GGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGT TTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTT TTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAG CTCAGTCAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTT ATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCTCCTCACAT GGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCCTTACCACCACA CCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAA AGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCT CAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCAT TTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATA CCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACAT GTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCCTGTCTCCTTCA CCCCATTGCGTATGAGCATTTTCAAGCTCCAAGGAGTCACAGGCATCTT TATAGTTCACGTAAACATATAGACACTGTTGGAAGCAGTTCTTCTAAAAG GGTAGCCCTGGACTTAATACCAGCCGATACCTCTGGCCCCCACCOCAT TACTGTACCTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACACA GCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGT GTGCTGGGCTAACCAGCCCACAGAGCTCACATTCTGTCCCTGGGTGA AAAATACATGTCCATCCTGATATCTCTGAATTCAGAAATTAGCCTCCACA TGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTCTGGGAATTTTGCAAGT TACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCT TTTTAGTCCTTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAAAG</p>

		<p>GTCTTGAAGCTTGACAGGATGTTTTGATTACTCAGTCTCCCAGGGCACT ACTGGTCCGTAGGATTCGATTGGTCGGGGTAGGAGAGTTAAACAACATTT AAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCC AATCACTGTTTGCACCTATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTA TTTACTGTGGAGAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACAAC TGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
36	opt_COX1 0-ND6- 3'UTR*	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGATGTATGCTTTG TTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTAAG CCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCCG GTGTGTTATTATTCTGAATTTTGGGGGAGGTTATATGGGTTAATGGTTTT TTTAATTTATTTAGGGGGAATGATGGTTGTCTTTGGATATACTACAGCGAT GGCTATTGAGGAGTATCCTGAGGCATGGGGGTCAGGGGTTGAGGTCTTG GTGAGTGTTTTAGTGGGGTAGCGATGGAGGTAGGATTGGTGCTGTGGG TGAAAGAGTATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTAGGA AGCTGGATGATTTATGAAGGAGAGGGGTCAGGGTTGATTCGGGAGGATC CTATTGGTGCGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGATT ACTGGTTGGACATTGTTTGGTGTATATATTGTAATTGAGATTGCTCGG GGGAATTAGGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTGCCA GGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGT TTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTT TTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAG CTCAGTCAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTT ATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCTCTCACAT GGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCTTACCACACA CCACACGCACACTCCACATGCCAGCAGAGTGGCATTTGGTGGCCAGAA AGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCT CAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCAT TTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACAATA CCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACAT GTTTGCTTGGGAGTCTCAAGCTGGACTGCCA</p>
37	opt_COX1 0- opt_ND6- 3'UTR	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGATGTACGCCCT GTTCTGTCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCAGC AAGCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCGTG GTGGGCTGCGTGATCATCTGAACCTTCGGCGGCGGCTACATGGGCCTGA TGGTGTTCTGATCTACCTGGGCGGCATGATGGTGGTGTTCGGCTACAC CACCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGCGT GGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGCCT GGTGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGAACCTT CAACAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGGCCT GATCCGCGAGGACCCCATCGGCGCCGCGCCCTGTACGACTACGGCCG CTGGCTGGTGGTGGTGACCGGCTGGACCCCTGTTCTGGGCGTGTACATC GTGATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCACCGC CCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACA AGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTGCT CAGTGATCACTTGACAGTTTTTTTTTTTTTTAAATATTACCCAAAATGCTCC CCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAATTATT TTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATT CTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCTCTTTTGG TTCCATCCTTACCACCACACCACACGCACTCCACATGCCAGCAGAGT GGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTT CTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGA CTGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAAC</p>

		<p>CATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTG GGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCC AGCCCCGTGCTCCTCCCTTACCCCCATTGCGTATGAGCATTTCAAGAACTCC AAGGAGTCACAGGCATCTTTATAGTTACGTTAACATATAGACACTGTTGG AAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATAC CTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGTGGGTCG CCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGG AAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCCACAGAGCTCACAT TCCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTC AGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTT CTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAA TACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACAGA GTCCCATCTGCCCCAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACT CAGTCTCCCAGGGCACTACTGGTCCGTAGGATTGATTGGTCGGGGTAG GAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGAT TGTAGGTAGATAACATCCAATCACTGTTTGCACCTATCTGAAATCTTCCCT CTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCT GAAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
38	opt_COX1 0- opt_ND6- 3'UTR*	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGATGTACGCCCT GTTCTGCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCAGC AAGCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCGTG GTGGGCTGCGTGATCATCTGAACCTTCGGCGGCGGCTACATCTGGTGA TGGTGTTCTGATCTACCTGGGCGGCATGATGGTGGTGTTCGGCTACAC CACCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGCGT GGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGCCT GGTGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGAACCT CAACAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGGCCT GATCCGCGAGGACCCCATCGGCGCCGGCGCCCTGTACGACTACGGCCG CTGGCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGGGCGTGATACATC GTGATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCACCCTG CCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACA AGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCCGGTGCT CAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCC CCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATT TTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCCAACCTCTATT CTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGG TTCCATCCTTACCACCACACCACACGCACACTCCACATGCCCAGCAGAGT GGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTT CTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCCTTGTGA CTGAGCCAGGGCCTGCATTTTGGTTTTCCCAACCCACACATTCTCAAC CATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTG GGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCC A</p>
39	opt_COX1 0-ND1- 3'UTR	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCCCATGGCCAA CCTCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAATGCT TACCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAGGCCCAACG TTGTAGGCCCCCTACGGGCTACTACAACCCTTCGCTGACAGCCTGAAACTC TTCACCAAAGAGCCCTAAAACCCGCCACATCTACCATCACCTCTACAT CACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCCCCC TCCCCATGCCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTTATT CTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTGGGC ATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCGAGCAGTAGCCCAA ACAATCTCATATGAAGTACCCTAGCCATCATTCTACTATCAACATTACTA ATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACACCTC TGGTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTTATCTCCAC ACTAGCAGAGACCAACCGAACCCTTCGACCTTGCCGAAGGGAGTCC GAACTAGTCTCAGGCTTCAACATCGAATACGCCGAGGCCCTTCGCCCT ATTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCTCACCAC</p>

		<p>TACAATCTTCCTAGGAACAACATATGACGCACTCTCCCTGAACTCTACAC AACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATGGAT TCGAACAGCATACCCCGATTCCGCTACGACCAACTCATGCACCTCCTAT GGAAAACTTCCTACCACTCACCTAGCATTACTTATGTGGTATGTCTCCA TGCCCATTAACAATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGGGAC GCCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATT CTGGAACACAAGAAGAGAAAATTGCTGGGTTTAGAACAAGATTATAAACGA ATTCCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCC AAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAA AGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCC ACCCTCTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAGCTT CCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGC CCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGC TGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCC CTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGTTTTCCCCACCCCCAC ACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCT GCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAA GCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGAGCAT TTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACATATA GACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATAC CAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACT ACTGTGGGTCGCCACTCCTCTGCTACACAGCAGCGCTTTTTCAAGGCTGT ATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCCAGCCAC AGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATAT CTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCA GAAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCT CGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCAC GGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGT TTTCGATTACTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTGATTG GTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATG TCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCACTTATCTG AAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTGAGAAACATTGCA TAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGT AGAAGCTTT</p>
40	opt_COX1 0-ND1- 3'UTR*	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCCCATGGCCAA CCTCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAATGCT TACCGAACGAAAAATCTAGGCTATATGCAACTACGCAAAGGCCCAACG TTGTAGGCCCTACGGGCTACTACAACCCTTCGCTGACGCCATGAAACTC TTCACCAAAGAGCCCCCTAAACCCGCCACATCTACCATCACCTCTACAC CACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCCCC TCCCCATGCCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTTATT CTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTGGGC ATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCGAGCAGTAGCCCAA ACAATCTCATATGAAGTCACCCTAGCCATCATTCTACTATCAACATTACTA ATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACACCTC TGGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTCCAC ACTAGCAGAGACCAACCGAACCCCTTCGACCTTCCGGAAGGGGAGTCC GAACTAGTCTCAGGCTTCAACATCGAATACGCCGAGGCCCTTCGCCCT ATTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCTCACAC TACAATCTTCCTAGGAACAACATATGACGCACTCTCCCTGAACTCTACAC AACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATGGAT TCGAACAGCATACCCCGATTCCGCTACGACCAACTCATGCACCTCCTAT GGAAAACTTCCTACCACTCACCTAGCATTACTTATGTGGTATGTCTCCA TGCCCATTAACAATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGGGAC GCCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATT CTGGAACACAAGAAGAGAAAATTGCTGGGTTTAGAACAAGATTATAAACGA ATTCCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCC AAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAA AGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCC</p>

		ACCCTCTATTCTGTTTCTTCCTCCTCACATGGGGGTACACATACACAGCTT CCTCTTTTGGTTCCATCCTTACCAACCACACCACACGCACACTCCACATGC CCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGC TGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCC CTTCTTGTGACTGAGCCAGGGCCTGCATTTTGGTTTTCCCCACCCCAC ACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCT GCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAA GCTGGACTGCCA
41	opt_COX1 0- opt_ND1- 3'UTR	ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCCCATGGCCAA CCTGCTGCTGCTGATCGTGCCCATCCTGATCGCCATGGCCTTCTGATGC TGACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCCCAA CGTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCATGAA GCTGTTACCAAGGAGCCCCCTGAAGCCCGCCACCAGCACCATCACCCCTG TACATCACCGCCCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGTGGA CCCCCCTGCCCATGCCCAACCCCTGGTGAACCTGAACCTGGGCCTGCT GTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGGAGC GGCTGGGCGCAGCAACAGCAACTACGCCCTGATCGGCGCCCTCGCGGCC GTGGCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGCTGA GCACCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCTGATCACAC CCAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCTGGCCATGATG TGGTTCATCAGCACCCTGGCCGAGACCAACCGCACCCCTTCGACCTGG CCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTACGCCG CCGGCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCATCATG ATGAACACCCTGACCACCACCATCTTCTGGGCACCACCTACGACGCCCT GAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCTCATGCTGT ACCAGCCTGTTCTGTGGATCCGCAACCGCCTACCCCCGTTCCGCTACG ACCAGCTGATGCACCTGCTGTGGAAGAACTTCTGCCCTGACCCTGGC CCTGCTGATGTGGTACGTGAGCATGCCATCACCATCAGCAGCATCCCC CCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTG CCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTG GGTTTAGAACAAAGATTATAAACGAATTCCGGTGCTCAGTGATCACTTGACA GTTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCA TCAGCTCAGTCAGTGAATACAAAAAGGAATTATTTTCCCTTTGAGGGTC TTTTATACATCTCTCTCCAAACCCCAACCTCTATTCTGTTTCTTCCCTCCTCA CATGGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCCTTACCACC ACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCA GAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTC CCTCAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTG CATTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAACA ATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCA CATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCCCT TCACCCCATTTGCGTATGAGCATTTTCAAGACTCCAAGGAGTACAGGCAT CTTTATAGTTACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAA AAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACC CATTACTGTACCTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTAC ACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGG GTGTGCTGGGCTAACCAAGCCACAGAGCTCACATTCTGTCCCTTGGGT GAAAAATACATGTCCATCCTGATATCTCCTGAATTGAGAAATTAGCCTCCA CATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGCA GTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAATACGGTTACCTGCAG CTTTTAGTCCTTTGTGCTCCACGGGTCTACAGAGTCCCCTCTGCCCAA AGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCA CTAAGTCCGTAGGATTCGATTGGTGGGGTAGGAGAGTTAAACAACAT TTAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACAT CCAATCACTGTTTGCATTATCTGAAATCTTCCCTCTTGGCTGCCCCAG GTATTTACTGTGGAGAACATTGCATAGGAATGTCTGAAAAAGCTTCTACA ACTTGTTACAGCCTTACATTTGTAGAAGCTTT

42	opt_COX1 0- opt_ND1- 3'UTR*	<p>ATGGCCGCCTCTCCACACACACTGAGTAGCAGACTGCTGACCGGCTGTG TTGGCGGCTCTGTGTGGTATCTGGAACGGCGGACAATGCCCATGGCCAA CCTGCTGCTGCTGATCGTGCCCATCCTGATCGCCATGGCCTTCCTGATGC TGACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCCCAA CGTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCATGAA GCTGTTACCAAGGAGCCCCCTGAAGCCCCGCCACCAGCACCATCACCCCTG TACATCACCGCCCCCACCCCTGGCCCTGACCATCGCCCTGCTGCTGTGGA CCCCCTGCCCATGCCAACCCCCCTGGTGAACCTGAACCTGGGCCTGCT GTTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGGAGC GGCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCCGCCCTGCGCGCC GTGGCCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGCTGA GCACCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCACCCAC CCAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCCCTGGCCATGATG TGGTTCATCAGCACCCCTGGCCGAGACCAACCGCACCCCTTCGACCTGG CCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTACGCCG CCGGCCCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCATCATG ATGAACACCCTGACCACCACCCTCTTCTGGGCACCACCTACGACGCCCT GAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGCTGCTG ACCAGCCTGTTCTGTGGATCCGCAACCGCCTACCCCCGCTTCCGCTACG ACCAGCTGATGCACCTGCTGTGGAAGAACTTCCTGCCCTGACCCTGGC CCTGCTGATGTGGTACGTGAGCATGCCCATCACCATCAGCAGCATCCCC CCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTCCCTCCGCTG CCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTG GGTTTGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACA GTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCA TCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTCCCTTTGAGGGTC TTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTCCTCCTCA CATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACC ACACCACACGCACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCA GAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTC CCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGATGAGCCAGGGCTG CATTTTTGGTTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAACA ATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCA CATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>
43	opt_COX1 0*-ND4- 3'UTR	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCTAAAACATA TCGTCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACACA TGATTTGGATCAACACAACCACCCACAGCCTAATTATTAGCATCATCCCTC TACTATTTTTTAACCAAATCAACAACAACCTATTTAGCTGTTCCCCAACCTT TTCTCCGACCCCTAACAACCCCTCCTAATGCTAATGCTAATGCTGCTCC TACCCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACCACTA TCACGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTA ATTATGACATTCACAGCCACAGAACTAATCATGTTTTATATCTTCTCGAAA CCACACTTATCCCCACCTTGGCTATCATACCCGATGGGGCAACCAGCCA GAACGCCTGAACGCAGGCACATACTTCCTATTCTACACCCTAGTAGGCTC CCTTCCCCTACTCATCGCACTAATTTACACTCACAACACCCTAGGCTCACT AAACATTCTACTACTCACTCTCACTGCCAAGAACTATCAAACCTCCTGGGC CAACAACCTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCC TCTTTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTCCGAAGCCCCCA TCGCTGGGTCAATGGTACTTGCCGCACTACTCTTAAAACTAGGCGGCTAT GGTATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGGC CTACCCCTTCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCCAT CTGCCTACGACAAACAGACCTAAAATCGCTCATTGCATACTCTTCAATCAG CCACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCT TCACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCATT CTATTCTGCCTAGCAAACCTCAAACCTACGAACGCACTCACAGTCGCATCAT GATCCTCTCTCAAGGACTTCAAACCTACTCCCACTAATGGCTTTTGGTG GCTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCCACTATTAACCTAC TGGGAGAACTCTCTGTGCTAGTAACCACGTTCTCCTGGTCAAATATCACT CTCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCTAC</p>

		<p>ATGTTTACCACAACACAATGGGGCTCACTCACCACACATTAACAACAT GAAACCCTCATTACACGAGAAAAACACCCTCATGTTTCATGCACCTATCCC CCATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCTT AAGAGCACTGGGACGCCCACCGCCCCCTTTCCCTCCGCTGCCAGGCGAG CATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAA CAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTT TTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGT CAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATC TCTCCTCCAACCCACCCCTCTATTCTGTTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCC TCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATCAACAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCCCTTACCCCCATT GCGTATGAGCATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTC ACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCC CTGGACTTAATACCAGCCGATACCTCTGGCCCCCACCCTTACTGTAC CTCTGGAGTCACTACTGTGGGTGCCACTCCTCTGCTACACAGCACGGC TTTTCAAGGCTGATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGG CTAACAGCCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACAT GTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATG GCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTGCAAGTTACCTGTGG CCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCC TTTGTGCTCCACGGGTCTACAGAGTCCCCTCTGCCCAAAGGTCTTGAAG CTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCG TAGGATTCGATTGGTGGGGTAGGAGAGTTAAACAACATTTAAACAGAGT TCTCTAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGT TTGCACTTATCTGAAATCTTCCCTCTTGGCTGCCCCACGGTATTTACTGTG GAGAACATTGCATAGGAATGTCTGGA AAAAGCTTCTACAACTTGTTACAG CCTTCACATTTGTAGAAGCTTT</p>
44	opt_COX1 0*-ND4- 3'UTR*	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCTAAACTAA TCGTCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACACA TGATTTGGATCAACACAACCACCCACAGCCTAATTATTAGCATCATCCCTC TACTATTTTTTAACCAAATCAACAACAACCTATTTAGCTGTTCCCAACCTT TTCTCCGACCCCTAACAACCCCTCCTAATGCTAACTACCTGGCTCC TACCCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACCACTA TCACGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTA ATTATGACATTCACAGCCACAGAACTAATCATGTTTTATATCTTCTCGAAA CCACACTTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCCA GAACGCCTGAACGCAGGCACATACTTCCTATTCTACACCCTAGTAGGCTC CCTTCCCCTACTCATCGCACTAATTTACACTCACAACACCCTAGGCTCACT AAACATTCTACTACTCACTCTCACTGCCAAGAAGTATCAAACCTCTGGGC CAACAACCTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCC TCTTTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGGAAGCCCCCA TCGCTGGGTCAATGGTACTTGCCGCAGTACTCTTAAACTAGGCGGCTAT GGTATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGGC CTACCCCTTCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCCAT CTGCCTACGACAAACAGACCTAAATCGCTCATTGCATACTCTTCAATCAG CCACATGGCCCTCGTAGTAACAGCCATTCTCATCAAACCCCTGAGGCT TCACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCATT CTATTCTGCCTAGCAAACCTCAAACCTACGAACGCACTCACAGTCGCATCAT GATCCTCTCTCAAGGACTTCAAACCTCACTCCCACTAATGGCTTTTTGGTG GCTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCCACTATTAACCTAC TGGGAGAACTCTCTGTGCTAGTAACACAGTTCTCCTGGTCAAAATCACT CTCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACCTCCTCTAC ATGTTTACCACAACACAATGGGGCTCACTCACCACACATTAACAACAT GAAACCCTCATTACACGAGAAAAACACCCTCATGTTTCATGCACCTATCCC</p>

		<p>CCATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCTT AAGAGCACTGGGACGCCCACCGCCCCCTTTCCCTCCGCTGCCAGGCGAG CATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAA CAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTT TTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGT CAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATC TCTCCTCCAACCCCAACCCTCTATTCTGTTTCTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCC TCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCA</p>
45	opt_COX1 0*- opt_ND4- 3'UTR	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCTGAAGCTG ATCGTGCCCAACCATCATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAACA CATGATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCATCC CTCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCCCC ACCTTCAGCAGCGACCCCTCTGACAACACCTCTGCTGATGCTGACCACCTG GCTGCTGCCCCCTACAATCATGGCCTCTCAGAGACACCTGAGCAGCGAG CCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCAGA TCTCTCTGATCATGACCTTCACCGCCACCGAGCTGATGATGTTCTACATCT TTTTCGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGGGGC AACCAGCCTGAGAGACTGAACGCCGGCACCTACTTTCTGTTCTACACCCT CGTGGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCACAACACC CTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGA GCAACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGCCTT CATGGTCAAGATGCCCCGTGTACGGCCTGCACCTGTGGCTGCCTAAAGCT CATGTGGAAGCCCCATCGCCGGCTCTATGGTGCTGGCTGCAGTGTCTGC TGAAACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAATCC CCTGACCAAGCACATGGCCTATCCATTTCTGGTGCTGAGCCTGTGGGGC ATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTCCCT GATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCACCGCCATC CTGATTGAGACCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATGATTGC CCACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAACAGCAACTAC GAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGACCC TCCTGCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTG GCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCA CCACATTGAGCTGGTCCAATATCACCCCTGCTGCTCACCAGCCTGAACATG CTGGTTACAGCCCTGTACTCCCTGTACATGTTACACCACACAGATGGGG AAGCCTGACACACCACATCAACAATATGAAGCCAGCTTACCCGCGAGA ACACCCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCTGAAT CCTGATATCATACCCGGCTTCTCCAGCTGAGAGCACTGGGACGCCCACC GCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACA CAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCCGGTG CTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCT CCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAATT ATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCT ATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTT TGGTTCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAG AGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTA GTTCTGTGAGCTCAGGTCCCTCAAAGGCCCTCGGAGCACCCCTTCCTTGT GACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCACACATTCTCA ACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCAC TGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTG CCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGAGCATTTTCAGAACT CCAAGGAGTCACAGGCATCTTTATAGTTACGTTAACATATAGCACTGTT GGAAGCAGTTCCTTCTAAAGGGTAGCCCTGGACTTAATACCAGCCGGAT ACCTCTGGCCCCCACCCATTACTGTACCTCTGGAGTCACTACTGTGGGT</p>

		CGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAG GGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCCACAGAGCTCAC ATTCCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAAT TCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGG TTCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTACCA AATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACA GAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTA CTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTGATTGGTCCGGGT AGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGG ATTGTAGGTAGATAACATCCAATCACTGTTTGCATTATCTGAAATCTTCC CTCTTGGCTGCCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGT CTGAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT
46	opt_COX1 0* opt_ND4- 3'UTR*	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCTGAAGCTG ATCGTGCCCACCATCATGCTGCTGCTGCTGACCTGGCTGAGCAAGAAACA CATGATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCATCC CTCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCCCC ACCTTCAGCAGCGACCCTCTGACAACACCTCTGCTGATGCTGACCACCTG GCTGCTGCCCCCTACAATCATGGCCTCTCAGAGACACCTGAGCAGCGAG CCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCAGA TCTCTCTGATCATGACCTTACCGCCACCGAGCTGATCATGTTCTACATCT TTTTCGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGGGGC AACCAGCCTGAGAGACTGAACGCCGGCACCTACTTTCTGTTCTACACCCT CGTGGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCACCAACACC CTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGA GCAACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGCCTT CATGGTCAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCT CATGTGGAAGCCCCTATCGCCGGCTCTATGGTGTGGCTGCAGTGCTGC TGAAACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAATCC CCTGACCAAGCACATGGCCTATCCATTTCTGGTGCTGAGCCTGTGGGGC ATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTCCCT GATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCACCGCCATC CTGATTACAGACCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATTTGC CCACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAACAGCAACTAC GAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGACCC TCCTGCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTG GCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCA CCACATTCAGCTGGTCCAATATCACCCCTGCTGCTCACCGGCCTGAACATG CTGGTTACAGCCCTGTACTCCCTGTACATGTTACACCACACAGTGGGG AAGCCTGACACACCACATCAACAATATGAAGCCAGCTTACCCGCGAGA ACACCCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCTGAAT CCTGATATCATCACCGGCTTCTCCAGCTGAGAGCACTGGGACGCCACC GCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACA CAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTG CTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCT CCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATT ATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCT ATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCTCTTT TGGTTCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAG AGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGCTGTCTGTGTA GTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCTCTGT GACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCACACATTCTCA ACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCAC TGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTG CCA

47	opt_COX1 0* opt_ND4* 3'UTR	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCTGAAGCTG ATCGTGCCCAACATCATGCTGCTGCCCCCTGACCTGGCTGAGCAAGAAGC ACATGATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCATC CCCCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTACAGCTGCAGCCC CACCTTCAGCAGCGACCCCCCTGACCACCCCCCTGCTGATGCTGACCACC TGGCTGCTGCCCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGCG AGCCCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCA GATCAGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACA TCTTCTTCGAGACCACCCTGATCCCCACCCTGGCCATCATCACCCGCTGG GGCAACCAGCCCCGAGCGCCTGAACGCCGGCACCTACTTCTGTTCTACA CCCTGGTGGGCAGCCTGCCCCCTGCTGATCGCCCTGATCTACACCCACAA CACCTGGGCAGCCTGAACATCCTGCTGCTGACCCTGACCGCCAGGAG CTGAGCAACAGCTGGGCCAACAACCTGATGTGGCTGGCCTACACCATGG CCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCCCAA GGCCACGTGGAGGCCCCCATCGCCGGCAGCATGGTGCTGGCCGCCGT GCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCCTGATCCTG AACCCCTGACCAAGCACATGGCCTACCCCTTCTGCTGCTGAGCCTGT GGGGCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAA GAGCCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACC GCCATCCTGATCCAGACCCCCTGGAGCTTCACCGGCGCCGTGATCCTGA TGATCGCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAG CAACTACGAGCGCACCCACAGCCGCATCATGATCCTGAGCCAGGGCCTG CAGACCCTGCTGCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGG CCAACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGT GCTGGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGC CTGAACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTTACCACCAC CCAGTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCTTC ACCCGCGAGAACACCCTGATGTTTATGCACCTGAGCCCCATCCTGCTGC TGAGCCTGAACCCCGACATCATACCGGCTTCAGCAGCTAAGAGCACTG GGACGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGT AATTCTGGAACACAAGAAGAAATTGCTGGGTTTGAACAAGATTATAAA CGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTA CCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACA AAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAAC CCCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACA GCTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCAC ATGCCAGCAGAGTGGAACCTTGGTGGCCAGAAAGTGTGAGCCTCATGAT CTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCA CCCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACC CCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCG GCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCT CAAGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGA GCATTTTCAAGACTCCAAGGAGTCACAGGCATCTTATAGTTACGTTAACA TATAGACACTGTTGGAAGCAGTTCTTCTAAAAGGGTAGCCCTGGACTTA ATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGT CACTACTGTGGGTGCGCACTCCTCTGCTACACAGCAGCGCTTTTTCAAGG CTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACACGC CCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCT GATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGA GCCAGAAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGT GGTCTCGGTTACCAAAATACGGTTACCTGCAGCTTTTTAGTCTTTGTGCTC CCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAG GATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTC GATTGGTCCGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAA AAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCACCT ATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACA TTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACA TTTGTAGAAGCTTT
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48	opt_COX1 0* opt_ND4* 3'UTR*	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCTGAAGCTG ATCGTGCCCAACATCATGCTGCTGCCCTGACCTGGCTGAGCAAGAAGC ACATGATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCATC CCCCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTACAGCTGCAGCCC CACCTTCAGCAGCGACCCCCCTGACCACCCCCCTGCTGATGCTGACCAAC TGGCTGCTGCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGCG AGCCCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCA GATCAGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTACA TCTTCTTCGAGACCACCCTGATCCCCACCCTGGCCATCATCAACCGCTGG GGCAACCAGCCCCAGCGCCTGAACGCCGGCACCTACTTCTGTTCTACA CCCTGGTGGGCAGCCTGCCCTGCTGATCGCCCTGATCTACACCCACAA CACCTGGGCAGCCTGAACATCCTGCTGCTGACCCTGACCGCCCAGGAG CTGAGCAACAGCTGGGCCAACAACCTGATGTGGCTGGCCTACACCATGG CCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCCAA GGCCACGTGGAGGCCCCCATCGCCGGCAGCATGGTGCTGGCCGCCGT GCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCCTGATCCTG AACCCCTGACCAAGCACATGGCCTACCCCTTCTGCTGCTGAGCCTGT GGGGCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAA GAGCCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACC GCCATCCTGATCCAGACCCCCTGGAGCTTCACCGGCGCCGTGATCCTGA TGATCGCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAG CAACTACGAGCGCACCCACAGCCGCATCATGATCCTGAGCCAGGGCCTG CAGACCCTGCTGCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGG CCAACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGT GCTGGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGC CTGAACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTTACCACCAC CCAGTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCTTC ACCCGCGAGAACACCCTGATGTTTATGCACCTGAGCCCCATCCTGCTGC TGAGCCTGAACCCCGACATCATACCGGCTTCAGCAGCTAAGAGCACTG GGACGCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTTGGT AATTCTGGAACACAAGAAGAGAAAATTGCTGGGTTTGAACAAGATTATAAA CGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTA CCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACA AAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAAC CCCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACA GCTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCAC ATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGAT CTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCA CCCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCACC CCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCG GCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCT CAAGCTGGACTGCCA
49	opt_COX1 0*-ND6- 3'UTR	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGATGTATGCTT TGTTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTA AGCCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTC GGGTGTGTTATTATTCTGAATTTTGGGGGAGGTTATATGGGTTTAAATGGTT TTTTTAATTTATTTAGGGGAATGATGGTTGTCTTTGGATATACTACAGCG ATGGCTATTGAGGAGTATCCTGAGGCATGGGGGTGAGGGGTTGAGGTCT TGGTGAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGCTGTG GGTGAAGAGATATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTAG GAAGCTGGATGATTTATGAAGGAGAGGGGTGAGGGTTGATTCGGGAGGA TCCTATTGGTGCGGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAG TACTGGTTGGACATTGTTTGTGGTGTATATATTGTAATTGAGATTGCTC GGGGGAATTAGGAGCACTGGGACGCCACCGCCCTTTCCCTCCGCTGC CAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGG GTTTGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGT TTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATC AGCTCAGTCAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTT

		<p>TTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCTCCTCAC ATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCA CACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAG AAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCC CTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGC ATTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACAA TACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCAC ATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCCCTT CACCCCATTTGCGTATGAGCATTTTCAAGACTCCAAGGAGTCACAGGCATC TTTATAGTTACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAA AGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACCCT ATTACTGTACCTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACA CAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGG GTGTGCTGGGCTAACAGCCACAGAGCTCACATTCTGTCCTTGGGT GAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCA CATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTGCAA GTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAG CTTTTGTAGTCTTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAA AGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCA CTACTGGTCCGTAGGATTCGATTGGTTCGGGGTAGGAGAGTTAAACAACAT TTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACAT CCAATCACTGTTTGCACCTTATCTGAAATCTTCCCTCTTGGCTGCCCCAG GTATTTACTGTGGAGAACATTGCATAGGAATGTCTGAAAAAGCTTCTACA ACTTGTTACAGCCTTACATTTGTAGAAGCTTT</p>
50	opt_COX1 0*-ND6- 3'UTR*	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGATGTATGCTT TGTTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTA AGCCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTC GGGTGTGTTATTATCTGAATTTTGGGGGAGGTTATATGGGTTTAATGGTT TTTTAATTTATTTAGGGGGAATGATGGTTGTCTTTGGATATACTACAGCG ATGGCTATTGAGGAGTATCCTGAGGCATGGGGGTGAGGGTTGAGGTCT TGGTGAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGTCTGTG GGTGAAGAGATATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTAG GAAGCTGGATGATTTATGAAGGAGAGGGGTGAGGGTTGATTCCGGGAGGA TCCTATTGGTGCGGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAG TACTGGTTGGACATTGTTTGTGGTGTATATATTGTAATTGAGATTGCTC GGGGGAATTAGGAGCACTGGGACGCCCCACCGCCCTTTCCCTCCGCTGC CAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGG GTTTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGT TTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATC AGCTCAGTCAGTGAATACAAAAAGGAATTATTTTCCCTTTGAGGGTCTT TTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCTCCTCAC ATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCA CACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAG AAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCC CTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGC ATTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACAA TACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCAC ATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>

51	opt_COX1 0* opt_ND6- 3'UTR	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGATGTACGCC CTGTTCTTGCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCA GCAAGCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCG TGGTGGGCTGCGTGATCATCCTGAACTTCGGCGGCGGCTACATGGGCCT GATGGTGTTCTTGATCTACCTGGGCGGCATGATGGTGGTGTTCCGGCTAC ACCACCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGC GTGGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGC CTGGTGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGAAC TTCAACAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGGC CTGATCCGCGAGGACCCCATCGGCGCCGGCGCCCTGTACGACTACGGC CGCTGGCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGGGCGTGATC ATCGTGATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCCCACC GCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACA CAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTG CTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAATGCT CCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAATT ATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCT ATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTT TGGTTCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAG AGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTA GTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCTTCCTTGT GACTGAGCCAGGCGCTGCATTTTTTGGTTTTCCCAACCCACACATTCTCA ACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCAC TGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTG CCAGCCCCTGTCTCCCTTCAACCCCATTTGCGTATGAGCATTTTCAAGACT CCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACATATAGACACTGTT GGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGAT ACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGTGGGT CGCCACTCCTCTGCTACACAGCAGCGCTTTTTCAAGGCTGTATTGAGAAG GGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCCAGCCACAGAGCTCAC ATTCCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAAT TCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGG TTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCA AATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACA GAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTA CTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTGATTGGTCCGGGT AGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGG ATTGTAGGTAGATAACATCCAATCACTGTTTGCATTATCTGAAATCTTCC CTTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGT CTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT
52	opt_COX1 0* opt_ND6- 3'UTR*	ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGATGTACGCC CTGTTCTTGCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCA GCAAGCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCG TGGTGGGCTGCGTGATCATCCTGAACTTCGGCGGCGGCTACATGGGCCT GATGGTGTTCTTGATCTACCTGGGCGGCATGATGGTGGTGTTCCGGCTAC ACCACCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGC GTGGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGC CTGGTGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGAAC TTCAACAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGGC CTGATCCGCGAGGACCCCATCGGCGCCGGCGCCCTGTACGACTACGGC CGCTGGCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGGGCGTGATC ATCGTGATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCCCACC GCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACA CAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTG CTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAATGCT CCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAATT ATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCT ATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTT

		<p>TGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAG AGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTA GTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCTTGT GACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCACACATTCTCA ACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCAC TGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTG CCA</p>
53	opt_COX1 0*-ND1- 3'UTR	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCCCATGGCC AACCTCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAATG CTTACCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAAGGCCCCAA CGTTGTAGGCCCTACGGGCTACTACAACCCCTCGCTGACGCCATGAAA CTCTTCACCAAAGAGCCCCCTAAAACCCGCCACATCTACCATCACCTCTA CATCACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCC CCCTCCCCATGCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTT ATTCTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTG GGCATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCGAGCAGTAGCC CAAACAATCTCATATGAAGTCACCCTAGCCATCATTCTACTATCAACATTA CTAATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACAC CTCTGGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTC CACACTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCGAAGGGGAG TCCGAAGTAGTCTCAGGCTTCAACATCGAATACGCCGCAGGCCCTTCGC CCTATTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCTCAC CACTACAATCTTCCTAGGAACAACATATGACGCACTCTCCCCTGAACCTA CACAACATATTTTGTACCAAGACCCCTACTTCTAACCTCCCTGTTCTTATG GATTCGAACAGCATACCCCCGATTCCGCTACGACCAACTCATGCACCTCC TATGGAAAACTTCTACCACTCACCTAGCATTACTTATGTGGTATGTCT CCATGCCCATTAACATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGG GACGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTA ATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTGAACAAGATTATAAAC GAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTAC CCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAA AAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCCTCCCAACC CCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAG CTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGAGC ATTTCAGAACTCCAAGGAGTCAAGGCATCTTTATAGTTACGTTAACATA TAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAAT ACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCA CTACTGTGGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCT GTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCC ACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGA TATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGC CAGAAGCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGG TCTCGGTTACCAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCC ACGGGTCTACAGAGTCCCCTCTGCCCAAAGGTCTTGAAGCTTGACAGGAT GTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTCTGAT TGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAA TGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCATTATC TGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTGGAGAACATTG CATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTT GTAGAAGCTTT</p>

54	opt_COX1 0*-ND1- 3'UTR*	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCCCATGGCC AACCTCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAATG CTTACCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAAGGCCCAA CGTTGTAGGCCCTACGGGCTACTACAACCCCTTCGCTGACGCCATGAAA CTCTTCACCAAAGAGCCCCCTAAAACCCGCCACATCTACCATCACCCCTA CATCACCGCCCCGACCTTAGCTCTACCATCGCTCTTCTACTATGGACCC CCCTCCCCATGCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTT ATTCTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTG GGCATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCGAGCAGTAGCC CAAACAATCTCATATGAAGTCAACCTAGCCATCATTCTACTATCAACATTA CTAATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACAC CTCTGGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTC CACACTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCGAAGGGGAG TCCGAAC TAGTCTCAGGCTTCAACATCGAATACGCCGCAAGGCCCTTCGC CCTATTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCCTCAC CACTACAATCTTCCTAGGAACAACATATGACGCACTCTCCCCTGAACCTCA CACAACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATG GATTGGAACAGCATACCCCCGATTCCGCTACGACCAACTCATGCACCTCC TATGGAAAACTTCCTACCACTCACCCCTAGCATTACTTATGTGGTATGTCT CCATGCCCATTAACATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGG GACGCCACCGCCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTA ATTCTGGAACACAAGAAGAGAAAATTGCTGGGTTTGAACAAGATTATAAAC GAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTAC CCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAA AAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCCTCCTCACATGGGGGTACACATACACAG CTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCAGCAGAGTGGCACTTGGTGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTGGTTTCCCACCCC ACACATTCTCAACCATAGTCCTTCTAACAATAACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCTTGGGAGTCTCA AGCTGGACTGCCA</p>
55	opt_COX1 0*- opt_ND1- 3'UTR	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCCCATGGCC AACCTGCTGCTGCTGATCGTGCCATCCTGATCGCCATGGCCTTCTGAT GCTGACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCC CAACGTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCAT GAAGCTGTTACCAAGGAGCCCCCTGAAGCCCCGCCACCAACCATCAC CTGTACATCACCGCCCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGT GGACCCCCCTGCCATGCCCAACCCCTGGTGAACCTGAACCTGGGCCT GCTGTTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGG AGCGGCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCGCCCTGCGC GCCGTGGCCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGC TGAGCACCCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCAC CACCCAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCCCTGGCCAT GATGTGGTTCATCAGACCCCTGGCCGAGACCAACCGCACCCCTTGCAG CTGGCCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTAC GCCGCCGGCCCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCA TCATGATGAACACCCTGACCACCACCATCTTCTGGGCACCACCTACGAC GCCCTGAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGC TGCTGACCAGCCTGTTCTGTGGATCCGCACCGCCTACCCCCGCTTCGG CTACGACCAGCTGATGCACCTGCTGTGGAAGAACTTCTGCCCTGACC CTGGCCCTGCTGATGTGGTACGTGAGCATGCCCATCACCATCAGCAGCA TCCCCCCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTTCCCTC CGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAAT TGCTGGGTTTGAACAAGATTATAAACGAATTCCGGTGCTCAGTGATCACTT GACAGTTTTTTTTTTTTTAAATATTACCAAAAATGCTCCCCAAATAAGAAA TGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTCCCTTTGAG</p>

		<p>GGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCT CCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTAC CACCACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTG GCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCA GGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGG CCTGCATTTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCT AACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGAT TCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTT CCCTTCACCCCATTCGCTATGAGCATTTTCAAGCTCCAAGGAGTCACAG GCATCTTTATAGTTCACGTTAACATATAGACACTGTTGGAAGCAGTTCCTT CTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCC ACCCCATTAAGTGTACCTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTG CTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAG AAGGGTGTGCTGGGCTAACAGCCACAGAGCTCACATTCCTGTCCCTT GGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGAAATTAGCC TCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTT GCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCT GCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACAGAGTCCCATCTGC CCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAG GGCACTACTGGTCCGTAGGATTGATTGGTCGGGGTAGGAGAGTTAAAC AACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGAT AACATCCAATCACTGTTTGCATTATCTGAAATCTTCCCTCTTGGCTGCCC CCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGGAAAAAGCTT CTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
56	<p>opt_COX1 0* opt_ND1- 3'UTR*</p>	<p>ATGGCCGCCAGCCCCACACCCTGAGCAGCCGCTGCTGACCGGCTGC GTGGGCGGCAGCGTGTGGTACCTGGAGCGCCGCACCATGCCATGGCC AACCTGCTGCTGCTGATCGTGCCATCCTGATCGCCATGGCCTTCCTGAT GCTGACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCC CAACGTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCAT GAAGCTGTTACCAAGGAGCCCCCTGAAGCCCGCCACCAGCACCATCACC CTGTACATCACCGCCCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGT GGACCCCTGCCCCATGCCCAACCCCTGGTGAACCTGAACCTGGGCCCT GCTGTTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGG AGCGGCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCGCCCTGCGC GCCGTGGCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGC TGAGCACCCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCAC CACCCAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCCCTGGCCAT GATGTGGTTTCATCAGCACCCCTGGCCGAGACCAACCGCACCCCTTCGAC CTGGCCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTAC GCCGCCGGCCCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCA TCATGATGAACACCCTGACCACCACCTTCTCCTGGGCACCACCTACGAC GCCCTGAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGC TGCTGACCAGCCTGTTCTGTGGATCCGCACCGCCTACCCCGCTTCGG CTACGACCAGCTGATGCACCTGCTGTGGAAGAACTTCCTGCCCTGACC CTGGCCCTGCTGATGTGGTACGTGAGCATGCCATCACCATCAGCAGCA TCCCCCCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTTCCCTC CGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAAT TGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTT GACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAAATAAGAAA TGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAG GGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCT CCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTAC CACCACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTG GCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCA GGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGG CCTGCATTTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCT AACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGAT TCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>

57	COX8- ND4- 3'UTR	<p> ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGGCGCGCCAGAATCCATTGCTGATGCTAAAACT AATCGTCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACA CATGATTTGGATCAACACAACCAACCCACAGCCTAATTATTAGCATCATCCC TCTACTATTTTTTAACCAAAATCAACAACAACCTATTTAGCTGTTCCCAACCC TTTTCCTCCGACCCCTAACAACCCCTCCTAATGCTAACTACCTGGCT CCTACCCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACAC TATCAGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTT AATTATGACATTACAGCCACAGAACTAATCATGTTTTATATCTTCTTCGAA ACCACACTTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCC AGAACGCCTGAACGCAGGCACATACTTCCTATTCTACACCCTAGTAGGCT CCCTTCCCCTACTCATCGCACTAATTTACACTCACAACACCCTAGGCTCAC TAAACATTCTACTACTCACTCTCACTGCCCAAGAACTATCAAACTCCTGGG CCAACAACCTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGC CTCTTTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGGAAGCCCCC ATCGCTGGGTCAATGGTACTTGCCGCAGTACTCTTAAAACTAGGCGGCTA TGGTATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGG CCTACCCCTTCCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCC ATCTGCCTACGACAAACAGACCTAAAATCGCTCATTGCATACTCTTCAATC AGCCACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAG CTTACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCAT TACTATTCTGCCTAGCAAACCTCAAACTACGAACGCACTCACAGTCGCATC ATGATCCTCTCTCAAGGACTTCAAACTCTACTCCCACTAATGGCTTTTGG TGGCTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCCACTATTAACCT ACTGGGAGAACTCTCTGTGCTAGTAACCACGTTCTCCTGGTCAAATATCA CTCTCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCT ACATGTTTACCACAACACAATGGGGCTCACTCACCCACCACATTAACAAC ATGAAACCCCTCATTCACACGAGAAAAACACCCTCATGTTTCATGCACCTATCC CCCATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCT TAAGAGCACTGGGACGCCACCGCCCTTTCCCTCCGCTGCCAGGCGAG CATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAA CAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTT TTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGT CAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATC TCTCCTCAACCCCAACCCTCTATTCTGTTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCC TCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCCCTTACCCCCATT GCGTATGAGCATTTTCAAGACTCCAAGGAGTCACAGGCATCTTTATAGTTC ACGTTAACATATAGACACTGTTGGAAGCAGTTCTTCTAAAAGGGTAGCC CTGGACTTAATACCAGCCGATACCTCTGGCCCCCACCCTTACTGTAC CTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACACAGCACGGC TTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGG CTAACCAAGCCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACAT GTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATG GCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGG CCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCC TTTGTGCTCCACGGGTCTACAGAGTCCCCTGCTGCCCCAAGGTCTTGAAG CTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCG TAGGATTCGATTGGTTCGGGTAGGAGAGTTAAACAACATTTAAACAGAGT TCTCTAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGT TTGCACTTATCTGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTG GAGAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACAACTTGTTACAG CCTTCACATTTGTAGAAGCTTT </p>
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58	COX8-ND4-3'UTR*	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGCTAAAACT AATCGTCCCAACAATTATGTTACTACCACTGACATGGCTTTCCAAAAACA CATGATTTGGATCAACACAACCAACCCACAGCCTAATTATTAGCATCATCCC TCTACTATTTTTTAACCAAAATCAACAACAACCTATTTAGCTGTTCCCAACCC TTTTCTCGGACCCCTAACAACCCCTCCTAATGCTAACTACCTGGCT CCTACCCCTCACAATCATGGCAAGCCAACGCCACTTATCCAGTGAACAC TATCAGAAAAAACTCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTT AATTATGACATTCACAGCCACAGAACTAATCATGTTTTATATCTTCTTCGAA ACCACACTTATCCCCACCTTGGCTATCATCACCCGATGGGGCAACCAGCC AGAACGCCTGAACGCGAGGCACATACTTCCTATTCTACACCCTAGTAGGCT CCCTTCCCCTACTCATCGCACTAATTTACACTCACAACACCCTAGGCTCAC TAAACATTCTACTACTCACTCTCACTGCCCAAGAACTATCAAACTCCTGGG CCAACAACCTTAATGTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGC CTCTTTACGGACTCCACTTATGGCTCCCTAAAGCCCATGTGGAAGCCCCC ATCGCTGGGTCAATGGTACTTGCCGCACTACTCTTAAAACTAGGCGGCTA TGGTATGATGCGCCTCACACTCATTCTCAACCCCTGACAAAACACATGG CCTACCCCTTCCTTGTACTATCCCTATGGGGCATGATTATGACAAGCTCC ATCTGCCTACGACAAACAGACCTAAAATCGCTCATTGCATACTCTTCAATC AGCCACATGGCCCTCGTAGTAACAGCCATTCTCATCCAAACCCCTGGAG CTTCACCGGCGCAGTCATTCTCATGATCGCCACGGGCTTACATCCTCAT TACTATTCTGCCTAGCAAACTCAAACCTACGAACGCACTCACAGTCGCATC ATGATCCTCTCTCAAGGACTTCAAACCTCTACTCCCACTAATGGCTTTTGG TGGCTTCTAGCAAGCCTCGCTAACCTCGCCTTACCCCCCACTATTAACCT ACTGGGAGAACTCTCTGTGCTAGTAACCACGTTCTCCTGGTCAAATATCA CTCTCCTACTTACAGGACTCAACATGCTAGTCACAGCCCTATACTCCCTCT ACATGTTTACCACAACACAATGGGGCTCACTCACCCACCACATTAACAAC ATGAAACCCCTCATTACACGAGAAAAACCCCTCATGTTTCATGCACCTATCC CCCATTCTCCTCCTATCCCTCAACCCCGACATCATTACCGGGTTTTCTCT TAAGAGCACTGGGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAG CATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAA CAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTT TTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGT CAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATC TCTCCTCAACCCCAACCTCTATTCTGTTTCTCCTCCTCACATGGGGGTA CACATACACAGCTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCC TCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCA</p>
59	COX8-opt_ND4-3'UTR	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGCTGAAGCT GATCGTGCCCAACCATCATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAA CACATGATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCAT CCCTCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTCACTGACGCC CCACCTTCAGCAGCGACCCCTCTGACAACACCTCTGCTGATGCTGACCACC TGGCTGCTGCCCCTCACAATCATGGCCTCTCAGAGACACCTGAGCAGCG AGCCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCA GATCTCTCTGATCATGACCTTACCGCCACCGAGCTGATCATGTTCTACA TCTTTTTCGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGG GGCAACCAGCCTGAGAGACTGAACGCCGGCACCTACTTTCTGTTCTACAC CCTCGTGGGCGAGCCTGCCACTGCTGATTGCCCTGATCTACACCCACAAC ACCCTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGC TGAGCAACAGCTGGGCCAACAATCTGATGTGGCTGGCCTACACAATGGC CTTCATGGTCAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCTGCTAAA GCTCATGTGGAAGCCCTATCGCCGGCTCTATGGTGTGGCTGCACTGC TGCTGAAACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAA TCCCCTGACCAAGCACATGGCCTATCCATTCTGTTGCTGAGCCTGTGGG</p>

		<p>GCATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTC CCTGATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCACCGCC ATCCTGATTCAGACCCCTTGAGCTTTACAGGCGCCGTGATCCTGATGAT TGCCACACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAAACAGCAAC TACGAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGA CCCTCCTGCCTCTTATGGCTTTTTTGGTGGCTGCTGGCCTCTCTGGCCAAT CTGGCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGG TCACCACATTCAGCTGGTCCAATATCACCCCTGCTGCTCACCGGCCTGAAC ATGCTGGTTACAGCCCTGTACTCCCTGTACATGTTACCACCACACAGTG GGGAAGCCTGACACACCACATCAACAATATGAAGCCCAGCTTCACCCGC GAGAACACCCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCT GAATCCTGATATCATCACCGGCTTCTCCAGCTGAGAGCACTGGGACGCC CACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTG GAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATT CGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAA ATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAG GAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCAC CCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCC TCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCC AGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTG TCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTT CCTTGTGACTGAGCCAGGGCCTGCATTTTTGTTTTCCCCACCCACACA TTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCT GTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCT GGACTGCCAGCCCCTGTCTCCCTTCAACCCCATTCGCTATGAGCATTTT AGAACTCCAAGGAGTCACAGGCATCTTTATAGTTACGTTAACATATAGAC ACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAG CCGGATACCTCTGGCCCCCACCCATTACTGTACCTCTGGAGTCACTACT GTGGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATT GAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACAGCCACAGA GCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTC CTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAA GCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGGTCTCG GTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCCTTTGTGCTCCACGG GTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTT TCGATTACTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTGATTGGT CGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCT AAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCATTATCTGAAA TCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAG GAATGTCTGGA AAAAGCTTCTACAACTTGTTACAGCCTTCACATTTGTAGA AGCTTT</p>
60	COX8- opt_ND4- 3'UTR*	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGCTGAAGCT GATCGTGCCCAACCATCATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAA CACATGATCTGGATCAACACCACCACGCACAGCCTGATCATCAGCATCAT CCCTCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTCACTGTCAGCC CCACCTTCAGCAGCGACCCTCTGACAACACCTCTGCTGATGCTGACCACC TGGCTGCTGCCCCCTACAATCATGGCCTCTCAGAGACACCTGAGCAGCG AGCCCTGAGCCGGAAGAACTGTACCTGAGCATGCTGATCTCCCTGCA GATCTCTCTGATCATGACCTTACCGCCACCGAGCTGATCATGTTCTACA TCTTTTTCGAGACAACGCTGATCCCCACACTGGCCATCATCACCAGATGG GGCAACCAGCCTGAGAGACTGAACGCCCGGCACCTACTTTCTGTTCTACAC CCTCGTGGGCAGCCTGCCACTGCTGATTGCCCTGATCTACACCCACAAC ACCCTGGGCTCCCTGAACATCCTGCTGCTGACACTGACAGCCCAAGAGC TGAGCAACAGCTGGGCCAACAACTGATGTGGCTGGCCTACACAATGGC CTTCATGGTCAAGATGCCCCGTACGGCCTGCACCTGTGGCTGCCTAAA GCTCATGTGGAAGCCCCTATCGCCGGCTCTATGGTGTGCTGCTGAGTGC TGCTGAAACTCGGCGGCTACGGCATGATGCGGCTGACCCTGATTCTGAA TCCCTGACCAAGCACATGGCCTATCCATTTCTGGTGTGAGCCTGTGGG GCATGATTATGACCAGCAGCATCTGCCTGCGGCAGACCGATCTGAAGTC</p>

		<p> CCTGATCGCCTACAGCTCCATCAGCCACATGGCCCTGGTGGTCACCGCC ATCCTGATTCAGACCCCTTGGAGCTTTACAGGCGCCGTGATCCTGATGAT TGCCACACGGCCTGACAAGCAGCCTGCTGTTTTGTCTGGCCAAACAGCAAC TACGAGCGGACCCACAGCAGAATCATGATCCTGTCTCAGGGCCTGCAGA CCCTCCTGCCTCTTATGGCTTTTTGGTGGCTGCTGGCCTCTCTGGCCAAT CTGGCACTGCCTCCTACCATCAATCTGCTGGGCGAGCTGAGCGTGCTGG TCACCACATTGAGCTGGTCCAATATCACCCTGCTGCTCACCAGCCTGAAC ATGCTGGTTACAGCCCTGTACTCCCTGTACATGTTACCACCACACAGTG GGGAAGCCTGACACACCACATCAACAATATGAAGCCAGCTTCACCCGC GAGAACACCCTGATGTTTCATGCATCTGAGCCCCATTCTGCTGCTGTCCCT GAATCCTGATATCATCACCAGGCTTCTCCAGCTGAGAGCACTGGGACGCC CACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTG GAACACAAGAAGAGAAAATTGCTGGGTTTAGAACAAGATTATAAACGAATT CGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTTTAAATATTACCCAAA ATGCTCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAG GAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCAC CCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCC TCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCC AGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTG TCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCCTCGGAGCACCCCTT CCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCACACA TTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCT GTGCACTGGGACTGGGGATTCCACATGTTGCTTGGGAGTCTCAAGCT GGACTGCCA </p>
61	COX8- opt_ND4*- 3'UTR	<p> ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGCTGAAGCT GATCGTGCCCAACCATCATGCTGCTGCCCCTGACCTGGCTGAGCAAGAAG CACATGATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCAT CCCCCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTGAGCTGCAGCC CCACCTTCAGCAGCGACCCCTGACCACCCCTGCTGATGCTGACCAC CTGGCTGCTGCCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGC GAGCCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCTGC AGATCAGCCTGATCATGACCTTCACCGCCACCGAGCTGATCATGTTCTAC ATCTTCTTCGAGACCACCCTGATCCCCACCCTGGCCATCATACCCGCTG GGCAACCAGCCCGAGCGCCTGAACGCCGGCACCTACTTCTGTTCTAC ACCCTGGTGGGACGCTGCCCCTGCTGATCGCCCTGATCTACACCCACA ACACCCTGGGACGCTGAACATCCTGCTGCTGACCCTGACCGCCCAGGA GCTGAGCAACAGCTGGGCCAACAACTGATGTGGCTGGCCTACACCATG GCCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCCCA AGGCCCACGTGGAGGGCCCCCATCGCCGCGAGCATGGTGTGCGCCGG TGCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCCTGATCCT GAACCCCTGACCAAGCACATGGCCTACCCCTTCTGTTGCTGAGCCTG TGGGGCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGA AGAGCCTGATCGCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGAC CGCCATCCTGATCCAGACCCCTGGAGCTTCACCGGCGCCGTGATCCTG ATGATCGCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACA GCAACTACGAGCGCACCCACAGCCGCATCATGATCCTGAGCCAGGGCCT GCAGACCCTGCTGCCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTG GCCAACCTGGCCCTGCCCCCACCATCAACCTGCTGGGCGAGCTGAGC GTGCTGGTGACCACCTTCAGCTGGAGCAACATCACCTGCTGCTGACCG GCCTGAACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTACCACC ACCCAGTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCAGCT TCACCCGCGAGAACACCCTGATGTTTCATGCACCTGAGCCCCATCCTGCT GCTGAGCCTGAACCCCGACATCATCACCAGGCTTCAGCAGCTAAGAGCAC TGGGACGCCACCGCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTG GTAATTCTGGAACACAAGAAGAGAAAATTGCTGGGTTTAGAACAAGATTATA AACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTAAATAT TACCCAAAATGCTCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATA CAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCA ACCCACCCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACAC </p>

		AGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCA CATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGA TCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCA CCCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACC CCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCG GCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCT CAAGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATTGCGTATGA GCATTTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACA TATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTA ATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGT CACTACTGTGGGTGCGCACTCCTCTGCTACACAGCACGGCTTTTTCAAGG CTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGC CCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCT GATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGA GCCAGAAGCAGGGTTCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGT GGTCTCGGTTACCAATACGGTTACCTGCAGCTTTTTAGTCTTTGTGCTC CCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAG GATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTC GATTGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAA AAATGTCTAAAGGATTGTAGGTAGATAACATCCAATCACTGTTTGCATT ATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACA TTGCATAGGAATGTCTGAAAAAGCTTCTACAACCTGTTACAGCCTTCACA TTGTAGAAGCTTT
62	COX8- opt_ND4*- 3'UTR*	ATGTCCGTCTTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGCTTGATGCTGAAGCT GATCGTGCCCACCATCATGCTGCTGCCCTGACCTGGCTGAGCAAGAAG CACATGATCTGGATCAACACCACCACCCACAGCCTGATCATCAGCATCAT CCCCCTGCTGTTCTTCAACCAGATCAACAACAACCTGTTACAGCTGCAGCC CCACCTTCAGCAGCGACCCCCTGACCACCCCCCTGCTGATGCTGACCAC CTGGCTGCTGCCCTGACCATCATGGCCAGCCAGCGCCACCTGAGCAGC GAGCCCCCTGAGCCGCAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGC AGATCAGCCTGATCATGACCTTACCGGCCACCGAGCTGATCATGTTCTAC ATCTTCTTCGAGACCACCCTGATCCCCACCCTGGCCATCATACCCGCTG GGGCAACCAGCCCAGCGCCTGAACGCCGGCACCTACTTCTGTTCTAC ACCCTGGTGGGAGCCTGCCCTGCTGATCGCCCTGATCTACACCCACA ACACCCTGGGCAGCCTGAACATCCTGCTGCTGACCTGACCGCCAGGA GCTGAGCAACAGCTGGGCCAACAACTGATGTGGCTGGCCTACACCATG GCCTTCATGGTGAAGATGCCCTGTACGGCCTGCACCTGTGGCTGCCCA AGGCCACGTGGAGGCCCCCATCGCCGGCAGCATGGTGTGGCCGCCG TGCTGCTGAAGCTGGGCGGCTACGGCATGATGCGCCTGACCTGACCTCT GAACCCCCTGACCAAGCACATGGCCTACCCCTTCTGGTGCTGAGCCTG TGGGGCATGATCATGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGA AGAGCCTGATCGCCTACAGCAGCATCAGCCACATGGCCCTGGTGGTGAC CGCCATCCTGATCCAGACCCCCTGGAGCTTACCGGGCGCCGTGATCCTG ATGATCGCCCACGGCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACA GCAACTACGAGCGCACCCACAGCCGCATCATGATCCTGAGCCAGGGCCT GCAGACCCTGCTGCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTG GCCAACCTGGCCCTGCCCCCCACCATCAACCTGCTGGGCGAGCTGAGC GTGCTGGTGACCACTTCAGCTGGAGCAACATCACCCCTGCTGACCG GCCTGAACATGCTGGTGACCGCCCTGTACAGCCTGTACATGTTACCAACC ACCCAGTGGGGCAGCCTGACCCACCACATCAACAACATGAAGCCCAGCT TCACCCGCGAGAACACCCTGATGTTTCATGCACCTGAGCCCCATCCTGCT GCTGAGCCTGAACCCCGACATCATACCGGCTTCAGCAGCTAAGAGCAC TGGGACGCCACCGCCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTG GTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATA AACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATAT TACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTGAATA CAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCA ACCCACCCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACAC AGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCA

		CATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCACACATTCTCAACCATAGTCCTTCTAACAAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA
63	COX8-ND6-3'UTR	ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCTCGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTCGTTGATGATGTATGCTTTGTTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTAAGCCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCGGGTGTGTTATTATTCTGAATTTTGGGGGAGGTTATATGGGTTTAATGGTTTTTTAATTTATTTAGGGGGAATGATGGTTGTCTTTGGATATACTACAGCGATGGCTATTGAGGAGTATCCTGAGGCATGGGGGTCAGGGGTTGAGGTC TTGGTGAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGCTGTGGGTGAAAGAGTATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTA GGAAGCTGGATGATTTATGAAGGAGAGGGGTCAGGGTTGATTCCGGGAGGATCCTATTGGTGCGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAGTACTGGTTGGACATTGTTTGGTGTATATATTGTAATTGAGATTGCTCGGGGGAATTAGGAGCACTGGGACGCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGTTTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCA TCAGCTCAGTCAGTGAATACAAAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTCTCCTCA CATGGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCTTACCACACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCA GAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACATAACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCA CATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCCCTCCCTTCACCCCATTCGCGTATGAGCATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAA AAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACCCTACTACTGTACCTCTGGAGTCACTACTGTGGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGTGTGCTGGGCTAACCAGCCACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCA CATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTGATTGGTTCGGGGTAGGAGATTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCATTATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACA ACTTGTTACAGCCTTCACATTTGTAGAAGCTTT
64	COX8-ND6-3'UTR*	ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCTCGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTCGTTGATGATGTATGCTTTGTTTCTGTTGAGTGTGGGTTTAGTAATGGGGTTTGTGGGGTTTTCTTCTAAGCCTTCTCCTATTTATGGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCGGGTGTGTTATTATTCTGAATTTTGGGGGAGGTTATATGGGTTTAATGGTTTTTTAATTTATTTAGGGGGAATGATGGTTGTCTTTGGATATACTACAGCGATGGCTATTGAGGAGTATCCTGAGGCATGGGGGTCAGGGGTTGAGGTC

		<p>TTGGTGAGTGTTTTAGTGGGGTTAGCGATGGAGGTAGGATTGGTGCTGT GGGTGAAAGAGTATGATGGGGTGGTGGTTGTGGTAACTTTAATAGTGTA GGAAGCTGGATGATTTATGAAGGAGAGGGGTCAGGGTTGATTCCGGGAGG ATCCTATTGGTGCGGGGGCTTTGTATGATTATGGGCGTTGGTTAGTAGTA GTTACTGGTTGGACATTGTTTGTGGTGTATATATTGTAATTGAGATTGCT CGGGGGAATTAGGAGCACTGGGACGCCACCGCCCTTTCCCTCCGCTG CCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAAATTGCTG GGTTTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACA GTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAAATAAGAAATGCA TCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTC TTTTATACATCTCTCCTCCAACCCCAACCTCTATTCTGTTTCTCTCCTCA CATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACC ACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCA GAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTC CCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCTG CATTTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAACA ATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCA CATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>
65	COX8- opt_ND6- 3'UTR	<p>ATGTCCGTCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGATGTACGC CCTGTTCTGCTGAGCGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGC AGCAAGCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGC GTGGTGGGCTGCGTGATCATCCTGAACCTCGGCGCGGCTACGTAGGGCC TGATGGTGTTCCTGATCTACCTGGGCGGCATGATGGTGGTGTTCGGCTA CACCACCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGG CGTGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGG CCTGGTGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGGTGAA CTTCAACAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGG CCTGATCCGCGAGGACCCCATCGGCGCGCGGCCCTGTACGACTACGG CCGCTGGCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGTTGGCGTGTA CATCGTGATCGAGATCGCCCGCGGCACTAAGAGCACTGGGACGCCAC CGCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAA CACAAGAAGAGAAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCGG TGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATG CTCCCCAAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAA TTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCCAACCT CTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAGCTTCCTCT TTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGC AGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCT GTAGTTCTGTGAGCTCAGTCCCTCAAAGGCCTCGGAGCACCCCTTCC TTGTGACTGAGCCAGGCGCTGCATTTTTGGTTTTCCCAACCCACACATT CTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGT GCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGG ACTGCCAGCCCTGTCTCCTCCCTTCAACCCCATTCGCTATGAGCATTTCAG AACTCCAAGGAGTCACAGGCATCTTTATAGTTCAAGTTAACATATAGACAC TGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCC GGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGT GGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTCAAGGCTGTATTGA GAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCCAGCCACAGAG CTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCC TGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAG CAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGGTCTCGGT TACCAAATACGGTTACCTGCAGCTTTTATGTCCTTTGTGCTCCACGGGT CTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTC GATTACTCAGTCTCCAGGGCACTACTGGTCCGTAGGATTCGATTGGTCG GGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAA AGGGATTGTAGGTAGATAACATCAATCACTGTTTGCATTATCTGAAATC TTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTGCATAGGA ATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAG CTTT</p>

66	COX8- opt_ND6- 3'UTR*	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGATGATGTACGC CCTGTTCTGCTGAGCGTGCGGCTGGTGATGGGCTTCGTGGGCTTCAGC AGCAAGCCCAGCCCCATCTACGGCGGCCTGGTGCTGATCGTGAGCGGC GTGGTGGGCTGCGTGATCATCCTGAACTTCGGCGGCGGCTACATGGGCC TGATGGTGTTCTGATCTACCTGGGCGGCATGATGGTGGTGTTCCGGTA CACCACCGCCATGGCCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGG CGTGGAGGTGCTGGTGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGG CCTGGTGCTGTGGGTGAAGGAGTACGACGGCGTGGTGGTGGTGGTGAA CTTCAACAGCGTGGGCAGCTGGATGATCTACGAGGGCGAGGGCAGCGG CCTGATCCGCGAGGACCCCATCGGCGCGCGGCCCTGTACGACTACGG CCGCTGGCTGGTGGTGGTGACCGGCTGGACCCTGTTCTGGGCGTGTA CATCGTGATCGAGATCGCCCGCGGCAACTAAGAGCACTGGGACGCCAC CGCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGTAATTCTGGAA CACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCCG TGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAATG CTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAA TTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCT CTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAGCTTCCTCT TTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGC AGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCT GTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCC TTGTGACTGAGCCAGGCGCTGCATTTTTGGTTTTCCCCACCCACACATT CTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGT GCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGG ACTGCCA</p>
67	COX8- ND1- 3'UTR	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGATGCCATGGC CAACCTCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTAAT GCTTACCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAAGGCCCA ACGTTGTAGGCCCTACGGGCTACTACAACCCTTCGCTGACGCCATGAAA CTCTTCACCAAAGAGCCCTAAAACCCGCCACATCTACCATCACCTCTA CATCACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCC CCCTCCCCATGCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTT ATTCTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTG GGCATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCGAGCAGTAGCC CAAACAATCTCATATGAAGTCAACCTAGCCATCATTCTACTATCAACATTA CTAATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACAC CTCTGGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTC CACACTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCGAAGGGAG TCCGAAGTGTCTCAGGCTTCAACATCGAATACGCCGCGAGGCCCTTCGC CCTATTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCTCAC CACTACAATCTTCTAGGAACAACATATGACGCACTCTCCCCTGAACCTA CACAACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATG GATTCGAACAGCATACCCCGATTCCGCTACGACCAACTCATGCACCTCC TATGGAAAACTTCCTACCACTCACCTAGCATTACTTATGTGGTATGTCT CCATGCCCATTAACATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGG GACGCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTA ATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAAC GAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTAC CCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAA AAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAG CTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCTTGTGACTGAGCCAGGCGCTGCATTTTTGGTTTTCCCAACCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCAGCCCTGTCTCCTTACCCCACTTGCATGATGAGC</p>

		ATTTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACATA TAGACACTGTTGGAAGCAGTTCCCTTCTAAAAGGGTAGCCCTGGACTTAAT ACCAGCCGGATACCTCTGGCCCCACCCATTACTGTACCTCTGGAGTCA CTA CTGTGGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCT GTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCC ACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGA TATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGC CAGAAGCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGG TCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCC ACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGAT GTTTTCGATTACTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTCGAT TGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAA TGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCACCTATC TGAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAACATTG CATAGGAATGTCTGGAAAAAGCTTCTACAACCTTGTTACAGCCTTCACATTT GTAGAAGCTTT
68	COX8- ND1- 3'UTR*	ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTCTGTTGATGCCCATGGC CAACCTCCTACTCCTCATTGTACCCATTCTAATCGCAATGGCATTCTTAAT GCTTACCGAACGAAAAATTCTAGGCTATATGCAACTACGCAAAGGCCCA ACGTTGTAGGCCCTACGGGCTACTACAACCCCTTCGCTGACGCCATGAAA CTCTTCACCAAAGAGCCCCTAAAACCCGCCACATCTACCATCACCCCTCTA CATCACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCTACTATGGACCC CCTCCCCATGCCAACCCCTGGTCAACCTCAACCTAGGCCTCCTATTT ATTCTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTG GGCATCAAACCTCAAACCTACGCCCTGATCGGCGCACTGCGAGCAGTAGCC CAAACAATCTCATATGAAGTCACCCCTAGCCATCATTCTACTATCAACATTA CTAATGAGTGGCTCCTTTAACCTCTCCACCCTTATCACAACACAAGAACAC CTCTGGTTACTCCTGCCATCATGGCCCTTGGCCATGATGTGGTTTATCTC CACACTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCGAAGGGGAG TCCGAAGTAGTCTCAGGCTTCAACATCGAATACGCCGAGGCCCTTCGC CCTATTCTTCATGGCCGAATACACAAACATTATTATGATGAACACCCTCAC CACTACAATCTTCTAGGAACAACATATGACGCACTCTCCCCTGAACTCTA CACAACATATTTTGTACCAAGACCCTACTTCTAACCTCCCTGTTCTTATG GATTGGAACAGCATACCCCGATTCCGCTACGACCAACTCATGCACCTCC TATGGAAAACTTCTACCACTCACCCCTAGCATTACTTATGTGGTATGTCT CCATGCCCATTAACATCTCCAGCATTCCCCCTCAAACCTAAGAGCACTGG GACGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTA ATTCTGGAACACAAGAAGAGAAATTGCTGGGTTAGAACAAGATTATAAAC GAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTAC CAAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAA AAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAG CTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGTTTTCCCCACCCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCA

69	COX8- opt_ND1- 3'UTR	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGCCCATGGC CAACCTGCTGCTGCTGATCGTGCCCATCCTGATCGCCATGGCCTTCCTGA TGCTGACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCC CAACGTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCAT GAAGCTGTTACCAAGGAGCCCCCTGAAGCCCGCCACCAGCACCATCACC CTGTACATCACCGCCCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGT GGACCCCCCTGCCATGCCCAACCCCTGGTGAACCTGAACCTGGGCCT GCTGTTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGG AGCGGCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCGCCCTGCGC GCCGTGGCCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGC TGAGCACCCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCAC CACCCAGGAGCACCTGTGGCTGCTGCTGCCAGCTGGCCCTGGCCAT GATGTGGTTCATCAGCACCCCTGGCCGAGACCAACCGCACCCCTTCGAC CTGGCCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTAC GCCGCCGGCCCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCA TCATGATGAACACCCTGACCACCACCTCTTCCTGGGCACCACCTACGAC GCCCTGAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGC TGCTGACCAGCCTGTTCTGTGGATCCGCACCGCCTACCCCCGCTTCGG CTACGACCAGCTGATGCACCTGCTGTGGAAGAACTTCCTGCCCTGACC CTGGCCCTGCTGATGTGGTACGTGAGCATGCCCATCACCATCAGCAGCA TCCCCCCCCAGACCTAAGAGCACTGGGACGCCACCGCCCTTTCCCTC CGCTGCCAGGCGAGCATGTTGTGTAATTCTGGAACACAAGAAGAGAAAT TGCTGGGTTTAGAACAAGATTATAAACGAATTCCGGTGCTCAGTGATCACTT GACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAA TGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAG GGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCCT CCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGTTCCATCCTTAC CACCACACCACACGCACACTCCACATGCCCAGCAGAGTGGCACTTGGTG GCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCA GGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGACTGAGCCAGGG CCTGCATTTTTTGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCT AACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGAT TCCACATGTTTGCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCT CCCTTCACCCCATTTGCGTATGAGCATTTCAGAACTCCAAGGAGTCACAG GCATCTTTATAGTTCACGTAAACATATAGACACTGTTGGAAGCAGTTCCTT CTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCC ACCCCATTAAGTGTACCTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTG CTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAG AAGGGTGTGCTGGGCTAACCAGCCACAGAGCTCACATTCCTGTCCCTT GGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGAAATTAGCC TCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTT GCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCT GCAGCTTTTATGTCCTTTGTGCTCCCACGGGTCTACAGAGTCCCATCTGC CCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAG GGCACTACTGGTCCGTAGGATTGATTGGTCGGGGTAGGAGAGTTAAAC AACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGAT AACATCCAATCACTGTTTGCACCTTATCTGAAATCTTCCCTCTTGGCTGCC CCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGGAAAAAGCTT CTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
70	COX8- opt_ND1- 3'UTR*	<p>ATGTCCGTCCTGACGCGCCTGCTGCTGCGGGGCTTGACACGGCTCGGCT CGGCGGCTCCAGTGCGGCGCGCCAGAATCCATTGTTGATGCCCATGGC CAACCTGCTGCTGCTGATCGTGCCCATCCTGATCGCCATGGCCTTCCTGA TGCTGACCGAGCGCAAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCC CAACGTGGTGGGCCCCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCAT GAAGCTGTTACCAAGGAGCCCCCTGAAGCCCGCCACCAGCACCATCACC CTGTACATCACCGCCCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGT GGACCCCCCTGCCATGCCCAACCCCTGGTGAACCTGAACCTGGGCCT GCTGTTTCATCCTGGCCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGG AGCGGCTGGGCCAGCAACAGCAACTACGCCCTGATCGGCGCCCTGCGC</p>

		<p> GCGGTGGCCCAGACCATCAGCTACGAGGTGACCCTGGCCATCATCCTGC TGAGCACCCCTGCTGATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCAC CACCCAGGAGCACCTGTGGCTGCTGCTGCCCAGCTGGCCCCCTGGCCAT GATGTGGTTCATCAGCACCCCTGGCCGAGACCAACCGCACCCCTTCGAC CTGGCCGAGGGCGAGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTAC GCCGCCGGCCCCCTTCGCCCTGTTCTTCATGGCCGAGTACACCAACATCA TCATGATGAACACCCTGACCACCACCATCTTCTGGGCACCACCTACGAC GCCCTGAGCCCCGAGCTGTACACCACCTACTTCGTGACCAAGACCCTGC TGCTGACCAGCCTGTTCTGTGGATCCGCACCGCCTACCCCCGCTTCGG CTACGACCAGCTGATGCACCTGCTGTGGAAGAACTTCCTGCCCTGACC CTGGCCCTGCTGATGTGGTACGTGAGCATGCCCATCACCATCAGCAGCA TCCCCCCCCAGACCTAAGAGCACTGGGACGCCACCGCCCCCTTCCCTC CGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAAT TGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCATT GACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAA TGCATCAGCTCAGTCAGTGAATACAAAAAGGAATTATTTTTCCCTTTGAG GGTCTTTTATACATCTCTCTCCAACCCACCCCTCTATTCTGTTTCTTCT CCTCACATGGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCCTTAC CACCACACCACACGCACACTCCACATGCCAGCAGAGTGCGCACTTGGTG GCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCA GGTCCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGG CCTGCATTTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCTTCT AACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGAT TCCACATGTTTGCTTGGGAGTCTCAAGCTGGACTGCCA </p>
71	OPA1-ND4-3'UTR	<p> GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTTGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCGTCTCGGCGCCTGCGTGACCTCCCCGCGGGCGGGATGTGGCGA CTACGTCGGGCGCCTGTGGCCTGATGCTAAAATAATCGTCCCAACAATT ATGTTACTACCACTGACATGGCTTTCCAAAAAACACATGATTTGGATCAAC ACAACCACCCACAGCCTAATTATTAGCATCATCCCTCTACTATTTTTTAAC CAAATCAACAACAACCTATTTAGCTGTTCCCCAACCTTTTCTCCGACCCC CTAACAACCCCCCTCCTAATGCTAACTACCTGGCTCCTACCCCTCACAAT CATGGCAAGCCAACGCCACTTATCCAGTGAACCACTATCACGAAAAAAC TCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTAATTATGACATTCAC AGCCACAGAACTAATCATGTTTTATATCTTCTTGGAAACCACACTTATCCC CACCTTGGCTATCATACCCGATGGGGCAACCAGCCAGAACGCCTGAAC GCAGGCACATACTTCTATTCTACACCCTAGTAGGCTCCCTTCCCTACT CATCGCACTAATTTACACTCACAACACCCTAGGCTCACTAAACACTTACT ACTCACTCTCACTGCCAAGAACTATCAAACCTCTGGGCCAACAACCTTAAT GTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCCTCTTTACGGACT CCACTTATGGCTCCCTAAAGCCCATGTCGAAGCCCCCATCGCTGGGTCAA TGGTACTTGCCGCAGTACTCTTAAACTAGGCGGCTATGGTATGATGCGC CTCACACTCATTCTCAACCCCTGACAAAACACATGGCCTACCCCTTCTCT GTACTATCCCTATGGGGCATGATTATGACAAGCTCCATCTGCCTACGACA AACAGACCTAAATCGCTCATTGCATACTCTTCAATCAGCCACATGGCCCT CGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCTTACCCGGCGCA GTCATTCTCATGATCGCCACGGGCTTACATCCTCATTACTATTCTGCCTA GCAAACTCAAACCTACGAACGCACTCACAGTCGCATCATGATCCTCTCTCA AGGACTTCAAACCTCTACTCCCACTAATGGCTTTTTGGTGGCTTCTAGCAAG CCTCGCTAACCTCGCTTACCCCCCACTATTAACCTACTGGGAGAACTCT CTGTGCTAGTAACCACGTTCTCCTGGTCAAATATCACTCTCCTACTTACAG GACTCAACATGCTAGTCACAGCCCTATACTCCCTCTACATGTTTACCACAA CACAATGGGGCTCACTCACCCACCACATTAACAACATGAAACCCTCATTC ACACGAGAAAAACCCCTCATGTTTCATGCACCTATCCCCATTCTCCTCCTA TCCCTCAACCCCGACATCATTACCGGGTTTTCTCTTAAGAGCACTGGGA CGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAAT TCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAACG AATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACC </p>

		CAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAA AAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCCTCCTCACATGGGGGTACACATACACAG CTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACACTCCACAT GCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCAGCCCCTGTCTCCCTTCACCCCATTTGCGTATGAGC ATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTAAACATA TAGACACTGTTGGAAGCAGTTCCCTTCTAAAAGGGTAGCCCTGGACTTAAT ACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCA CTACTGTGGGTGCGCACTCCTCTGCTACACAGCAGGCTTTTTCAAGGCT GTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCC ACAGAGCTCACATTCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGA TATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGC CAGAAGCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTGTGG TCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCC ACGGGTCTACAGAGTCCCCTCTGCCCAAAGGTCTTGAAGCTTGACAGGAT GTTTTCGATTACTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATTCGAT TGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAA TGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCACATTATC TGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTGGAGAACATTG CATAGGAATGTCTGGAAAAAGCTTCTACAACCTTGTTACAGCCTTCACATT GTAGAAGCTTT
72	OPA1-ND4-3'UTR*	GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCGCGCGGGATGTGGCGA CTACGTGCGGGCCGCTGTGGCCTGATGCTAAAACTAATCGTCCCAACAATT ATGTTACTACCACTGACATGGCTTTCCAAAAAACACATGATTTGGATCAAC ACAACCACCCACAGCCTAATTATTAGCATCATCCCTCTACTATTTTTTAAC CAAATCAACAACAACCTATTTAGCTGTTCCCAACCTTTTCTCCGACCCC CTAACAACCCCCCTCCTAATGCTAACTACCTGGCTCCTACCCCTCACAAT CATGGCAAGCCAACGCCACTTATCCAGTGAACCACTATCACGAAAAAAC TCTACCTCTCTATGCTAATCTCCCTACAAATCTCCTTAATTATGACATTCAC AGCCACAGAATAATCATGTTTTATATCTTCTTGAACCACACTTATCCC CACCTTGGCTATCATCACCCGATGGGGCAACCAGCCAGAACGCCTGAAC GCAGGCACATACTTCTATTCTACACCCTAGTAGGCTCCCTTCCCTACT CATCGCACTAATTTACACTCACAACACCCTAGGCTCACTAAACATTCTACT ACTCACTCTCACTGCCCAAGAACTATCAAACCTCTGGGCCAACAACTTAAT GTGGCTAGCTTACACAATGGCTTTTATGGTAAAGATGCCTCTTTACGGACT CCACTTATGGCTCCCTAAAGCCCATGTGGAAGCCCCCATCGCTGGGTCAA TGGTACTTGCCGCAGTACTCTTAAAACTAGGCGGCTATGGTATGATGCGC CTCACACTCATTCTCAACCCCTGACAAAACACATGGCTACCCCTTCCTT GTACTATCCCTATGGGGCATGATTATGACAAGCTCCATGTGCCTACGACA AACAGACCTAAAATCGCTCATTGCATACTCTTCAATCAGCCACATGGCCCT CGTAGTAACAGCCATTCTCATCCAAACCCCTGGAGCTTACCGGCGCA GTCATTCTCATGATCGCCACGGGCTTACATCCTCATTACTATTCTGCCTA GCAAACCTCAAACACGAACGCACTCACAGTCGCATCATGATCCTCTCTCA AGGACTTCAAACCTTACTCCACTAATGGCTTTTTGGTGGCTTCTAGCAAG CCTCGCTAACCTCGCCTTACCCCCCACTATTAACCTACTGGGAGAACTCT CTGTGCTAGTAACCAGTTCTCCTGGTCAAATATCACTCTCCTACTTACAG GACTCAACATGCTAGTCACAGCCCTATACTCCCTCTACATGTTTACCACAA CACAATGGGGCTCACTACCCACCACATTAACAACATGAACCCCTCATT ACACGAGAAAAACCCCTCATGTTTCATGCACCTATCCCCATTCTCCTCCTA TCCCTCAACCCCGACATCATTACCGGGTTTTCTCTTAAGAGCACTGGGA CGCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAAT

		<p>TCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAAGATTATAAACG AATTCCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACC CAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAA AAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACC CCACCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATACACAG CTTCTCTTTTTGTTCCATCCTTACCACCACACCACAGCAGACTCCACAT GCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCT GCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACC CCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGTTTTCCCAACCC ACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGG CTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCA AGCTGGACTGCCA</p>
73	OPA1- opt_ND4- 3'UTR	<p>GTGCTGCCCCGCTAGAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGGATGTGGCGA CTACGTCGGGCCGCTGTGGCCTGATGCTGAAGCTGATCGTGCCACCAT CATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAACACATGATCTGGATCA ACACCACCACGCACAGCCTGATCATCAGCATCATCCCTCTGCTGTTCTTC AACCAGATCAACAACAACCTGTTTCAGCTGCAGCCCCACCTTCAGCAGCGA CCCTCTGACAACACCTCTGCTGATGCTGACCACCTGGCTGCTGCCCTCA CAATCATGGCCTCTCAGAGACACCTGAGCAGCGAGCCCTGAGCCGGAA GAAACTGTACCTGAGCATGCTGATCTCCCTGCAGATCTCTCTGATCATGA CCTTCACCGCCACCGAGCTGATCATGTTCTACATCTTTTTCGAGACAACG CTGATCCCCACACTGGCCATCATCACCAGATGGGGCAACCAGCCTGAGA GACTGAACGCCGGCACCTACTTTCTGTTCTACACCCTCGTGGGCAGCCT GCCACTGCTGATTGCCCTGATCTACACCCACAACACCCTGGGCTCCCTGA ACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGAGCAACAGCTGGGC CAACAATCTGATGTGGCTGGCCTACACAATGGCCTTCATGGTCAAGATGC CCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCTCATGTGGAAGCCCC TATCGCCGGCTCTATGGTGCTGGCTGCAGTGCTGCTGAACTCGGCGGC TACGGCATGATGCGGCTGACCCTGATTCTGAATCCCCTGACCAAGCATAT GGCCTATCCATTTCTGGTGCTGAGCCTGTGGGGCATGATTATGACCAGCA GCATCTGCCTGCGGCAGACCGATCTGAAGTCCCTGATCGCCTACAGCTC CATCAGCCACATGGCCCTGGTGGTCACCGCCATCCTGATTACAGACCCCT GGAGCTTTACAGGCGCCGTGATCCTGATGATTGCCACCGGCCTGACAAG CAGCCTGCTGTTTTGTCTGGCCAACAGCAACTACGAGCGGACCCACAGC AGAATCATGATCCTGTCTCAGGGCCTGCAGACCCTCCTGCCTCTTATGGC TTTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTGGCAATGCTCCTACCA TCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCACCAATTACAGCTGGTC CAATATCACCCCTGCTGCTCACCGGCCTGAACATGCTGGTTACAGCCCTGT ACTCCCTGTACATGTTACCAACACACAGTGGGGAAGCCTGACACACCAC ATCAACAATATGAAGCCCAGCTTCACCCGCGAGAACACCCTGATGTTTAT GCATCTGAGCCCCATTCTGCTGCTGTCCCTGAATCCTGATATCATACCG GCTTCTCCAGCTGAGAGCACTGGGACGCCACCGCCCCCTTTCCCTCCGC TGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGC TGGGTTTAGAACAAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGAC AGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGC ATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGT CTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCTCCTC ACATGGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCCTTACCAC CACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCC AGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGT CCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCCT GCATTTTTGGTTTTCCCAACCCACACATTCTCAACCATAGTCCTTCTAAC AATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGAGTTCC ACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCCGTGCCTCCC TTCACCCCCATTGCGTATGAGCATTTCAAGACTCCAAGGAGTCACAGGCA</p>

		<p>TCTTTATAGTTCACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTA AAAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACC CCATTACTGTACCTCTGGAGTCACTACTGTGGGTCGCCACTCCTCTGCTA CACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAG GGTGTGCTGGGCTAACCAGCCACAGAGCTCACATTCTGTCCCTTGGG TGAAAAATACATGTCCATCCTGATATCTCCTGAATTACAGAAATTAGCCTCC ACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTCTGGGAATTTTGCA AGTTACCTGTGGCCAGGTGTGGTCTCGGTACCAAATACGGTTACCTGCA GCTTTTGTAGTCTTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCA AAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCAGGGC ACTACTGGTCCGTAGGATTGATTGGTTCGGGGTAGGAGAGTTAAACAACA TTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACA TCCAATCACTGTTTGCATTATCTGAAATCTTCCCTCTTGGCTGCCCCAG GTATTTACTGTGGAGAACATTGCATAGGAATGTCTGAAAAAGCTTCTACA ACTTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
74	OPA1- opt_ND4- 3'UTR*	<p>GTGCTGCCCCGCTAGAAAGGGTGAAGTGGTTGTTCCGTGACGGAAGTGA GTACGGGTGCCTGTGAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCGCCGGCGGGATGTGGCGA CTACGTGCGGGCCGCTGTGGCCTGATGCTGAAGCTGATCGTGCCACCAT CATGCTGCTGCCTCTGACCTGGCTGAGCAAGAAACACATGATCTGGATCA ACACCACCACGCACAGCCTGATCATCAGCATCATCCCTCTGCTGTTCTTC AACCAGATCAACAACAACCTGTTTCAGCTGCAGCCCCACCTTCAGCAGCGA CCCTCTGACAACACCTCTGCTGATGCTGACCACCTGGCTGCTGCCCTCA CAATCATGGCCTCTCAGAGACACCTGAGCAGCGAGCCCCCTGAGCCGGAA GAACTGTACCTGAGCATGCTGATCTCCCTGCAGATCTCTCTGATCATGA CCTTCACCGCCACCGAGCTGATCATGTTCTACATCTTTTTCGAGACAACG CTGATCCCCACACTGGCCATCATCACCAGATGGGGCAACCAGCCTGAGA GACTGAACGCCGGCACCTACTTTCTGTTCTACACCCTCGTGGGCAGCCT GCCACTGCTGATTGCCCTGATCTACACCCACAACACCCTGGGCTCCCTGA ACATCCTGCTGCTGACACTGACAGCCCAAGAGCTGAGCAACAGCTGGGC CAACAATCTGATGTGGCTGGCCTACACAATGGCCTTCATGGTCAAGATGC CCCTGTACGGCCTGCACCTGTGGCTGCCTAAAGCTCATGTGGAAGCCCC TATCGCCGGCTCTATGGTGTGGCTGCAGTGCTGCTGAAACTCGGCGGC TACGGCATGATGCGGCTGACCCTGATTCTGAATCCCTGACCAAGCAT GGCCTATCCATTTCTGGTGTGAGCCTGTGGGCATGATTATGACCAGCA GCATCTGCCTGCGGCAGACCGATCTGAAGTCCCTGATCGCCTACAGCTC CATCAGCCACATGGCCCTGGTGGTCAACCGCCATCCTGATTACAGCCCTT GGAGCTTTACAGGCGCCGTGATCCTGATGATTGCCACGGCCTGACAAG CAGCCTGCTGTTTTGTCTGGCCAACAGCAACTACGAGCGGACCCACAGC AGAATCATGATCCTGTCTCAGGGCCTGCAGACCCTCCTGCCTCTTATGGC TTTTGGTGGCTGCTGGCCTCTCTGGCCAATCTGGCACTGCCTCCTACCA TCAATCTGCTGGGCGAGCTGAGCGTGCTGGTCACCACATTCAGCTGGTC CAATATCACCTGCTGCTCACCAGCCTGAACATGCTGGTTACAGCCCTGT ACTCCCTGTACATGTTACCACCACACAGTGGGGAAGCCTGACACACCAC ATCAACAATATGAAGCCCAGCTTCACCCGCGAGAACACCCTGATGTTTCT GCATCTGAGCCCCATTCTGCTGCTGTCCCTGAATCCTGATATCATACCG GCTTCTCCAGCTGAGAGCACTGGGACGCCCACCGCCCCCTTTCCCTCCGC TGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGC TGGGTTTAGAACAAGATTATAAAGCAATTCGGTGCTCAGTGATCACTTGAC AGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGC ATCAGCTCAGTCAGTGAATACAAAAAGGAATTATTTTCCCTTTGAGGGT CTTTTATACATCTCTCTCCAACCCACCCCTCTATTCTGTTTCTTCTCCTC ACATGGGGGTACACATACACAGCTTCTCTTTTGGTTCCATCCTTACCAC CACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCC AGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGT</p>

		<p>CCCTCAAAGGCCTCGGAGCACCCCCTTCCTTGTGACTGAGCCAGGGCCT GCATTTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAAC AATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCC ACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>
75	OPA1- opt_ND4*- 3'UTR	<p>GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGAAGTGA GTACGGGTGCCTGTGACGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTTGACCGGGAGCCGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGATGTGGCGA CTACGTGCGGGCCGCTGTGGCCTGATGCTGAAGCTGATCGTGCCACCAT CATGCTGCTGCCCTGACCTGGCTGAGCAAGAAGCACATGATCTGGATC AACACCACCACCCACAGCCTGATCATCAGCATCATCCCCCTGCTGTTCTT CAACCAGATCAACAACAACCTGTTCAAGCTGCAGCCCCACCTTCAGCAGCG ACCCCTGACCACCCCCCTGCTGATGCTGACCACCTGGCTGCTGCCCT GACCATCATGGCCAGCCAGCGCCACCTGAGCAGCGAGCCCCCTGAGCCG CAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCAGATCAGCCTGATCA TGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCTTCTTCGAGACC ACCCTGATCCCCACCTGGCCATCATCACCCGCTGGGGCAACCAGCCCG AGCGCTGAACGCCGCGCACCTACTTCCTGTTCTACACCCTGGTGGGCG CCTGCCCTGCTGATCGCCCTGATCTACACCCACAACACCCTGGGCGAGC CTGAACATCCTGCTGCTGACCCTGACCGCCAGGAGCTGAGCAACAGCT GGGCAACAACCTGATGTGGCTGGCCTACACCATGGCCTTCATGGTGAA GATGCCCTGTACGGCCTGCACCTGTGGCTGCCCAAGGCCACAGTGA GGCCCCCATCGCCGGCAGCATGGTGTGCGCGCCGTGCTGCTGAAGCT GGGCGGCTACGGCATGATGCGCCTGACCCCTGATCCTGAACCCCTGACC AAGCACATGGCCTACCCCTTCCTGGTGTGCTGAGCCTGTGGGCATGATCA TGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAAGAGCCTGATCGC CTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACCGCCATCCTGATC CAGACCCCTGGAGCTTCACCGGCGCCGTGATCCTGATGATCGCCACG GCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAGCAACTACGAGCG CACCCACAGCCGCATCATGATCCTGAGCCAGGGCCTGCAGACCCTGCTG CCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGGCCAACCTGGCCC TGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGTGTGGTGACCAC CTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGCCTGAACATGCTG GTGACCGCCCTGTACAGCCTGTACATGTTCAACACCACCCAGTGGGGCA GCCTGACCCACCACATCAACAACATGAAGCCCAGCTTCACCCGCGAGAA CACCTGATGTTTATGCACCTGAGCCCCATCCTGCTGCTGAGCCTGAACC CCGACATCATACCGGCTTCAGCAGCTAAGAGCACTGGGACGCCACCG CCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACAC AAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCCGGTGC TCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTC CCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAATTAT TTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTAT TCTGTTTCTTCTCCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTTG GTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAGAG TGGCACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGT TCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTG ACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCACACATTCTCAA CCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACT</p>

		GGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGC CAGCCCCCTGTCCTCCCTTCACCCCCATTGCGTATGAGCATTTCAGAACTC CAAGGAGTCACAGGCATCTTTATAGTTCACGTTAACATATAGACACTGTTG GAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATA CCTCTGGCCCCCACCCTTACTGTACCTCTGGAGTCACTACTGTGGGTG GCCACTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGG GAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCCACAGAGCTCACA TTCCTGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATT CAGAAATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGT TCTGGGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAA ATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCCACGGGTCTACAG AGTCCCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTAC TCAGTCTCCAGGGCACTACTGGTCCGTAGGATTGATTGGTCGGGGTA GGAGAGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGA TTGTAGGTAGATAACATCCAATCACTGTTTGCACCTTATCTGAAATCTTCCC TCTTGGCTGCCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTC TGGAAAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT
76	OPA1- opt_ND4*- 3'UTR*	GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTCCGTGACGGACTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTTGACCGGGAGCCGGGCTGGGGCTCACACGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGGATGTGGCGA CTACGTCGGGCGGCTGTGGCCTGATGCTGAAGCTGATCGTGCCACCAT CATGCTGCTGCCCTGACCTGGCTGAGCAAGAAGCACATGATCTGGATC AACACCACCACCCACAGCCTGATCATCAGCATCATCCCCCTGCTGTTCTT CAACCAGATCAACAACAACCTGTTCAAGCTGCAGCCCCACCTTCAGCAGCG ACCCCTGACCACCCCCCTGCTGATGCTGACCACCTGGCTGCTGCCCT GACCATCATGGCCAGCCAGCGCCACCTGAGCAGCGAGCCCCCTGAGCCG CAAGAAGCTGTACCTGAGCATGCTGATCAGCCTGCAGATCAGCCTGATCA TGACCTTCACCGCCACCGAGCTGATCATGTTCTACATCTTCTTCAGAGAC ACCCTGATCCCCACCTGGCCATCATCACCCGCTGGGGCAACCAGCCCG AGCGCTGAACGCCGGCACCTACTTCCTGTTCTACACCCTGGTGGGCAG CCTGCCCTGCTGATCGCCCTGATCTACACCCACAACACCCTGGGCAGC CTGAACATCCTGCTGCTGACCCTGACCGCCAGGAGCTGAGCAACAGCT GGGCCAACAACCTGATGTGGCTGGCCTACACCATGGCCTTCATGGTGAA GATGCCCTGTACGGCCTGCACCTGTGGCTGCCCAAGGCCACAGTGGA GGCCCCCATCGCCGGCAGCATGGTGTGGCGCCGTGCTGCTGAAGCT GGGCGGCTACGGCATGATGCGCCTGACCCTGATCCTGAACCCCTGACC AAGCACATGGCCTACCCCTTCCTGGTGCTGAGCCTGTGGGGCATGATCA TGACCAGCAGCATCTGCCTGCGCCAGACCGACCTGAAGAGCCTGATCGC CTACAGCAGCATCAGCCACATGGCCCTGGTGGTGACCGCCATCCTGATC CAGACCCCTGGAGCTTCACCGGCGCCGTGATCCTGATGATCGCCACG GCCTGACCAGCAGCCTGCTGTTCTGCCTGGCCAACAGCAACTACGAGCG CACCCACAGCCGCATCATGATCCTGAGCCAGGGCCTGCAGACCCTGCTG CCCCTGATGGCCTTCTGGTGGCTGCTGGCCAGCCTGGCCAACCTGGCCC TGCCCCCACCATCAACCTGCTGGGCGAGCTGAGCGTGCTGGTGACCAC CTTCAGCTGGAGCAACATCACCTGCTGCTGACCGGCCTGAACATGCTG GTGACCGCCCTGTACAGCCTGTACATGTTCAACCACACCCAGTGGGGCA GCCTGACCCACCACATCAACAACATGAAGCCCAGCTTCACCCGCGAGAA CACCTGATGTTTCATGCACCTGAGCCCCATCCTGCTGCTGAGCCTGAACC CCGACATCATACCGGCTTCAGCAGCTAAGAGCACTGGGACGCCACCG CCCTTTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACAC AAGAAGAGAAATTGCTGGGTTTAGAACAAGATTATAAACGAATTCGGTGC TCAGTGATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTC CCCAAATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAGGAATTAT TTTTCCCTTTGAGGGTCTTTTATACATCTCTCTCCAACCCACCTCTAT TCTGTTTCTTCTCCTCACATGGGGGTACACATACACAGCTTCTCTTTTG GTTCCATCCTTACCACCACACCACACGCACACTCCACATGCCAGCAGAG TGGCACTTGGTGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGT

		<p>TCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCCTTCCTTGTG ACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCACCCACACATTCTCAA CCATAGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACT GGGACTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGC CA</p>
77	OPA1- ND6- 3'UTR	<p>GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTCCGTGACGGAAGTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTTGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGATGTGGCGA CTACGTCGGGCCGCTGTGGCCTGATGATGTATGCTTTGTTTCTGTTGAGT GTGGGTTTAGTAATGGGTTTGTGGGGTTTTCTTCTAAGCCTTCTCCTATT TATGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCGGGTGTGTTATTATT CTGAATTTTGGGGGAGGTTATATGGGTTTAATGGTTTTTTAATTTATTTAG GGGAATGATGGTTGTCTTTGGATATACTACAGCGATGGCTATTGAGGAG TATCCTGAGGCATGGGGGTGAGGGTTGAGGTCTTGGTGAGTGTGTTTAG TGGGGTTAGCGATGGAGGTAGGATTGGTGCTGTGGGTGAAAGAGTATGA TGGGGTGGTGGTTGTGGTAACTTTAATAGTGTAGGAAGCTGGATGATTT ATGAAGGAGAGGGGTGAGGGTTGATTGCGGAGGATCCTATTGGTGCGGG GGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAGTTACTGGTTGGACATT GTTTGTGTTGTATATATTGTAATTGAGATTGCTCGGGGGAATTAGGAGC ACTGGGACGCCCACCGCCCCTTTCCCTCCGCTGCCAGGCGAGCATGTTG TGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATT ATAAACGAATTCGGTGCTCAGTGATCAGTTGACAGTTTTTTTTTTTTTAA TATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAA TACAAAAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTC CAACCCACCCCTCTATTCTGTTTCTTCTCCTCCTACATGGGGGTACACATAC ACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACTC CACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCAT GATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCGGAG CACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCCA CCCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACC CGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGT CTCAAGCTGGACTGCCAGCCCCTGTCTCCTTCCCTTACCCCATTCGCGTATG AGCATTTTCAAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTACGTTAAC ATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGACTT AATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTGGAG TCACTACTGTGGGTGCGCACTCCTCTGCTACACAGCACGGCTTTTTCAAG GCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAACCAG CCCACAGAGCTCACATTCCTGTCCCTTGGGTGAAAAATACATGTCCATCC TGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTTAAG AGCCAGAAGCAGGGTTCTGGGAATTTTGAAGTTACCTGTGGCCAGGTG TGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTTGTGCT CCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTTGAAGCTTGACA GGATGTTTTCGATTACTCAGTCTCCCAGGGCACTACTGGTCCGTAGGATT CGATTGGTCGGGGTAGGAGAGTTAAACAACATTTAAACAGAGTTCTCTCA AAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCAT TATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAAC ATTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAGCCTTCAC ATTTGTAGAAGCTTT</p>

78	OPA1-ND6-3'UTR*	<p>GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGGATGTGGCGA CTACGTCGGGCGCGCTGTGGCCTGATGATGTATGCTTTGTTTCTGTTGAGT GTGGGTTTAGTAATGGGGTTTGTGGGGTTTCTTCTAAGCCTTCTCCTATT TATGGGGTTTAGTATTGATTGTTAGCGGTGTGGTCGGGTGTGTTATTATT CTGAATTTTGGGGGAGGTTATATGGGTTTAATGGTTTTTTAATTTATTTAG GGGAATGATGGTTGTCTTTGGATATACTACAGCGATGGCTATTGAGGAG TATCCTGAGGCATGGGGGTGAGGGTTGAGGTCTTGGTGAGTGTTTTAG TGGGGTTAGCGATGGAGGTAGGATTGGTGCTGTGGGTGAAAGAGTATGA TGGGGTGGTGGTTGTGGTAACTTTAATAGTGATAGGAAGCTGGATGATTT ATGAAGGAGAGGGGTGAGGGTTGATTCCGGGAGGATCCTATTGGTGCGGG GGCTTTGTATGATTATGGGCGTTGGTTAGTAGTAGTTACTGGTTGGACATT GTTTGTGGTGTATATATTGTAATTGAGATTGCTCGGGGGAATTAGGAGC ACTGGGACGCCCACCGCCCCCTTCCCTCCGCTGCCAGGCGAGCATGTTG TGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAAGATT ATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTTTAA TATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAGTGAA TACAAAAAGGAATTATTTTCCCTTTGAGGGTCTTTTATACATCTCTCCTC CAACCCACCCCTCTATTCTGTTTCTTCTCCTCACATGGGGGTACACATAC ACAGCTTCTCTTTTGGTTCCATCCTTACCACCACACACACACGCACACTC CACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCTCAT GATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCCTCGGAG CACCCCTTCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTTTCCCA CCCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAGGACC CGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGGAGT CTCAAGCTGGACTGCCA</p>
79	OPA1-opt_ND6-3'UTR	<p>GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGGATGTGGCGA CTACGTCGGGCGCGCTGTGGCCTGATGATGTACGCCCTGTTCTGCTGAG CGTGGGCCTGGTGATGGGCTTCGTGGGCTTCAGCAGCAAGCCCAGCCC CATCTACGGCGGCCTGGTGCTGATCGTGAGCGGCGTGGTGGGCTGCGT GATCATCCTGAACCTCGGCGGCGGCTACATGGGCCTGATGGTGTTCTCTG ATCTACCTGGGCGGCATGATGGTGGTGTTCCGCTACACCACCGCCATGG CCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGCGTGGAGCTCTGG TGAGCGTGCTGGTGGGCTGGCCATGGAGGTGGGCTGGTGCTGTGGG TGAAGGAGTACGACGGCGTGGTGGTGGTGAACCTCAACAGCGTGGG CAGCTGGATGATCTACGAGGGCGAGGGCAGCGGCCTGATCCGCGAGGA CCCCATCGGCGCCGGCGCCCTGTACGACTACGGCCGCTGGCTGGTGGT GGTGACCGGCTGGACCCTGTTCTGGGCGTGTACATCGTGATCGAGATC GCCCAGCGCAACTAAGAGCACTGGGACGCCCACCGCCCCCTTCCCTCCG CTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTG CTGGGTTTAGAACAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGA CAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATG CATCAGCTCAGTCAGTGAATACAAAAAGGAATTATTTTCCCTTTGAGGG TCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCTCCT CACATGGGGGTACACATACACAGCTTCTCTTTGGTTCCATCCTTACCA CCACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGC CAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGG TCCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGACTGAGCCAGGGCC TGCATTTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAA CAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGAGTGGGATTC CACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGCCCTGTCTCTC CTTCAACCCCATTTGCGTATGAGCATTTTCAAGACTCCAAGGAGTCACAGGC ATCTTTATAGTTCACGTAAACATATAGACACTGTTGGAAGCAGTTCCTTCT</p>

		AAAAGGGTAGCCCTGGACTTAATACCAGCCGGATACCTCTGGCCCCCACC CCCATTACTGTACCTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCT ACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAA GGGTGTGCTGGGCTAACCAGCCCACAGAGCTCACATTCTGTCCCTTGG GTGAAAAATACATGTCCATCCTGATATCTCCTGAATTACAGAAATTAGCCTC CACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTTCTGGGAATTTTGC AAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGC AGCTTTTTAGTCCTTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCC AAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAGTCTCCCAGGG CACTACTGGTCCGTAGGATTGATTGGTTCGGGGTAGGAGAGTTAAACAAC ATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAAC ATCCAATCACTGTTTGCATTATCTGAAATCTTCCCTCTTGGCTGCCCCCA GGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGAAAAAGCTTCTA CACTTGTACAGCCTTACATTTGTAGAAGCTTT
80	OPA1- opt_ND6- 3'UTR*	GTGCTGCCCCGCCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGAAGTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCGCCGGCGGGATGTGGCGA CTACGTGCGGGCCGCTGTGGCCTGATGATGTACGCCCTGTTCTCTGTGAG CGTGGGCCTGGTGTGGGCTTCGTGGGCTTCAGCAGCAAGCCCAGCCC CATCTACGGCGGCCTGGTGTGATCGTGAGCGGCGTGGTGGGCTGCGT GATCATCCTGAACCTTCGGCGGCGGCTACATGGGCGCTGATGGTGTCTG ATCTACCTGGGCGGCATGATGGTGGTGTTCGGCTACACCACCGCCATGG CCATCGAGGAGTACCCCGAGGCCTGGGGCAGCGGCGTGGAGGTGCTGG TGAGCGTGCTGGTGGGCCTGGCCATGGAGGTGGGCCTGGTGTGTGGG TGAAGGAGTACGACGGCGTGGTGGTGGTGGTGAACCTCAACAGCGTGGG CAGCTGGATGATCTACGAGGGGCGAGGGCAGCGGCCTGATCCGCGAGGA CCCCATCGGCGCCGGCGCCCTGTACGACTACGGCCGCTGGCTGGTGGT GGTGACCGGCTGGACCCTGTTCTGTGGGCGTGTACATCGTGATCGAGATC GCGCGCGCAACTAAGAGCACTGGGACGCCCACCGCCCTTCCCTCCG CTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAAAGAAATTG CTGGGTTTAGAACAAGATTATAAACGAATTCCGGTGCTCAGTGATCACTTGA CAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATG CATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGG TCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGTTTCTTCTCTCT CACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCATCCTTACCA CCACACCACACGCACACTCCACATGCCAGCAGAGTGGCACTTGGTGGC CAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGG TCCCTCAAAGGCCTCGGAGCACCCCTTCTTGTGATGAGCCAGGGGCC TGCATTTTTGGTTTTCCCCACCCACACATTCTCAACCATAGTCCTTCTAA CAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCT CACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA
81	OPA1- ND1- 3'UTR	GTGCTGCCCCGCCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGAAGTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCGCCGGCGGGATGTGGCGA CTACGTGCGGGCCGCTGTGGCCTGATGCCATGGCCAACCTCTACTCCT CATTGTACCCATTCTAATCGCAATGGCATTCTAATGCTTACCGAACGAAA AATTCTAGGCTATATGCAACTACGCAAAGGCCCAACGTTGTAGGCCCT ACGGGCTACTACAACCCTTCGCTGACGCCATGAACTCTTCACCAAAGAG CCCCTAAAACCCGCCACATCTACCATCACCCTCTACATCACCGCCCCGAC CTTAGCTCTCACCATCGCTCTTCTACTATGGACCCCTTCCCATGCCCA ACCCCCTGGTCAACCTCAACCTAGGCCTCCTATTTATTCTAGCCACCTCTA GCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTGGGCATCAAACCTCAAAC TACGCCCTGATCGGCGCACTGCGAGCAGTAGCCCAAACAATCTCATATGA AGTCACCCTAGCCATCATTCTACTATCAACATTACTAATGAGTGGCTCCTT TAACCTCTCCACCCTTATCACAACACAAGAACACCTCTGGTTACTCCTGCC ATCATGGCCCTTGGCCATGATGTGGTTTATCTCCACACTAGCAGAGACCA

		<p>ACCGAACCCCCTTCGACCTTGCCGAAGGGGAGTCCGAACCTAGTCTCAGG CTTCAACATCGAATACGCCGAGGCCCTTCGCCCTATTCTTCATGGCCG AATACACAAACATTATTATGATGAACACCCTCACCCTACAATCTTCCTAG GAACAACATATGACGCACTCTCCCCTGAACTCTACACAACATATTTTGTCA CCAAGACCCTACTTCTAACCTCCCTGTTCTTATGGATTGGAACAGCATACC CCCGATTCCGCTACGACCAACTCATGCACCTCCTATGGAAAACTTCCTA CCACTCACCTTAGCATTACTTATGTGGTATGTCTCCATGCCCATTACAATC TCCAGCATTCCCCCTCAAACCTAAGAGCACTGGGACGCCACCGCCCCCT TTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAA GAGAAATTGCTGGGTTTGAACAAGATTATAAACGAATTCGGTGCTCAGT GATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAA ATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTC CCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCACCCCTCTATTCTGT TTCTTCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCC ATCCTTACCACCACACCACACGACACTCCACATGCCAGCAGAGTGGC ACTTGGTGGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTG TGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTG AGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAACCAT AGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGA CTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCAGC CCCTGTCCTCCCTTCACCCCATTCGCGTATGAGCATTTCAGAACTCCAAG GAGTCACAGGCATCTTTATAGTTCACGTTAACATATAGACACTGTTGGAAG CAGTTCCTTCTAAAAGGGTAGCCCTGGACTTAATACCAGCCGGATACGA TGGCCCCCACCCATTACTGTACCTCTGGAGTCACTACTGTGGGTCGCCA CTCCTCTGCTACACAGCACGGCTTTTTCAAGGCTGTATTGAGAAGGGAAG TTAGGAAGAAGGGTGTGCTGGGCTAACCAGCCACAGAGCTCACATTCC TGTCCCTTGGGTGAAAAATACATGTCCATCCTGATATCTCCTGAATTCAGA AATTAGCCTCCACATGTGCAATGGCTTTAAGAGCCAGAAGCAGGGTCTG GGAATTTTGCAAGTTACCTGTGGCCAGGTGTGGTCTCGGTTACCAAATAC GGTTACCTGCAGCTTTTTAGTCCTTTGTGCTCCACGGGTCTACAGAGTC CCATCTGCCCAAAGGTCTTGAAGCTTGACAGGATGTTTTCGATTACTCAG TCTCCAGGGCACTACTGTCGTCGTCAGGATTGCGATTGGTCGGGGTAGGAG AGTTAAACAACATTTAAACAGAGTTCTCTCAAAAATGTCTAAAGGGATTGT AGGTAGATAACATCCAATCACTGTTTGCATTATCTGAAATCTTCCCTCTT GGCTGCCCCCAGGTATTTACTGTGGAGAACATTGCATAGGAATGTCTGGA AAAAGCTTCTACAACCTGTTACAGCCTTCACATTTGTAGAAGCTTT</p>
82	OPA1- ND1- 3'UTR*	<p>GTGCTGCCCCGCTAGAAAGGGTGAAGTGGTTGTTCCGTGACGGAAGTGA GTACGGGTGCCTGTCAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTTGACCGGGAGCCGGGCTGGGGCTCACACGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCGCCGGCGGGATGTGGCGA CTACGTCGGGCGGCTGTGGCCTGATGCCCATGGCCAACCTCCTACTCCT CATTGTACCCATTCTAATCGCAATGGCATTCTAATGCTTACCGAACGAAA AATTCTAGGCTATATGCAACTACGCAAAGGCCCAACGTTGTAGGCCCT ACGGGCTACTACAACCTTCGCTGACGCCATGAACTCTTCACCAAAGAG CCCCTAAAACCCGCCACATCTACCATCACCTCTACATCACCGCCCCGAC CTTAGCTCTACCATCGCTCTTCTACTATGGACCCCCCTCCCCATGCCCA ACCCCTGGTCAACCTCAACCTAGGCCTCCTATTTATTCTAGCCACCTCTA GCCTAGCCGTTTACTCAATCCTCTGGTCAGGGTGGGCATCAAACCTCAAAC TACGCCCTGATCGGCGCACTGCGAGCAGTAGCCCAAACAATCTCATATGA AGTCACCCTAGCCATCATTCTACTATCAACATTACTAATGAGTGGCTCCTT TAACCTCTCCACCCTTATCACAACACAAGAACACCTCTGGTTACTCCTGCC ATCATGGCCCTTGGCCATGATGTGGTTTATCTCCACACTAGCAGAGACCA ACCGAACCCCCTTCGACCTTGCCGAAGGGGAGTCCGAACCTAGTCTCAGG CTTCAACATCGAATACGCCGAGGCCCTTCGCCCTATTCTTCATGGCCG AATACACAAACATTATTATGATGAACACCCTCACCCTACAATCTTCCTAG GAACAACATATGACGCACTCTCCCCTGAACTCTACACAACATATTTTGTCA CCAAGACCCTACTTCTAACCTCCCTGTTCTTATGGATTGGAACAGCATACC CCCGATTCCGCTACGACCAACTCATGCACCTCCTATGGAAAACTTCCTA CCACTCACCTTAGCATTACTTATGTGGTATGTCTCCATGCCCATTACAATC</p>

		<p>TCCAGCATTCCCCCTCAAACCTAAGAGCACTGGGACGCCACCGCCCCCT TTCCCTCCGCTGCCAGGCGAGCATGTTGTGGTAATTCTGGAACACAAGAA GAGAAATTGCTGGGTTTAGAACAAAGATTATAAACGAATTCGGTGCTCAGT GATCACTTGACAGTTTTTTTTTTTTTAAATATTACCCAAAATGCTCCCCAA ATAAGAAATGCATCAGCTCAGTCAGTGAATACAAAAAAGGAATTATTTTTT CCTTTGAGGGTCTTTTATACATCTCTCCTCCAACCCCAACCTCTATTCTGT TTCTTCTCCTCACATGGGGGTACACATACACAGCTTCCTCTTTTGGTTCC ATCCTTACCACCACACCACACGCACTCCACATGCCAGCAGAGTGGC ACTTGGTGCCAGAAAGTGTGAGCCTCATGATCTGCTGTCTGTAGTTCTG TGAGCTCAGGTCCCTCAAAGGCCTCGGAGCACCCCTTCCTTGTGACTG AGCCAGGGCCTGCATTTTTGGTTTTCCCAACCCACACATTCTCAACCAT AGTCCTTCTAACAATACCAATAGCTAGGACCCGGCTGCTGTGCACTGGGA CTGGGGATTCCACATGTTTGCCTTGGGAGTCTCAAGCTGGACTGCCA</p>
83	OPA1- opt_ND1- 3'UTR	<p>GTGCTGCCCCGCTAGAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCTGTCAAGGCTCTTGCGGAAGTCCATGCCCATTTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTGGACCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCCGGCGGGATGTGGCGA CTACGTCGGGCGCTGTGGCCTGATGCCCATGGCCAACCTGCTGCTGCT GATCGTGCCCATCCTGATCGCCATGGCCTTCCTGATGCTGACCGAGCGC AAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCCCAACGTGGTGGGC CCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCATGAAGCTGTTACCA AGGAGCCCCCTGAAGCCCCGCCACCAGCACCATCACCTGTACATCACCGC CCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGTGGACCCCCCTGCC ATGCCAACCCCCCTGGTGAACCTGAACCTGGGCCTGCTGTTTCATCCTGG CCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGGAGCGGCTGGGCCA GCAACAGCAACTACGCCCTGATCGGCGCCCTGCGCGCCGTGGCCAGA CCATCAGCTACGAGGTGACCCTGGCCATCATCCTGCTGAGCACCCCTGCT GATGAGCGGCAGCTTCAACCTGAGCACCCCTGATCACCAACCAGGAGCAC CTGTGGCTGCTGCTGCCAGCTGGCCCCTGGCCATGATGTGGTTCATCA GCACCCTGGCCGAGACCAACCGCACCCCTTCGACCTGGCCGAGGGCG AGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTACGCCGCGCGGCCCTT CGCCCTGTTCTTCATGGCCGAGTACACCAACATCATCATGATGAACACCC TGACCACCACCATCTTCTGGGCACCACCTACGACGCCCTGAGCCCCGA GCTGTACACCACCTACTTCGTGACCAAGACCCTGCTGCTGACCAGCCTGT TCCTGTGGATCCGCACCGCCTACCCCCGCTTCCGCTACGACCAGCTGAT GCACCTGCTGTGGAAGAACTTCCTGCCCTGACCCTGGCCCTGCTGATG TGGTACGTGAGCATGCCATCACCATCAGCAGCATCCCCCCCCAGACCT AAGAGCACTGGGACGCCACCGCCCCCTTTCCCTCCGCTGCCAGGCGAG CATGTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTAGAA CAAGATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTT TTTTAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGT CAGTGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATC TCTCCTCCAACCCCAACCTCTATTCTGTTTCTTCTCCTCACATGGGGGTA CACATACACAGCTTCTCTTTTGGTTCCATCCTTACCACCACACCACACGC ACACTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAG CCTCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCC TCGGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTTGGTTT TCCCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCT AGGACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTT GGGAGTCTCAAGCTGGACTGCCAGCCCCTGTCTCCCTTACCCCCATT GCGTATGAGCATTTTCAAGCTCCAAGGAGTACAGGCATCTTTATAGTTC ACGTTAACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCC CTGGACTTAATACCAGCCGATACCTCTGGCCCCCAACCCATTACTGTAC CTCTGGAGTCACTACTGTGGGTGCGCACTCCTCTGCTACACAGCACGGC TTTTTCAAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGG CTAACCAGCCACAGAGCTCACATTCTGTCCTTGGGTGAAAAATACAT GTCCATCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATG GCTTTAAGAGCCAGAAGCAGGGTCTGGGAATTTTGCAAGTTACCTGTGG CCAGGTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCC</p>

		<p>TTTGTGCTCCACGGGTCTACAGAGTCCCATCTGCCCAAAGGTCTTGAAG CTTGACAGGATGTTTTCGATTACTCAGTCTCCCAGGGCACTACTGGTCCG TAGGATTCGATTGGTGGGGTAGGAGAGTTAAACAACATTTAAACAGAGT TCTCTCAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGT TTGCACTTATCTGAAATCTTCCCTCTTGGCTGCCCCCAGGTATTTACTGTG GAGAACATTGCATAGGAATGTCTGGAAAAAGCTTCTACAACCTGTTACAG CCTTCACATTTGTAGAAGCTTT</p>
84	OPA1- opt_ND1- 3'UTR*	<p>GTGCTGCCCCGCTAGAAAAGGGTGAAGTGGTTGTTTCCGTGACGGACTGA GTACGGGTGCCTGTCAAGGCTCTTGCGGAAGTCCATGCGCCATTGGGAGG GCCTCGGCCGCGGCTCTGTGCCCTTGCTGCTGAGGGCCACTTCCTGGGT CATTCTTGACCCGGGAGCCGGGCTGGGGCTCACACGGGGGCTCCCGCG TGGCCGTCTCGGCGCCTGCGTGACCTCCCCGCGGGCGGGATGTGGCGA CTACGTGCGGCGCTGTGGCCTGATGCCCATGGCCAACCTGCTGCTGCT GATCGTGCCCATCCTGATCGCCATGGCCTTCCTGATGCTGACCGAGCGC AAGATCCTGGGCTACATGCAGCTGCGCAAGGGCCCCAACGTGGTGGGC CCCTACGGCCTGCTGCAGCCCTTCGCCGACGCCATGAAGCTGTTACCA AGGAGCCCCCTGAAGCCCCGCCACCAGCACCATCACCTGTACATCACCGC CCCCACCCTGGCCCTGACCATCGCCCTGCTGCTGTGGACCCCCCTGCC ATGCCCAACCCCTGGTGAACCTGAACCTGGGCTGCTGTTTCATCTCGG CCACCAGCAGCCTGGCCGTGTACAGCATCCTGTGGAGCGGCTGGGCCA GCAACAGCAACTACGCCCTGATCGGCGCCCTGCGCGCCGTGGCCAGA CCATCAGCTACGAGGTGACCCTGGCCATCATCCTGCTGAGCACCCTGCT GATGAGCGGCAGCTTCAACCTGAGCACCCTGATCACCACCCAGGAGCAC CTGTGGCTGCTGCTGCCAGCTGGCCCCCTGGCCATGATGTGGTTCATCA GCACCCTGGCCGAGACCAACCGCACCCCTTCGACCTGGCCGAGGGCG AGAGCGAGCTGGTGAGCGGCTTCAACATCGAGTACGCCGCCGGCCCCCT CGCCCTGTTCTTCATGGCCGAGTACACCAACATCATCATGATGAACCCC TGACCACCACCATCTTCTGCGCACCACCTACGACGCCCTGAGCCCCGA GCTGTACACCACCTACTTCGTGACCAAGACCCTGCTGCTGACCAGCCTGT TCCTGTGGATCCGCACCGCCTACCCCGCTTCCGCTACGACCAGCTGAT GCACCTGCTGTGGAAGAACTTCCTGCCCTGACCCTGGCCCTGCTGATG TGGTACGTGAGCATGCCCATCACCATCAGCAGCATCCCCCCCCAGACCT AA</p> <p>GAGCACTGGGACGCCCCACGCCCCCTTTCCCTCCGCTGCCAGGCGAGCAT GTTGTGTAATTCTGGAACACAAGAAGAGAAAATTGCTGGGTTTGAACAA GATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTT TAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAG TGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTTATACATCTCT CCTCCAACCCACCCCTCTATTCTGTTTCTTCTCCTCCTCACATGGGGGTACA CATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCAC ACTCCACATGCCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCC TCATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTC GGAGCACCCCTTCCTTGTGACTGAGCCAGGGCCTGCATTTTGGTTTTC CCCACCCACACATTCTCAACCATAGTCCTTCTAACAATACCAATAGCTAG GACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGG GAGTCTCAAGCTGGACTGCCA</p>
85	β -actin-S primer	CGAGATCGTGCGGGACAT
86	β -actin-A primer	CAGGAAGGAGGGCTGGAAC

87	ND4-S primer	CTGCCTACGACAAACAGAC
88	ND4-A primer	AGTGCGTTCGTAGTTTGAG
89	ND6-F primer	ATGATGTATGCTTTGTTTCTG
90	ND6-R primer	CTAATTCCCCCGAGCAATCTC
91	ND6-S primer	AGTGTGGGTTTAGTAATG
92	ND6-A primer	TGCCTCAGGATACTCCTC
93	β -actin-F primer	CTCCATCCTGGCCTCGCTGT
94	β -actin-R primer	GCTGTCACCTTCACCGTTCC
95	ND6-F primer	GGGTTTTCTTCTAAGCCTTCTCC
96	ND6-R primer	CCATCATACTCTTTCACCCACAG
97	opt_ND6-F primer	CGCCTGCTGACCGGCTGCGT
98	opt_ND6-R	CCAGGCCTCGGGGTACTCCT
99	ND1-F primer	ATGGCCGCATCTCCGCACACT
100	ND1-R primer	TTAGGTTTGAGGGGGAATGCT
101	ND1-F primer	AACCTCAACCTAGGCCTCCTA
102	ND1-R primer	TGGCAGGAGTAACCAGAGGTG
103	ND1-F primer	AGGAGGCTCTGTCTGGTATCTTG
104	ND1-R primer	TTTTAGGGGCTCTTTGGTGAA
105	opt-ND1-F primer	GCCGCCTGCTGACCGGCTGCGT
106	opt-ND1-R primer	TGATGTACAGGGTGATGGTGCTGG
107	ND4-S primer	GCCAACAGCAACTACGAGC
108	ND4-A primer	TGATGTTGCTCCAGCTGAAG
109	opt-ND4-S primer	GCCTGACCCTGATCCTGAAC
110	opt-ND4-A primer	GTGCGCTCGTAGTTGCTGTT
111	hsACO2	GGGCAGTGCCCTCCCCGCCCGCCGCTGGCGTCAAGTTCAGCTCCACGT GTGCCATCAGTGGATCCGATCCGTCCAGCCATGGCTTCCTATTCCAAGAT GGTGTGACCAGACATGCTTCCTGCTCCCCGCTTAGCCCACGGAGTGACT GTGGTTGTGGTGGGGGGTCTTAAATAACTTTTTAGCCCCCGTCTTCC TATTTTGAGTTTGTTTCAGATCTTAAGCAGCTCCATGCAACTGTATTTATTT TTGATGACAAGACTCCCATCTAAAGTTTTCTCCTGCCTGATCATTTTCATT GGTGGCTGAAGGATTCTAGAGAACCTTTTGTCTTGCAAGGAAAACAAGA ATCCAAAACCACTGACTGTTCTGTGA
112	hsATP5B	GGGGTCTTTGTCCTCTGTACTGTCTCTCTCCTTGCCCCTAACCCAAAAAG CTTCATTTTTCTGTGTAGGCTGCACAAGAGCCTTGATTGAAGATATATTCT TTCTGAACAGTATTTAAGTTTTCCAATAAAATGTACACCCCTCAG

113	hsAK2	<p>TGTTGGGTCCAAGAAGGAATTTCTTTCCATCCCTGTGAGGCAATGGGTGG GAATGATAGGACAGGCCAAAGAGAAGCTTCCTCAGGCTAGCAAAAATATCA TTTGATGTATTGATTAAGGACACTTGCTTGATGTATCTTTGGCGTGTGT GCTACTCTCATCTGTGTGTATGTGTGTTGTGTGTGTGTGTGTGCATGC ACATATGTGTTCACTCTGCTACTTTGTAAGTTTTAGGCTAGGTTGCTTTAC CAGCTGTTTACTTCTTTTTTTGTTGTTGTTTTGAGACAAGGTTTCGCTCTGC CACCTGGCTGGAGTGCAGTGGCGTGATCTTGGCTCACGGCAACCTCTG CCTCCTGGGGCTCAAGCAATTATCCACCTCAGCCTCCTGAGCAGCTGG GACTACAGGTGCATGCCACAACACCTGGCTGATATTTGTATTTTTGTAGA GACAGGATTTTGCCAAGTTGCCAGGCTGGTCTTGAACCTCCTAGGCTTAA GCAATCCACCCACCTTGGCCTCCTGAAGTGCCAGGATCACAGACGTGAG CCACTACACCCAGCCCAGCTGTTTACTTCTTTAACCATACTTTGATTTTAT TTTTGACCAAAATGAACTAACCAGGTAATCTTCCAGGGACCGCAATTCC AGAACCTCATAGTATTTCTTCCATTTCCAGCAGCTGATTAGAAGTCCAGGA TCATGTGAAGTCAGGCAGGGTCACAGTTCCTGATGGCACATTATGGACAG AGAATTCCATTTGTTTTCTAACCCTATGATGAAAACCCACGTGAGTCAGTG TGTGAACAGGGATCATTATTTTTTCCCCCTAGGTGGAAGGAAAAAGGCA CTTACTTTGCAGGTTACAGAAATTACTGGGAGAGGATATCGTCATAAAAAG AGCCAGGCCAAATTGGAATATTTTGTGATCTGCATCATGATGCTGAAAAT AGCAATTATTTGGGAATTGGGTTTGAAAACCTGAATTGTTGCCAGAGAATTA AACCAGGTGAAAGGTCCTTTTGAATTCAGATTGTCTTCTGAACATCCAGG CTGATCATCTGAGAGCAGTCAAATCTACTTCCCCAAAAAGAGACCAGGGT AGGTTTATTTGCTTTTATTTTAAATGTTTGCCTGTGTTTCCAAGTGTGAACA AAACAGTGTGTGATCTATTCTTGGATTCAATTTGATCAGTATTTATTCAAAC CCAGTCTCTCTCCAGGACATAAACTGAAATCAGATATGTTCTTTTAAAGC CCAAACCCTCTCCTTTCTAGATCCAACCCTTCAACCCTAATTTTATGATGG CTATAGCCATGGACTTCCCCAAGAAAAGATCACCCAGAAATAAGACCACC TGTGACAGTTACCAGCTTTTATTCATAACCTTAGCTTCCCAACTATTGAGC ATTTTCTAAGGTCCCTGCTGTCTTTTGGTCTCTGGTTTGATTTGTGGCAAA CAGATGAAGTAACAGACTGCTATGAAGGACCACAAAACGGCAGCCTCT GGAAAAACCATTAGAAAGTCAGTGGCAGATCCAGTAAATAATATCGCCAG CCTCAGCATAATCTGCTGCTGACTCGATTCAAGTGGACTCTAAAGTGCCCA GCCTCCTGACCTGAGCTCTCCTGCCATCTGTGAGACTACCAGAGGTCTTA TCTGCTGTCCACATGGCAACTGGGCATGAGTACCTGGCCACCTTGCTTCC CTCTTTGCCTGGTCCAAGTGAGTGTCTGCTGCCTCTGCTCCTGCCTTGTTT TCCTGGCTCTAAACCAACTCCACCCACTCTTAATGGAACTCAGTCTGGC TTTGTGTGTTTCTGGGAAGCACATGACTTCTGGGAATGGGCAAGGAAGAG GAGTGAAACAAAACTGTCAGCTATGTGTGCCTGGTCTGGGATCCTTCTC TGGGTGACAGTGGCATCATGAATCTTAGAATCAGCTCCCC</p>
114	hsALDH2	<p>GAATCATGCAAGCTTCCTCCCTCAGCCATTGATGGAAGTTTCAAGAT CAGCAACAAAACCAAGAAAAATGATCCTTGCGTGCTGAATATCTGAAAAG AGAAATTTTCTACAAAATCTCTTGGGTCAAGAAAGTTCTAGAATTTGAAT TGATAAACATGGTGGGTTGGCTGAGGGTAAGAGTATATGAGGAACCTTTT AAACGACAACAATACTGCTAGCTTTCAGGATGATTTTTAAAAATAGATTC AAATGTGTTATCCTCTCTCTGAAACGCTTCCTATAACTCGAGTTTATAGGG GAAGAAAAAGCTATTGTTTACAATTATATCACCATTAAAGGCAACTGCTACA CCCTGCTTTGTATTCTGGGCTAAGATTCATTAATAAACTAGCTGCTCTTAAC TTACA</p>
115	hsCOX10	<p>GAGCACTGGGACGCCCACCGCCCTTTCCCTCCGCTGCCAGGCGAGCAT GTTGTGGTAATTCTGGAACACAAGAAGAGAAATTGCTGGGTTTAGAACAA GATTATAAACGAATTCGGTGCTCAGTGATCACTTGACAGTTTTTTTTTTTT TAAATATTACCCAAAATGCTCCCCAAATAAGAAATGCATCAGCTCAGTCAG TGAATACAAAAAAGGAATTATTTTTCCCTTTGAGGGTCTTTATACATCTCTC CTCCAACCCACCCCTCTATTCTGTTTCTTCCCTCCTCATGCGGGGTACAC ATACACAGCTTCCTCTTTTGGTTCCATCCTTACCACCACACCACACGCACA CTCCACATGCCAGCAGAGTGGCACTTGGTGGCCAGAAAGTGTGAGCCT CATGATCTGCTGTCTGTAGTTCTGTGAGCTCAGGTCCCTCAAAGGCCTCG GAGACCCCTTCTGCTGGTGACTGAGCCAGGGCCTGCATTTTGGTTTCC CCACCCACACATTCTCAACCATAGTCTTCTAACAATACCAATAGCTAGG ACCCGGCTGCTGTGCACTGGGACTGGGGATTCCACATGTTTGCCTTGGG</p>

		AGTCTCAAGCTGGACTGCCAGCCCCTGTCCTCCCTTCACCCCCATTGCGT ATGAGCATTTCAGAACTCCAAGGAGTCACAGGCATCTTTATAGTTCACGTT AACATATAGACACTGTTGGAAGCAGTTCCTTCTAAAAGGGTAGCCCTGGA CTTAATACCAGCCGGATACCTCTGGCCCCCACCCTTACTGTACCTCTG GAGTCACTACTGTGGGTCGCCACTCCTCTGCTACACAGCACGGCTTTTTTC AAGGCTGTATTGAGAAGGGAAGTTAGGAAGAAGGGTGTGCTGGGCTAAC CAGCCCACAGAGCTCACATTCCTGTCCCTTGGGTGAAAAATACATGTCCA TCCTGATATCTCCTGAATTCAGAAATTAGCCTCCACATGTGCAATGGCTTT AAGAGCCAGAAGCAGGGTTCTGGGAATTTTGCAAGTTATCCTGTGGCCAG GTGTGGTCTCGGTTACCAAATACGGTTACCTGCAGCTTTTTAGTCCTTTGT GCTCCCACGGGTCTGCAGAGTCCCATCTGCCCAAAGGTCTTGAAGCTTG ACAGGATGTTTTCACTACTCAGTCTCCAGGGCACTGCTGGTCCGTAGGG ATTCATTGGTCCGGGTGGGAGAGTTAAACAACATTTAAACAGAGTTCTCT CAAAAATGTCTAAAGGGATTGTAGGTAGATAACATCCAATCACTGTTTGCA CTTATCTGAAATCTTCCCTCTTGGCTGCCCCAGGTATTTACTGTGGAGAA CATTGCATAGGAATGTCTGGAAAAAGCCTCTACAACCTGTTACAGCCTTCA CATTTGTACAATTCATTGATTCTCTTTTCTCCACAATAAAATGGTATACA AGAAC
116	hsUQCRF S1	GAGACTTGGAAGTCATAGGCTTCTTTTCACTCTTTATGTACCTCAGG AGACTTATTTGAGAGGAAGCCTTCTGTACTTGAAGTTGATTTGAAATATGT AAGAATTGATGATGATTTTGCAAACATTAATGTGAAATAAATTGAATTTAAT GTTGAATACTTTCAAGGCATTCACTTAATAAAGACACTGTTAAGCACTGTTA TGCTCAGTCATACACGCGAAAGGTACAATGTCTTTTAGCTAATTCTAATTA AAAATTACAGACTGGTGTACAAGATACTTGTG
117	hsNDUFV 1	CCCACCACCCTGGCCTGCTGTCTGCGTCTATCCATGTGGAATGCTGGA CAATAAAGCGAGTGCTGCCACCCTCCAGCTGCC
118	hsNDUFV 2	TTTATATTGAAGTGTAAATATGTCACTAGAGAAATAAAATATGGACTTCCAA TCTACGTAACTTA
119	hsSOD2	ACCACGATCGTTATGCTGAGTATGTTAAGCTCTTTATGACTGTTTTGTAG TGGTATAGAGTACTGCAGAATACAGTAAGCTGCTCTATTGTAGCATTCTT GATGTTGCTTAGTCACTTATTTTCATAAACAACCTTAATGTTCTGAATAATTT TACTAAACATTTTGTTATTGGGCAAGTGATTGAAAAATAGTAAATGCTTTGT GTGATTGA
120	hsCOX6c	TCTTGGAATATAAAGAATTTCTTCAGGTTGAATTACCTAGAAGTTTGTCACT GACTTGTGTTCTGAAGTATGACACATGAATATGTGGGCTAAGAAATAGTT CCTCTTGATAAATAAACAATTAACAATACTTTGGACAGTAAGTCTTTCTCA GTTCTTAATGATAATGCAGGGCACTTACTAGCATAAGAATTGTTTGGGAT TAACTGTTTATGAAGCTAAGTTGATTTCGGTGTTTTGTTAAATTTTCATTG TTCTAGCACATCTTTAACTGTGATAGTT
121	hsIRP1	GAGACGTGCACTTGGTCGTGCGCCAGGGAGGAAGCCGCACCACCAGC CAGCGCAGGCCCTGGTGGAGAGGCCTCCCTGGCTGCCTCTGGGAGGGG TGCTGCCTTGATAGTGGAGCAAGTGAGCACTGAGGGTCTGGTGCCAATC CTGTAGGCACAAAACCAGAAGTTTCTACATTCTCTATTTTTGTTAATCATCT TCTCTTTTCCAGAATTTGGAAGCTAGAATGGTGGGAATGTCAGTAGTGC CAGAAAGAGAGAACCAAGCTTGTCTTTAAAGTTACTGATCACAGGACGTT GCTTTTTCACTGTTTCTTATTAATCTTCAGCTGAACACAAGCAAACCTTCT CAGGAGGTGTCTCCTACCCTCTTATTGTTCTCTTACGCTCTGCTCAATGA AACCTTCTCTTGAGGGTCATTTTCTTTCTGTATTAATTATACAGTGTTA AGTGACATAGATAAGAACTTTGCACACTTCAAATCAGAGCAGTGATTCTCT CTTCTCTCCCCTTTTCTTCAGAGTGAATCATCCAGACTCCTCATGGATAG GTCGGGTGTTAAAGTTGTTTTGATTATGTACCTTTTGATAGATCCACATAA AAAGAAATGTGAAGTTTTCTTTTACTATCTTTTCAATTTATCAAGCAGAGACC TTTGTGGGAGGCGGTTTGGGAGAACACATTTCTAATTTGAATGAAATGAA ATCTATTTTTCAGTG
122	hsMRPS1 2	CAGAAGAAGTGACGGCTGGGGGCACAGTGGGCTGGGCGCCCTGCAGA ACATGAACCTTCCGCTCCTGGCTGCCACAGGGTCTCCGATGCTGGCCT TTGCGCCTCTAGAGGCAGCCACTCATGGATTCAAGTCTGGCTCCGCCT CTTCCATCAGGACCACT
123	hsATP5J2	AGAGGACACACTCTGCACCCCCCACCACACGACCTTGGCCCGAGCCCC TCCGTGAGGAA

124	rnSOD2	AGCCCTTCCGCCAGGCTGTGTGTCAGGCCCGTGGTGGGTGTTTTGTAGT AGTGTAGAGCATTGCA
125	hsOXA1L	CTTATGTTCTGTGCGCATTCTGGCAGGAATTCTGTCTCTTCAGAGACTCAT CCTCAAAACAAGACTTGACACTGTGTCCTTGCCCCAGTCCTAGGAAGTGT GGCACACAGAGATGTTTCATTTTAAAAACGGATTTTCATGAAACACTCTTGTA CTTATGTTTATAAGAGAGCACTGGGTAGCCAAGTGATCTTCCCATTACACA GAGTTAGTAAACCTCTGTACTACATGCTG
126	MTS- COX10	MAASPHLTSSRLLTGCVGGSVWYLERRT
127	MTS- COX8	MSVLTRLLLRLTRLGSAAPVRRARIHSL
128	MTS- OPA1	MWRLRRAAVA
129	hsCOX10	MAASPHLTSSRLLTGCVGGSVWYLERRT
130	scRPM2	MAFKSFIYSKGYHRSAAQKKTATSFDDSSYQYLRQNQGLVNSDPVLHASHLH PHPVVVANVNNVDDILPHDLSSINNTNNPLTHEELLYNQNVSLRSLKQ QQSTNYVNNNNNNQHRY
131	lcSirt5	MRKRSLRCHLWSANASLSPRKDEVTSRKESENLVKGKKNKSHLHLLFTAS KIGTDSVFDVQKSKECKELGLLFTSLIHSIGSFDFDEEPKAAVFLPGSLPQL TVLV LAPGSGSCPTGKSTPHLAASGRNAELLRPQNSMIVRQFTCRGTISSHL CAHLRKPHDSRNMARP
132	tbNDUS7	MLRRTSFNFTGRAMISRGSPESWHRDLKKGKKTMMHKLGTSKPNNALQY AQMTL
133	ncQCR2	MISRSALSRGSQLALRRPAAAKTAQRGFAAAAASPAASYEPTTIAG
134	hsATP5G 2	MPLEILYVAITLSVAERLVGPGHACAEPFRSSRCSAPLCLCSGSSSPATAP HPLKMFACSKFVSTPSLVKSTSQLLSRPLSAVVLKREILTDESLSLAVSCPL TSLVSSRSFQTS AISRDIDA
135	hsLACTB	MYRLMSAVTARAAAPGGLASSCGRRGVHQRAGLPPLGHGWVGGGLGLGLGL ALGVKLAGGLRGAAPAQSPAAPDEASPLAEPPEQESLAPWSPQTPAPPCS RCFARAIESSRDLL
136	spilv1	MTVLAPLRRHLHTRAAFSSYGREIALQKRFLNLNSCSAVRRYGTGFSNNLRIKK LKNAFGVVRANSTKSTSTVTTASPIKYDSSFVGKTGGEIFHDMMLKHNVKHV FGYPGGAILPVFDAIYRSPHFELPRHEQAAGHA
137	gmCOX2	MILCPLEAFIVQHILTISVMGLLSCFRSTVLRKCSKGSSGMSRFLYTNFQNRNL ISSGGNESYYGYFNRRSYTSLYMGTVGGITSARIRVPNVGCEGFMCSHL SITQRNSRLIHSTSKIVPN
138	crATP6	MALQQAAPRVFGLGRAPVALGQSGILTGSSGFKNQGFNGSLQSVENHVYA QAFSTSSQEEQAAPSIQGASGMKLPGMAGSMMLGKSRSGRLTGSMVPFAA QQAMNM
139	hsOPA1	MWRLRRAAVACEVCQSLVKHSSGIGSLPLQKLHLVSRSIYHSHHPTLKLQR PQLRTSFQQFSSLTNLPLRKLKFSPIKYGYQPRRN
140	hsSDHD	MAVLWRLSAVCGALGGRALLRTPVVRPAHISAFLQDRPIPEWCGVQHIHLS PSHH
141	hsADCK3	MAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIMAARALQSTAVEQIGM FLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGASTDFSSASAPDQSAP PSLGHAHSEGPAPAYVASGPFREAGFPQGASSPLGRANGRLFANPRDSFSA MGFQRRF
142	osP0644B 06.24-2	MALLLRHSPKLRRRAHAILGCERGTVVRHFSSSTCSSLVKEDTVSSSNLHPEY AKKIGGSDFSHDRQSGKELQNFKVSPQEASRASNFMRASKYGMPIITANGVH SLFSCGQVVPSRCF
143	Neurospor a crassa ATP9 (ncATP9)	MASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMT SIVNATTRQAFQKRA
144	hsGHITM	MLAARLVCLRTLPSRVFHPAFTKASPVVKNSTKNQWLLTPSRE
145	hsNDUFA B1	MASRVLSAYVSRLPAAFAPLPRVRMLAVARPLSTALCSAGTQTRLGLTLPAL VLAQVPGRVTQLCRQY
146	hsATP5G 3	MFACAKLACTPSLIRAGSRVAYRPISASVLSRPEASRTGEGSTVFNGAQNGV SQLIQREFQTS AISR

147	crATP6 _hsADCK 3	MALQQAAPRVFGLLGRAPVALGQSGILTGSSGFKNQGFNGSLQSVENHVYA QAFSTSSQEEQAAPSIQGASGMKLPGMAGSMMLLGKSRSGRLTGSMVPFAA QQAMNMGGMAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIMAARALQ STAVEQIGMFLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGASTDFSS ASAPDQSAPPSLGHAHSEGPAPAYVASGPFREAGFPGQASSPLGRANGRLF ANPRDSFSAMGFQRRFVG
148	ncATP9_n cATP9	MASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMT SIVNATTRQAFQKRAMASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQ TGSPLQTLKRTQMTSIVNATTRQAFQKRA
149	zmLOC10 0282174	MALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPASTRPEPNNPHADRR HVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPLSTSSSSSRPADKAQ LTWVDKWIPEAARPY
150	ncATP9_z mLOC100 282174_s pilv1_ncA TP9	MASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMT SIVNATTRQAFQKRAMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPA STRPEPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPL STSSSSSRPADKAQLTWVDKWIPEAARPYMTVLAPLRLHTRAAFSSYGREI ALQKRFLNLSNSCAVRRYGTGFSNNLRIKKLKNAGFVVANSTKSTSTVTTA SPIKYDSSFVGKTGGEIFHDMMLKHNVKHVFGYPGGAILPVFDAIYRSPHFEF ILPRHEQAAGHAMASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGS PLQTLKRTQMTSIVNATTRQAFQKRA
151	zmLOC10 0282174_ hsADCK3 _crATP6 _hsATP5 G3	MALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPASTRPEPNNPHADRR HVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPLSTSSSSSRPADKAQ LTWVDKWIPEAARPYMAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIM AARALQSTAVEQIGMFLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGA STDFSSASAPDQSAPPSLGHAHSEGPAPAYVASGPFREAGFPGQASSPLGR ANGRLFANPRDSFSAMGFQRRFMALQQAAPRVFGLLGRAPVALGQSGILTG SSGFKNQGFNGSLQSVENHVYAQAFSTSSQEEQAAPSIQGASGMKLPGMA GSMMLLGKSRSGRLTGSMVPFAAQQAMNMMFACAKLACTPSLIRAGSRVAYR PISASVLSRPEASRTGEGSTVFNGAQNGVSQLIQREFQTSASIR
152	zmLOC10 0282174_ hsADCK3 _hsATP5 G3	MALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPASTRPEPNNPHADRR HVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPLSTSSSSSRPADKAQ LTWVDKWIPEAARPYMAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIM AARALQSTAVEQIGMFLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGA STDFSSASAPDQSAPPSLGHAHSEGPAPAYVASGPFREAGFPGQASSPLGR ANGRLFANPRDSFSAMGFQRRFMFACAKLACTPSLIRAGSRVAYRPISASVL SRPEASRTGEGSTVFNGAQNGVSQLIQREFQTSASIR
153	ncATP9_z mLOC100 282174	MASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMT SIVNATTRQAFQKRAMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPA STRPEPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPL STSSSSSRPADKAQLTWVDKWIPEAARPY
154	hsADCK3 _zmLOC1 00282174 _crATP6 _hsATP5 G3	MAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIMAARALQSTAVEQIGM FLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGASTDFSSASAPDQSAP PSLGHAHSEGPAPAYVASGPFREAGFPGQASSPLGRANGRLFANPRDSFSA MGFQRRFMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPASTRPEPN NPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPLSTSSSSS RPADKAQLTWVDKWIPEAARPYMALQQAAPRVFGLLGRAPVALGQSGILTG SSGFKNQGFNGSLQSVENHVYAQAFSTSSQEEQAAPSIQGASGMKLPGMA GSMMLLGKSRSGRLTGSMVPFAAQQAMNMMFACAKLACTPSLIRAGSRVAYR PISASVLSRPEASRTGEGSTVFNGAQNGVSQLIQREFQTSASIR
155	crATP6 _hsADCK 3_zmLOC 10028217 4_hsATP5 G3	MALQQAAPRVFGLLGRAPVALGQSGILTGSSGFKNQGFNGSLQSVENHVYA QAFSTSSQEEQAAPSIQGASGMKLPGMAGSMMLLGKSRSGRLTGSMVPFAA QQAMNMMAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIMAARALQST AVEQIGMFLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGASTDFSSAS APDQSAPPSLGHAHSEGPAPAYVASGPFREAGFPGQASSPLGRANGRLFA NPRDSFSAMGFQRRFMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSP ASTRPEPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPL STSSSSSRPADKAQLTWVDKWIPEAARPYMFAKAKLACTPSLIRAGSRVAY RPISASVLSRPEASRTGEGSTVFNGAQNGVSQLIQREFQTSASIR

156	hsADCK3_zmLOC100282174	MAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIMAARALQSTAVEQIGM FLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGASTDFSSASAPDQSAP PSLGHAHSEGPAPAYVASGPFREAGFPQGASSPLGRANGRLFANPRDSFSA MGFQRRFGGMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPASTRP EPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPLSTSS SSSRPADKAQLTWVDKWIPEAARPYGG
157	hsADCK3_zmLOC100282174_crATP6	MAAILGDTIMVAKGLVKLTQAAVETHLQHLGIGGELIMAARALQSTAVEQIGM FLGKVQGGQDKHEEYFAENFGGPEGEFHFSVPHAAGASTDFSSASAPDQSAP PSLGHAHSEGPAPAYVASGPFREAGFPQGASSPLGRANGRLFANPRDSFSA MGFQRRFGGMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPASTRP EPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPLSTSS SSSRPADKAQLTWVDKWIPEAARPYGGMALQQAAPRVFGLLGRAPVALGQ SGILTGSSGFKNQGFNGSLQSVENHVYAQAFSTSSQEEQAAPSIQGASGMK LPGMAGSMMLGKSRSGRLTGSMPVFAAQAMNMGG
158	ncATP9_zmLOC100282174_s pilv1_GNFP_ncATP9	MASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMT SIVNATTRQAFQKRAMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPA STRPEPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPL STSSSSSRPADKAQLTWVDKWIPEAARPYMTVLAPLRLHTRAAFSSYGREI ALQKRFLNLNSCSAVRRYGTGFSNNLRIKKLKNAFGVVANSTKSTSTVTTA SPIKYDSSFVGKTGGEIFHDMMLKHNKHFVFGYPGGAILPVFDAIYRSPHFEF ILPRHEQAAGHAVSGEGDATYGLTLKFICTTGKLPVPWPTLVTTLYGVQCF SRYPDHMKQHDFFKSAMPEGYVQERTIFFKDDGNYKTRAEVKFEGDTLVNR IELKGIDFKEDGNILGHKLEYNYNHVMADKQKNGIKVNFKIRHNIEDGSV QLADHYQQNTPIGDGPVLLPDNHYLSTQSALSKDPNEMASTRVLASRLASQ MAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMTSIVNATTRQAFQKRA
159	ncATP9_zmLOC100282174_s pilv1_IcSir t5_osP0644B06.24-2_hsATP5 G2_ncATP9	MASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGSPLQTLKRTQMT SIVNATTRQAFQKRAMALLRAAVSELRRRGRGALTPLPALSSLLSSLSRSPA STRPEPNNPHADRRHVIALRRCPPLPASAVLAPELLHARGLLPRHWSHASPL STSSSSSRPADKAQLTWVDKWIPEAARPYMTVLAPLRLHTRAAFSSYGREI ALQKRFLNLNSCSAVRRYGTGFSNNLRIKKLKNAFGVVANSTKSTSTVTTA SPIKYDSSFVGKTGGEIFHDMMLKHNKHFVFGYPGGAILPVFDAIYRSPHFEF ILPRHEQAAGHAMRKRSRLCHLWSANASLSPRKDEVTSRKESENVLKGGKN KKSHLHLLFTASKIGTDSVFDVQKSKECKELGLLFTSLIHSIGSFPPDEEPK AAAVFLPGSLPQLTVLVLAPGSGSCPTGKSTPHLAASGRNAELLRPQNSMIV RQFTCRGTISSHLCAHLRKPCHSRNMARPMALLLRHSPKLRRRAHAILGCERG TVVRHFSSSTCSSLVKEDTVSSNLHPEYAKKIGGSDFSHDRQSGKELQNFK VSPQEASRASNFMRASKYGMPTANGVHSLFSCGQVVPSCFMPELILYVAI TLSVAERLVGPGHACAEPFSRSSRCSAPLCLLCSGSSSPATAPHPLKMFACS KFVSTPSLVKSTSQLLSRPLSAVVLKRPEILTDESLSLAVSCPLTSLVSSRSF QTSISRDIIDTAMASTRVLASRLASQMAASAKVARPAVRVAQVSKRTIQTGS PLQTLKRTQMTSIVNATTRQAFQKRA
160	ND4	MLKLIVPTIMLLPLTWLSKKHMIWINTTTHSLIISIPLFFNQINNNLFCSCPTFS SDPLTTPLLMLTTWLLPLTIMASQRHLSSEPLSRKKLYLSMLISLQISLIMTFTA TELIMFYIFFETTLIPTLAITRWGNQPERLNAGTYFLFYTLVGLSPLLIALLYTHN TLGSLNILLTLTAQELSNSWANNLMWLAYTMAFMVKMPLYGLHLWLPKAHV EAPIAGSMVLA AVLKLGGYGMMRLTLILNPLTKHMAYPFLVLSLWGMIMTSS ICLRQTDLSLIAYSISHMALVVTAILIQTTPWSFTGAVILMIAHGLTSSLLFCLA NSNYERTHSRIMLSQGLQTLPLMAFWWLLASLANLALPPTINLLGELSVLVT TFWSNITLLLTGLNMLVTALYSYMFTTTQWGSLLTHHINNMKPSFTRENTLM FMHLSPIILLSLNPDITGFSS
161	ND6	MMYALFLLSVGLVMGFVGFSSKPSPIYGGVLIVSGVVGCVIILNFGGGYMGL MVFLIYLGMMVVFGYTTAMAEIPEAWGSGVEVLVSVLVLGLAMEVGLVL WVKEYDGVVVVVNFNSVGSWMIYEGEGLIREDPIGAGALYDYGRWLVVV TGWTLFVGVIYVIEIARGN
162	ND1	MPMANLLLLIVPILIAMAFMLTERKILGYMQLRKGPVVGYPYGLLPFADAM KLFTKEPLKPATSTITLYITAPTALTIALLLWTPMPNPLVNLNLGLLFIATSS LAVYSILWSGWASNSNYALIGALRAVAQTISYEVTLAIILLSTLLMSGSFNLSTLI TTQEHLWLLPSWPLAMMWFIETLAETNRTPFDLAEGESELVSGFNIEYAAG PFALFFMAEYTNIMMNTLTITIFLGTTYDALSPELYTTYFVTKTLLLTSLFLWIR TAYPRFRYDQLMHLLWKNFLPLTLALLMWYVSMPTISSIPPQT

163	ND1 [homo sapiens]	ATACCCATGGCCAACCTCCTACTCCTCATTGTACCCATTCTAATCGCAATG GCATTCCCTAATGCTTACCGAACGAAAAATTCTAGGCTATATACAACCTACGC AAAGGCCCCCAACGTTGTAGGCCCTACGGGCTACTACAACCCCTTCGCTG ACGCCATAAACTCTTCACCAAAGAGCCCCTAAAACCCGCCACATCTACC ATCACCCCTCTACATCACCGCCCCGACCTTAGCTCTCACCATCGCTCTTCT ACTATGAACCCCCCTCCCCATACCCAACCCCTGGTCAACCTCAACCTAG GCCTCCTATTTATTCTAGCCACCTCTAGCCTAGCCGTTTACTCAATCCTCT GATCAGGGTGAGCATCAAACCTCAAACCTACGCCCTGATCGGGCGCACTGCG AGCAGTAGCCCAAACAATCTCATATGAAGTCACCCCTAGCCATCATTCTACT ATCAACATTACTAATAAGTGGCTCCTTTAACCTCTCCACCCTTATCACAAC ACAAGAACACCTCTGATTACTCCTGCCATCATGACCCCTTGCCCATAAATATG ATTTATCTCCACACTAGCAGAGACCAACCGAACCCCTTCGACCTTGCCG AAGGGGAGTCCGAAGTAGTCTCAGGCTTCAACATCGAATACGCCGCGAGG CCCCTTCGCCCTATTCTTCATAGCCGAATACACAAACATTATTATAATAAA CACCCCTACCACTACAATCTTCCTAGGAACAACATATGACGCACTCTCCC CTGAACTCTACACAACATATTTTGTACCAAGACCCTACTTCTAACCTCCC TGTTCTTATGAATTGGAACAGCATACCCCGATTCCGCTACGACCAACTC ATACACCTCCTATGAAAAAATTCTACCACTACCCCTAGCATTACTTATA TGATATGTCTCCATACCCATTACAATCTCCAGCATTCCCCTCAAACCTAA
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Adeno-associated virus (AAV)

[0037] Adeno-associated virus (AAV) is a small virus that infects humans and some other primate species. The compositions disclosed herein comprises firstly an adeno-associated virus (AAV) genome or a derivative thereof.

[0038] An AAV genome is a polynucleotide sequence which encodes functions needed for production of an AAV viral particle. These functions include those operating in the replication and packaging cycle for AAV in a host cell, including encapsidation of the AAV genome into an AAV viral particle. Naturally occurring AAV viruses are replication-deficient and rely on the provision of helper functions in trans for completion of a replication and packaging cycle. Accordingly, the AAV genome of the vector of the invention is typically replication-deficient.

[0039] The AAV genome can be in single-stranded form, either positive or negative-sense, or alternatively in double-stranded form. The use of a double-stranded form allows bypass of the DNA replication step in the target cell and so can accelerate transgene expression.

[0040] The AAV genome may be from any naturally derived serotype or isolate or Glade of AAV. Thus, the AAV genome may be the full genome of a naturally occurring AAV virus. As is known to the skilled person, AAV viruses occurring in nature may be classified according to various biological systems.

[0041] Commonly, AAV viruses are referred to in terms of their serotype. A serotype corresponds to a variant subspecies of AAV which owing to its profile of expression of capsid surface antigens has a distinctive reactivity which can be used to distinguish it from other variant subspecies. Typically, a virus having a particular AAV serotype does

not efficiently cross-react with neutralising antibodies specific for any other AAV serotype. AAV serotypes include AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV9, AAV10, AAV11, AAV12, AAV13, AAV14, AAV15, and AAV16, also recombinant serotypes, such as Rec2 and Rec3, recently identified from primate brain. In some embodiments, the AAV viruses comprising the recombinant nucleic acid of the disclosure has a serotype selected from the group consisting of AAV2, AAV5, AAV7, AAV8, AAV9, AAV10, AAV-DJ, and a combination thereof.

[0042] A preferred serotype of AAV for use in the invention is AAV2. Other serotypes of particular interest for use in the invention include AAV4, AAV5 and AAV8 which efficiently transduce tissue in the eye, such as the retinal pigmented epithelium. The serotype of AAV which is used can be an AAV serotype which is not AAV4. Reviews of AAV serotypes may be found in Choi et al (Curr Gene Ther. 2005; 5(3); 299-310) and Wu et al (Molecular Therapy. 2006; 14(3), 316-327). The sequences of AAV genomes or of elements of AAV genomes including ITR sequences, rep or cap genes for use in the invention may be derived from the following accession numbers for AAV whole genome sequences: Adeno-associated virus 1 NC_002077, AF063497; Adeno-associated virus 2 NC_001401; Adeno-associated virus 3 NC_001729; Adeno-associated virus 3B NC_001863; Adeno-associated virus 4 NC_001829; Adeno-associated virus 5 Y18065, AF085716; Adeno-associated virus 6 NC_001862; Avian AAV ATCC VR-865 AY186198, AY629583, NC_004828; Avian AAV strain DA-1 NC_006263, AY629583; Bovine AAV NC_005889, AY388617.

[0043] AAV viruses may also be referred to in terms of clades or clones. This refers to the phylogenetic relationship of naturally derived AAV viruses, and typically to a phylogenetic group of AAV viruses which can be traced back to a common ancestor, and includes all descendants thereof. Additionally, AAV viruses may be referred to in terms of a specific isolate, i.e. a genetic isolate of a specific AAV virus found in nature. The term genetic isolate describes a population of AAV viruses which has undergone limited genetic mixing with other naturally occurring AAV viruses, thereby defining a recognisably distinct population at a genetic level.

[0044] Examples of clades and isolates of AAV that may be used in the invention include: Clade A: AAV1 NC_002077, AF063497, AAV6 NC_001862, Hu. 48 AY530611, Hu 43 AY530606, Hu 44 AY530607, Hu 46 AY530609; Clade B: Hu. 19 AY530584, Hu. 20 AY530586, Hu 23 AY530589, Hu22 AY530588, Hu24 AY530590, Hu21 AY530587, Hu27 AY530592, Hu28 AY530593, Hu 29 AY530594, Hu63 AY530624, Hu64 AY530625, Hu13 AY530578, Hu56 AY530618, Hu57 AY530619, Hu49 AY530612,

Hu58 AY530620, Hu34 AY530598, Hu35 AY530599, AAV2 NC_001401, Hu45 AY530608, Hu47 AY530610, Hu51 AY530613, Hu52 AY530614, Hu T41 AY695378, Hu S17 AY695376, Hu T88 AY695375, Hu T71 AY695374, Hu T70 AY695373, Hu T40 AY695372, Hu T32 AY695371, Hu T17 AY695370, Hu LG15 AY695377; Clade C: Hu9 AY530629, Hu10 AY530576, Hu11 AY530577, Hu53 AY530615, Hu55 AY530617, Hu54 AY530616, Hu7 AY530628, Hu18 AY530583, Hu15 AY530580, Hu16 AY530581, Hu25 AY530591, Hu60 AY530622, Ch5 AY243021, Hu3 AY530595, Hu1 AY530575, Hu4 AY530602 Hu2, AY530585, Hu61 AY530623; Clade D: Rh62 AY530573, Rh48 AY530561, Rh54 AY530567, Rh55 AY530568, Cy2 AY243020, AAV7 AF513851, Rh35 AY243000, Rh37 AY242998, Rh36 AY242999, Cy6 AY243016, Cy4 AY243018, Cy3 AY243019, Cy5 AY243017, Rh13 AY243013; Clade E: Rh38 AY530558, Hu66 AY530626, Hu42 AY530605, Hu67 AY530627, Hu40 AY530603, Hu41 AY530604, Hu37 AY530600, Rh40 AY530559, Rh2 AY243007, Bb1 AY243023, Bb2 AY243022, Rh10 AY243015, Hu17 AY530582, Hu6 AY530621, Rh25 AY530557, Pi2 AY530554, Pi1 AY530553, Pi3 AY530555, Rh57 AY530569, Rh50 AY530563, Rh49 AY530562, Hu39 AY530601, Rh58 AY530570, Rh61 AY530572, Rh52 AY530565, Rh53 AY530566, Rh51 AY530564, Rh64 AY530574, Rh43 AY530560, AAV8 AF513852, Rh8 AY242997, Rh1 AY530556; Clade F: Hu14 (AAV9) AY530579, Hu31 AY530596, Hu32 AY530597, Clonal Isolate AAV5 Y18065, AF085716, AAV 3 NC_001729, AAV 3B NC_001863, AAV4 NC_001829, Rh34 AY243001, Rh33 AY243002, Rh32 AY243003.

[0045] The skilled person can select an appropriate serotype, Glade, clone or isolate of AAV for use in the present invention on the basis of their common general knowledge. For instance, the AAV5 capsid has been shown to transduce primate cone photoreceptors efficiently as evidenced by the successful correction of an inherited color vision defect (Mancuso et al., Nature 2009, 461:784-7).

[0046] It should be understood however that the invention also encompasses use of an AAV genome of other serotypes that may not yet have been identified or characterised. The AAV serotype determines the tissue specificity of infection (or tropism) of an AAV virus. Accordingly, preferred AAV serotypes for use in AAV viruses administered to patients in accordance with the invention are those which have natural tropism for or a high efficiency of infection of target cells within eye in LHON. Thus, AAV serotypes for use in AAV viruses administered to patients can be ones which infect cells of the neurosensory retina and retinal pigment epithelium.

[0047] Typically, the AAV genome of a naturally derived serotype or isolate or Glade of AAV comprises at least one inverted terminal repeat sequence (ITR). An ITR

sequence acts in cis to provide a functional origin of replication, and allows for integration and excision of the vector from the genome of a cell. In preferred embodiments, one or more ITR sequences flank the polynucleotide sequence encoding ND4, ND6, or ND1 or a variant thereof. Preferred ITR sequences are those of AAV2, and variants thereof. The AAV genome typically also comprises packaging genes, such as rep and/or cap genes which encode packaging functions for an AAV viral particle. The rep gene encodes one or more of the proteins Rep78, Rep68, Rep52 and Rep40 or variants thereof. The cap gene encodes one or more capsid proteins such as VP1, VP2 and VP3 or variants thereof. These proteins make up the capsid of an AAV viral particle. Capsid variants are discussed below.

[0048] A promoter will be operably linked to each of the packaging genes. Specific examples of such promoters include the p5, p19 and p40 promoters (Laughlin et al., 1979, PNAS, 76:5567-5571). For example, the p5 and p19 promoters are generally used to express the rep gene, while the p40 promoter is generally used to express the cap gene.

[0049] As discussed above, the AAV genome used in the vector of the invention may therefore be the full genome of a naturally occurring AAV virus. For example, a vector comprising a full AAV genome may be used to prepare AAV virus in vitro. However, while such a vector may in principle be administered to patients, this will be done rarely in practice. Preferably the AAV genome will be derivatised for the purpose of administration to patients. Such derivatisation is standard in the art and the present invention encompasses the use of any known derivative of an AAV genome, and derivatives which could be generated by applying techniques known in the art. Derivatisation of the AAV genome and of the AAV capsid are reviewed in Coura and Nardi (Virology Journal, 2007, 4:99), and in Choi et al and Wu et al, referenced above.

[0050] Derivatives of an AAV genome include any truncated or modified forms of an AAV genome which allow for expression of a ND4, ND6, or ND1 transgene from a vector of the invention in vivo. Typically, it is possible to truncate the AAV genome significantly to include minimal viral sequence yet retain the above function. This is preferred for safety reasons to reduce the risk of recombination of the vector with wild-type virus, and also to avoid triggering a cellular immune response by the presence of viral gene proteins in the target cell.

[0051] Typically, a derivative will include at least one inverted terminal repeat sequence (ITR), preferably more than one ITR, such as two ITRs or more. One or more of the ITRs may be derived from AAV genomes having different serotypes, or may be a

chimeric or mutant ITR. A preferred mutant ITR is one having a deletion of a trs (terminal resolution site). This deletion allows for continued replication of the genome to generate a single-stranded genome which contains both coding and complementary sequences i.e. a self-complementary AAV genome. This allows for bypass of DNA replication in the target cell, and so enables accelerated transgene expression.

[0052] The one or more ITRs will preferably flank the polynucleotide sequence encoding ND4, ND6, ND1, or a variant thereof at either end. The inclusion of one or more ITRs is preferred to aid concatamer formation of the vector of the invention in the nucleus of a host cell, for example following the conversion of single-stranded vector DNA into double-stranded DNA by the action of host cell DNA polymerases. The formation of such episomal concatamers protects the vector construct during the life of the host cell, thereby allowing for prolonged expression of the transgene in vivo.

[0053] In preferred embodiments, ITR elements will be the only sequences retained from the native AAV genome in the derivative. Thus, a derivative will preferably not include the rep and/or cap genes of the native genome and any other sequences of the native genome. This is preferred for the reasons described above, and also to reduce the possibility of integration of the vector into the host cell genome. Additionally, reducing the size of the AAV genome allows for increased flexibility in incorporating other sequence elements (such as regulatory elements) within the vector in addition to the transgene.

[0054] With reference to the AAV2 genome, the following portions could therefore be removed in a derivative of the invention: One inverted terminal repeat (ITR) sequence, the replication (rep) and capsid (cap) genes (NB: the rep gene in the wildtype AAV genome should not to be confused with ND4, ND6, or ND1, the human gene affected in LHON). However, in some embodiments, including in vitro embodiments, derivatives may additionally include one or more rep and/or cap genes or other viral sequences of an AAV genome. Naturally occurring AAV virus integrates with a high frequency at a specific site on human chromosome 19, and shows a negligible frequency of random integration, such that retention of an integrative capacity in the vector may be tolerated in a therapeutic setting.

[0055] Where a derivative genome comprises genes encoding capsid proteins i.e. VP1, VP2 and/or VP3, the derivative may be a chimeric, shuffled or capsid-modified derivative of one or more naturally occurring AAV viruses. In particular, the invention encompasses the provision of capsid protein sequences from different serotypes, clades, clones, or isolates of AAV within the same vector i.e. pseudotyping.

[0056] Chimeric, shuffled or capsid-modified derivatives will be typically selected to provide one or more desired functionalities for the viral vector. Thus, these derivatives may display increased efficiency of gene delivery, decreased immunogenicity (humoral or cellular), an altered tropism range and/or improved targeting of a particular cell type compared to an AAV viral vector comprising a naturally occurring AAV genome, such as that of AAV2. Increased efficiency of gene delivery may be effected by improved receptor or co-receptor binding at the cell surface, improved internalisation, improved trafficking within the cell and into the nucleus, improved uncoating of the viral particle and improved conversion of a single-stranded genome to double-stranded form. Increased efficiency may also relate to an altered tropism range or targeting of a specific cell population, such that the vector dose is not diluted by administration to tissues where it is not needed.

[0057] Chimeric capsid proteins include those generated by recombination between two or more capsid coding sequences of naturally occurring AAV serotypes. This may be performed for example by a marker rescue approach in which non-infectious capsid sequences of one serotype are cotransfected with capsid sequences of a different serotype, and directed selection is used to select for capsid sequences having desired properties. The capsid sequences of the different serotypes can be altered by homologous recombination within the cell to produce novel chimeric capsid proteins.

[0058] Chimeric capsid proteins also include those generated by engineering of capsid protein sequences to transfer specific capsid protein domains, surface loops or specific amino acid residues between two or more capsid proteins, for example between two or more capsid proteins of different serotypes.

[0059] Shuffled or chimeric capsid proteins may also be generated by DNA shuffling or by error-prone PCR. Hybrid AAV capsid genes can be created by randomly fragmenting the sequences of related AAV genes e.g. those encoding capsid proteins of multiple different serotypes and then subsequently reassembling the fragments in a self-priming polymerase reaction, which may also cause crossovers in regions of sequence homology. A library of hybrid AAV genes created in this way by shuffling the capsid genes of several serotypes can be screened to identify viral clones having a desired functionality. Similarly, error prone PCR may be used to randomly mutate AAV capsid genes to create a diverse library of variants which may then be selected for a desired property.

[0060] The sequences of the capsid genes may also be genetically modified to introduce specific deletions, substitutions or insertions with respect to the native wild-

type sequence. In particular, capsid genes may be modified by the insertion of a sequence of an unrelated protein or peptide within an open reading frame of a capsid coding sequence, or at the N- and/or C-terminus of a capsid coding sequence.

[0061] The unrelated protein or peptide may advantageously be one which acts as a ligand for a particular cell type, thereby conferring improved binding to a target cell or improving the specificity of targeting of the vector to a particular cell population. An example might include the use of RGD peptide to block uptake in the retinal pigment epithelium and thereby enhance transduction of surrounding retinal tissues (Cronin et al., 2008 ARVO Abstract: D1048). The unrelated protein may also be one which assists purification of the viral particle as part of the production process i.e. an epitope or affinity tag. The site of insertion will typically be selected so as not to interfere with other functions of the viral particle e.g. internalisation, trafficking of the viral particle. The skilled person can identify suitable sites for insertion based on their common general knowledge. Particular sites are disclosed in Choi et al, referenced above.

[0062] The invention additionally encompasses the provision of sequences of an AAV genome in a different order and configuration to that of a native AAV genome. The invention also encompasses the replacement of one or more AAV sequences or genes with sequences from another virus or with chimeric genes composed of sequences from more than one virus. Such chimeric genes may be composed of sequences from two or more related viral proteins of different viral species.

[0063] The vector of the invention takes the form of a polynucleotide sequence comprising an AAV genome or derivative thereof and a sequence encoding ND4, ND6, ND1 or a variant thereof.

[0064] For the avoidance of doubt, the invention also provides an AAV viral particle comprising a vector of the invention. The AAV particles of the invention include transcapsidated forms wherein an AAV genome or derivative having an ITR of one serotype is packaged in the capsid of a different serotype. The AAV particles of the invention also include mosaic forms wherein a mixture of unmodified capsid proteins from two or more different serotypes makes up the viral envelope. The AAV particle also includes chemically modified forms bearing ligands adsorbed to the capsid surface. For example, such ligands may include antibodies for targeting a particular cell surface receptor.

[0065] The invention additionally provides a host cell comprising a vector or AAV viral particle of the invention.

[0066] Recombinant nucleic acid sequences

[0067] Also disclosed herein are recombinant nucleic acid sequences comprising a polynucleotide sequence encoding a NADH dehydrogenase subunit-4 (ND4), NADH dehydrogenase subunit-1 (ND1) and NADH dehydrogenase subunit-6 (ND6) polypeptide or a variant thereof.

[0068] The polynucleotide sequence for ND4 is shown in SEQ ID NO: 6 and encodes the protein shown in SEQ ID NO: 160. Further nucleic acid sequences for ND4 are SEQ ID NO: 7 and 8. The polynucleotide sequence for ND6 is shown in SEQ ID NO: 9 and encodes the protein shown in SEQ ID NO: 161. A further nucleic acid sequence for ND6 is SEQ ID NO: 10. The polynucleotide sequence for ND1 is shown in SEQ ID NO: 11 and encodes the protein shown in SEQ ID NO: 162. A further nucleic acid sequence for ND1 is SEQ ID NO: 12.

[0069] A variant of any one of SEQ ID NO: 160, 161, or 162 may comprise truncations, mutants or homologues thereof, and any transcript variants thereof which encode a functional ND4, ND6, or ND1 polypeptide. Any homologues mentioned herein are typically at least 70% homologous to a relevant region of ND4, ND6, or ND1, and can functionally compensate for the polypeptide deficiency.

[0070] Homology can be measured using known methods. For example the UWGCG Package provides the BESTFIT program which can be used to calculate homology (for example used on its default settings) (Devereux et al (1984) Nucleic Acids Research 12, 387-395). The PILEUP and BLAST algorithms can be used to calculate homology or line up sequences (typically on their default settings), for example as described in Altschul S. F. (1993) J Mol Evol 36:290-300; Altschul, S, F et al (1990) J Mol Biol 215:403-10. Software for performing BLAST analyses is publicly available through the National Center for Biotechnology Information (<http://www.ncbi.nlm.nih.gov/>).

[0071] In preferred embodiments, a recombinant nucleic acid sequence may encode a polypeptide which is at least 55%, 65%, 70%, 75%, 80%, 85%, 90% and more preferably at least 95%, 97%, 99%, 99.5%, or 100% homologous to a relevant region of ND4, ND6, or ND1 (SEQ ID NO: 160, 161, or 162) over at least 20, preferably at least 30, for instance at least 40, 60, 100, 200, 300, 400 or more contiguous amino acids, or even over the entire sequence of the recombinant nucleic acid. The relevant region will be one which provides for functional activity of ND4, ND6, or ND1.

[0072] Alternatively, and preferably the recombinant nucleic acid sequence may encode a polypeptide having at least 70%, 75%, 80%, 85%, 90% and more preferably at least 95%, 97%, 99%, 99.5%, or 100% homologous to full-length ND4, ND6, or ND1 (SEQ ID NO: 160, 161, or 162) over its entire sequence. Typically the recombinant

nucleic acid sequence differs from the relevant region of ND4, ND6, or ND1 (SEQ ID NO: 160, 161, or 162) by at least, or less than, 2, 5, 10, 20, 40, 50 or 60 mutations (each of which can be substitutions, insertions or deletions).

[0073] A recombinant nucleic acid ND4, ND6, or ND1 polypeptide may have a percentage identity with a particular region of SEQ ID NO: 160, 161, or 162 which is the same as any of the specific percentage homology values (i.e. it may have at least 70%, 80% or 90% and more preferably at least 95%, 97%, 99% identity) across any of the lengths of sequence mentioned above.

[0074] Variants of ND4, ND6, or ND1 (SEQ ID NO: 160, 161, or 162) also include truncations. Any truncation may be used so long as the variant is still functional. Truncations will typically be made to remove sequences that are non-essential for the protein activity and/or do not affect conformation of the folded protein, in particular folding of the active site. Appropriate truncations can routinely be identified by systematic truncation of sequences of varying length from the N- or C-terminus. Preferred truncations are N-terminal and may remove all other sequences except for the catalytic domain.

[0075] Variants of ND4, ND6, or ND1 (SEQ ID NO: 160, 161, or 162) further include mutants which have one or more, for example, 2, 3, 4, 5 to 10, 10 to 20, 20 to 40 or more, amino acid insertions, substitutions or deletions with respect to a particular region of ND4, ND6, or ND1 (SEQ ID NO: 160, 161, or 162). Deletions and insertions are made preferably outside of the catalytic domain as described below. Substitutions are also typically made in regions that are non-essential for protease activity and/or do not affect conformation of the folded protein.

[0076] Substitutions preferably introduce one or more conservative changes, which replace amino acids with other amino acids of similar chemical structure, similar chemical properties or similar side-chain volume. The amino acids introduced may have similar polarity, hydrophilicity, hydrophobicity, basicity, acidity, neutrality or charge to the amino acids they replace. Alternatively, the conservative change may introduce another amino acid that is aromatic or aliphatic in the place of a pre-existing aromatic or aliphatic amino acid. Conservative amino acid changes are well known in the art and may be selected in accordance with the properties of the amino acids.

[0077] Similarly, preferred variants of the polynucleotide sequence of ND4, ND6, or ND1 (SEQ ID NO: 6, 9, or 11) include polynucleotides having at least 70%, 75%, 80%, 85%, 90% and more preferably at least 95%, 96%, 97%, 98%, 99%, or 99.5% homologous to a relevant region of ND4, ND6, or ND1 (SEQ ID NO: 6, 9, or 11).

Preferably the variant displays these levels of homology to full-length ND4, ND6, or ND1 (SEQ ID NO: 6, 9, or 11) over its entire sequence.

[0078] Mitochondrial targeting sequences (MTSs) and three prime untranslated regions (3'UTRs) can be used to target proteins or mRNA to the mitochondria. The charge, length, and structure of the MTS can be important for protein import into the mitochondria. Particular 3'UTRs may drive mRNA localization to the mitochondrial surface and thus facilitate cotranslational protein import into the mitochondria.

[0079] The polynucleotide sequence for a mitochondrial targeting sequence can encode a polypeptide selected from hsCOX10, hsCOX8, scRPM2, lcSirt5, tbNDUS7, ncQCR2, hsATP5G2, hsLACTB, spilv1, gmCOX2, crATP6, hsOPA1, hsSDHD, hsADCK3, osP0644B06.24-2, *Neurospora crassa* ATP9 (ncATP9), hsGHITM, hsNDUFAB1, hsATP5G3, crATP6_hsADCK3, ncATP9_ncATP9, zmLOC100282174, ncATP9_zmLOC100282174_spilv1_ncATP9, zmLOC100282174_hsADCK3_crATP6_hsATP5G3, zmLOC100282174_hsADCK3_hsATP5G3, ncATP9_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6_hsATP5G3, crATP6_hsADCK3_zmLOC100282174_hsATP5G3, hsADCK3_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6, ncATP9_zmLOC100282174_spilv1_GNFP_ncATP9, and ncATP9_zmLOC100282174_spilv1_lcSirt5_osP0644B06.24-2_hsATP5G2_ncATP9 (see Table 1 for SEQ ID NO). In one example, the polynucleotide sequences, COX10 (SEQ ID NO: 1, 2, or 3) can encode the mitochondrial targeting sequence, MTS-COX10 (SEQ ID NO: 126). In another example, the polynucleotide sequences, COX8 (SEQ ID NO: 4) can encode the mitochondrial targeting sequence, MTS-COX8 (SEQ ID NO: 127). In another example, the polynucleotide sequences, OPA1 (SEQ ID NO: 5) can encode the mitochondrial targeting sequence, MTS-OPA1 (SEQ ID NO: 128).

[0080] The 3'UTR nucleic acid sequence can be selected from hsACO2 (SEQ ID NO: 111), hsATP5B (SEQ ID NO: 112), hsAK2 (SEQ ID NO: 113), hsALDH2 (SEQ ID NO: 114), hsCOX10 (SEQ ID NO: 115), hsUQCRFS1 (SEQ ID NO: 116), hsNDUFV1 (SEQ ID NO: 117), hsNDUFV2 (SEQ ID NO: 118), hsSOD2 (SEQ ID NO: 119), hsCOX6c (SEQ ID NO: 120), hsIRP1 (SEQ ID NO: 121), hsMRPS12 (SEQ ID NO: 122), hsATP5J2 (SEQ ID NO: 123), rnSOD2 (SEQ ID NO: 124), and hsOXA1L (SEQ ID NO: 125). The 3'UTR nucleic acid sequence can also be a variant having at least 70%, 75%, 80%, 85%, 90% and more preferably at least 95%, 96%, 97%, 98%, 99%, 99.5%, or 100% homologous to any 3'UTR nucleic acid sequence listed here. For example, the 3'UTR nucleic acid sequence can be SEQ ID NO: 13 or 14.

[0081] Also disclosed herein are recombinant nucleic acid sequences comprising a mitochondrial targeting sequence, a mitochondrial protein coding sequence, and a 3'UTR nucleic acid sequence. For example, the recombinant nucleic acid sequence can be selected from SEQ ID NO: 15-84. The recombinant nucleic acid sequence can also be a variant having at least 70%, 75%, 80%, 85%, 90% and more preferably at least 95%, 96%, 97%, 98%, 99%, 99.5%, or 100% homologous to any recombinant nucleic acid sequence listed here.

Promoters and regulatory sequences

[0082] The vector of the invention also includes elements allowing for the expression of the disclosed transgene in vitro or in vivo. Thus, the vector typically comprises a promoter sequence operably linked to the polynucleotide sequence encoding the ND4, ND6, or ND1 transgene or a variant thereof.

[0083] Any suitable promoter may be used. The promoter sequence may be constitutively active i.e. operational in any host cell background, or alternatively may be active only in a specific host cell environment, thus allowing for targeted expression of the transgene in a particular cell type. The promoter may show inducible expression in response to presence of another factor, for example a factor present in a host cell. In any event, where the vector is administered for therapy, the promoter must be functional in a retinal cell background.

[0084] In some embodiments, it is preferred that the promoter shows retinal-cell specific expression in order to allow for the transgene to only be expressed in retinal cell populations. Thus, expression from the promoter may be retinal-cell specific, for example confined only to cells of the neurosensory retina and retinal pigment epithelium.

[0085] Preferred promoters for the ND4, ND6, or ND1 transgene include the chicken beta-actin (CBA) promoter, optionally in combination with a cytomegalovirus (CME) enhancer element. In some cases, the preferred promoters for the ND4, ND6, or ND1 transgene comprises the CAG promoter. A particularly preferred promoter is a hybrid CBA/CAG promoter, for example the promoter used in the rAVE expression cassette. Examples of promoters based on human sequences that would induce retina specific gene expression include rhodospin kinase for rods and cones (Allocca et al., 2007, J Biol Chem 282:11372-80), PR2.1 for cones only (Mancuso et al. 2009, Nature) and/or RPE65 for the retinal pigment epithelium (Bainbridge et al., 2008, N Eng J Med).

[0086] The vector of the invention may also comprise one or more additional regulatory sequences which may act pre- or post-transcriptionally. The regulatory

sequence may be part of the native ND4, ND6, or ND1 gene locus or may be a heterologous regulatory sequence. The vector of the invention may comprise portions of the 5'UTR or 3'UTR from the native ND4, ND6, or ND1 transcript.

[0087] Regulatory sequences are any sequences which facilitate expression of the transgene i.e. act to increase expression of a transcript, improve nuclear export of mRNA or enhance its stability. Such regulatory sequences include for example enhancer elements, postregulatory elements and polyadenylation sites. A preferred polyadenylation site is the Bovine Growth Hormone poly-A signal. In the context of the vector of the invention such regulatory sequences will be cis-acting. However, the invention also encompasses the use of trans-acting regulatory sequences located on additional genetic constructs.

[0088] A preferred postregulatory element for use in a vector of the invention is the woodchuck hepatitis postregulatory element (WPRE) or a variant thereof. Another regulatory sequence which may be used in a vector of the present invention is a scaffold-attachment region (SAR). Additional regulatory sequences may be selected by the skilled person on the basis of their common general knowledge.

[0089] Preparation of vector

[0090] The vector of the invention may be prepared by standard means known in the art for provision of vectors for gene therapy. Thus, well established public domain transfection, packaging and purification methods can be used to prepare a suitable vector preparation.

[0091] As discussed above, a vector of the invention may comprise the full genome of a naturally occurring AAV virus in addition to a polynucleotide sequence encoding ND4, ND6, or ND1 or a variant thereof. However, commonly a derivatised genome will be used, for instance a derivative which has at least one inverted terminal repeat sequence (ITR), but which may lack any AAV genes such as rep or cap.

[0092] In such embodiments, in order to provide for assembly of the derivatised genome into an AAV viral particle, additional genetic constructs providing AAV and/or helper virus functions will be provided in a host cell in combination with the derivatised genome. These additional constructs will typically contain genes encoding structural AAV capsid proteins i.e. cap, VP1, VP2, VP3, and genes encoding other functions required for the AAV life cycle, such as rep. The selection of structural capsid proteins provided on the additional construct will determine the serotype of the packaged viral vector.

[0093] A particularly preferred packaged viral vector for use in the invention comprises a derivatised genome of AAV2 in combination with AAV5 or AAV8 capsid proteins. This packaged viral vector typically comprises one or more AAV2 ITRs.

[0094] As mentioned above, AAV viruses are replication incompetent and so helper virus functions, preferably adenovirus helper functions will typically also be provided on one or more additional constructs to allow for AAV replication.

[0095] All of the above additional constructs may be provided as plasmids or other episomal elements in the host cell, or alternatively one or more constructs may be integrated into the genome of the host cell.

[0096] In these aspects, the invention provides a method for production of a vector of the invention. The method comprises providing a vector which comprises an adeno-associated virus (AAV) genome or a derivative thereof and a polynucleotide sequence encoding ND4, ND6, or ND1 or a variant thereof in a host cell, and providing means for replication and assembly of the vector into an AAV viral particle. Preferably, the method comprises providing a vector comprising a derivative of an AAV genome and a polynucleotide sequence encoding ND4, ND6, or ND1 or a variant thereof, together with one or more additional genetic constructs encoding AAV and/or helper virus functions. Typically, the derivative of an AAV genome comprises at least one ITR. Optionally, the method further comprises a step of purifying the assembled viral particles. Additionally, the method may comprise a step of formulating the viral particles for therapeutic use.

Methods of therapy and medical uses

[0097] As discussed above, the present inventors have surprisingly demonstrated that a vector of the invention may be used to address the cellular dysfunction underlying LHON. In particular, they have shown that use of the vector can correct the defect associated with LHON. This provides a means whereby the degenerative process of the disease can be treated, arrested, palliated or prevented.

[0098] The invention therefore provides a method of treating or preventing LHON in a patient in need thereof, comprising administering a therapeutically effective amount of a vector of the invention to the patient by direct retinal, subretinal or intravitreal injection. Accordingly, LHON is thereby treated or prevented in the patient.

[0099] In a related aspect, the invention provides for use of a vector of the invention in a method of treating or preventing LHON by administering said vector to a patient by direct retinal, subretinal or intravitreal injection. Additionally, the invention provides the use of a vector of the invention in the manufacture of a medicament for treating or preventing LHON by direct retinal, subretinal or intravitreal injection.

[00100] In all these embodiments, the vector of the invention may be administered in order to prevent the onset of one or more symptoms of LHON. The patient may be asymptomatic. The subject may have a predisposition to the disease. The method or use may comprise a step of identifying whether or not a subject is at risk of developing, or has, LHON. A prophylactically effective amount of the vector is administered to such a subject. A prophylactically effective amount is an amount which prevents the onset of one or more symptoms of the disease.

[00101] Alternatively, the vector may be administered once the symptoms of the disease have appeared in a subject i.e. to cure existing symptoms of the disease. A therapeutically effective amount of the antagonist is administered to such a subject. A therapeutically effective amount is an amount which is effective to ameliorate one or more symptoms of the disease. Such an amount may also arrest, slow or reverse some loss of peripheral vision associated with LHON. Such an amount may also arrest, slow or reverse onset of LHON.

[00102] A typical single dose is between 10^{10} and 10^{12} genome particles, depending on the amount of remaining retinal tissue that requires transduction. A genome particle is defined herein as an AAV capsid that contains a single stranded DNA molecule that can be quantified with a sequence specific method (such as real-time PCR). That dose may be provided as a single dose, but may be repeated for the fellow eye or in cases where vector may not have targeted the correct region of retina for whatever reason (such as surgical complication). The treatment is preferably a single permanent treatment for each eye, but repeat injections, for example in future years and/or with different AAV serotypes may be considered.

[00103] The invention also provides a method of monitoring treatment or prevention of LHON in a patient comprising measuring activity ex vivo in retinal cells obtained from said patient following administration of the AAV vector of the invention by direct retinal, subretinal or intravitreal injection. This method can allow for determination of the efficacy of treatment.

Pharmaceutical Compositions

[00104] The vector of the invention can be formulated into pharmaceutical compositions. These compositions may comprise, in addition to the vector, a pharmaceutically acceptable excipient, carrier, buffer, stabiliser or other materials well known to those skilled in the art. Such materials should be non-toxic and should not interfere with the efficacy of the active ingredient. The precise nature of the carrier or

other material may be determined by the skilled person according to the route of administration, i.e. here direct retinal, subretinal or intravitreal injection.

[00105] The pharmaceutical composition is typically in liquid form. Liquid pharmaceutical compositions generally include a liquid carrier such as water, petroleum, animal or vegetable oils, mineral oil or synthetic oil. Physiological saline solution, magnesium chloride, dextrose or other saccharide solution or glycols such as ethylene glycol, propylene glycol or polyethylene glycol may be included. In some cases, a surfactant, such as pluronic acid (PF68) 0.001% may be used.

[00106] In some embodiments, the pharmaceutical composition of the disclosure comprises between 10⁹ and 10¹⁶ viral vectors. In some embodiments, the pharmaceutical composition of the disclosure comprises between 10¹⁰ and 10¹² viral vectors per milliliter.

[00107] For injection at the site of affliction, the active ingredient will be in the form of an aqueous solution which is pyrogen-free and has suitable pH, isotonicity and stability. Those of relevant skill in the art are well able to prepare suitable solutions using, for example, isotonic vehicles such as Sodium Chloride Injection, Ringer's Injection, Lactated Ringer's Injection. Preservatives, stabilisers, buffers, antioxidants and/or other additives may be included, as required.

[00108] For delayed release, the vector may be included in a pharmaceutical composition which is formulated for slow release, such as in microcapsules formed from biocompatible polymers or in liposomal carrier systems according to methods known in the art.

Samples

[00109] Samples that are suitable for use in the methods described herein can be nucleic acid samples from a subject. A "nucleic acid sample" as used herein can include RNA or DNA, or a combination thereof. In another embodiment, a "polypeptide sample" (e.g., peptides or proteins, or fragments therefrom) can be used to ascertain information that an amino acid change has occurred, which is the result of a genetic variant. Nucleic acids and polypeptides can be extracted from one or more samples including but not limited to, blood, saliva, urine, mucosal scrapings of the lining of the mouth, expectorant, serum, tears, skin, tissue, or hair. A nucleic acid sample can be assayed for nucleic acid information. "Nucleic acid information," as used herein, includes a nucleic acid sequence itself, the presence/absence of genetic variation in the nucleic acid sequence, a physical property which varies depending on the nucleic acid sequence (e.g., T_m), and the amount of the nucleic acid (e.g., number of mRNA copies). A "nucleic acid" means any

one of DNA, RNA, DNA including artificial nucleotides, or RNA including artificial nucleotides. As used herein, a “purified nucleic acid” includes cDNAs, fragments of genomic nucleic acids, nucleic acids produced using the polymerase chain reaction (PCR), nucleic acids formed by restriction enzyme treatment of genomic nucleic acids, recombinant nucleic acids, and chemically synthesized nucleic acid molecules. A “recombinant” nucleic acid molecule includes a nucleic acid molecule made by an artificial combination of two otherwise separated segments of sequence, e.g., by chemical synthesis or by the manipulation of isolated segments of nucleic acids by genetic engineering techniques. As used herein, a “polypeptide” includes proteins, fragments of proteins, and peptides, whether isolated from natural sources, produced by recombinant techniques, or chemically synthesized. A polypeptide may have one or more modifications, such as a post-translational modification (e.g., glycosylation, phosphorylation, etc.) or any other modification (e.g., pegylation, etc.). The polypeptide may contain one or more non-naturally-occurring amino acids (e.g., such as an amino acid with a side chain modification).

[00110] In some embodiments, the nucleic acid sample can comprise cells or tissue, for example, cell lines. Exemplary cell types from which nucleic acids can be obtained using the methods described herein include, but are not limited to, the following: a blood cell such as a B lymphocyte, T lymphocyte, leukocyte, erythrocyte, macrophage, or neutrophil; a muscle cell such as a skeletal cell, smooth muscle cell or cardiac muscle cell; a germ cell, such as a sperm or egg; an epithelial cell; a connective tissue cell, such as an adipocyte, chondrocyte; fibroblast or osteoblast; a neuron; an astrocyte; a stromal cell; an organ specific cell, such as a kidney cell, pancreatic cell, liver cell, or a keratinocyte; a stem cell; or any cell that develops therefrom. A cell from which nucleic acids can be obtained can be a blood cell or a particular type of blood cell including, for example, a hematopoietic stem cell or a cell that arises from a hematopoietic stem cell such as a red blood cell, B lymphocyte, T lymphocyte, natural killer cell, neutrophil, basophil, eosinophil, monocyte, macrophage, or platelet. Generally, any type of stem cell can be used including, without limitation, an embryonic stem cell, adult stem cell, or pluripotent stem cell.

[00111] In some embodiments, a nucleic acid sample can be processed for RNA or DNA isolation, for example, RNA or DNA in a cell or tissue sample can be separated from other components of the nucleic acid sample. Cells can be harvested from a nucleic acid sample using standard techniques, for example, by centrifuging a cell sample and resuspending the pelleted cells, for example, in a buffered solution, for

example, phosphate-buffered saline (PBS). In some embodiments, after centrifuging the cell suspension to obtain a cell pellet, the cells can be lysed to extract DNA. In some embodiments, the nucleic acid sample can be concentrated and/or purified to isolate DNA. All nucleic acid samples obtained from a subject, including those subjected to any sort of further processing, are considered to be obtained from the subject. In some embodiments, standard techniques and kits known in the art can be used to extract RNA or DNA from a nucleic acid sample, including, for example, phenol extraction, a QIAAMP® Tissue Kit (Qiagen, Chatsworth, Calif.), a WIZARD® Genomic DNA purification kit (Promega), or a Qiagen Autopure method using Puregene chemistry, which can enable purification of highly stable DNA well-suited for archiving.

[00112] In some embodiments, determining the identity of an allele or determining copy number can, but need not, include obtaining a nucleic acid sample comprising RNA and/or DNA from a subject, and/or assessing the identity, copy number, presence or absence of one or more genetic variations and their chromosomal locations within the genomic DNA (i.e. subject's genome) derived from the nucleic acid sample.

[00113] The individual or organization that performs the determination need not actually carry out the physical analysis of a nucleic acid sample from a subject. In some embodiments, the methods can include using information obtained by analysis of the nucleic acid sample by a third party. In some embodiments, the methods can include steps that occur at more than one site. For example, a nucleic acid sample can be obtained from a subject at a first site, such as at a health care provider or at the subject's home in the case of a self-testing kit. The nucleic acid sample can be analyzed at the same or a second site, for example, at a laboratory or other testing facility.

Nucleic Acids

[00114] The nucleic acids and polypeptides described herein can be used in methods and kits of the present disclosure. In some embodiments, aptamers that specifically bind the nucleic acids and polypeptides described herein can be used in methods and kits of the present disclosure. As used herein, a nucleic acid can comprise a deoxyribonucleotide (DNA) or ribonucleotide (RNA), whether singular or in polymers, naturally occurring or non-naturally occurring, double-stranded or single-stranded, coding, for example a translated gene, or non-coding, for example a regulatory region, or any fragments, derivatives, mimetics or complements thereof. In some embodiments, nucleic acids can comprise oligonucleotides, nucleotides, polynucleotides, nucleic acid sequences, genomic sequences, complementary DNA (cDNA), antisense nucleic acids,

DNA regions, probes, primers, genes, regulatory regions, introns, exons, open-reading frames, binding sites, target nucleic acids and allele-specific nucleic acids.

[00115] A “probe,” as used herein, includes a nucleic acid fragment for examining a nucleic acid in a specimen using the hybridization reaction based on the complementarity of nucleic acid.

[00116] A “hybrid” as used herein, includes a double strand formed between any one of the abovementioned nucleic acid, within the same type, or across different types, including DNA-DNA, DNA-RNA, RNA-RNA or the like.

[00117] “Isolated” nucleic acids, as used herein, are separated from nucleic acids that normally flank the gene or nucleotide sequence (as in genomic sequences) and/or has been completely or partially purified from other transcribed sequences (e.g., as in an RNA library). For example, isolated nucleic acids of the disclosure can be substantially isolated with respect to the complex cellular milieu in which it naturally occurs, or culture medium when produced by recombinant techniques, or chemical precursors or other chemicals when chemically synthesized. In some instances, the isolated material can form part of a composition, for example, a crude extract containing other substances, buffer system or reagent mix. In some embodiments, the material can be purified to essential homogeneity using methods known in the art, for example, by polyacrylamide gel electrophoresis (PAGE) or column chromatography (e.g., HPLC). With regard to genomic DNA (gDNA), the term “isolated” also can refer to nucleic acids that are separated from the chromosome with which the genomic DNA is naturally associated. For example, the isolated nucleic acid molecule can contain less than about 250 kb, 200 kb, 150 kb, 100 kb, 75 kb, 50 kb, 25 kb, 10 kb, 5 kb, 4 kb, 3 kb, 2kb, 1 kb, 0.5 kb or 0.1 kb of the nucleotides that flank the nucleic acid molecule in the gDNA of the cell from which the nucleic acid molecule is derived.

[00118] Nucleic acids can be fused to other coding or regulatory sequences can be considered isolated. For example, recombinant DNA contained in a vector is included in the definition of “isolated” as used herein. In some embodiments, isolated nucleic acids can include recombinant DNA molecules in heterologous host cells or heterologous organisms, as well as partially or substantially purified DNA molecules in solution. Isolated nucleic acids also encompass in vivo and in vitro RNA transcripts of the DNA molecules of the present disclosure. An isolated nucleic acid molecule or nucleotide sequence can be synthesized chemically or by recombinant means. Such isolated nucleotide sequences can be useful, for example, in the manufacture of the encoded polypeptide, as probes for isolating homologous sequences (e.g., from other

mammalian species), for gene mapping (e.g., by in situ hybridization with chromosomes), or for detecting expression of the gene, in tissue (e.g., human tissue), such as by Northern blot analysis or other hybridization techniques disclosed herein. The disclosure also pertains to nucleic acid sequences that hybridize under high stringency hybridization conditions, such as for selective hybridization, to a nucleotide sequence described herein. Such nucleic acid sequences can be detected and/or isolated by allele- or sequence-specific hybridization (e.g., under high stringency conditions). Stringency conditions and methods for nucleic acid hybridizations are well known to the skilled person (see, e.g., *Current Protocols in Molecular Biology*, Ausubel, F. et al., John Wiley & Sons, (1998), and Kraus, M. and Aaronson, S., *Methods Enzymol.*, 200:546-556 (1991), the entire teachings of which are incorporated by reference herein.

[00119] Calculations of “identity” or “percent identity” between two or more nucleotide or amino acid sequences can be determined by aligning the sequences for optimal comparison purposes (e.g., gaps can be introduced in the sequence of a first sequence). The nucleotides at corresponding positions are then compared, and the percent identity between the two sequences is a function of the number of identical positions shared by the sequences (i.e. $\% \text{ identity} = \# \text{ of identical positions} / \text{total} \# \text{ of positions} \times 100$). For example, a position in the first sequence is occupied by the same nucleotide as the corresponding position in the second sequence, then the molecules are identical at that position. The percent identity between the two sequences is a function of the number of identical positions shared by the sequences, taking into account the number of gaps, and the length of each gap, which need to be introduced for optimal alignment of the two sequences.

[00120] In some embodiments, the length of a sequence aligned for comparison purposes is at least 30%, at least 40%, at least 50%, at least 60%, at least 70%, at least 80%, at least 90%, or at least 95%, of the length of the reference sequence. The actual comparison of the two sequences can be accomplished by well-known methods, for example, using a mathematical algorithm. A non-limiting example of such a mathematical algorithm is described in Karlin, S. and Altschul, S., *Proc. Natl. Acad. Sci. USA*, 90- 5873-5877 (1993). Such an algorithm is incorporated into the NBLAST and XBLAST programs (version 2.0), as described in Altschul, S. et al., *Nucleic Acids Res.*, 25:3389-3402 (1997). When utilizing BLAST and Gapped BLAST programs, any relevant parameters of the respective programs (e.g., NBLAST) can be used. For example, parameters for sequence comparison can be set at score= 100, word length=

12, or can be varied (e.g., W=5 or W=20). Other examples include the algorithm of Myers and Miller, CABIOS (1989), ADVANCE, ADAM, BLAT, and FASTA. In some embodiments, the percent identity between two amino acid sequences can be accomplished using, for example, the GAP program in the GCG software package (Accelrys, Cambridge, UK).

[00121] “Probes” or “primers” can be oligonucleotides that hybridize in a base-specific manner to a complementary strand of a nucleic acid molecule. Probes can include primers, which can be a single-stranded oligonucleotide probe that can act as a point of initiation of template-directed DNA synthesis using methods including but not limited to, polymerase chain reaction (PCR) and ligase chain reaction (LCR) for amplification of a target sequence. Oligonucleotides, as described herein, can include segments or fragments of nucleic acid sequences, or their complements. In some embodiments, DNA segments can be between 5 and 10,000 contiguous bases, and can range from 5, 10, 12, 15, 20, or 25 nucleotides to 10, 15, 20, 25, 30, 40, 50, 100, 200, 500, 1000 or 10,000 nucleotides. In addition to DNA and RNA, probes and primers can include polypeptide nucleic acids (PNA), as described in Nielsen, P. et al., Science 254: 1497-1500 (1991). A probe or primer can comprise a region of nucleotide sequence that hybridizes to at least about 15, typically about 20-25, and in certain embodiments about 40, 50, 60 or 75, consecutive nucleotides of a nucleic acid molecule.

[00122] The present disclosure also provides isolated nucleic acids, for example, probes or primers, that contain a fragment or portion that can selectively hybridize to a nucleic acid that comprises, or consists of, a nucleotide sequence, wherein the nucleotide sequence can comprise at least one polymorphism or polymorphic allele contained in the genetic variations described herein or the wild-type nucleotide that is located at the same position, or the complements thereof. In some embodiments, the probe or primer can be at least 70% identical, at least 80% identical, at least 85% identical, at least 90% identical, or at least 95% identical, to the contiguous nucleotide sequence or to the complement of the contiguous nucleotide sequence.

[00123] In some embodiments, a nucleic acid probe can be an oligonucleotide capable of hybridizing with a complementary region of a gene associated with a condition (e.g., LHON) containing a genetic variation described herein. The nucleic acid fragments of the disclosure can be used as probes or primers in assays such as those described herein.

[00124] The nucleic acids of the disclosure, such as those described above, can be identified and isolated using standard molecular biology techniques well known to the

skilled person. In some embodiments, DNA can be amplified and/or can be labeled (e.g., radiolabeled, fluorescently labeled) and used as a probe for screening, for example, a cDNA library derived from an organism. cDNA can be derived from mRNA and can be contained in a suitable vector. For example, corresponding clones can be isolated, DNA obtained following in vivo excision, and the cloned insert can be sequenced in either or both orientations by art-recognized methods to identify the correct reading frame encoding a polypeptide of the appropriate molecular weight. Using these or similar methods, the polypeptide and the DNA encoding the polypeptide can be isolated, sequenced and further characterized.

[00125] In some embodiments, nucleic acid can comprise one or more polymorphisms, variations, or mutations, for example, single nucleotide polymorphisms (SNPs), single nucleotide variations (SNVs), copy number variations (CNVs), for example, insertions, deletions, inversions, and translocations. In some embodiments, nucleic acids can comprise analogs, for example, phosphorothioates, phosphoramidates, methyl phosphonate, chiral methyl phosphonates, 2'-O-methyl ribonucleotides, or modified nucleic acids, for example, modified backbone residues or linkages, or nucleic acids combined with carbohydrates, lipids, polypeptide or other materials, or peptide nucleic acids (PNAs), for example, chromatin, ribosomes, and transcriptosomes. In some embodiments nucleic acids can comprise nucleic acids in various structures, for example, A DNA, B DNA, Z-form DNA, siRNA, tRNA, and ribozymes. In some embodiments, the nucleic acid may be naturally or non-naturally polymorphic, for example, having one or more sequence differences, for example, additions, deletions and/or substitutions, as compared to a reference sequence. In some embodiments, a reference sequence can be based on publicly available information, for example, the U.C. Santa Cruz Human Genome Browser Gateway (genome.ucsc.edu/cgi-bin/hgGateway) or the NCBI website (www.ncbi.nlm.nih.gov). In some embodiments, a reference sequence can be determined by a practitioner of the present disclosure using methods well known in the art, for example, by sequencing a reference nucleic acid.

[00126] In some embodiments, a probe can hybridize to an allele, SNP, SNV, or CNV as described herein. In some embodiments, the probe can bind to another marker sequence associated with LHON as described herein.

[00127] One of skill in the art would know how to design a probe so that sequence specific hybridization can occur only if a particular allele is present in a genomic sequence from a test nucleic acid sample. The disclosure can also be reduced to

practice using any convenient genotyping method, including commercially available technologies and methods for genotyping particular genetic variations.

[00128] Control probes can also be used, for example, a probe that binds a less variable sequence, for example, a repetitive DNA associated with a centromere of a chromosome, can be used as a control. In some embodiments, probes can be obtained from commercial sources. In some embodiments, probes can be synthesized, for example, chemically or in vitro, or made from chromosomal or genomic DNA through standard techniques. In some embodiments sources of DNA that can be used include genomic DNA, cloned DNA sequences, somatic cell hybrids that contain one, or a part of one, human chromosome along with the normal chromosome complement of the host, and chromosomes purified by flow cytometry or microdissection. The region of interest can be isolated through cloning, or by site-specific amplification using PCR.

[00129] One or more nucleic acids for example, a probe or primer, can also be labeled, for example, by direct labeling, to comprise a detectable label. A detectable label can comprise any label capable of detection by a physical, chemical, or a biological process for example, a radioactive label, such as ^{32}P or ^3H , a fluorescent label, such as FITC, a chromophore label, an affinity-ligand label, an enzyme label, such as alkaline phosphatase, horseradish peroxidase, or β -galactosidase, an enzyme cofactor label, a hapten conjugate label, such as digoxigenin or dinitrophenyl, a Raman signal generating label, a magnetic label, a spin label, an epitope label, such as the FLAG or HA epitope, a luminescent label, a heavy atom label, a nanoparticle label, an electrochemical label, a light scattering label, a spherical shell label, semiconductor nanocrystal label, such as quantum dots (described in U.S. Pat. No. 6,207,392), and probes labeled with any other signal generating label known to those of skill in the art, wherein a label can allow the probe to be visualized with or without a secondary detection molecule. A nucleotide can be directly incorporated into a probe with standard techniques, for example, nick translation, random priming, and PCR labeling. A "signal," as used herein, include a signal suitably detectable and measurable by appropriate means, including fluorescence, radioactivity, chemiluminescence, and the like.

[00130] Non-limiting examples of label moieties useful for detection include, without limitation, suitable enzymes such as horseradish peroxidase, alkaline phosphatase, β -galactosidase, or acetylcholinesterase; members of a binding pair that are capable of forming complexes such as streptavidin/biotin, avidin/biotin or an antigen/antibody complex including, for example, rabbit IgG and anti-rabbit IgG; fluorophores such as umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, tetramethyl

rhodamine, eosin, green fluorescent protein, erythrosin, coumarin, methyl coumarin, pyrene, malachite green, stilbene, lucifer yellow, Cascade Blue, Texas Red, dichlorotriazinylamine fluorescein, dansyl chloride, phycoerythrin, fluorescent lanthanide complexes such as those including Europium and Terbium, cyanine dye family members, such as Cy3 and Cy5, molecular beacons and fluorescent derivatives thereof, as well as others known in the art as described, for example, in Principles of Fluorescence Spectroscopy, Joseph R. Lakowicz (Editor), Plenum Pub Corp, 2nd edition (July 1999) and the 6th Edition of the Molecular Probes Handbook by Richard P. Hoagland; a luminescent material such as luminol; light scattering or plasmon resonant materials such as gold or silver particles or quantum dots; or radioactive material include ^{14}C , ^{123}I , ^{124}I , ^{125}I , $\text{Tc}^{99\text{m}}$, ^{32}P , ^{33}P , ^{35}S or ^3H .

[00131] Other labels can also be used in the methods of the present disclosure, for example, backbone labels. Backbone labels comprise nucleic acid stains that bind nucleic acids in a sequence independent manner. Non-limiting examples include intercalating dyes such as phenanthridines and acridines (e.g., ethidium bromide, propidium iodide, hexidium iodide, dihydroethidium, ethidium homodimer-1 and -2, ethidium monoazide, and ACMA); some minor groove binders such as indoles and imidazoles (e.g., Hoechst 33258, Hoechst 33342, Hoechst 34580 and DAPI); and miscellaneous nucleic acid stains such as acridine orange (also capable of intercalating), 7-AAD, actinomycin D, LDS751, and hydroxystilbamidine. All of the aforementioned nucleic acid stains are commercially available from suppliers such as Molecular Probes, Inc. Still other examples of nucleic acid stains include the following dyes from Molecular Probes: cyanine dyes such as SYTOX Blue, SYTOX Green, SYTOX Orange, POPO-1, POPO-3, YOYO-1, YOYO-3, TOTO-1, TOTO-3, JOJO-1, LOLO-1, BOBO-1, BOBO-3, PO-PRO-1, PO-PRO-3, BO-PRO-1, BO-PRO-3, TO-PRO-1, TO-PRO-3, TO-PRO-5, JO-PRO-1, LO-PRO-1, YO-PRO-1, YO-PRO-3, PicoGreen, OliGreen, RiboGreen, SYBR Gold, SYBR Green I, SYBR Green II, SYBR DX, SYTO-40, -41, -42, -43, -44, -45 (blue), SYTO-13, -16, -24, -21, -23, -12, -11, -20, -22, -15, -14, -25 (green), SYTO-81, -80, -82, -83, -84, -85 (orange), SYTO-64, -17, -59, -61, -62, -60, -63 (red).

[00132] In some embodiments, fluorophores of different colors can be chosen, for example, 7-amino-4-methylcoumarin-3-acetic acid (AMCA), 5-(and-6)-carboxy-X-rhodamine, lissamine rhodamine B, 5-(and-6)-carboxyfluorescein, fluorescein-5-isothiocyanate (FITC), 7-diethylaminocoumarin-3-carboxylic acid, tetramethylrhodamine-5-(and-6)-isothiocyanate, 5-(and-6)-carboxytetramethylrhodamine, 7-hydroxycoumarin-

3-carboxylic acid, 6-[fluorescein 5-(and-6)-carboxamido]hexanoic acid, N-(4,4-difluoro-5,7-dimethyl-4-bora-3a,4a diaza-3-indacenepropionic acid, eosin-5-isothiocyanate, erythrosin-5- isothiocyanate, TRITC, rhodamine, tetramethylrhodamine, R-phycoerythrin, Cy-3, Cy-5, Cy-7, Texas Red, Phar-Red, allophycocyanin (APC), and CASCADE™ blue acetylazide, such that each probe in or not in a set can be distinctly visualized. In some embodiments, fluorescently labeled probes can be viewed with a fluorescence microscope and an appropriate filter for each fluorophore, or by using dual or triple band-pass filter sets to observe multiple fluorophores. In some embodiments, techniques such as flow cytometry can be used to examine the hybridization pattern of the probes.

[00133] In other embodiments, the probes can be indirectly labeled, for example, with biotin or digoxigenin, or labeled with radioactive isotopes such as ^{32}P and/or ^3H . As a non-limiting example, a probe indirectly labeled with biotin can be detected by avidin conjugated to a detectable marker. For example, avidin can be conjugated to an enzymatic marker such as alkaline phosphatase or horseradish peroxidase. In some embodiments, enzymatic markers can be detected using colorimetric reactions using a substrate and/or a catalyst for the enzyme. In some embodiments, catalysts for alkaline phosphatase can be used, for example, 5-bromo-4-chloro-3-indolylphosphate and nitro blue tetrazolium. In some embodiments, a catalyst can be used for horseradish peroxidase, for example, diaminobenzoate.

Formulations, routes of administration, and effective doses

[00134] Yet another aspect of the present disclosure relates to formulations, routes of administration and effective doses for pharmaceutical compositions comprising an agent or combination of agents of the instant disclosure. Such pharmaceutical compositions can be used to treat a condition (e.g., LHON) as described above.

[00135] Compounds of the disclosure can be administered as pharmaceutical formulations including those suitable for oral (including buccal and sub-lingual), rectal, nasal, topical, transdermal patch, pulmonary, vaginal, suppository, or parenteral (including intraocular, intravitreal, intramuscular, intraarterial, intrathecal, intradermal, intraperitoneal, subcutaneous and intravenous) administration or in a form suitable for administration by aerosolization, inhalation or insufflation. General information on drug delivery systems can be found in Ansel et al., *Pharmaceutical Dosage Forms and Drug Delivery Systems* (Lippencott Williams & Wilkins, Baltimore Md. (1999).

[00136] In various embodiments, the pharmaceutical composition includes carriers and excipients (including but not limited to buffers, carbohydrates, mannitol,

polypeptides, amino acids, antioxidants, bacteriostats, chelating agents, suspending agents, thickening agents and/or preservatives), water, oils including those of petroleum, animal, vegetable or synthetic origin, such as peanut oil, soybean oil, mineral oil, sesame oil and the like, saline solutions, aqueous dextrose and glycerol solutions, flavoring agents, coloring agents, detackifiers and other acceptable additives, adjuvants, or binders, other pharmaceutically acceptable auxiliary substances to approximate physiological conditions, such as pH buffering agents, tonicity adjusting agents, emulsifying agents, wetting agents and the like. Examples of excipients include starch, glucose, lactose, sucrose, gelatin, malt, rice, flour, chalk, silica gel, sodium stearate, glycerol monostearate, talc, sodium chloride, dried skim milk, glycerol, propylene, glycol, water, ethanol and the like. In some embodiments, the pharmaceutical preparation is substantially free of preservatives. In other embodiments, the pharmaceutical preparation can contain at least one preservative. General methodology on pharmaceutical dosage forms is found in Ansel et al., *Pharmaceutical Dosage Forms and Drug Delivery Systems* (Lippencott, Williams, & Wilkins, Baltimore Md. (1999)). It can be recognized that, while any suitable carrier known to those of ordinary skill in the art can be employed to administer the compositions of this disclosure, the type of carrier can vary depending on the mode of administration.

[00137] Compounds can also be encapsulated within liposomes using well-known technology. Biodegradable microspheres can also be employed as carriers for the pharmaceutical compositions of this disclosure. Suitable biodegradable microspheres are disclosed, for example, in U.S. Pat. Nos. 4,897,268, 5,075,109, 5,928,647, 5,811,128, 5,820,883, 5,853,763, 5,814,344 and 5,942,252.

[00138] The compound can be administered in liposomes or microspheres (or microparticles). Methods for preparing liposomes and microspheres for administration to a subject are well known to those of skill in the art. U.S. Pat. No. 4,789,734, the contents of which are hereby incorporated by reference, describes methods for encapsulating biological materials in liposomes. Essentially, the material is dissolved in an aqueous solution, the appropriate phospholipids and lipids added, and along with surfactants if required, and the material dialyzed or sonicated, as necessary. A review of known methods is provided by G. Gregoriadis, Chapter 14, "Liposomes," *Drug Carriers in Biology and Medicine*, pp. 2.sup.87-341 (Academic Press, 1979).

[00139] Microspheres formed of polymers or polypeptides are well known to those skilled in the art, and can be tailored for passage through the gastrointestinal tract directly into the blood stream. Alternatively, the compound can be incorporated and the

microspheres, or composite of microspheres, implanted for slow release over a period of time ranging from days to months. See, for example, U.S. Pat. Nos. 4,906,474, 4,925,673 and 3,625,214, and Jain, TIPS 19:155-157 (1998), the contents of which are hereby incorporated by reference.

[00140] The concentration of drug can be adjusted, the pH of the solution buffered and the isotonicity adjusted to be compatible with intraocular or intravitreal injection.

[00141] The compounds of the disclosure can be formulated as a sterile solution or suspension, in suitable vehicles. The pharmaceutical compositions can be sterilized by conventional, well-known sterilization techniques, or can be sterile filtered. The resulting aqueous solutions can be packaged for use as is, or lyophilized, the lyophilized preparation being combined with a sterile solution prior to administration. Suitable formulations and additional carriers are described in Remington "The Science and Practice of Pharmacy" (20th Ed., Lippincott Williams & Wilkins, Baltimore MD), the teachings of which are incorporated by reference in their entirety herein.

[00142] The agents or their pharmaceutically acceptable salts can be provided alone or in combination with one or more other agents or with one or more other forms. For example, a formulation can comprise one or more agents in particular proportions, depending on the relative potencies of each agent and the intended indication. For example, in compositions for targeting two different host targets, and where potencies are similar, about a 1:1 ratio of agents can be used. The two forms can be formulated together, in the same dosage unit e.g., in one cream, suppository, tablet, capsule, aerosol spray, or packet of powder to be dissolved in a beverage; or each form can be formulated in a separate unit, e.g., two creams, two suppositories, two tablets, two capsules, a tablet and a liquid for dissolving the tablet, two aerosol sprays, or a packet of powder and a liquid for dissolving the powder, etc.

[00143] The term "pharmaceutically acceptable salt" means those salts which retain the biological effectiveness and properties of the agents used in the present disclosure, and which are not biologically or otherwise undesirable.

[00144] Typical salts are those of the inorganic ions, such as, for example, sodium, potassium, calcium, magnesium ions, and the like. Such salts include salts with inorganic or organic acids, such as hydrochloric acid, hydrobromic acid, phosphoric acid, nitric acid, sulfuric acid, methanesulfonic acid, p toluenesulfonic acid, acetic acid, fumaric acid, succinic acid, lactic acid, mandelic acid, malic acid, citric acid, tartaric acid or maleic acid. In addition, if the agent(s) contain a carboxyl group or other acidic group, it can be converted into a pharmaceutically acceptable addition salt with inorganic or

organic bases. Examples of suitable bases include sodium hydroxide, potassium hydroxide, ammonia, cyclohexylamine, dicyclohexyl-amine, ethanolamine, diethanolamine, triethanolamine, and the like.

[00145] A pharmaceutically acceptable ester or amide refers to those which retain biological effectiveness and properties of the agents used in the present disclosure, and which are not biologically or otherwise undesirable. Typical esters include ethyl, methyl, isobutyl, ethylene glycol, and the like. Typical amides include unsubstituted amides, alkyl amides, dialkyl amides, and the like.

[00146] In some embodiments, an agent can be administered in combination with one or more other compounds, forms, and/or agents, e.g., as described above.

Pharmaceutical compositions with one or more other active agents can be formulated to comprise certain molar ratios. For example, molar ratios of about 99:1 to about 1:99 of a first active agent to the other active agent can be used. In some subset of the embodiments, the range of molar ratios of a first active agent: other active agents are selected from about 80:20 to about 20:80; about 75:25 to about 25:75, about 70:30 to about 30:70, about 66:33 to about 33:66, about 60:40 to about 40:60; about 50:50; and about 90:10 to about 10:90. The molar ratio of a first active: other active agents can be about 1:9, and in some embodiments can be about 1:1. The two agents, forms and/or compounds can be formulated together, in the same dosage unit e.g., in one cream, suppository, tablet, capsule, or packet of powder to be dissolved in a beverage; or each agent, form, and/or compound can be formulated in separate units, e.g., two creams, suppositories, tablets, two capsules, a tablet and a liquid for dissolving the tablet, an aerosol spray a packet of powder and a liquid for dissolving the powder, etc.

[00147] If necessary or desirable, the agents and/or combinations of agents can be administered with still other agents. The choice of agents that can be co-administered with the agents and/or combinations of agents of the instant disclosure can depend, at least in part, on the condition being treated.

[00148] The agent(s) (or pharmaceutically acceptable salts, esters or amides thereof) can be administered per se or in the form of a pharmaceutical composition wherein the active agent(s) is in an admixture or mixture with one or more pharmaceutically acceptable carriers. A pharmaceutical composition, as used herein, can be any composition prepared for administration to a subject. Pharmaceutical compositions for use in accordance with the present disclosure can be formulated in conventional manner using one or more physiologically acceptable carriers, comprising excipients, diluents, and/or auxiliaries, e.g., which facilitate processing of the active agents into

preparations that can be administered. Proper formulation can depend at least in part upon the route of administration chosen. The agent(s) useful in the present disclosure, or pharmaceutically acceptable salts, esters, or amides thereof, can be delivered to a subject using a number of routes or modes of administration, including oral, buccal, topical, rectal, transdermal, transmucosal, subcutaneous, intravenous, intraocular, intravitreal, and intramuscular applications, as well as by inhalation.

[00149] In some embodiments, oils or non-aqueous solvents can be used to bring the agents into solution, due to, for example, the presence of large lipophilic moieties. Alternatively, emulsions, suspensions, or other preparations, for example, liposomal preparations, can be used. With respect to liposomal preparations, any known methods for preparing liposomes for treatment of a condition can be used. See, for example, Bangham et al., J. Mol. Biol. 23: 238-252 (1965) and Szoka et al., Proc. Natl Acad. Sci. USA 75: 4194-4198 (1978), incorporated herein by reference. Ligands can also be attached to the liposomes to direct these compositions to particular sites of action. Agents of this disclosure can also be integrated into foodstuffs, e.g., cream cheese, butter, salad dressing, or ice cream to facilitate solubilization, administration, and/or compliance in certain subject populations.

[00150] The compounds of the disclosure can be formulated for parenteral administration (e.g., by injection, for example, intraocular or intravitreal injection) and can be presented in unit dose form in ampoules, pre-filled syringes, small volume infusion or in multi-dose containers with an added preservative. The compositions can take such forms as suspensions, solutions, or emulsions in oily or aqueous vehicles, for example, solutions in aqueous polyethylene glycol.

[00151] For injectable formulations, the vehicle can be chosen from those known in art to be suitable, including aqueous solutions or oil suspensions, or emulsions, with sesame oil, corn oil, cottonseed oil, or peanut oil, as well as elixirs, mannitol, dextrose, or a sterile aqueous solution, and similar pharmaceutical vehicles. The formulation can also comprise polymer compositions which are biocompatible, biodegradable, such as poly(lactic-co-glycolic)acid. These materials can be made into micro or nanospheres, loaded with drug and further coated or derivatized to provide superior sustained release performance. Vehicles suitable for periocular or intraocular injection include, for example, suspensions of therapeutic agent in injection grade water, liposomes and vehicles suitable for lipophilic substances. Other vehicles for periocular or intraocular injection are well known in the art.

[00152] In some embodiments, the composition is formulated in accordance with routine procedures as a pharmaceutical composition adapted for intravenous administration to human beings. Typically, compositions for intravenous administration are solutions in sterile isotonic aqueous buffer. Where necessary, the composition can also include a solubilizing agent and a local anesthetic such as lidocaine to ease pain at the site of the injection. Generally, the ingredients are supplied either separately or mixed together in unit dosage form, for example, as a dry lyophilized powder or water free concentrate in a hermetically sealed container such as an ampoule or sachette indicating the quantity of active agent. Where the composition is to be administered by infusion, it can be dispensed with an infusion bottle containing sterile pharmaceutical grade water or saline. Where the composition is administered by injection, an ampoule of sterile water for injection or saline can be provided so that the ingredients can be mixed prior to administration.

[00153] When administration is by injection, the active compound can be formulated in aqueous solutions, specifically in physiologically compatible buffers such as Hanks solution, Ringer's solution, or physiological saline buffer. The solution can contain formulatory agents such as suspending, stabilizing and/or dispersing agents. Alternatively, the active compound can be in powder form for constitution with a suitable vehicle, e.g., sterile pyrogen-free water, before use. In some embodiments, the pharmaceutical composition does not comprise an adjuvant or any other substance added to enhance the immune response stimulated by the peptide. In some embodiments, the pharmaceutical composition comprises a substance that inhibits an immune response to the peptide. Methods of formulation are known in the art, for example, as disclosed in Remington's Pharmaceutical Sciences, latest edition, Mack Publishing Co., Easton P.

[00154] In some embodiments, eye disorders can be effectively treated with ophthalmic solutions, suspensions, ointments or inserts comprising an agent or combination of agents of the present disclosure. Eye drops can be prepared by dissolving the active ingredient in a sterile aqueous solution such as physiological saline, buffering solution, etc., or by combining powder compositions to be dissolved before use. Other vehicles can be chosen, as is known in the art, including but not limited to: balance salt solution, saline solution, water soluble polyethers such as polyethylene glycol, polyvinyls, such as polyvinyl alcohol and povidone, cellulose derivatives such as methylcellulose and hydroxypropyl methylcellulose, petroleum derivatives such as mineral oil and white petrolatum, animal fats such as lanolin,

polymers of acrylic acid such as carboxypolymethylene gel, vegetable fats such as peanut oil and polysaccharides such as dextrans, and glycosaminoglycans such as sodium hyaluronate. If desired, additives ordinarily used in the eye drops can be added. Such additives include isotonizing agents (e.g., sodium chloride, etc.), buffer agent (e.g., boric acid, sodium monohydrogen phosphate, sodium dihydrogen phosphate, etc.), preservatives (e.g., benzalkonium chloride, benzethonium chloride, chlorobutanol, etc.), thickeners (e.g., saccharide such as lactose, mannitol, maltose, etc.; e.g., hyaluronic acid or its salt such as sodium hyaluronate, potassium hyaluronate, etc.; e.g., mucopolysaccharide such as chondroitin sulfate, etc.; e.g., sodium polyacrylate, carboxyvinyl polymer, crosslinked polyacrylate, polyvinyl alcohol, polyvinyl pyrrolidone, methyl cellulose, hydroxy propyl methylcellulose, hydroxyethyl cellulose, carboxymethyl cellulose, hydroxy propyl cellulose or other agents known to those skilled in the art).

[00155] The solubility of the components of the present compositions can be enhanced by a surfactant or other appropriate co-solvent in the composition. Such cosolvents include polysorbate 20, 60, and 80, Pluronic F68, F-84 and P-103, cyclodextrin, or other agents known to those skilled in the art. Such co-solvents can be employed at a level of from about 0.01% to 2% by weight.

[00156] The compositions of the disclosure can be packaged in multidose form. Preservatives can be preferred to prevent microbial contamination during use. Suitable preservatives include: benzalkonium chloride, thimerosal, chlorobutanol, methyl paraben, propyl paraben, phenylethyl alcohol, edetate disodium, sorbic acid, Onamer M, or other agents known to those skilled in the art. In the prior art ophthalmic products, such preservatives can be employed at a level of from 0.004% to 0.02%. In the compositions of the present application the preservative, preferably benzalkonium chloride, can be employed at a level of from 0.001% to less than 0.01%, e.g., from 0.001% to 0.008%, preferably about 0.005% by weight. It has been found that a concentration of benzalkonium chloride of 0.005% can be sufficient to preserve the compositions of the present disclosure from microbial attack.

[00157] In some embodiments, the agents of the present disclosure are delivered in soluble rather than suspension form, which allows for more rapid and quantitative absorption to the sites of action. In general, formulations such as jellies, creams, lotions, suppositories and ointments can provide an area with more extended exposure to the agents of the present disclosure, while formulations in solution, e.g., sprays, provide more immediate, short-term exposure.

[00158] It is envisioned additionally, that the compounds of the disclosure can be attached releasably to biocompatible polymers for use in sustained release formulations on, in or attached to inserts for topical, intraocular, periocular, or systemic administration. The controlled release from a biocompatible polymer can be utilized with a water soluble polymer to form an instillable formulation, as well. The controlled release from a biocompatible polymer, such as for example, PLGA microspheres or nanospheres, can be utilized in a formulation suitable for intra ocular implantation or injection for sustained release administration, as well any suitable biodegradable and biocompatible polymer can be used.

FURTHER NUMBERED EMBODIMENTS

[00159] Further numbered embodiments of the disclosure are provided here as follows:

[00160] Embodiment 1. A recombinant nucleic acid, comprising:

a mitochondrial targeting sequence;

a mitochondrial protein coding sequence comprising a sequence that is at least 99% identical to SEQ ID NO: 11 or 12; and

a 3'UTR nucleic acid sequence.

[00161] Embodiment 2. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial targeting sequence encodes a polypeptide comprising a peptide sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 129-159.

[00162] Embodiment 3. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 2.

[00163] Embodiment 4. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 3.

[00164] Embodiment 5. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 4.

[00165] Embodiment 6. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least

95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 5.

[00166] Embodiment 7. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 1.

[00167] Embodiment 8. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial protein coding sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 12.

[00168] Embodiment 8.1. The recombinant nucleic acid of Embodiment 1, wherein said mitochondrial protein coding sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 11.

[00169] Embodiment 9. The recombinant nucleic acid of any one of Embodiments 1-8 and 8.1, wherein said 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 111-125.

[00170] Embodiment 10. The recombinant nucleic acid of any one of Embodiments 1-8 and 8.1, wherein said 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14.

[00171] Embodiment 11. The recombinant nucleic acid of Embodiment 1, wherein said recombinant nucleic acid comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 25-28, 39-42, 53-56, 67-70, and 81-84.

[00172] Embodiment 12. A recombinant nucleic acid, comprising:
a mitochondrial targeting sequence;
a mitochondrial protein coding sequence comprising a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to SEQ ID NO: 11 or 12; and
a 3'UTR nucleic acid sequence.

[00173] Embodiment 13. The recombinant nucleic acid of Embodiment 12, wherein said mitochondrial targeting sequence comprises a sequence encodes a polypeptide selected from the group consisting of hsCOX10, hsCOX8, scRPM2, lcSirt5, tbNDUS7,

ncQCR2, hsATP5G2, hsLACTB, spilv1, gmCOX2, crATP6, hsOPA1, hsSDHD, hsADCK3, osP0644B06.24-2, Neurospora crassa ATP9 (ncATP9), hsGHITM, hsNDUFAB1, hsATP5G3, crATP6_hsADCK3, ncATP9_ncATP9, zmLOC100282174, ncATP9_zmLOC100282174_spilv1_ncATP9, zmLOC100282174_hsADCK3_crATP6_hsATP5G3, zmLOC100282174_hsADCK3_hsATP5G3, ncATP9_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6_hsATP5G3, crATP6_hsADCK3_zmLOC100282174_hsATP5G3, hsADCK3_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6, ncATP9_zmLOC100282174_spilv1_GNFP_ncATP9, and ncATP9_zmLOC100282174_spilv1_lcSirt5_osP0644B06.24-2_hsATP5G2_ncATP9.

[00174] Embodiment 14. The recombinant nucleic acid of Embodiment 12 or 13, wherein said mitochondrial targeting sequence encodes a polypeptide comprising a peptide sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 129-159.

[00175] Embodiment 15. The recombinant nucleic acid of any one of Embodiments 12-14, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 2 or 3.

[00176] Embodiment 16. The recombinant nucleic acid of any one of Embodiments 12-14, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 4.

[00177] Embodiment 17. The recombinant nucleic acid of any one of Embodiments 12-14, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 5.

[00178] Embodiment 18. The recombinant nucleic acid of any one of Embodiments 12-14, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 1.

[00179] Embodiment 19. The recombinant nucleic acid of any one of Embodiments 12-18, wherein said 3'UTR nucleic acid sequence is located at 3' of said mitochondrial targeting sequence.

[00180] Embodiment 20. The recombinant nucleic acid of any one of Embodiments 12-19, wherein said 3'UTR nucleic acid sequence comprises a sequence selected from

the group consisting of hsACO2, hsATP5B, hsAK2, hsALDH2, hsCOX10, hsUQCERS1, hsNDUFV1, hsNDUFV2, hsSOD2, hsCOX6c, hsIRP1, hsMRPS12, hsATP5J2, rnSOD2, and hsOXA1L.

[00181] Embodiment 21. The recombinant nucleic acid of any one of Embodiments 12-20, wherein said 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 111-125.

[00182] Embodiment 22. The recombinant nucleic acid of any one of Embodiments 12-21, wherein said 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14.

[00183] Embodiment 23. The recombinant nucleic acid of any one of Embodiments 12-22, wherein said mitochondrial targeting sequence is located at 5' of said 3'UTR nucleic acid sequence.

[00184] Embodiment 24. The recombinant nucleic acid of any one of Embodiments 12-22, wherein said mitochondrial targeting sequence is located at 3' of said mitochondrial targeting sequence.

[00185] Embodiment 25. The recombinant nucleic acid of any one of Embodiments 12-24, wherein said recombinant nucleic acid comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 25-28, 39-42, 53-56, 67-70, and 81-84.

[00186] Embodiment 26. The recombinant nucleic acid of any one of Embodiments 12-25, wherein said mitochondrial protein coding sequence encodes a mitochondrial protein comprising or consisting of a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 162.

[00187] Embodiment 27. A recombinant nucleic acid, comprising a mitochondrial protein coding sequence, wherein said mitochondrial protein coding sequence encodes a polypeptide comprising a mitochondrial protein, wherein said mitochondrial protein coding sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to SEQ ID NO: 11 or 12.

[00188] Embodiment 28. The recombinant nucleic acid of Embodiment 27, further comprising a mitochondrial targeting sequence.

[00189] Embodiment 29. The recombinant nucleic acid of Embodiment 27 or 28, wherein said mitochondrial targeting sequence comprises a sequence encodes a

polypeptide selected from the group consisting of hsCOX10, hsCOX8, scRPM2, lcSirt5, tbNDUS7, ncQCR2, hsATP5G2, hsLACTB, spilv1, gmCOX2, crATP6, hsOPA1, hsSDHD, hsADCK3, osP0644B06.24-2, Neurospora crassa ATP9 (ncATP9), hsGHITM, hsNDUFAB1, hsATP5G3, crATP6_hsADCK3, ncATP9_ncATP9, zmLOC100282174, ncATP9_zmLOC100282174_spilv1_ncATP9, zmLOC100282174_hsADCK3_crATP6_hsATP5G3, zmLOC100282174_hsADCK3_hsATP5G3, ncATP9_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6_hsATP5G3, crATP6_hsADCK3_zmLOC100282174_hsATP5G3, hsADCK3_zmLOC100282174, hsADCK3_zmLOC100282174_crATP6, ncATP9_zmLOC100282174_spilv1_GNFP_ncATP9, and ncATP9_zmLOC100282174_spilv1_lcSirt5_osP0644B06.24-2_hsATP5G2_ncATP9.

[00190] Embodiment 30. The recombinant nucleic acid of any one of Embodiments 27-29, wherein said mitochondrial targeting sequence encodes a polypeptide comprising a peptide sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 129-159.

[00191] Embodiment 31. The recombinant nucleic acid of any one of Embodiments 27-30, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 2.

[00192] Embodiment 32. The recombinant nucleic acid of any one of Embodiments 27-31, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 3.

[00193] Embodiment 33. The recombinant nucleic acid of any one of Embodiments 27-32, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 4.

[00194] Embodiment 34. The recombinant nucleic acid of any one of Embodiments 27-33, wherein said mitochondrial targeting sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 5.

[00195] Embodiment 35. The recombinant nucleic acid of any one of Embodiments 27-34, wherein said mitochondrial targeting sequence comprises a sequence that is at

least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 1.

[00196] Embodiment 36. The recombinant nucleic acid of any one of Embodiments 27-35, further comprising a 3'UTR nucleic acid sequence.

[00197] Embodiment 37. The recombinant nucleic acid of Embodiment 36, wherein said 3'UTR nucleic acid sequence is located at 3' of said mitochondrial targeting sequence.

[00198] Embodiment 38. The recombinant nucleic acid of Embodiment 36 or 37, wherein said 3'UTR nucleic acid sequence comprises a sequence selected from the group consisting of hsACO2, hsATP5B, hsAK2, hsALDH2, hsCOX10, hsUQCRRS1, hsNDUFV1, hsNDUFV2, hsSOD2, hsCOX6c, hslRP1, hsMRPS12, hsATP5J2, rnSOD2, and hsOXA1L.

[00199] Embodiment 39. The recombinant nucleic acid of any one of Embodiments 36-38, wherein said 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 111-125.

[00200] Embodiment 40. The recombinant nucleic acid of any one of Embodiments 36-39, wherein said 3'UTR nucleic acid sequence comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence as set forth in SEQ ID NO: 13 or SEQ ID NO: 14.

[00201] Embodiment 41. The recombinant nucleic acid of any one of Embodiments 36-40, wherein said mitochondrial targeting sequence is located at 5' of said 3'UTR nucleic acid sequence.

[00202] Embodiment 42. The recombinant nucleic acid of any one of Embodiments 36-41, wherein said mitochondrial targeting sequence is located at 3' of said mitochondrial targeting sequence.

[00203] Embodiment 43. The recombinant nucleic acid of any one of Embodiments 36-42, wherein said recombinant nucleic acid comprises a sequence that is at least 90%, at least 95%, at least 97%, at least 99%, or 100% identical to a sequence selected from the group consisting of SEQ ID NO: 25-28, 39-42, 53-56, 67-70, and 81-84.

[00204] Embodiment 44. A viral vector comprising said recombinant nucleic acid of any one of Embodiments 1-43.

[00205] Embodiment 45. The viral vector of Embodiment 44, wherein said viral vector is an adeno-associated virus (AAV) vector.

[00206] Embodiment 46. The viral vector of Embodiment 45, wherein said AAV vector is selected from the group consisting of AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV9, AAV10, AAV11, AAV12, AAV13, AAV14, AAV15, and AAV16 vectors.

[00207] Embodiment 47. The viral vector of Embodiment 45 or 46, wherein said AAV vector is a recombinant AAV (rAAV) vector.

[00208] Embodiment 48. The viral vector of Embodiment 47, wherein said rAAV vector is rAAV2 vector.

[00209] Embodiment 49. A pharmaceutical composition, comprising an adeno-associated virus (AAV) comprising said recombinant nucleic acid of any one of Embodiments 1-43.

[00210] Embodiment 50. The pharmaceutical composition of Embodiment 49, further comprising a pharmaceutically acceptable excipient thereof.

[00211] Embodiment 51. A pharmaceutical composition, comprising said viral vector of any one of Embodiments 44-48, and a pharmaceutically acceptable excipient thereof.

[00212] Embodiment 52. The pharmaceutical composition of Embodiment 50 or 51, wherein said pharmaceutically acceptable excipient comprises phosphate-buffered saline (PBS), α,α -trehalose dehydrate, L-histidine monohydrochloride monohydrate, polysorbate 20, NaCl, NaH₂PO₄, Na₂HPO₄, KH₂PO₄, K₂HPO₄, poloxamer 188, or any combination thereof.

[00213] Embodiment 53. The pharmaceutical composition of Embodiment 50 or 51, wherein said pharmaceutically acceptable excipient is selected from phosphate-buffered saline (PBS), α,α -trehalose dehydrate, L-histidine monohydrochloride monohydrate, polysorbate 20, NaCl, NaH₂PO₄, Na₂HPO₄, KH₂PO₄, K₂HPO₄, poloxamer 188, and any combination thereof.

[00214] Embodiment 54. The pharmaceutical composition of Embodiment 50 or 51, wherein said pharmaceutically acceptable excipient comprises poloxamer 188.

[00215] Embodiment 55. The pharmaceutical composition of Embodiment 54, wherein said pharmaceutically acceptable excipient comprises 0.0001%-0.01% poloxamer 188.

[00216] Embodiment 56. The pharmaceutical composition of Embodiment 55, wherein said pharmaceutically acceptable excipient comprises 0.001% poloxamer 188.

[00217] Embodiment 57. The pharmaceutical composition of any one of Embodiments 50-56, wherein said pharmaceutically acceptable excipient further comprises one or more salts.

- [00218] Embodiment 58. The pharmaceutical composition of Embodiment 57, wherein said one or more salts comprises NaCl, NaH₂PO₄, Na₂HPO₄, and KH₂PO₄.
- [00219] Embodiment 59. The pharmaceutical composition of Embodiment 57, wherein said one or more salts comprises 80 mM NaCl, 5 mM NaH₂PO₄, 40 mM Na₂HPO₄, and 5 mM KH₂PO₄.
- [00220] Embodiment 60. The pharmaceutical composition of any one of Embodiments 49-59, wherein said pharmaceutical composition has a pH of 6-8.
- [00221] Embodiment 61. The pharmaceutical composition of Embodiment 60, wherein said pharmaceutical composition has a pH of 7.2-7.4.
- [00222] Embodiment 62. The pharmaceutical composition of Embodiment 61, wherein said pharmaceutical composition has a pH of 7.3.
- [00223] Embodiment 63. The pharmaceutical composition of any one of Embodiments 49-62, wherein said pharmaceutical composition has a viral titer of at least 1.0×10^{10} vg/mL.
- [00224] Embodiment 64. The pharmaceutical composition of Embodiment 63, wherein said pharmaceutical composition has a viral titer of at least 5.0×10^{10} vg/mL.
- [00225] Embodiment 65. The pharmaceutical composition of any one of Embodiments 49-64, when said pharmaceutical composition is subject to five freeze/thaw cycles, said pharmaceutical composition retains at least 60%, 70%, 80%, or 90% of a viral titer as compared to the viral titer prior to the five freeze/thaw cycles.
- [00226] Embodiment 66. The pharmaceutical composition of any one of Embodiments 49-65, wherein said pharmaceutical composition, when administered to a patient with Leber's hereditary optic neuropathy, generates a higher average recovery of vision than a comparable pharmaceutical composition without said recombinant nucleic acid.
- [00227] Embodiment 67. The pharmaceutical composition of any one of Embodiments 49-66, wherein said pharmaceutical composition, when administered to a patient with Leber's hereditary optic neuropathy, generates a higher average recovery of vision than a comparable pharmaceutical composition comprising a recombinant nucleic acid as set forth in SEQ ID NO: 15.
- [00228] Embodiment 68. A method of treating an eye disorder, comprising administering said pharmaceutical composition of any one of Embodiments 49-67 to a patient in need thereof.
- [00229] Embodiment 69. The method of Embodiment 68, wherein said eye disorder is Leber's hereditary optic neuropathy (LHON).

- [00230] Embodiment 70. The method of Embodiment 68 or 69, comprising administering said pharmaceutical composition to one or both eyes of said patient.
- [00231] Embodiment 71. The method of any one of Embodiments 68-70, wherein said pharmaceutical composition is administered via intraocular or intravitreal injection.
- [00232] Embodiment 72. The method of Embodiment 71, wherein said pharmaceutical composition is administered via intravitreal injection.
- [00233] Embodiment 73. The method of Embodiment 72, wherein about 0.01-0.1 mL of said pharmaceutical composition is administered via intravitreal injection.
- [00234] Embodiment 74. The method of Embodiment 73, wherein about 0.05 mL of said pharmaceutical composition is administered via intravitreal injection.
- [00235] Embodiment 75. The method of any one of Embodiments 68-74, further comprising administering methylprednisolone to said patient.
- [00236] Embodiment 76. The method of Embodiment 75, wherein said methylprednisolone is administered prior to said intravitreal injection of said pharmaceutical composition.
- [00237] Embodiment 77. The method of Embodiment 75 or 76, wherein said methylprednisolone is administered orally.
- [00238] Embodiment 78. The method of any one of Embodiments 75-77, wherein said methylprednisolone is administered daily for at least 1, 2, 3, 4, 5, 6, or 7 days prior to said intravitreal injection of said pharmaceutical composition.
- [00239] Embodiment 79. The method of any one of Embodiments 75-78, wherein said methylprednisolone is administered daily.
- [00240] Embodiment 80. The method of any one of Embodiments 75-79, wherein a daily dosage of about 32 mg/60 kg methylprednisolone is administered.
- [00241] Embodiment 81. The method of any one of Embodiments 75-80, wherein said methylprednisolone is administered after said intravitreal injection of said pharmaceutical composition.
- [00242] Embodiment 82. The method of any one of Embodiments 75-81, further comprising administering creatine phosphate sodium to said patient.
- [00243] Embodiment 83. The method of Embodiment 82, wherein said creatine phosphate sodium is administered intravenously.
- [00244] Embodiment 84. The method of any one of Embodiments 75-83, wherein said methylprednisolone is administered intravenously or orally.

[00245] Embodiment 85. The method of any one of Embodiments 75-84, comprising administering methylprednisolone intravenously for at least one day, which is followed by administering methylprednisolone orally for at least a week.

[00246] Embodiment 86. The method of Embodiment 85, comprising administering methylprednisolone intravenously for about 3 days, which is followed by administering methylprednisolone orally for at least about 6 weeks.

[00247] Embodiment 87. The method of any one of Embodiments 75-86, wherein said methylprednisolone is administered intravenously at a daily dose of about 80 mg/60 kg.

[00248] Embodiment 88. The method of any one of Embodiments 75-87, wherein said administering said pharmaceutical composition generates a higher average recovery of vision than a comparable pharmaceutical composition without said recombinant nucleic acid.

[00249] Embodiment 89. The method of any one of Embodiments 75-88, wherein said administering said pharmaceutical composition generates a higher average recovery of vision than a comparable pharmaceutical composition comprising a recombinant nucleic acid as set forth in SEQ ID NO: 25.

EXAMPLES

[00250] The following exemplary embodiments further describe the present invention. It should be understood that these examples are only intended to illustrate the invention, but not to limit the scope of the present invention. Unless otherwise indicated, the methods and conditions disclosed in e.g., Sambrook et al, molecular cloning: a laboratory manual (New York: Cold Spring Harbor Laboratory Press, 1989) or the conditions recommended by the manufacturer can be used in the examples below.

Example 1 – ND1 plasmid and virus preparation

1.1 plasmid preparation

[00251] The nucleotide sequence for human ND1 was obtained based on US National Center for Biotechnology Information reference Gene ID 4535 (SEQ ID NO: 163). The mitochondrial targeting sequence is derived from COX10 (e.g., as shown in SEQ ID NO: 1 and 3). The optimized nucleotide sequence of human ND1 (e.g., SEQ ID NO: 11 and 12, referred herein as ND1 and optimized ND1) were designed to improve the transcription efficiency and/or the translation efficiency. The optimized COX10-opt_ND1 sequence is about 81% homology to COX10-ND1 (as shown in FIG. 4), and the GC content is raised from 49.45% to 64.26% after codon-optimization, and therefore has improved gene transcription efficiency and protein translation efficiency. The 3' of the optimized opt_ND1 gene was followed by an untranslated region (i.e., 3'UTR, SEQ ID

NO: 13) to form a recombinant nucleic acid, COX10-opt_ND1-3'UTR (as shown in SEQ ID NO: 27).

[00252] The synthesized recombinant nucleic acid, COX10-opt_ND1-3'UTR and the AAV vector was cut by restriction enzymes to form cohesive ends, and then the recombinant nucleic acid was embedded into the rAAV vector to form generate the rAAV-optimized ND1 plasmid (i.e., the rAAV2-opt_ND1 plasmid). The rAAV2-opt_ND1 plasmid was compared to the rAAV2-ND1 plasmid which comprises the COX10-ND1 nucleic acid. The plasmid was cultured at 37 °C in a LB plate with Kanamycin. Blue colonies and white colonies appeared, where white colonies were recombinant clones. The white colonies were picked, added to 100 mg/L kanamycin-containing LB culture medium, cultured at 37 °C, 200 rpm for 8 hours and then the plasmid were extracted from the cultured bacterial medium.

[00253] 1.2 cell transfection

[00254] One day before transfection, HEK293 cells were inoculated to 225 cm² cell culture bottle: at the inoculation density of 3.0×10^7 cells/ml, the culture medium was the Dulbecco's Modified Eagle Medium (DMEM) with 10% bovine serum, at 37 °C in a 5% CO₂ incubator overnight. The culture medium were replaced with fresh DMEM with 10% bovine serum on the day of transfection. After the cells grow to 80-90%, the culture medium was discarded and cells were transfected with the rAAV2-ND1 and rAAV2-opt_ND1 plasmid. The cells were collected 48 h after the transfection.

[00255] 1.3 Collection, concentration and purification of the recombinant adeno-associated virus

[00256] Virus collection: 1) dry ice ethanol bath (or liquid nitrogen) and a 37 °C water bath were prepared; 2) the transfected cells along with media were collected in a 15 ml centrifuge tube; 3) the cells were centrifuged for 3 minutes at 1000 rpm/min; the cells and supernatant were separated; the supernatant were stored separately; and the cells were re-suspended in 1 ml of PBS; 4) the cell suspension were transferred between the dry ice-ethanol bath and 37 °C water bath repeatedly, freeze thawing for four times for 10 minutes each, slightly shaking after each thawing.

[00257] Virus concentration : 1) cell debris were removed with 10,000 g centrifugation; the centrifugal supernatant was transferred to a new centrifuge tube; 2) adding benzonase nuclease was added to remove residual plasmid DNA (final concentration at 50 U/ml). The tube was inverted several times to mix thoroughly and then incubated at 37 °C for 30 minutes; 3) the sample was filtered with a 0.45 µm filtration head; the filtrate is the concentrated rAAV2 virus.

[00258] Virus purification : 1) Iodixanol at final concentrations of 60%, 50%, 40%, or 25% was added to the concentrated virus solution; 2) samples were centrifuged at 50,000 g for 4 hours to form a density gradient. The enriched rAAV2 particles were collected near the fraction with 50% iodixanol; 3) viruses were loaded to a dialysis column bag and eluted for 10 times to obtain the purified recombinant AAV virus.

[00259] Accordingly, the concentrated, purified AAV particles comprising rAAV2-ND1 and rAAV2-opt_ND1 were obtained.

[00260] Similarly, other mitochondrial targeting sequences (MTS), such as OPA1 (SEQ ID NO: 5) can be used to replace COX10 in the above example and create AAV with recombinant plasmids. Mitochondria targeting peptide encoded by COX10 and OPA1 can direct the protein encoded by the optimized ND1 nucleic acid to the inner membrane of mitochondria, thereby achieving mitochondria targeted expression of protein.

Example 2 – Expression of ND1 protein in HEK293 cells using COX10-ND1 and further optimized COX10-opt_ND1 vectors

[00261] HEK293 cells were transduced with viral particle comprising 1) rAAV2-COX10-opt_ND1 (comprising SEQ ID NO: 27) or 2) rAAV2-COX10-ND1 (comprising SEQ ID NO: 25) at MOI of 10,000. PBS was used for the control group. Cellular proteins were extracted 48 hours after transduction for analysis by western blotting. β -actin was used as loading control. As shown in FIG. 5, the results indicated that ND1 expression level in cells transduced with the optimized rAAV2-COX10-opt_ND1 is 2.1 times of the ND1 expression level in cells transduced with the non-optimized COX10-ND1. In FIG. 5, lane 1 is PBS control, lane 2 is rAAV2-COX10-ND1 group, and lane 3 is rAAV2-COX10-opt_ND1 group.

Example 3 – Expression and mitochondria localization of human AAV2-ND1 in HEK293 cells

[00262] We have conducted fluorescence microscopy/staining experiment to show that the mitochondria targeting sequence (MTS) can direct ND1 protein into mitochondria, suggesting that it is feasible to use these constructs to treat LHON.

[00263] Here, 293 cells and RGC-5 cells were transduced with corresponding rAAV2-ND1-ZsGreen at MOI of 106. 48 hours after viral transduction, we used fluorescence microscopy to monitor the expression of green fluorescence protein and cell condition. Mitochondria was stained with MitoTracker and cell nucleus were stained with DAPI after fixation using 4% paraformaldehyde.

[00264] As shown in FIG. 6, mitochondria was labeled with MitoTracker and shown in red color, ND1-ZsGreen protein was shown in green color. According to laser confocal

microscopy, ND1 proteins were co-localized with mitochondria (as shown in the merged yellow color) in 293 cells and RGC-5 cells. The results showed that the ND1 constructs carrying MTS result in expression of ND1 protein in mitochondria.

Example 4 – Dynamics of Expression of AAV2-ND1 in HEK293 cells

[00265] To study the change of ND1 mRNA expression over time after rAAV2-ND1 transduction in cells, we collected cell samples at different time points and analyzed ND1 mRNA expression level using RT-PCT.

[00266] Briefly, 293 cells were cultured and transduced with viral particles at MOI of 104 or 105. RT-PCR was conducted using the following primers for ND1 and GAPDH (as control):

[00267] ND1-F: GAGGCTCTGTCTGGTATCTTGAA (SEQ ID NO: 164)

[00268] ND1-R: GTCGGGGCGGTGATGTAG (SEQ ID NO: 165)

[00269] GAPDH-F: CCTGTACGCCAACACAGTGC (SEQ ID NO: 166)

[00270] GAPDH-R: ATACTCCTGCTTGCTGATCC (SEQ ID NO: 167)

[00271] According to Fig. 7, the results showed that ND1 mRNA expression reached peak value at about 72 hours after transduction at MOI of 105, and decreased afterwards, suggesting that rAAV2-ND1 can effectively transduce cells.

Example 5 – Exploratory study of ND1 expression in C57BL/6J mice with intravitreal injection of rAAV2-ND1

[00272] C57BL/6J mice received intravitreal injection of rAAV2-ND1 (at 1 μ L injection volume) and eye samples were analyzed 1 day, 5 days, 10 days, or 30 days after injection. RNA were extracted from the sample and RT-PCT was performed to analyze the expression level. As shown in Fig. 8, the results indicated that rAAV-ND1 can be expressed in mice eye and the mRNA expression level continued to increase from 7 days post-injection to 30 days post-injection.

Example 6 – ND1 Protein Expression in HEK293 cells transduced with rAAV2-ND1

[00273] 293 cells were transduced with rAAV2-ND1 viruses at MOI of 105 and ND1 protein expression was analyzed by Western blotting. As shown in Fig. 9, the results indicated that rAAV2-ND1 can successfully transduce cells and induce ND1 expression.

[00274] Example 7 – Safety study of rAAV2-ND1 using rabbit model

[00275] Eight rabbits were divided into 2 group. rAAV2-ND1 virus solution (1×10^{10} vg/0.05 mL) or PBS control solution was punctured into the vitreous cavity from 3 mm outside the corneal limbus at the pars plana. Blood samples were collected for routine blood tests and cytokine analysis 1-month and 2-month post-injection.

[00276] Tables 2 and 3 below showed the results of the routine blood tests, including white blood cell count (WBC), red blood cell count (RBC), hemoglobin (HGB), hematocrit (HCT), platelet (PLT), mean platelet volume (MPV), platelet hemato-crit (PCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC) and neutrophil ratio (NEUT%). The results showed no significant differences between the rAAV2-ND1 virus injected group and the PBS control group, indicating that injection of rAAV2-ND1 is safe.

Table 2. Routine Blood Test Results: 1-month Post-injection

1-month	WBC	RBC	HGB	HCT	PLT	MPV
PBS Control	10.0±1.7	6.1±0.4	128.4±7.6	39.2±2.3	425.0±74.3	6.6±0.2
rAAV2-ND1	10.9±2.6	6.3±0.4	132.0±6.7	40.4±2.0	363.9±144.1	7.1±0.4
1-month	PCT	MCV	MCH	MCHC	NEUT%	
PBS Control	0.3±0.1	64.6±1.9	21.2±0.5	327.4±6.5	48.4±8.5	
rAAV2-ND1	0.3±0.1	64.5±3.4	21.1±0.9	326.9±6.1	38.7±8.6	

Table 3. Routine Blood Test Results: 2-month Post-injection

2-month	WBC	RBC	HGB	HCT	PLT	MPV
PBS Control	8.9±4.1	6.5±0.5	139.6±10.2	41.6±3.1	284.0±120	7.8±0.6
rAAV2-ND1	7.6±1.6	6.8±0.2	144.7±5.7	42.8±1.4	326.6±130	7.9±0.6
2-month	PCT	MCV	MCH	MCHC	NEUT%	
PBS Control	0.2±0.1	64.4±3.2	21.6±1.1	335.6±6.9	32.9±6.9	
rAAV2-ND1	0.3±0.1	63.0±1.7	21.3±0.5	338.1±8.9	40.2±8.3	

[00277] As shown in Fig. 10, cytokine analysis of blood samples 1-month and 2-month post-injection showed that there was no significant differences of cytokine levels (TNF- α , IFN- γ , IL-6) between rAAV2-ND1 virus injected group and the PBS control group, indicating that injection of rAAV2-ND1 does not generate immune response, is safe and without immunogenicity.

Example 8 – other fusion proteins

[00278] Similar experimental methods in examples 1-7 can be followed using other fusion proteins as set forth in SEQ ID NO: 15-84. And similar results are expected to be achieved.

[00279] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.