

## nucSEEK® Comprehensive Sequence Analysis of Nuclear Mitochondrial Exome

### Addendum A: gene list by category

ABC Transporters					14 genes
ABCA9	ABCC12	ABCD3			
ABCB10	ABCC8	ABCF2			
ABCB6	ABCC9	CFTR			
ABCB7	ABCD1	TAP1			
ABCB8	ABCD2				
Amino Acid Metabolism					48 genes
AADAT	BCKDK	GLS2	LAP3	PYCR1	
AASS	CCBL2	GLUD1	MAT2B	QDPR	
ADO	DBT	GLYCTK	METAP1D	SARDH	
AMT	DLD	GPT2	MPST	SERHL2	
ARG2	ETHE1	HIBADH	PAH	SHMT1	
ASS1	GCAT	HMGCL	PCBD1	SHMT2	
BCAT1	GCDH	HOGA1	PCBD2	SUOX	
BCAT2	GCSH	IVD	PRODH	TAT	
BCKDHA	GLDC	KYNU	PRODH2		
BCKDHB	GLS	L2HGDH	PROSC		
Antioxidant					20 genes
GLRX	GSR	MSRB2	PRDX1	PRDX6	
GLRX2	GSTK1	OXR1	PRDX2	ROMO1	
GLRX5	MPV17	PARK7	PRDX3	SOD1	
GPX1	MSRA	PINK1	PRDX5	SOD2	
Carbohydrate Metabolism					39 genes
ARSA	GAD1	GPD1	HK3	PFKL	
CA5A	GAD2	GPD2	HLCS	PGAM2	
CA5B	GALC	GPI	LDHA	PGK1	
ENO1	GCK	GYS1	LDHAL6B	PGS1	
ENO3	GK	GYS2	LDHB	PKLR	
FBP1	GK2	H6PD	LDHD	TPI1	
G6PC	GLA	HK1	MOGS	TPK1	
G6PD	GMPPB	HK2	PCK1		

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Cell Function					119 genes
AAAS	BLOC1S1	FOLR1	MTFP1	SPG20	
ACOT13	C20orf24	GADD45GIP1	MTFR1	SPG7	
ACOT2	CASP8	GDAP1	NRF1	SSBP1	
ACOT7	CDC42BPA	GFER	NRXN1	TBRG4	
ACOT9	CERK	HSPA9	PDX1	TCIRG1	
AK2	CKB	HSPB7	PHB	THEM4	
AK3	CKM	HSPD1	PHB2	THEM5	
AKAP1	CKMT1A	HSPE1	PPM1B	TRAP1	
AKAP10	CKMT1B	HTRA2	PPM1K	TRIAP1	
AKAP4	CLN3	IMMP2L	PRKAB1	TSPO	
ANK2	CLN5	IMMT	PTS	TXN	
ANKRD26	CLN6	KRT5	RDH13	TXN2	
ARMC10	CLN8	LETM1	RDH14	TXNRD1	
ASAH2	CRY1	LETMD1	REEP1	TXNRD2	
ATAD1	DAP3	LRPPRC	RMND1	TYMP	
ATAD3A	DIABLO	MAVS	SAMM50	UCP1	
ATAD3B	DISC1	MEN1	SEPT4	UCP2	
ATXN7	DNM1L	METTL17	SERAC1	UCP3	
AUH	DRG2	MFN1	SIRT1	UXS1	
BAD	DTNBP1	MFN2	SIRT2	VAMP1	
BAK1	E2F1	MGST3	SIRT3	VAMP8	
BAX	ELN	MPC1	SIRT5	VAT1	
BCL2	FASTKD2	MPC2	SNPH	WWOX	
BID	FIS1	MTCP1	SPAST		
Coenzyme Q					11 genes
COQ10A	COQ3	COQ6	PDSS1		
COQ10B	COQ4	COQ7	PDSS2		
COQ2	COQ5	COQ9			
Complex I					51 genes
AIFM1	NDUFA3	NDUFAF4	NDUFB6	NDUFS6	
AIFM2	NDUFA4	NDUFAF5	NDUFB7	NDUFS7	
AIFM3	NDUFA5	NDUFAF6	NDUFB8	NDUFS8	
C2orf47	NDUFA6	NDUFAF7	NDUFB9	NDUFV1	
FOXRED1	NDUFA7	NDUFB1	NDUFC1	NDUFV2	
NDUFA1	NDUFA8	NDUFB10	NDUFC2	NDUFV3	
NDUFA10	NDUFA9	NDUFB11	NDUFS1	NUBPL	
NDUFA11	NDUFAB1	NDUFB2	NDUFS2		
NDUFA12	NDUFAF1	NDUFB3	NDUFS3		
NDUFA13	NDUFAF2	NDUFB4	NDUFS4		
NDUFA2	NDUFAF3	NDUFB5	NDUFS5		
Complex II					6 genes
SDHA	SDHAF2	SDHC			
SDHAF1	SDHB	SDHD			
Complex III					9 genes
BCS1L	UQCR11	UQCRC1	UQCRC1	UQCRC1	
UQCR10	UQCRB	UQCRC2	UQCRH	UQCRCQ	

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Complex IV					32 genes
CMC1	COX16	COX5B	COX7A2	SCO1	
COA5	COX17	COX6A1	COX7A2L	SCO2	
COA6	COX18	COX6A2	COX7B	SURF1	
COX10	COX19	COX6B1	COX7B2	TACO1	
COX11	COX4I1	COX6B2	COX7C		
COX14	COX4I2	COX6C	COX8A		
COX15	COX5A	COX7A1	COX8C		
Complex V					22 genes
ATP10D	ATP5E	ATP5H	ATP5O	ATPIF1	
ATP5A1	ATP5F1	ATP5I	ATP5S	TMEM70	
ATP5B	ATP5G1	ATP5J	ATP5SL		
ATP5C1	ATP5G2	ATP5J2	ATPAF1		
ATP5D	ATP5G3	ATP5L	ATPAF2		
DNA/RNA					32 genes
APEX2	MGME1	POLG2	RRM2B	TOP1MT	
APTX	MTPAP	POLRMT	TATDN3	TSFM	
C10orf2	OGG1	REXO2	TDP1	TUFM	
ENDOG	OPA1	RNASEH1	TFAM	UNG	
EXOG	OPA3	RNASEL	TFB1M		
FTSJ2	PNPT1	RNMTL1	TFB2M		
MED23	POLG	RPUSD4	TK2		
GTPase					22 genes
CNR1	GTPBP8	RAB1B	RAB40AL	RHOT2	
GNG5	PAK7	RAB24	RAB4B	RILP	
GTPBP10	RAB11A	RAB32	RAB8B		
GTPBP3	RAB11B	RAB35	RHOA		
GTPBP5	RAB11FIP5	RAB3D	RHOT1		
Ion Channel					32 genes
ATP7B	CLCN7	KCNJ11	RYR1	SMGT1	
CACNA1A	CLCNKB	KCNJ2	RYR2	VDAC1	
CACNA1S	CLIC4	KCNQ1	SCN1A	VDAC2	
CACNA2D1	KCNA1	KCNQ2	SCN1B	VDAC3	
CLCN1	KCNE1	KCNQ3	SCN2A		
CLCN2	KCNE2	MCU	SCN4A		
CLCN5	KCNH2	NNT	SCN5A		
Iron Metabolism					23 genes
ACO1	CISD2	FTMT	IREB2	NFU1	
ALAS1	CPOX	FXN	ISCA1	PPOX	
ALAS2	FDX1	HCCS	ISCA2	UROS	
BOLA3	FECH	HSCB	ISCU		
CISD1	FTH1	IBA57	NFS1		

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Lipid Metabolism					116 genes
ACAA1	ACSM2A	CYBA	FDXR	MCCC1	
ACAA2	ACSM3	CYBB	FITM2	MCCC2	
ACACA	ACSM4	CYC1	GATM	MCEE	
ACACB	ACSM5	CYCS	GNPAT	ME1	
ACAD10	ACSS1	CYP11A1	GPAM	MGLL	
ACAD11	AGK	CYP11B1	HADH	MLYCD	
ACAD8	AGPAT5	CYP11B2	HADHA	MMAA	
ACAD9	AGPS	CYP24A1	HADHB	MMAB	
ACADL	APOA1BP	CYP27A1	HAGH	MMACHC	
ACADM	APOOL	CYP27B1	HAO2	MMADHC	
ACADS	ATP8B1	DECR1	HIBCH	MUT	
ACADSB	BBOX1	DMGDH	HMGCS2	OXSM	
ACADVL	CHDH	ECH1	HSD17B10	PISD	
ACAT1	CPT1A	ECHDC3	HSD17B4	PLA2G15	
ACAT2	CPT1B	ECHS1	HSD17B8	PRKAA2	
ACOX3	CPT1C	ECI1	HSD3B1	PRKAB2	
ACP6	CPT2	ECI2	HSD3B2	PTGES2	
ACSF2	CRAT	EHHADH	HSDL1	PTGR2	
ACSF3	CROT	ETFA	HSDL2	SCP2	
ACSL1	CYB5A	ETFB	IDI1	SPTLC2	
ACSL4	CYB5B	ETFDH	LIAS		
ACSL5	CYB5R1	FAAH	LIPT1		
ACSL6	CYB5R2	FASN	LIPT2		
ACSM1	CYB5R3	FDPS	MCAT		
Membrane Protein					40 genes
EMC2	PLGRKT	TIMM44	TMEM14C	TOMM22	
FRMD3	PXMP2	TIMM50	TMEM160	TOMM34	
FXC1	TIMM10	TIMM8A	TMEM186	TOMM40	
GHITM	TIMM13	TIMM8B	TMEM22	TOMM40L	
MFSD8	TIMM17A	TIMM9	TMEM223	TOMM5	
MPV17L	TIMM17B	TMEM11	TMEM65	TOMM7	
MPV17L2	TIMM22	TMEM126A	TMTC1	TOMM70A	
PARL	TIMM23	TMEM143	TOMM20	UQCC	
Neurotransmitters					17 genes
ABAT	CHRNA4	DDC	NLN	TPH2	
ACHE	CHRN2	GLRA1	NOS3		
AKR7A2	COMT	MAOA	OAT		
CHAT	COMTD1	MAOB	PNMT		
Nucleotide Metabolism					23 genes
ADSL	DPYD	MTHFD1L	NT5C3	NUDT19	
ATIC	DUT	MTHFD2	NT5DC3	NUDT2	
CTPS2	GIMAP5	MTHFD2L	NT5M	NUDT8	
DGUOK	HINT2	MTHFS	NTHL1		
DHODH	MTHFD1	NT5C	NUDT13		

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Other		168 genes		
ACN9	CCDC90A	GNAS	MRM1	RFK
ACYP2	CCDC90B	GPX4	MRS2	RSAD1
ADCK1	CDC42BPG	GRPEL1	MTCH1	RSPH9
ADCK2	CECR5	GRPEL2	MTCH2	RTN4IP1
ADCK4	CHCHD1	GRSF1	MTERFD1	SACS
ADCK5	CHCHD10	HBXIP	MTERFD3	SECISBP2
AFG3L2	CHCHD2	HDDC2	MTG1	SFXN1
AGR2	CHCHD3	HEMK1	MTX1	SFXN2
ALKBH7	CHCHD4	HIGD1A	MTX2	SFXN3
APOPT1	CHCHD7	HIGD2A	MYL10	SFXN4
ARMC1	CKMT2	HRSP12	NCOA4	SFXN5
ARMC4	DACT2	ICT1	NFXL1	SLIRP
ARMS2	DCAF5	IDE	NIF3L1	SLMO1
AS3MT	DHX29	INSR	NIPSNAP1	SLMO2
AURKAIP1	ECSIT	IQCE	NIPSNAP3A	SMCR7L
BCL2L13	EEFSEC	KIAA0141	NIPSNAP3B	SND1
BOLA1	EFHA1	KIF1B	NLRX1	SPRYD4
C10orf10	EFHD1	LYRM1	NOA1	SQRDL
C14orf159	FAHD1	LYRM2	OCIAD1	STAR
C14orf2	FAHD2A	LYRM4	PACRG	STOML2
C15orf48	FAM136A	LYRM5	PAM16	SUPV3L1
C17orf89	FAM162A	LYRM7	PET112	TAMM41
C19orf70	FAM210A	MARC1	PIGY	TAZ
C1QBP	FAM213A	MARC2	PNKD	TCAIM
C21orf33	FAM36A	MECP2	PPA2	TDRKH
C6orf136	FAM65C	MECR	PPARGC1A	TSHZ3
C6orf203	FAM82A1	MICU1	PPARGC1B	TST
C6orf57	FAM82A2	MINOS1	PPTC7	TTC19
C7orf10	FAM82B	MNF1	PRELID1	USMG5
C7orf55	FDX1L	MOBP	PRELID2	WBSCR16
CABC1	FOXC1	MOCOS	PRICKLE4	WFS1
CCDC136	FOXG1	MOCS1	PRR5L	YME1L1
CCDC51	FUNDC2	MOCS2	PTCD2	
CCDC58	GBAS	MOCS3	PTCD3	

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Other Enzymes					100 genes
ABHD10	ALDH6A1	D2HGDH	LACTB	OXA1L	
ABHD11	ALDH7A1	DKAKD	LACTB2	OXCT1	
ACLY	ALDH9A1	DDAH1	LONP1	OXCT2	
ADHFE1	AMACR	DDX28	LRRK2	OXLD1	
AGMAT	BDH1	DHRS1	MIPEP	OXNAD1	
AGXT	BHMT	DHRS4	MTHFR	PANK2	
AGXT2	BPHL	DHTKD1	MTRR	PARK2	
AGXT2L2	BTD	DMPK	MUL1	PARP1	
AHCY	CARKD	DUSP16	NAGS	PCCA	
AKR1B15	CBR4	DUSP26	NEU4	PCCB	
AKT1	CBS	FASTK	NIT1	PDE12	
AKT2	CDC42BPB	FBXL4	NME1	PITRM1	
ALDH18A1	CDKL5	FPGS	NME2	SCCPDH	
ALDH1B1	CLPB	GLO1	NME3	SDSL	
ALDH1L1	CLPX	GLOD4	NME4	SPR	
ALDH1L2	CLYBL	GLYAT	NME6	TIMM21	
ALDH2	CPS1	GUF1	NPL	TIMMDC1	
ALDH3A2	CRLS1	HPDL	OMA1	VDR	
ALDH4A1	CTSD	ISOC2	OSGEPL1	YBEY	
ALDH5A1	CTU1	LACE1	OTC	ZADH2	
Peroxisomes					18 genes
PEX1	PEX12	PEX19	PEX5	PHYH	
PEX10	PEX13	PEX2	PEX5L	PHYHIPL	
PEX11A	PEX14	PEX26	PEX6		
PEX11B	PEX16	PEX3	PEX7		
Protein Metabolism					32 genes
C12orf65	DNAJC27	MTERF	PMPCA	TPP1	
CCT7	DNAJC30	MTIF2	PMPCB	UBE3A	
CLPP	DNAJC4	MTIF3	PPIF	USP24	
DNAJA3	DNAJC5	MTO1	PPT1	XPNPEP3	
DNAJC11	FKBP8	MTRF1	PREPL		
DNAJC15	GFM1	MTRF1L	PRSS35		
DNAJC19	GFM2	NRD1	PTPMT1		
Pyruvate Dehydrogenase					11 genes
DLAT	PDHB	PDK2	PDP1		
PDHA1	PDHX	PDK3	PDP2		
PDHA2	PDK1	PDK4			

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Ribosome Protein					83 genes
MRP63	MRPL24	MRPL43	MRPS14	MRPS31	
MRPL1	MRPL27	MRPL44	MRPS15	MRPS33	
MRPL10	MRPL28	MRPL45	MRPS16	MRPS34	
MRPL11	MRPL3	MRPL46	MRPS17	MRPS35	
MRPL12	MRPL30	MRPL47	MRPS18A	MRPS36	
MRPL13	MRPL32	MRPL48	MRPS18B	MRPS5	
MRPL14	MRPL33	MRPL49	MRPS18C	MRPS6	
MRPL15	MRPL34	MRPL50	MRPS2	MRPS7	
MRPL16	MRPL35	MRPL51	MRPS21	MRPS9	
MRPL17	MRPL36	MRPL52	MRPS22	MRRF	
MRPL18	MRPL37	MRPL53	MRPS23	RPL10A	
MRPL19	MRPL38	MRPL54	MRPS24	RPL34	
MRPL2	MRPL39	MRPL55	MRPS25	RPL35A	
MRPL20	MRPL4	MRPL9	MRPS26	RPS14	
MRPL21	MRPL40	MRPS10	MRPS27	RPS15A	
MRPL22	MRPL41	MRPS11	MRPS28		
MRPL23	MRPL42	MRPS12	MRPS30		
Solute Carrier					57 genes
SLC16A1	SLC25A16	SLC25A27	SLC25A38	SLC25A5	
SLC19A2	SLC25A17	SLC25A28	SLC25A39	SLC25A51	
SLC19A3	SLC25A18	SLC25A29	SLC25A4	SLC25A6	
SLC22A4	SLC25A19	SLC25A3	SLC25A40	SLC27A4	
SLC22A5	SLC25A2	SLC25A30	SLC25A41	SLC2A1	
SLC25A1	SLC25A20	SLC25A31	SLC25A42	SLC30A6	
SLC25A10	SLC25A21	SLC25A32	SLC25A43	SLC37A4	
SLC25A11	SLC25A22	SLC25A33	SLC25A44	SLC3A1	
SLC25A12	SLC25A23	SLC25A34	SLC25A45	SLC6A8	
SLC25A13	SLC25A24	SLC25A35	SLC25A46		
SLC25A14	SLC25A25	SLC25A36	SLC25A47		
SLC25A15	SLC25A26	SLC25A37	SLC25A48		
TCA Cycle					22 genes
ACO2	IDH1	MDH1	OGDHL	SUCLG1	
CS	IDH2	MDH2	PC	SUCLG2	
DLST	IDH3A	ME2	PCK2		
FH	IDH3B	ME3	PDPR		
GOT2	IDH3G	OGDH	SUCLA2		
tRNA					40 genes
AARS2	GATC	MARS2	PUS1	TRIT1	
CARS2	HARS	MTFMT	QRSL1	TRMT10C	
DARS2	HARS2	NARS	RARS	TRMT2B	
DUS2L	IARS2	NARS2	RARS2	TRMU	
EARS2	KARS	PARS2	SARS	TRNT1	
ELAC2	LARS	PSTK	SARS2	VARS2	
FARS2	LARS2	PTRH1	TARS2	WARS2	
GARS	MARS	PTRH2	THG1L	YARS2	