Order Form
Metabolic / Mitochondrial Disorders

General Information

Patient

Surname: _____

First name: _____

Date of birth: _____

Sex: ❑ male ❑ female

Material

❑ Blood ____ ml (min. 1-2 ml EDTA-blood)

❑ Dried blood spot cards (at least 5 spots)

❑ DNA ____ µg (min. 1-2 µg DNA, concentr. ≥ 50 ng/µl) DNA-No.: _____

Source material
of extracted DNA: _____ (e.g. EDTA blood, skin biopsy)

❑ Other specimen _____

External ID: _____

Date of sample collection: _____

Samples can be sent by mail in a cardboard box or air cushion envelope. Samples should not be exposed to direct sunlight. Dried blood spot cards can be ordered for free (info@cegat.com).

Sender / Clinic

Surname: _____

First name: _____

Institution: _____

Street: _____

Postcode/City: _____

Country: _____

Phone: _____

Email: _____

VAT: _____

If applicable, please include a VAT number or a copy of your business registration certificate.

Invoice

❑ to sender / clinic
❑ to patient / other (KVA-No.: _____)

Surname: _____

First name: _____

Street: _____

Postcode/City: _____

Country: _____

Email: _____

Declaration of consent

By signing this form, I declare that I have received comprehensive information regarding the genetic background related to the disease in question, as well as the possibilities and limitations of molecular genetic testing. I understand that I have the right to withdraw my consent for genetic analyses.

I have been informed, and agree, that my personal data and the data obtained in the analysis will be recorded, evaluated or stored in an pseudonymized form in scientific databases, and that further, in accordance with data protection and medical confidentiality, the request, or parts thereof, may be transmitted to a specialized cooperating laboratory.

I consent to the re-evaluation of my test results within the data storage period. If significant alterations become apparent, my Physician will be informed by e-mail.

I consent that in addition to the full genetic test as requested, the analysis can be expanded to all pathogenic and likely pathogenic variants (ACMG class 4 and 5) in genes which are related to the indication described for the proband (if applicable, screen for differential diagnosis).

I have been informed, and agree to the electronic storage, processing, use, and transmission of all data collected by CeGaT GmbH.

For more detailed information on data privacy as well as your rights please refer to www.cegat.de/en/privacy-policy

Please Note

Our panels are regularly updated to reflect current scientific research. It should therefore be recognized that there is the possibility that the list of genes on the order form may have changed slightly (genes added or removed) by the time the sample is analyzed in the laboratory. By signing this form, the patient accepts that the list of genes actually analyzed may be slightly different from what is currently listed. When NGS is utilized more than the requested genes are sequenced for each sample.

This declaration of consent can be completely or partially withdrawn at any time. I have had sufficient time to consider giving my consent.

I, the referring physician, confirm that I am authorized to request genetic testing for the above-mentioned patient. For predictive testing, I confirm that I am authorized, and that I have fulfilled the requirements, to request this testing. For minors, I declare that I have the consent of all legal guardians.

If the patient did not sign this order form: I, the referring physician, confirm that the patient received genetic counseling and agrees with the genetic testing. The patient's consent has been obtained in writing.

If you do not check these boxes, your answer will be recorded as "No".

I consent to the storage of my genetic material for additional tests and/or quality control (for max. 10 years). ❑ Yes ❑ No

I consent to the storage of my test results beyond the timespan of 10 years (as required by German law). ❑ Yes ❑ No

I consent to the pseudonymous storage and use of surplus genetic material and/or test results for scientific research and in scientific literature. ❑ Yes ❑ No

With regard to secondary findings I would like to be informed: ❑ Yes ❑ No

Genetic variation may sometimes be identified, which does not fit within the scope of the requested genetic analysis (so-called secondary findings). The reporting of these variants is limited to pathogenic alterations (ACMG classes 4 and 5) within selected genes, for which a treatment or course of action exists for you or your family (according to the current guidelines of the American College of Medical Genetics and Genomics; details on genes and associated diseases can be found at https://www.cegat.com/acmg-genes/). There is no claim of a comprehensive analysis of this gene set. An absence of secondary findings cannot be used to indicate a reduced disease risk.

Targeted analysis of the ACMG genes according to current recommendations can be requested as "additional analyses".

According to German Genetic Diagnostic Act (GenDG) we will issue the medical report to the counselling physician. Please indicate here the contact email of the counselling physician:

Email: _____

Physician's stamp / Barcode

Patient / Legal Guardian
(Block letters)

Physician
(Surname, First name)

X _____
Patient / Legal Guardian
(Date, Signature)

X _____
Physician
(Date, Signature)

DAkkS Deutsche Akkreditierungsstelle D-ML-13206-01-00

CAP ACCREDITED COLLEGE of AMERICAN PATHOLOGISTS

CLIA CERTIFIED ID: 99D2130225

CeGaT is accredited by DAkkS according to DIN EN ISO 15189:2014, the College of American Pathologists (CAP) and CLIA.

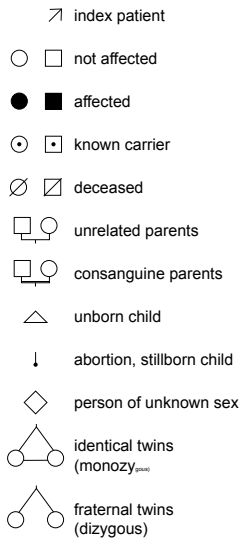
Order Form
Metabolic / Mitochondrial Disorders

Indication & Medical History

For targeted and effective processing, please complete the medical history form with as much detail as possible and include a copy of all existing reports.

Indication/Suspected Diagnosis

Pedigree



For a better description and illustration of the suspected familiy history, CeGaT offers a free Pedigree Chart Designer (PCD). You can find the PCD on our website or http://pedigree.cegat.de.

Additional information

Consanguinity: ❑ Yes ❑ No

Ethnic origin: _____ Age of father: _____ Age of mother: _____

Transplants (bone marrow, tissue, stem cells) ❑ No ❑ Yes, (please specify) _____

Family medical history

Are there other family members who currently have or have had the same or a similar disease as the patient?

❑ Yes ❑ No Relationship to patient (e.g. mother): _____

Please list **family members** of the patient who are currently or have been affected by the following **disorders**:

	Affected family members available?	Relationship to patient (e.g. mother)	Age of onset	**Diagnosis/Symptoms**
Muscle disorders/myopathy				
Movement disorders				
Epilepsy				
Stroke				
Inner-ear deafness				
Visual impairment				
Type II diabetes				
Other				

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Medical History of Patient

Pregnancy clinical history

1. Pregnancy history	Abnormal	❑ No	❑ Yes (please answer following questions)
	Bleedings	❑ No	❑ Yes
	Infection	❑ No	❑ Yes; details: _____
	Medication	❑ No	❑ Yes; details: _____
	Preterm birth	❑ No	❑ Yes; gestation week? _____
	Hypoxia	❑ No	❑ Yes; pH umbilical cord? _____

2. Birth data Size: _____ Weight: _____ Head circumference: _____

Noticeable problems: _____

3. Worsening of symptoms during infection ❑ No ❑ Yes; please describe? _____

4. Disease progression Age of onset: _____ Progressive course: ❑ No ❑ Yes

Symptoms

	Yes	No
1. Neurologic		
Psychomotor delay	❑	❑
Regression	❑	❑
Muscular hypotonia	❑	❑
Acute encephalopathy	❑	❑
Epilepsy	❑	❑
Stroke-like episodes	❑	❑
Peripheral neuropathy	❑	❑
Ataxia	❑	❑
Movement disorder (e.g. dystonia):		
2. Muscle		
Muscle weakness	❑	❑
Exercise intolerance	❑	❑
Severe myopathy	❑	❑
Rhabdomyolysis	❑	❑
3. Heart		
Hypertrophic cardiomyopathy	❑	❑
Dilated cardiomyopathy	❑	❑
4. Eyes/Retina		
Optic atrophy	❑	❑
Ophthalmoplegia/CPEO	❑	❑
Ptosis	❑	❑
Other:		

	Yes	No
5. Ears		
Sensorineural hearing loss/deafness	❑	❑
6. Gastro-intestinal system		
Dysphagia	❑	❑
Pseudoobstruction	❑	❑
Cyclic vomiting	❑	❑
Chronic recurring diarrhea	❑	❑
7. Liver		
Acute liver failure	❑	❑
Chronic liver failure	❑	❑
8. Kidney		
Tubular dysfunction	❑	❑
Tubulointerstitial nephritis	❑	❑
Glomerular involvement	❑	❑
Cystic renal disease	❑	❑
9. Endocrine system		
Diabetes (type 2)/pancreatic insufficiency	❑	❑
Short Stature	❑	❑
Other:		
10. Blood		
Sideroblastic anemia	❑	❑
Other:		

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Medical History of Patient

Tests previously performed (please attach copies)

Genetic tests
- ❑ Not performed
- ❑ Array-CGH
- ❑ Sequencing of following genes: _____
- ❑ Other (e.g. MLPA): _____

MRI
- ❑ Not performed
- ❑ Yes **(please attach copy of results if patient agrees)**

Remarks: _____

Lab test – body fluids	❑ Not performed	Normal	Abnormalities detected (Please clarify or attach test results)
Blood lactate			
CSF lactate			
Creatine kinase			
Organic acids			
Other			

Tissue biopsies	❑ Not performed	Normal	Abnormalities detected (Please clarify, e.g. ragged red fibers)

Enzyme activity assays	❑ Not performed	Normal	Abnormalities detected (Please clarify or attach test results)

Findings from other tests (e.g. histology)

_____

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Inquiry

Array-CGH

- ❑ Please perform Array-CGH before Panel Diagnostics
  (Please attach a separate laboratory order)
- ❑ Array-CGH analysis already performed
- ❑ Array-CGH analysis not required

MET: Metabolic Diseases

All genes listed on this order form, and the entire mitochondrial genome, are sequenced in parallel. This allows you to select multiple gene sets, or choose individual genes in addition to your selected gene set. As there is no additional laboratory expenditure, there is only a moderate price increase due to the subsequent analysis and interpretation. We are happy to answer your questions or send you an individual quote. Please contact us at info@cegat.com.

- ❑ **CDG Syndrome (61 Genes, MET-01)**
  ALG1, ALG11, ALG12, ALG13, ALG14, ALG2, ALG3, ALG6, ALG8, ALG9, ATP6AP1, ATP6AP2, B4GALT1, CCDC115, COG1, COG2, COG4, COG5, COG6, COG7, COG8, DDOST, DHDDS, DOLK, DPAGT1, DPM1, DPM2, DPM3, EDEM3, FCSK, FUT8, GALNT2, GFUS, GMPPA, MAGT1, MAN1B1, MAN2B2, MGAT2, MOGS, MPDU1, MPI, NGLY1, NUS1, OSTC, PGM1, PMM2, RFT1, SLC35A1, SLC35A2, SLC35A3, SLC35C1, SLC37A4, SLC39A8, SRD5A3, SSR3, SSR4, STT3A, STT3B, TMEM165, TMEM199, TUSC3

- ❑ **Lysosomal Storage Disorders (58 Genes, MET-02)**
  AGA, ARSA, ARSB, ARSG, ASAH1, ATP13A2, CLN3, CLN5, CLN6, CLN8, CTNS, CTSA, CTSD, CTSF, CTSK, DNAJC5, DYM, FIG4, FUCA1, GAA, GALC, GALNS, GBA, GLA, GLB1, GM2A, GNE, GNPTAB, GNPTG, GNS, GUSB, HEXA, HEXB, HGSNAT, HYAL1, IDS, IDUA, LAMP2, LIPA, MAN1B1, MAN2B1, MANBA, MCOLN1, MFSD8, NAGA, NAGLU, NEU1, NPC1, NPC2, PPT1, PSAP, SGSH, SLC17A5, SMPD1, SUMF1, TPP1, VPS16, VPS33A

  A dedicated gene set for „Neuronal ceroid lipofuscinosis“ can be found in the order form „Epilepsy & Brain Development Disorders“

- ❑ **Peroxisome Biogenesis Disorders: Zellweger Spectrum Disorder (14 Genes, MET-03)**
  PEX1, PEX10, PEX11B, PEX12, PEX13, PEX14, PEX16, PEX19, PEX2, PEX26, PEX3, PEX5, PEX6, PEX7

- ❑ **Further Peroxisomal Disorders (22 Genes, MET-19)**
  ABCD1, ACBD5, ACOX1, AGK, AGPS, AGXT, AMACR, ARSL, CAT, DNM1L, EBP, FAR1, GNPAT, GRHPR, HOGA1, HSD17B4, NSDHL, PEX5, PEX7, PHYH, SCP2, TRIM37

- ❑ **Urea Cycle Disorders/Hyperammonemias (10 Genes, MET-05)**
  ARG1, ASL, ASS1, CA5A, CPS1, GLUD1, NAGS, OTC, SLC25A13, SLC25A15

- ❑ **Glycine Encephalopathy/Hyperglycinemia (7 Genes, MET-06)**
  AMT, BOLA3, GCSH, GLDC, GLRX5, LIAS, SLC6A9

- ❑ **Cerebral Creatine Deficiency (3 Genes, MET-04)**
  GAMT, GATM, SLC6A8

- ❑ **Maple Syrup Urine Disease (3 Genes, MET-08)**
  BCKDHA, BCKDHB, DBT

- ❑ **Disorders of Intracellular Cobalamin Metabolism (17 Genes, MET-20)**
  ABCD4, AMN, CBLIF, CD320, CUBN, HCFC1, LMBRD1, MMAA, MMAB, MMACHC, MMADHC, MTR, MTRR, PRDX1, TCN2, THAP11, ZNF143

- ❑ **Isolated Methylmalonic Acidemia (5 Genes, MET-10)**
  MCEE, MMAA, MMAB, MMADHC, MMUT

- ❑ **Congenital Hyperinsulinism (15 Genes, MET-12)**
  ABCC8, AKT2, FOXA2, GCK, GLUD1, GPC3, HADH, HNF1A, HNF4A, INSR, KCNJ11, KDM6A, KMT2A, PMM2, SLC16A1

- ❑ **Maturity-onset Diabetes of the Young (MODY) (13 Genes, MET-13)**
  APPL1, BLK, CEL, GCK, HNF1A, HNF1B, HNF4A, INS, KCNJ11, KLF11, NEUROD1, PAX4, PDX1

- ❑ **Glycogen Storage Disease (25 Genes, MET-14)**
  AGL, ALDOA, ALDOB, ENO3, FBP1, G6PC1, GAA, GBE1, GYG1, GYS1, GYS2, LAMP2, LDHA, PFKM, PGAM2, PGM1, PHKA1, PHKA2, PHKB, PHKG2, PRKAG2, PYGL, PYGM, SLC2A2, SLC37A4

- ❑ **Molybdenum Cofactor Deficiency (4 Genes, MET-16)**
  GPHN, MOCOS, MOCS1, MOCS2

- ❑ **Cerebral Folate Deficiency (4 Genes, MET-17)**
  DHFR, FOLR1, MTHFR, SLC46A1

- ❑ **Porphyria (9 Genes, MET-18)**
  ALAD, ALAS2, CPOX, FECH, HFE, HMBS, PPOX, UROD, UROS

MIT: Mitochondriopathies

- ❑ **Mitochondrial Genome (mtDNA) (37 Genes, MIT-01)**
  MT-ATP6, MT-ATP8, MT-CO1, MT-CO2, MT-CO3, MT-CYB, MT-ND1, MT-ND2, MT-ND3, MT-ND4, MT-ND4L, MT-ND5, MT-ND6, MT-RNR1, MT-RNR2, MT-TA, MT-TC, MT-TD, MT-TE, MT-TF, MT-TG, MT-TH, MT-TI, MT-TK, MT-TL1, MT-TL2, MT-TM, MT-TN, MT-TP, MT-TQ, MT-TR, MT-TS1, MT-TS2, MT-TT, MT-TV, MT-TW, MT-TY

- ❑ **Metabolic Myopathies (48 Genes, NMD08)**
  ABHD5, ACAD9, ACADL, ACADM, ACADS, ACADVL, AGL, ALDOA, AMPD1, CPT2, ENO3, ETFA, ETFB, ETFDH, FLAD1, G6PC, GAA, GBE1, GYG1, GYS1, HADH, HADHA, HADHB, ISCU, LAMP2, LDHA, LPIN1, NPL, PDHA1, PFKM, PGAM2, PGK1, PGM1, PHKA1, PHKB, PHKG2, PNPLA2, POLG2, PRKAG2, PUS1, PYGM, RBCK1, RRM2B, SLC16A1, SLC22A5, SLC25A20, TAZ, YARS2

- ❑ **Progressive External Ophthalmoplegia (PEO) (13 Genes, MIT-09)**
  DGUOK, DNA2, MGME1, OPA1, POLG, POLG2, RNASEH1, RRM2B, SLC25A4, TK2, TOP3A, TWNK, TYMP

- ❑ **Pyruvate Dehydrogenase Deficiency (24 Genes, MIT-05)**
  BOLA3, DLAT, DLD, ECHS1, FBXL4, GLRX5, HIBCH, IBA57, ISCA1, ISCA2, LIAS, LIPT1, LIPT2, LONP1, NFU1, PDHA1, PDHB, PDHX, PDP1, SLC19A2, SLC19A3, SLC25A19, SLC25A26, TPK1

- ❑ **Primary Coenzyme Q10 Deficiency (10 Genes, MIT-08)**
  COQ2, COQ4, COQ5, COQ6, COQ7, COQ8A, COQ8B, COQ9, PDSS1, PDSS2

- ❑ **Nuclear-encoded Mitochondrial Disorders (258 Genes, MIT-02)**
  AARS2, ABCB7, ACAD9, ACO2, AFG3L2, AGK, AIFM1, ANO10, APTX, ATAD3A, ATP5F1A, ATP5F1D, ATP5F1E, ATP5MK, ATPAF2, BCS1L, BOLA3, BTD, C1QBP, C2orf69, CA5A, CARS2, CLPB, CLPP, COA3, COA5, COA6, COA7, COA8, COQ2, COQ4, COQ5, COQ6, COQ7, COQ8A, COQ8B, COQ9, COX10, COX14, COX15, COX16, COX20, COX4I1, COX5A, COX6A1, COX6A2, COX6B1, COX7B, COX8A, CYC1, DARS2, DGUOK, DLAT, DLD, DNA2, DNAJC19, DNAJC30, DNM1L, EARS2, ECHS1, ELAC2, ETFDH, ETHE1, FARS2, FASTKD2, FBXL4, FDX2, FDXR, FH, FLAD1, FOXRED1, GARS1, GATB, GATC, GFER, GFM1, GFM2, GLRX5, GTPBP3, HARS2, HCCS, HIBCH, HLCS, HSD17B10, HSPD1, HTRA2, IARS2, IBA57, ISCA1, ISCA2, ISCU, KARS1, KIF5A, LARS2, LIAS, LIPT1, LIPT2, LONP1, LRPPRC, LYRM4, LYRM7, MARS2, MDH2, MECR, MFF, MGME1, MICOS13, MICU1, MIEF2, MIPEP, MPC1, MPV17, MRM2, MRPL12, MRPL3, MRPL44, MRPS14, MRPS16, MRPS2, MRPS22, MRPS23, MRPS25, MRPS28, MRPS34, MRPS7, MSTO1, MTFMT, MTO1, MTRFR, NADK2, NARS2, NAXD, NAXE, NDUFA1, NDUFA10, NDUFA11, NDUFA12, NDUFA13, NDUFA2, NDUFA4, NDUFA6, NDUFA8, NDUFA9, NDUFAF1, NDUFAF2, NDUFAF3, NDUFAF4, NDUFAF5, NDUFAF6, NDUFAF8, NDUFB10, NDUFB11, NDUFB3, NDUFB8, NDUFB9, NDUFC2, NDUFS1, NDUFS2, NDUFS3, NDUFS4, NDUFS6, NDUFS7, NDUFS8, NDUFV1, NDUFV2, NFS1, NFU1, NSUN3, NUBPL, OPA1, OPA3, PARS2, PC, PDHA1, PDHB, PDHX, PDP1, PDSS1, PDSS2, PET100, PET117, PMPCA, PMPCB, PNPLA8, PNPT1, POLG, POLG2, PPA2, PTCD3, PUS1, QRSL1, RARS2, RMND1, RNASEH1, RRM2B, RTN4IP1, SARS2, SCO1, SCO2, SDHA, SDHAF1, SDHB, SDHD, SERAC1, SFXN4, SLC19A2, SLC19A3, SLC25A1, SLC25A10, SLC25A12, SLC25A19, SLC25A21, SLC25A22, SLC25A26, SLC25A3, SLC25A38, SLC25A4, SLC25A42, SLC25A46, SPATA5, SPG7, SSBP1, SUCLA2, SUCLG1, SURF1, TACO1, TAFAZZIN, TARS2, TFAM, TIMM22, TIMM50, TIMM8A, TIMMDC1, TK2, TMEM126B, TMEM70, TOP3A, TPK1, TRIT1, TRMT10C, TRMT5, TRMU, TRNT1, TSFM, TTC19, TUFM, TWNK, TXN2, TYMP, UQCC2, UQCC3, UQCRB, UQCRC2, UQCRFS1, UQCRQ, VARS2, WARS2, YARS2

Order Form
Metabolic / Mitochondrial Disorders

Inquiry

Not all metabolic disorders can be depicted in this order form. Individual requests are welcome, e.g. referring to IEMbase (Inborn Errors of Metabolism Knowledgebase, http://iembase.org/). You can also point out specific aspects to focus on if a large gene set is chosen (e.g. “complex III deficiency“ for nuclear-encoded mitochondriopathy). Still all genes will be analyzed, yet it may improve the interpretation of results.

Additional analyses (additional fees may apply)

❑ **HLA-Typing (HLA01)**
I would like to receive an additional report stating the HLA alleles (HLA class I (Gene A, B, C) and HLA class II (Gene DPA1, DPB1, DQA1, DQB1, DRB1, DRB3, DRB4, DRB5)).

❑ **ACMG genes diagnostics**
I would like to be informed of relevant alterations within the list of recommended genes for secondary analysis, according to the current guidelines of the American College of Medical Genetics and Genomics. The analysis is restricted to the sequence data, re-sequencing of regions with poor sequence coverage will not typically be performed. A negative “ACMG genes” report cannot be used to rule out (genetic) disease risk. Additional fees may apply. According to German legislation, predictive tests for minors may not be performed for diseases which have an onset in adulthood. Therefore, some genes will not be analyzed for minors, unless the phenotypic spectrum is within the scope of the primary medical indication of the patient.
Details on genes and associated diseases can be found at https://www.cegat.com/acmg-genes/

❑ **Pharmacogenetics (PGX) (22 genes)**
ABCG2, CACNA1S, CYP2B6, CYP2C19, CYP2C9, CYP2D6, CYP3A4, CYP3A5, CYP4F2, DPYD, G6PD, HLA-A, HLA-B, IFNL3, MT-RNR1, NUDT15, POR, RYR1, SLCO1B1, TPMT, UGT1A1, VKORC1

I would like to receive an additional report analyzing known variants in 22 genes that are involved in the metabolism of pharmaceutical products.

❑ _____

For further information and advice please do not hesitate to contact our Diagnostic Support team.

www.cegat.com/diagnostic-support · diagnostic-support@cegat.de · Phone +49 7071 565 44-55